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Creatures of the night: Chronotypes and the Dark Triad traits

Peter K. Jonason [a,*], Amy Jones [b], Minna Lyons [b]

[a] University of Western Sydney, Australia
[b] Liverpool Hope University, United Kingdom

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ABSTRACT

In this study ($N = 263$) we provide a basic test of a niche-specialization hypothesis of the Dark Triad (i.e., narcissism, psychopathy, and Machiavellianism). We propose that in order to best enact a "cheater strategy" those high on the Dark Triad traits should have optimal cognitive performance and, thus, have a night-time chronotype. Such a disposition will take advantage of the low light, the limited monitoring, and the lessened cognitive processing of morning-type people. The Dark Triad composite was correlated with an eveningness disposition. This link worked through links with the "darker" aspects of the Dark Triad (i.e., Machiavellianism, secondary psychopathy, and exploitive narcissism); correlations that were invariant across the sexes. While we replicated sex differences in the Dark Triad, we failed to replicate sex differences in chronotype, suggesting eveningness may not be a sexually selected trait as some have argued but is a trait under natural selective pressures to enable effective exploitations of conspecifics by both sexes.

1. Introduction

A fundamental individual difference in biology (see Rosbash & Hall, 1989) is the distinction between nocturnality (i.e., activity during the night) and diurnality (i.e., activity during the day). This distinction is accompanied by a number of specialized adaptations. For instance, chimpanzees (*Pan troglodytes*) and spider monkeys (genus *Ateles*) have evolved for diurnality (Campbell, Fuentes, MacKinnon, Panger, & Bearder, 2007). Both have evolved specialized psychological systems like color-vision to forage for ripe fruits. In contrast, nocturnal animals like tarsiers (genus *Tarsius*) and cats (genus *Felidae*) have specialized adaptations for finding food at night. Tarsiers, for example, have evolved eyes that are so large they do not fit within their eye-sockets (Fleagle, 1999), and cats have reflective lenses (i.e., *Tapetum lucidum*) to amplify ambient light at night (Ollivier et al., 2004). Like vision, personality traits may represent specialized adaptations for carving up the multidimensional human niche (Figueredo et al., 2006; Jonason, Webster, Schmitt, Li, & Crysel, 2012). In this study we correlate individual differences in chronotypes (i.e., tendency to be a night-owl or an early-riser) and the Dark Triad traits (i.e., narcissism, psychopathy, and Machiavellianism).

"Chronotype" is an individual difference that reflects people's propensity to go to sleep early or late in the evening and to wake up early or late. At one end of the spectrum are early risers who exhibit optimal cognitive functioning earlier in the day than those on the opposite end of the spectrum who exhibit their optimal cognitive performance later in the day (Horne, Brass, & Pettitt, 1980; Horne & Östberg, 1976; Roberts & Kyllonen, 1999; Tankova, Adan, & Buela-Casal, 1994). Some have argued that diurnality is the ancestral state for human beings given our most recent common ancestors (i.e., Great Apes) who share this tendency (Kanazawa & Perina, 2009; Piffer, 2010) but this idea fails to take into account that nocturnality is the ancestral state for the most likely common primate ancestor; a small, nocturnal shrew-like animal (Fleagle, 1999) and, thus, nocturnality could be argued as the ancestral condition just as easily.[1] We would contend that humans have retained the ability for both, with diurnality being the more recent (i.e., derived) adaptation but the potential for nocturnality still lingering in our genes (i.e., primitive). With this flexibility, some humans may find it adaptive to occupy this under exploited niche for their adaptive goals. We contend the Dark Triad traits may represent a specialized adaptation for night-time living.

There is considerable empirical evidence to believe the Dark Triad are linked to such a disposition. First, both the Dark Triad traits (Vernon, Villani, Vickers, & Harris, 2008) and chronotype (Hur, 2007; Hur, Bouchard, & Lykken, 1998; Klei et al., 2005) are heritable. Second, an evening chronotype has been linked to increased mating success in the short-term context (Gunawardane,

* Corresponding author. Address: School of Social Sciences and Psychology, University of Western Sydney, Milperra, NSW 2214, Australia. Tel.: +61 0434104710.
E-mail address: p.jonason@uws.edu.au (P.K. Jonason).

[1] This highlights the pernicious problem in evolutionary psychology of (1) generating hypothetical scenarios or "just-so stories" and (2) a problem with reasoning by homology given the problem of pinning down the appropriate ancestor to focus on.

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Piffer, & Custance, 2011; Piffer, 2010; Randler et al., 2012), as well as to impulsivity, risk-taking, sensation-seeking (Adan, Natale, Caci, & Prat, 2010; Caci, Robert, & Boyer, 2004; Digdon & Howell, 2008; Killgore, 2007; Russo, Leone, Penolazzi, & Natale, 2012), extraversion (Diaz-Morales, 2007; Matthews, 1988; Randler et al., 2012; but see Tonetti, Fabrri, & Natale, 2009), and limited conscientiousness and agreeableness (Randler, 2008; Tsaousis, 2010). Furthermore, an evening chronotype is more common in those with individualistic predispositions over collectivistic, other-orientated ones (Vollmer & Randler, 2012). All of these have been linked to the Dark Triad (Jonason, Koenig, & Tost, 2010; Jonason, Li, & Teicher, 2010; Jonason, Li, Webster, & Schmitt, 2009; Jonason & McCain, 2012; Jonason & Tost, 2010; Jonason, Valentine, Li, & Harbeson, 2011; Jonason & Webster, 2010; Jones & Paulhus, 2011; Lee & Ashton, 2005; Paulhus & Williams, 2002).

However, there are also good theoretical reasons to believe the Dark Triad might be associated with a specialization to a night-time chronotype. There is likely a co-evolutionary arms race between cheaters and those who wish to detect and punish them (Cosmides & Tooby, 1992; Cummins, 1999). The Dark Triad traits may represent specialized adaptations to avoid cheater detection (Jonason & Webster, 2012). The Dark Triad traits are characterized by entitlement, superiority, dominance (i.e., narcissism), glib social charm, manipulativeness (i.e., Machiavellianism), callous social attitudes, impulsivity, and interpersonal antagonism (i.e., psychopathy). One manner by which these traits might be adaptive is by predisposing individuals to exploit the night-time niche. With fewer people awake, the lessened light, and the diminished cognitive processing of those with morning disposition, enacting a "cheater strategy" (Jonason & Webster, 2012; Mealey, 1995) might be easier at night; all of which diminishing detection risks. Indeed, most crimes (Laubichler & Ruby, 1986; Stroebel et al., 2010) and most sexual activity peaks at night (Reinberg & Lagoguey, 1978), suggesting just such a link. Therefore, we predict the Dark Triad will be linked to a tendency to being a "night-owl".

The Dark Triad traits are not monolithic. Although Machiavellianism (as measured by the MACH IV; Christie & Geis, 1970) appears to be one-dimensional (Hunter, Gerbing, & Boster, 1982), both narcissism (as measured with the NPI; Raskin & Terry, 1988) and psychopathy (as measured with the SRP III; Paulhus, Neumann, & Hare, in press) are multidimensional (Ackerman et al., 2011; Falkenbach, Poythress, Falki, & Manchak, 2007; Hicks, Markon, Patrick, Krueger, & Newman, 2004; Raskin & Terry, 1988). We expect the "darker" aspects of these traits to be the primary berth of any links between the Dark Triad and chronotype. We expect secondary or hostile/reactive psychopathy (see Falkenbach et al., 2007; Hicks et al., 2004) to be related to an evening orientation, as it is associated with social manipulation, deviance, aggressive, impulsivity, and neuroticism. Similarly, we expect the entitlement/exploitativeness aspect of the three dimensional model of the Narcissistic Personality Inventory (Ackerman et al., 2011) to be linked to an evening chronotype more than the other aspects (e.g., leadership/authority; grandiose exhibitionism).

In this study we provide a simple test of the niche-specialization hypothesis for the Dark Triad. That is, in order to be adaptive, the traits should facilitate the active exploitation of specialized niches (Jonason & Schmitt, 2012; Jonason et al., 2011). One such niche might be night-time, providing for diminished detection risk for those predisposed to be "bad".

2. Method

2.1. Participants and procedure

Two hundred and sixty-three volunteers (74 males; $M = 24.72$, $SD = 8.71$) participated in an online study advertised to students in a university in northwest England ($n = 55$), on an on-line psychology participation website ($n = 147$), and via e-mail and social media advertising ($n = 61$).[2] The front page of the survey provided information on the nature of the study, as well as relevant ethical issues. Participants exited the survey via a page that included the researchers' contact details and a full debrief.

2.2. Measures

Narcissism was assessed with the widely used 40-item Narcissistic Personality Inventory (Raskin & Terry, 1988). Participants chose one of two statements for each item, one reflecting narcissistic attitude (e.g., "I have a natural talent for influencing people"), whereas the other did not (e.g., "I am not good at influencing people"). The narcissistic choices were averaged to create an index of leadership/authority (Cronbach's $\alpha = .78$), grandiose exhibitionism ($\alpha = .79$), and entitlement/exploitativeness ($\alpha = .57$), and overall narcissism ($\alpha = .87$).

The 64-item Self-Report Psychopathy Scale-III (Paulhus et al., in press)[3] was used to assess subclinical psychopathy. Participants rated how much they agreed (1 = *strongly disagree*; 5 = *strongly agree*) with statements such as: "I enjoy driving at high speeds" and "I think I could beat a lie detector." The items were averaged to create indices of secondary ($\alpha = .90$) and primary ($\alpha = .77$), along with overall psychopathy ($\alpha = .91$).

Machiavellianism was measured with the 20-item MACH-IV (Christie & Geis, 1970), where participants were asked how much they agreed (1 = *strongly disagree*; 7 = *strongly agree*) with statements such as: "It is hard to get ahead without cutting corners here and there" and "People suffering from incurable diseases should have the choice of being put painlessly to death." The items were summed to create a Machiavellianism index ($\alpha = .75$).

All of the Dark Triad instruments were significantly, positively correlated with each other. Machiavellianism was associated with psychopathy ($r(263) = .61$, $p < .01$) and narcissism ($r(263) = .38$, $p < .01$) and psychopathy and narcissism were linked ($r(263) = .52$, $p < .01$). In a principal components analysis, the three Dark Triad traits loaded on a single factor that explained 67.10% of the variance in the traits (Eigen = 2.01). Therefore, we created a composite Dark Triad measure by averaging standardised scores for the three instruments ($\alpha = .73$).

Chronotypes were measured with the 19-item Morningness–Eveningness Questionnaire (Horne & Östberg, 1976), asking participants about their sleep timing and schedules with questions such as: "If you got into bed at 11 PM, how tired would you be? (0 = *not at all tired*; 5 = *very tired*) and "During the first half hour after you wake up in the morning, how do you feel? (1 = *very tired*; 4 = *very refreshed*). Higher scores indicate a morning type, and low scores a more evening type orientation. The items were summed to form an index of chronotype ($\alpha = .81$, $M = 46.70$; $SD = 9.68$).

3. Results

We investigated the relationship between chronotype and the Dark Triad in a series of zero-order correlations (see Table 1). The composite Dark Triad score ($r(261) = -.16$, $p < .01$), total psychopathy ($r(261) = -.14$, $p < .01$), secondary psychopathy ($r(261) = -.14$, $p < .01$), Machiavellianism ($r(263) = -.14$, $p < .01$), and the entitlement/exploitativeness facet of the NPI ($r(261) = -.20$,

[2] No differences were detected across sample type and, thus, results are collapsed across that distinction.

[3] Although still in press, this scale has repeatedly been used in Dark Triad research despite its status (e.g., Jonason, Li, Webster, & Schmitt, 2009; Jonason, Lyons, Bethell, & Ross, 2013; Jones & Paulhus, 2011; Lee & Ashton, 2005; McDonald, Donnellan, & Navarrete, 2011; Paulhus & Williams, 2002; Vernon et al., 2008).

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Table 1
Descriptive statistics and a summary of zero-order correlations and regression values for the Dark Triad (predictor variables) and chronotype (outcome variable).

	r	*β* (*t*)	*M* (SD)
Dark Triad	−.14* [−.23**]	–	0.00 (0.80)
Narcissism	−.04 [−.05]	.04 (0.60)	0.34 (0.18)
Entitlement/ exploitativeness	−.20** [−.36**]	−.24 (−3.33**)	0.19 (0.26)
Grandiose exhibitionism	−.05 [.07]	−.05 (−0.69)	0.30 (0.26)
Leadership/authority	.05 [.07]	.18 (2.29*)	0.40 (0.26)
Psychopathy	−.13* [−.18**]	−.09 (−1.05)	142.56 (27.99)
Primary	−.07 [−.11]	.16 (−1.07)	75.16 (16.57)
Secondary	−.18** [−.26**]	−.20 (−2.63**)	67.40 (14.54)
Machiavellianism	−.14* [−.23**]	−.09 (−1.07)	75.16 (16.57)

*$p < .01$, **$p < .001$, '–' denote variables not included in the regression.
Correlations in brackets are the disattenuated values using the reliability for the scales.

$p < .01$) were all related to an evening-type orientation. In Table 1, we also report the attenuated correlations between chronotype and the Dark Triad variables. None of the correlations were moderated by sex of the participant (full results can be obtained from the third author). Although men scored higher on Machiavellianism ($t(261) = -3.16$, $p < .01$, Hedge's $g = -0.31$), psychopathy ($t(261) = -7.60$, $p < .01$, $g = 1.05$), and narcissism ($t(261) = -4.46$, $p < .01$, $g = -0.61$) than women did, however, we failed to replicate (Adan & Natale, 2002; Tonetti, Fabrri, & Natale, 2008; Tsai & Li, 2004) sex differences in chronotypes ($t = 0.13$, $g = 0.02$), thus precluding mediation analyses.

In order to control for shared variance between the Dark Triad and its sub-components, we ran two regressions where chronotype was entered as the outcome variable, and Machiavellianism, psychopathy and NPI-total scores as the predictor variables. When the shared variance between the Dark Triad traits was controlled for, none of the three emerged as a significant predictor of chronotype. In order to investigate the relative importance of the Dark Triad subcomponents, we ran a second regression where Machiavellianism, secondary and primary psychopathy, and the three NPI facets were entered as the predictor variables. When shared variance between the Dark Triad sub-components were controlled for, secondary psychopathy ($\beta = -20$, $p < .01$) and the entitlement/exploitativeness facet of the NPI ($\beta = -24$, $p < .01$) were linked to the evening chronotype. Leadership/authority had a relationship with morning chronotype ($\beta = .18$, $p < .01$). Primary psychopathy also had a non-significant trend towards morning chronotype, ($\beta = .16$, $p < .10$).

4. Discussion

Evolutionary psychologists (Jonason et al., 2012; McDonald et al., 2011) suggest the Dark Triad traits might be an adaptive set of personality traits. In the past, research has focused on mating success (Jonason et al., 2009, 2011) and mechanisms (Jonason et al., 2010; 2013; Jonason & Webster, 2012) through which they operate. In contrast, we have tried to understand how the Dark Triad traits might be adaptive through the pairing with a certain environment. This niche-specialization hypothesis was tested by correlating the Dark Triad traits with morningness–eveningness. We found that the Dark Triad, especially its "darker" (Rauthmann, 2012) aspects (i.e., Machiavellianism, secondary psychopathy, and exploitive narcissism), were linked to a night-time specialization. We would contend that such a specialization may facilitate the "cheater strategy" these traits embody (Jonason et al., 2012; Mealey, 1995). It is possible that these Dark Triad traits relate to greater cognitive functioning at night to facilitate the protean social style (Jonason & Webster, 2012) by outthinking those set on detecting and punishing them (Cosmides & Tooby, 1992; Cummins, 1999) along with lower detection risk with fewer vigilant eyes and a diminished capacity to see the actual exploitation given darkness.

We failed to find sex differences in morningness–eveningness (Adan & Natale, 2002; Tonetti et al., 2008; Tsai & Li, 2004), although not all studies have found such a difference (see Randler, 2007). This also fails to support the sexual selection argument for night-time orientation (Kanazawa & Perina, 2009; Piffer, 2010). This argument contends that (young) men may have adaptively benefitted from pursuing "night-time adventures" including sex and other antisocial, yet reproductively useful, behaviors. We had hoped to show mediation for sex differences in the Dark Triad by morningness–eveningness but could not. Our results suggest that while men may score higher than women do on the Dark Triad traits (Jonason et al., 2009, 2013) the sexes do not differ in the time of the day they have optimal cognitive performance. This might suggest a natural selection, instead of a sexual selection, argument. It could be adaptively effective for anyone pursuing a fast life strategy like that embodied in the Dark Triad to occupy and exploit a low-light environment where others are sleeping and have diminished cognitive functioning. Such features of the night may facilitate the casual sex (Jonason et al., 2009), mate-poaching (Jonason, Li, & Buss, 2010), and risk-taking (Jonason, Koenig, et al., 2010) the Dark Triad traits are linked to.

This study had a number of limitations. First, we only used one measure of morningness–eveningness. We have used this one measure as we saw it as the "gold-standard" having been used numerous times (e.g., Adan et al., 2010; Russo et al., 2012), however, other measures exist (see Randler, 2007; Vollmer & Randler, 2012) and warrant attention. Second, our correlations were rather small in comparison to other work on the Dark Triad (e.g., Jonason et al., 2009, 2013). However, similarly low correlations have been reported in most studies assessing the relationship between personality traits and chronotype (Randler, 2008; Russo et al., 2012; Tsaousis, 2010). Third, we sampled a predominantly college-student sample. Although our effects were robust to differences in sample-type, it is possible that the links between the Dark Triad traits and night-time preferences may be strongest in college-students because of the freedom afforded to stay up late and lessened need to work relative to adults. Future research should address these limitations, but, given our results are (1) consistent with our predictions and (2) the predictions are based on the *a priori* logic provided by evolutionary psychology—life history theory in particular—we feel confident in our results.

We proposed and tested a relatively new hypothesis to account for the presence of the Dark Triad as indicators of an evolved psychosocial strategy directed towards the immediate extraction of resources from the socioecology (Jonason & Schmitt, 2012; Jonason & Webster, 2012). We have provided a unique test, arguing and showing that those high on the Dark Triad may be characterized by cognitive biases that orient them to occupy an environment that will facilitate their life history strategy. In short, those high on the Dark Triad traits like many other predators (e.g., lions, African hunting dogs, scorpions), are creatures of the night.

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