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Published in:
Journal of Individual Differences

DOI:
[10.1027/1614-0001/a000306](https://doi.org/10.1027/1614-0001/a000306)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2020

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):
Barelds, D. P. H., Dijkstra, P., & van Brummen-Girigori, O. (2020). A Cock in the Henhouse: Relations Between Dark Triad, Jealousy, and Sex Ratio. *Journal of Individual Differences*, 41(2), 78-85.
<https://doi.org/10.1027/1614-0001/a000306>

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A Cock in the Henhouse

Relations Between Dark Triad, Jealousy, and Sex Ratio

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Abstract: The present study's primary aim was to examine the effect of an imbalanced sex ratio on the Dark Triad traits, three types of jealousy, and their relations. For this purpose, data were collected in the Netherlands ($n = 297$) and Curaçao ($n = 199$). Curaçao is a constituent part of the Netherlands, but has, contrary to the Netherlands, a highly imbalanced sex ratio. We expected the Dark Triad traits to be positively related to anxious and preventive jealousy, but not to reactive jealousy (Hypothesis 1), and, in addition, these relations to be more pronounced in Curaçao than in the Netherlands (Hypothesis 2). Furthermore, it was expected that Curaçaoan men would score higher on the Dark Triad traits than Dutch men (Hypothesis 3), and that Curaçaoan men and women would, overall, report higher levels of jealousy than Dutch men and women (Hypothesis 4). Results largely supported Hypotheses 1, 2, and 4, but not Hypothesis 3. Results are discussed in relation to the role of sex ratio and the cultural beliefs that may accompany it. The current study's findings may provide new insights into the role of the Dark Triad traits in mating psychology.

Keywords: mating, personality, The Netherlands, Curaçao

Several studies have shown the Dark Triad traits – a cluster of three personality traits: narcissism, psychopathy, and Machiavellianism – to be related to different aspects of individuals' mating behavior. Studies have, for instance, shown that individuals high in one or more of the three Dark Triad traits are rated as more attractive than individuals low in these traits, especially in the context of short-term mating (e.g., Carter, Campbell, & Muncer, 2014). An explanation for this finding is that the Dark Triad traits facilitate short-term mating because of the risk taking and self-confidence that is involved in the case of short-term mating. In general, men score higher on the Dark Triad traits and to be more likely than women to pursue a short-term mating strategy (e.g., Jonason, Valentine, Li, & Harbeson, 2011). The Dark Triad traits also have been found to be associated with the way individuals respond to relationship threats (e.g., Jonason, Li, & Buss, 2010). Some authors (Brewer, Hunt, James, & Abell, 2015) have, for instance, found that women with higher psychopathy scores had stronger intentions to take revenge by shouting and spreading rumors in response to a hypothetical scenario describing a partner's infidelity.

Recently, three studies also examined the relations between the Dark Triad traits and the most common response to a relationship threat, that is jealousy. Jealousy can be defined as a response to a threat to or the actual loss of a romantic relationship, as a result of an actual or

imagined rival for one's partner's attention (e.g., Dijkstra & Buunk, 1998). Relatedly, jealousy may be strengthened by the loss of self-esteem that may accompany the (potential) loss of a partner (DeSteno, Valdesolo, & Bartlett, 2006). In a study on the relationship between jealousy and psychopathy among students from the Netherlands and Germany it was found that secondary psychopathy predicted the experience of jealousy (Massar, Winters, Lenz, & Jonason, 2016). A second study (Barelds, Dijkstra, Groothof, & Pastoor, 2017) examined the relations between three types of jealousy and all three Dark Triad traits among heterosexuals and homosexuals in the Netherlands. This study found the Dark Triad traits to be related to anxious and preventive jealousy. Finally, several relations have been found in one study (Chin, Atkinson, Raheb, Harris, & Vernon, 2017) between the Dark Triad traits and emotional, cognitive, and behavioural jealousy (cf. Pfeiffer & Wong, 1989). The present study set out to extend this latter study by using a different, more recent typology of jealousy, and, more importantly, to examine the extent to which an imbalanced sex ratio affects the expression of the Dark Triad, the experience of jealousy, and their relations.

Dark Triad and Types of Jealousy

In line with Barelds et al. (2017), the present study distinguished between three qualitatively different types of

jealousy, based on the work of Buunk (1997), that is reactive, anxious, and preventive jealousy. Reactive jealousy refers to the degree of upset that individuals experience when their mate is actually being emotionally or sexually unfaithful, for instance, when one's partner is having sex with someone else. Individuals may, however, also experience preventive jealousy. Preventive jealousy refers to an individuals' inclination to prevent contact of their partner with a third person. For example, preventively jealous individuals may find it unacceptable that their mate has opposite-sex friends, and, find it difficult to give their partner space in the relationship. Preventive jealousy may be seen as the psychological antecedent of mate-retention behaviors, such as monitoring a partner's behaviour or aggression toward the partner or a potential rival. Finally, anxious jealousy refers to a process in which an individual ruminates about the possibility of a mate's infidelity, and experiences feelings of anxiety, suspicion, worry, distrust, and upset.

In contrast to the typology used by Chin et al. (2017; Pfeiffer & Wong, 1989), the typology of Buunk (1997) is based on the assumption that these three different types of jealousy differ in the extent to which they are potentially problematic or "unhealthy" (see also Barelds & Dijkstra, 2006). Because reactive jealousy constitutes a direct response to an actual relationship threat (i.e., one's partner is, for instance, kissing or having sex with someone else), reactive jealousy can be considered a relatively "healthy" response. Responding with jealousy when one's partner has been unfaithful may even be considered a sign of love and commitment (see also Barelds & Dijkstra, 2007). In contrast, both preventive and anxious jealousy may become problematic or "unhealthy" in nature. The most important reason is that preventive and anxious jealousy may be triggered in response to an imagined rather than a real rival, and may therefore become illusory in nature (Barelds & Dijkstra, 2006, 2007; Buunk, 1997). In that case, jealousy is no longer evoked only by actual indications of infidelity, but also by illusory ones. Illustrative is the fact that in the experience of jealousy feelings and preferences of the self are often projected on the partner (e.g., Ellis, 1996), causing individuals to think their partner is or wants to be unfaithful, even if this is not the case at all.

According to Barelds et al. (2017), because of their relatively strong tendency toward short-term mating, individuals high in the Dark Triad traits are relatively likely to believe their partner is also interested in extra-dyadic sex, and report stronger feelings of anxious and preventive jealousy as a consequence. This line of reasoning is supported by a study by Neel, Kenrick, White, and Neuberg (2016), who found a positive relationship between the tendency toward short-term mating and break-up concerns. More importantly, in line with their expectations, Barelds et al. (2017) found positive relationships between the Dark

Triad traits on the one hand, and anxious and preventive jealousy on the other hand, but not between the Dark Triad traits and reactive jealousy. In the current study, we therefore also expected anxious and preventive jealousy – but not reactive jealousy – to be related to the three Dark Triad traits (Hypothesis 1). We would like to argue, however, that the strength of these relationships might differ as a result of sex ratio.

Sex Ratio, Dark Triad, and Jealousy

Studies on the Dark Triad traits and their role in mating behaviour have been conducted in several (mostly Western) countries, such as Canada, Japan, Austria, Germany, the United Kingdom, Finland, and the US. Most of these countries have a relatively balanced sex ratio (the number of males for each 100 females in a population), that is an approximately equal number of men and women, with sex ratios ranging between 95 (Japan) and 106 (China; United Nations, 2015). In imbalanced sex ratio societies, the sex that is in the majority lowers its standards to facilitate acquisition of a partner of the sex that is in the minority (Moss & Maner, 2016). Relative scarcity of one of the sexes also impacts the way individuals respond to threats to their relationship, with mate scarcity resulting in intensified intrasexual competition and jealousy on the part of the most prevalent sex (Arnocky, Ribout, Mrza, & Knack, 2014). On the basis of this theorizing one may expect to find differences in jealousy, the Dark Triad traits and their relationship between regions characterized by different sex ratios. To examine this, the present study was conducted in two regions differing vastly in terms of sex ratio, that is, the Netherlands and Curaçao. The Netherlands is a small and densely populated country in western Europe. Curaçao, on the other hand, is a small Caribbean island with about 140,000 inhabitants. It is a former Dutch colony and still a constituent part of the Kingdom of the Netherlands. The Netherlands and Curaçao differ greatly with regard to their sex ratio. In the Netherlands, the sex ratio is rather balanced (99; United Nations, 2015), whereas Curaçao has one of the worlds' lowest sex ratios (86; indicating that for every 100 women there are just 86 men; United Nations, 2015). The phenomenon that the most prevalent sex will adapt their standards in favor of the other sexes' mating strategy is highly visible in Curaçao. For instance, on Curaçao it is relatively common for men to have children with multiple female partners, without taking the (financial) responsibility to take care of these children (e.g., Stutterheim, Bertens, Mevissen, & Schaalma, 2013).

On the basis of these differences in sex ratio, several predictions can be formulated about differences between Curaçao and the Netherlands in the Dark Triad traits,

jealousy, and their relationships. First, we expected the relationship between the three types of jealousy and the Dark Triad traits, as formulated earlier, to be more apparent in Curaçao than in the Netherlands (Hypothesis 2). Under conditions of increased risk of partner infidelity, the Dark Triad traits may help reduce this risk because they may facilitate behavior directed at defeating rivals, and guarding mates to prevent them from becoming unfaithful. This can, however, only happen if the Dark Triad traits are related to an increased vigilance regarding partner infidelity, as expressed in, for instance, different types of jealousy. We also expected Curaçaoan men to report higher scores on the Dark Triad traits than Dutch men (Hypothesis 3). According to life history theory, individual difference variables, such as the Dark Triad traits, are partially shaped by social and environmental factors (e.g., Neel et al., 2016), such as sex ratio. Reasoning from this perspective, it can be argued that, relative to men in the Netherlands, the skewed sex ratio in Curaçao pushes men in Curaçao toward the evolvment of those traits that facilitate short-term mating, among which Dark Triad traits. Finally, we expected both men and women in Curaçao to report higher levels of jealousy (all three types) than men and women from the Netherlands (Hypothesis 4). Curaçaoan women can be expected to be more jealous than Dutch women because of the relative scarcity of men in Curaçao. Although one might argue that, due to their relative scarcity, men from Curaçao would experience *less* feelings of jealousy than men from the Netherlands, for several reasons, we expected men from Curaçao to be *more* jealous than Dutch men. Although the imbalanced sex ratio may push Curaçaoan men toward experiencing less jealousy, there is evidence that several other factors push them into the opposite direction, that is, toward experiencing more jealousy. One of these jealousy-enhancing factors lies in the double sexual standard for men and women in Curaçao. For instance, in the basis of an ethnographical study, it has been found that Curaçaoan men perceive it as a right to engage in multiple partnering, a right that women on the island is denied (Marcha & Verweel, 2005). In contrast to a male's infidelity, a female's infidelity therefore poses a much stronger norm transgression, that, as a consequence, may evoke relatively high levels of male jealousy.

Method

Participants and Procedure

Participants were undergraduates recruited at the University of Groningen in the Netherlands, and at the University

of Curaçao in Willemstad, the capital of the island of Curaçao. Participants were asked to participate in a study on relationships. The Dutch sample consisted of 313 Dutch native students. Of this sample, 16 participants indicated that they were homo- or bisexual. Compared to heterosexuals, homo-, and bisexuals tend to experience jealousy in a somewhat different way (e.g., Barelds & Dijkstra, 2006; Dijkstra et al., 2001), and it was therefore decided to remove these participants from the sample. Mean age of the remaining sample of 297 participants (63 men, 234 women) was 19.19 ($SD = 1.97$). At the time of research, 51.2% of the sample was not involved in a romantic relationship, whereas 48.8% was. More specifically, 1% were married, 4.7% cohabiting, and 43.1% dating but not married or cohabiting. Of 98% of these Dutch students, both parents were also born in the Netherlands, and 93% indicated being "white" (the other 7% "colored").

The Curaçaoan sample consisted of 212 students, of which 199 students (95 men, 104 women) indicated being heterosexual and were included in the current study's sample. Mean age was 24.26 ($SD = 4.34$). Curaçaoan students were, therefore, on average, 5 years older than the Dutch students, $F(1, 494) = 309.50, p < .001, \eta^2 = .39$. At the time of the research, 37.9% of the Curaçaoan sample were not involved in a romantic relationship, whereas 62.1% were. More specifically, 7.1% were married, 10.1% cohabiting, and 45.0% dating but not married or cohabiting. In the Curaçaoan sample, 12% indicated being "white" (88% "coloured" or "black"), and 96% indicated that they were born in either Curaçao or one of the neighbouring Caribbean countries and islands, that have a similar culture as Curaçao (e.g., Aruba, Bonaire, Saba).

Both groups of students participated in this study in return for research credits and participation was voluntary. This study was approved by the ethics committees of both universities. The Dutch sample completed an online questionnaire, whereas the participants from Curaçao were handed the questionnaires on paper by researchers from the University of Curaçao in a specially arranged classroom of the university building. To ensure that participants fully understood the questions, in Curaçao questionnaires were offered in both of the official languages of Curaçao, that is, Dutch and Papiamentu. A forward and backward translation was conducted from Dutch to Papiamentu by a professional translator, employed by the University of Curaçao, in collaboration with the third author of the present paper. The former translated the questionnaires into Papiamentu, and the latter translated these back into Dutch. Differences between the original and back-translation were discussed and agreements were made regarding the appropriate translations (e.g., Brislin, 1980).

Instruments

Dark Triad

The Dark Triad traits were assessed by means of the Dark Triad Dirty Dozen (DTDD; Jonason & Webster, 2010). This measure consists of 12 items that were assessed on 7-point Likert scales, ranging from 1 (= *disagree strongly*) to 7 (= *agree strongly*). The three Dark Triad traits were assessed by four items each. Example items are “I tend to expect special favors from others” (narcissism), “I tend to lack remorse” (psychopathy), and “I have used deceit or lied to have my way” (Machiavellianism). In the Dutch and Curaçaoan samples, respectively, Cronbach’s α were .78 and .83 (Machiavellianism), .66 and .65 (psychopathy), and .76 and .87 (narcissism). Several studies have found the Dark Triad Dirty Dozen to be a valid and reliable instrument for assessing Dark Triad traits (e.g., Jonason & McCain, 2012). More specifically, in the Netherlands, the instrument has been found to have adequate psychometric properties (e.g., Barelds, 2016; Wisse, Barelds, & Rietzschel, 2015).

Jealousy

Jealousy was measured by means of the Revised Anticipated Sexual Jealousy Scale (RASJS; Buunk, 1997), a scale consisting of 15 items; five items for each type of jealousy: reactive, anxious, and preventive. The items of the reactive jealousy scale asked participants how upset they would feel if their partner would engage in various extra-dyadic intimate and sexual behaviors, such as having sexual contact with someone else or flirting with someone else. These five items were assessed on 5-point scales, ranging from 1 (= *not at all upset*) to 5 (= *extremely upset*). Preventive jealousy was assessed by items such as “I don’t want my partner to meet too many people of the opposite sex.” For each item, the five possible answers ranged from 1 (= *not applicable*) to 5 (= *very much applicable*). Anxious jealousy was assessed by items such as “I am concerned about my partner finding someone else more attractive than me.” Items could be scored on 5-point scales, ranging from 1 (= *never*) to 5 (= *very often*). In the Dutch and Curaçaoan samples, respectively, Cronbach’s α s were .74 and .71 (reactive jealousy), .88 and .85 (anxious jealousy), and .85 and .87 (preventive jealousy).¹

Results

Correlations were computed separately for the two regions, and appeared to be in line with Hypothesis 1. In the Curaçaoan sample, the Dark Triad traits were related significantly to both anxious (r s from .19 to .38, p s < .01) and preventive jealousy (r s from .21 to .43, p s < .01), but not to reactive jealousy (r s from $-.04$ to .09, p s > .05). In the Dutch sample, mostly weak correlations were found between the Dark Triad traits and the three types of jealousy. Most notable in the Dutch sample were the significant relationships between preventive jealousy and Machiavellianism ($r = .20$, $p < .01$), and narcissism ($r = .25$, $p < .01$).²

To examine the moderating role of region in the relationships between the Dark Triad traits and the three types of jealousy (Hypothesis 2), moderation analyses were first conducted. For each type of jealousy, a regression analysis was conducted, using the Dark Triad traits, Region and their interaction effects (computed after centering the variables; dummy coding was used for Region) as predictors. Age was used as a control variable. Contrary to Hypothesis 2, no significant Dark Triad \times Region effects were found ($|\beta|$ s < .08, p s > .17). Thus, although there are, on first sight, stronger relationships between the Dark Triad traits and jealousy in the Curaçaoan sample (see Table 1), we could not conclude from these analyses that these relationships as a whole were significantly different between the two samples. When differences between correlations were examined pairwise however (tests for independent correlations), five significantly different pairs of correlations were found: The relations between anxious jealousy and the three Dark Triad traits were all stronger in the Curaçaoan sample than in the Dutch sample (z s > 2.19, p s < .05), as well as the relations between preventive jealousy and Machiavellianism and Narcissism (z s > 1.76, p s < .05). This means that Hypothesis 2 was partially supported.

To test Hypothesis 3, means were first calculated for the three Dark Triad traits as a function of Region and Sex (see Table 2), showing that, contrary to expectations, Curaçaoan men did not score higher than Dutch men on the Dark Triad traits. In fact, Dutch men scored slightly higher on Machiavellianism than men from Curaçao, although this difference was not significant: univariate $F(1, 157) = 2.90$,

¹ Invariance of the factors in both instruments across the two samples was examined by extracting three factors for both instruments in both samples individually. Similarities between the factors were then examined by calculating Tucker’s ϕ coefficient (Tucker, 1951) between corresponding factors after Procrustes rotation (Kiers & Groenen, 1996). For the DTDD the values were $\phi = .92$ for Psychopathy, $\phi = .93$ for Narcissism, and $\phi = .92$ for Machiavellianism. For the RASJS the values were $\phi = .97$ for Preventive, $\phi = .95$ for Anxious, and $\phi = .95$ for Reactive jealousy. Values in the range .85–.94 have been proposed to be indicative of a fair similarity, while a value higher than .95 means that factors can be considered equal (Lorenzo-Seva & ten Berge, 2006). Other authors adopt a threshold of .85 (Haven & ten Berge, 1977) or .90 (Van de Vijver & Leung, 1997) as a threshold value for congruence. For the DTDD all values are .92 or higher, and for the RASJS all values are .95 or higher, which supports the invariance of these instruments’ factors in the two samples.

² Because of the mean age difference between the two samples, we also computed partial correlations (controlled for age). These were highly similar compared to those reported here, with absolute differences in correlations all being equal to or smaller than .02.

Table 1. Correlations between the study's variables separately for the two regions

	Reactive jealousy	Anxious jealousy	Preventive jealousy	Machiavellianism	Psychopathy	Narcissism
Reactive jealousy	1	.30**	.24**	.09	-.04	.02
Anxious jealousy	.34**	1	.59**	.32**	.19**	.38**
Preventive jealousy	.56**	.51**	1	.35**	.21**	.43**
Machiavellianism	.01	.09	.20**	1	.43**	.53**
Psychopathy	-.14*	-.01	.10	.43**	1	.37**
Narcissism	.04	.10	.25**	.38**	.25**	1

Note. Correlations above the diagonal refer to the Curaçaoan sample, correlations below the diagonal refer to the Dutch sample. * $p < .05$, ** $p < .01$.

Table 2. Means of Dark Triad traits and the three types of jealousy by sex and region and effect sizes

	Men				Women				Effect size		
	The Netherlands		Curaçao		The Netherlands		Curaçao		Sex (S)	Region (R)	S × R
	M	SD	M	SD	M	SD	M	SD	η_p^2	η_p^2	η_p^2
Reactive jealousy	17.46 _a	3.71	21.61 _b	3.08	19.34 _c	3.27	21.58 _b	3.21	0.02	0.16	0.02
Anxious jealousy	10.57 _a	4.27	13.83 _b	4.71	11.60 _a	4.24	13.63 _b	4.87	0.00	0.07	0.00
Preventive jealousy	9.32 _a	3.43	12.45 _b	5.14	10.21 _{ac}	4.38	11.18 _{bc}	4.14	0.00	0.04	0.01
Machiavellianism	15.00 _a	5.15	13.53 _{ab}	5.48	11.25 _c	4.16	11.94 _{bc}	5.21	0.06	0.00	0.01
Psychopathy	13.30 _a	4.53	12.77 _a	4.66	10.59 _b	4.13	9.83 _b	3.73	0.08	0.01	0.00
Narcissism	16.71 _a	3.61	15.58 _{ab}	5.65	15.49 _{ab}	4.05	14.16 _b	6.08	0.02	0.01	0.00

Note. Means with different subscripts within rows differ significantly ($p < .01$).

$p = .09$. The two groups of men did also not differ significantly in their levels of narcissism and psychopathy, univariate $F_s(1, 157) < 1.83$, $p_s > .17$.

To test Hypothesis 4, multivariate analyses of variances were conducted using sex and region as independent variables, and the three types of jealousy as the dependent variables. Mean scores by sex and region are listed in Table 2. These analyses yielded a multivariate main effect of Sex, Wilk's $\lambda = .88$, $F(6, 491) = 10.62$, $p < .001$, $\eta_p^2 = .12$, and Region, Wilk's $\lambda = .80$, $F(6, 491) = 19.61$, $p < .001$, $\eta_p^2 = .20$, as well as a significant multivariate interaction effect between Sex and Region, Wilk's $\lambda = .96$, $F(6, 491) = 3.56$, $p < .01$, $\eta_p^2 = .04$. The multivariate main effect of Sex could be attributed to significant univariate effects for reactive jealousy and the three Dark Triad traits. Women reported more reactive jealousy than men, whereas men reported higher scores on all three Dark Triad traits than women [see Table 2 for means; Machiavellianism: $F(1, 491) = 30.49$, $p < .001$, $\eta_p^2 = .06$; psychopathy: $F(1, 491) = 44.30$, $p < .001$, $\eta_p^2 = .08$; narcissism: $F(1, 491) = 7.43$, $p < .01$, $\eta_p^2 = .02$]. The multivariate main effect of Region could be attributed to significant univariate effects for all three types of jealousy. In support of Hypothesis 4, individuals from Curaçao scored higher on all three types of

jealousy than individuals from the Netherlands [see Table 2 for means; reactive jealousy: $F(1, 491) = 93.42$, $p < .001$, $\eta_p^2 = .16$; anxious jealousy: $F(1, 491) = 34.30$, $p < .001$, $\eta_p^2 = .07$; preventive jealousy: $F(1, 491) = 21.62$, $p < .001$, $\eta_p^2 = .04$]. Finally, the multivariate interaction effect between Sex and Region could only be attributed to a significant univariate effect for reactive jealousy, $F(1, 491) = 8.37$, $p < .01$, showing that Dutch men scored relatively low on reactive jealousy (see Table 2).³

Discussion

The primary goal of the present research was to examine the extent to which sex ratio affects the Dark Triad, three types of jealousy, and their relationships. To examine this, two regions differing in sex ratio were compared: the Netherlands and Curaçao (which is a constituent part of the Netherlands). First, as expected, and in line with Barelds et al. (2017), the Dark Triad traits were related positively to preventive and anxious jealousy, but not to reactive jealousy. In addition, and partly in line with our prediction, in the Curaçaoan sample some of these relationships were

³ In examining Hypotheses 3 and 4, we examined whether age differences between the samples could affect the results. This was not the case. Age did not have a significant main effect or interaction effect, and was therefore dropped from the analyses.

found to be stronger than in the Dutch sample, particularly the relationships between the Dark Triad traits and anxious jealousy.

Most notable was that, across samples, the Dark Triad traits were associated relatively consistently with preventive jealousy. A possible explanation is that possessiveness is a central feature of preventive jealousy (e.g., Barelds & Dijkstra, 2007). In extreme forms, preventive jealousy may lead to aggressive behaviours, unwanted pursuit, and stalking, behaviours that have been found to be related to one or more Dark Triad traits (e.g., Jones & Neria, 2015). When comparing our study's results to those of Chin et al. (2017), the difference especially lies in the relationships between reactive jealousy and the Dark Triad traits. Whereas Chin et al. report that "most types of jealousy are positively correlated with the Dark Triad" (p. 28), the present study shows that, in both samples, as expected, reactive jealousy is not significantly or negatively related to the Dark Triad traits.

In addition, and as expected, men and women from Curaçao were found to be more jealous (all three types) than their Dutch counterparts. For women, these results can be attributed to the higher scarcity of men in Curaçao. In general, the scarcity of men in a given society enhances relationship instability and break-up, making women feel more insecure about their relationship, and thus, to more easily experience jealousy. As expected, despite the imbalanced sex ratio, Curaçaoan men also reported more jealousy than Dutch men. The higher jealousy of men in Curaçao may not only be attributed to differences in sexual standards with regard to multiple partnering and infidelity, but also to cultural standards regarding masculinity. In general, the identity of Curaçaoan men is relatively heavily based on ideas of masculinity. Men from Curaçao see themselves as tough, powerful and important, while showing difficulty expressing emotions (e.g., Hegamin-Younger, Jermiah, & Bilbro, 2014). In general, as men report higher levels of masculinity, they perceive a partner's infidelity as a stronger threat to their self-image and, as a result, men usually experience more jealousy and tend to express their jealousy in a more antisocial way (e.g., Aylor & Dainton, 2001).

Finally, we did not find men from Curaçao to score higher on the Dark Triad traits than men from the Netherlands. A possible explanation is that, whereas the imbalanced sex ratio may promote the evolvment of the Dark Triad traits, other factors may discourage it. One such factor may be the strong cultural masculinity scripts that are embraced in Curaçaoan society, and that prescribe how a successful man is supposed to behave. These scripts often make men relatively fragile and in need of constant confirmation and protection, not only in the domain of sex but also in domains such as housekeeping (Izugarra

& Undie, 2008). These scripts also prevent men from seeking help, especially from same-sex friends and professionals (e.g., Mahalik, Good, & Englar-Carlson, 2003). Despite their short-term mating preferences, this may make men relatively dependent on women's approval and care, not only in the relationship with sex partners, but also in relationships with female family members, such as their mother, aunts, or grandmother. The necessity to maintain positive and enduring relationships with women may constitute a factor that discourages the evolvment of the Dark Triad traits, that, in general, undermine the quality of (enduring) relationships.

It must be noted that the present study assumed differences in sex ratio between the Netherlands and Curaçao to cause differences in jealousy, the Dark Triad traits, and their relationships. However, it might be argued that any differences in this regard between the two regions under investigation may also be attributed to cultural or social-environmental differences between these regions. It seems most likely that both explanations – differences in sex ratio and differences in socio-cultural beliefs – are valid because sex ratio and cultural beliefs are often intertwined in a complex way. According to Gangestad, Haselton, and Buss (2006), differences in sex ratios can make some behaviors and beliefs more effective in some places than in others, thereby contributing to the variation in human culture, not only in the domain of family and mating (see also Pedersen, 1991), but also, for example in the economic domain. Griskevicius et al. (2012), for instance, found that, as there were more men in a given society than women, individuals tended to spend more money, were willing to incur more financial debt and saved less for the future.

Strengths and Limitations

The few studies on the Dark Triad traits and jealousy have been conducted in Western societies, and, as a consequence, only reflect responses and patterns of behavior shaped by Western social and environmental conditions. Moreover, the effect of an imbalanced sex ratio on the Dark Triad, jealousy, and their relationships has not been examined previously. Despite its relevance in that regard, the present study is obviously not without limitations. One such limitation is, for instance, that participants from Curaçao were, on average, about 5 years older than participants from the Netherlands. Likewise, the Dutch sample consisted of relatively few men. These differences in age and sex may limit the comparability of the two samples. A second limitation concerns the way the data were collected. Whereas Dutch participants filled out the questionnaire online, because of the sometimes problematic functioning of the Internet in Curaçao, it was decided to use a paper-and-pencil questionnaire to collect the data in

Curaçao. This difference in data collection may further decrease the comparability of the two samples. Finally, the present study used the Dark Triad Dirty Dozen to assess the Dark Triad traits. Although multiple studies have shown this to be a reliable and valid instrument, several scholars also have pointed out several potential weaknesses of this measure, such as the fact that it is not always possible to distinguish between three different dimensions (e.g., Carter, Campbell, Muncer, & Carter, 2015). It must be noted, however, that this latter problem was not found in the present data (see Table 1), as well as in other recent studies conducted in the Netherlands (e.g., Barelids, 2016; Wisse et al., 2015). However, despite these limitations, the present study contributes to the growing body of knowledge about the Dark Triad traits and their role in mating psychology across different regions of the world.

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History

Received May 10, 2017

Revision received June 14, 2019

Accepted June 26, 2019

Published online November 5, 2019

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