



The Dark Triad traits through the lens of Reinforcement Sensitivity Theory[☆]



Peter K. Jonason^{a,*}, Christopher J. Jackson^b

^a Western Sydney University, Australia

^b University of New South Wales, Australia

ARTICLE INFO

Article history:

Received 12 June 2015

Received in revised form 28 October 2015

Accepted 13 November 2015

Available online xxxx

Keywords:

Dark Triad

Psychopathy

Machiavellianism

Narcissism

Behavioral activation

Behavioral Inhibition: Reinforcement

Sensitivity Theory

ABSTRACT

In two studies ($N = 504$) we looked through the lens of Reinforcement Sensitivity Theory to understand the Dark Triad traits (i.e., narcissism, psychopathy, and Machiavellianism). In Study 1, the Dark Triad traits were correlated with negative affectivity, reward sensitivity, the fight system, and dysfunctional impulsivity. In Study 2, the Dark Triad traits were associated with a fight response. Sex differences in the Dark Triad traits were present in Study 1 but proved more allusive in Study 2, but were mediated by individual differences in fight systems (Study 2) and reward and punishment sensitivity (Study 1). Narcissism was associated with Behavioral Activation and Inhibition Systems across studies and measures. Results are consistent with the adaptive coordination expected by evolutionary psychologists who study the Dark Triad traits.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

The Dark Triad traits (Paulhus & Williams, 2002) are characterized by entitlement, superiority, dominance (i.e., narcissism), glib social charm, manipulateness (i.e., Machiavellianism), callous social attitudes, impulsivity, and interpersonal antagonism (i.e., psychopathy). One reason for the recent explosion of work on these traits by academics and the media is their integration into an evolutionary paradigm (Jonason, Li, Webster, & Schmitt, 2009; Jonason & Tost, 2010). While useful, work on the Dark Triad traits using this paradigm has failed to address what are the underlying motivational systems that inform personality variance; motivational systems that may be directly related to neurological systems that facilitate survival. In two studies, we examine the utility of Reinforcement Sensitivity Theory (Gray, 1982), or, more importantly, Revised Reinforcement Sensitivity Theory (Corr, 2004) in understanding the Dark Triad traits.

As originally described, Reinforcement Sensitivity Theory (Gray & McNaughton, 2000) postulates that there are two primary neurological differences between people that result in the various individual differences researchers concern themselves with; the Behavioral Activation

System or approach system (BAS) and the Behavioral Inhibition System or avoidance system (BIS). These neurological differences are thought to be the motivational mechanisms that cause the behavioral patterns described by personality psychologists. The theory has since been modified (Jackson, 2003; Smillie, 2008) to include three other motivational systems in people's behavior; Fight/Flight/Freeze Systems (FFFS). Fighting (e.g., defending offspring), fleeing (e.g., criminal escaping capture), and freezing (e.g., rape victims avoiding further damage) all can enable survival (Blanchard & Blanchard, 1990) and, thus, should have been selected for in organisms. For instance, hedgehogs freeze in response to attacks by foxes whereas lions will fight off hyena (i.e., between-species variance). Moreover, even a fighting species like a lion, may flee when confronted with overwhelming numbers of hyena (i.e., within-species variance). All of these systems are considered fundamental differences in how organisms react to various inputs, have evolutionary relevance, and are consistent with contemporary biology and animal learning (Gray & McNaughton, 2000). It seems like a reasonable extension to research conducted by evolutionary psychologists who study the Dark Triad traits.

As a brief review, the BAS describes an approach orientation that is sensitive to rewards (Torrubia, Avila, Caseras, & Molto, 2001). The BIS is essential to resolve goal conflicts between the BAS and the FFFS (Corr, 2004) and is associated with anxiety, arousal, hypersensitivity to threat, and cautious approach to determine if the threat is real (Smillie, Pickering, & Jackson, 2006). The FFFS mediates a fear response to tangible, aversive stimuli in three ways. Fight concerns a frenzied and

[☆] The authors thank Ben Walker for reviewing this manuscript prior to submission. Sixty percent of the data in Study 1 was collected as part of an honor's thesis for Jaqueline Nikko at Western Sydney University.

* Corresponding author at: School of Social Sciences and Psychology, Western Sydney University, Milperra NSW, 2214, Australia.

E-mail address: pjonason@westernsydney.edu.au (P.K. Jonason).

vociferous response to threat or pain that is unescapable (Smillie et al., 2006). Fight reflects both defensive (Harmon-Jones & Sigelman, 2001) and offensive aggression (Smillie et al., 2006) to proximal threats. Flight concerns escape and freezing concerns non-action when presented with distal threats (DeYoung, 2010). These systems are an integrative framework for the neurobiology of personality (Corr, 2016) and we extend this to understand the Dark Triad traits.

From an evolutionary perspective the Dark Triad traits may reflect an exploitive and opportunistic approach to social (Jonason & Webster, 2012) and sexual (Jonason et al., 2009) relationships as part of coordinated cheater strategy (Mealey, 1995). However, doing so presents a serious challenge; people try to detect and punish cheaters. Those who engage in such a social style should have a coordinated system of traits that would enable their success if these are specialized adaptations. For instance, limited empathy may be one system that makes those high on the Dark Triad trait deaf, dumb, and blind to the suffering of their victims (Jonason, Lyons, Bethell, & Ross, 2013). Three other systems are proposed here: negative affectivity, reward to sensitivity, and a fight disposition. All three may enable those high on the Dark Triad traits to “take” what they want from the world. Being predisposed to negative feelings (i.e., being disagreeable) may enable one to take advantage of others. Being sensitive to rewards may enable perseverance in light of failures which may be likely. And, being predisposed to fighting may be an effective strategy to get what one wants from others in a competitive world (Jonason, 2015). That said, given the short timeline those high on the Dark Triad traits operate on (Jonason & Tost, 2010) they may have some dysfunctional impulsivity (Jones & Paulhus, 2011).

An important question is why men are more narcissistic, Machiavellian, and psychopathic than women are (Jonason et al., 2009). Men are generally more aggressive than women are (Wilson & Daly, 1985) and the Dark Triad traits are related to various measures of aggression (Jonason, 2015; Jonason & Webster, 2010). It may be that sex differences in the Dark Triad traits are artifacts of—driven by—sex differences in fight systems. Males—including human men, gorilla, and lions—may have, overly evolutionary time (and even today), benefited more from being physically aggressive than females did. If evolutionary psychologists (back to Darwin) are correct, there should be correlated psychological differences that may come in the form of individual differences in the Dark Triad traits. Therefore, we test for whether sex differences in the Dark Triad traits are mediated by individual differences in people's fight systems.

The Dark Triad traits are the “new kids on the personality psychology block”. As such, many questions remain unanswered regarding what they lead to and what underlies them. In two studies, we examine both of these through the lens of Reinforcement Sensitivity Theory (Corr, 2016). We examine the associations between measures used in this paradigm, whether sex differences in the Dark Triad traits might be the result of particular cognitive biases, and whether the Dark Triad traits account for sex differences in men's tendency to be oriented toward fighting.

2. Study 1

In Study 1, we tackle two tasks. First, we provide a wide account¹ of how the Dark Triad traits fit within the Reinforcement Sensitivity Theory paradigm. Second, we test for mediation of sex differences in the Dark Triad traits by individual differences in Reinforcement Sensitivity Theory. Given the large number measures we include, we use the briefest measure of the Dark Triad, the Dirty Dozen (Jonason & Webster, 2010) despite criticisms (Miller et al., 2012).

3. Method

3.1. Participants and procedure

Three hundred people (74% female) aged 17–53 years ($M = 23.94$, $SD = 6.87$) participated in an online study concerning the Dark Triad traits. Seventy-two percent of the sample was of European descent with 14% Asian, and 9% of Middle-eastern descent with the rest being of some “other” ethnic descent. Seventy-nine percent of the sample was Australian undergraduates who received partial course credit and the remainder was collected through snowball sampling from Facebook postings as volunteers. Only those participants who completed the measures from unique IP addresses were included. Participants were informed of the nature of the study and were asked to give consent if they wished to participate; only those who gave consent have been included. They progressed through a series of self-report measures that assessed the variables of interest. At the end of the study, participants were debriefed and thanked.

3.2. Measures

To measure the Dark Triad traits, the Dark Triad Dirty Dozen (Jonason & Webster, 2010) was used. Participants were asked how much they agreed (1 = *Not at all*; 5 = *Very much*) with statements such as: “I tend to want others to admire me” (i.e., narcissism), “I tend to lack remorse” (i.e., psychopathy), and “I have used deceit or lied to get my way” (i.e., Machiavellianism). Items were averaged together to create an index of narcissism (Cronbach's $\alpha = .82$), Machiavellianism ($\alpha = .82$), and psychopathy ($\alpha = .69$).²

We measured the BIS/BAS (Carver & White, 1994). It is composed of dimensions for Behavioral Inhibition and Behavioral Activation. Participants were asked how much they agreed (1 = *Not at all*; 5 = *Very much*) with each item and we averaged the corresponding items to create scales measuring Behavioral Inhibition ($\alpha = .83$), Behavioral Activation by Rewards ($\alpha = .83$), Behavioral Activation by Drive ($\alpha = .89$), and Behavioral Activation by Fun-Seeking ($\alpha = .83$).

We measured functional and dysfunctional impulsivity (Dickman, 1990). Participants were asked their agreement (1 = *Not at all*; 5 = *Very much*) with items such as “I often say and do things without considering the consequences” (i.e., dysfunctional) and “Most of the times I can put my thoughts into words very rapidly”. The corresponding items were averaged to create indexes of functional ($\alpha = .80$) and dysfunctional ($\alpha = .82$) impulsivity.

We measured Revised Reinforcement Sensitivity Theory with the Jackson-5 (Jackson, 2008). The scale measures individual differences in all of the purported systems discussed above. Participants were asked their agreement (1 = *Not at all*; 5 = *Very much*) with the statements and the corresponding items were averaged to create indexes of Behavioral Activation System ($\alpha = .81$), the Behavioral Inhibition System ($\alpha = .80$), the Fight response ($\alpha = .82$), the Flight response ($\alpha = .77$), and the Freeze response ($\alpha = .72$).

We measured sensitivity to rewards and punishment with the Sensitivity to Punishment Sensitivity to Reward Questionnaire (Torrubia et al., 2001). Participants were asked whether or not they agree (yes/no) with items such as “Do you spend a lot of your time on obtaining a good image?” (i.e., reward sensitivity; $\alpha = .80$) and “Are you easily discouraged in difficult situations?” (i.e., punishment sensitivity; $\alpha = .88$) and the items were summed to create their respective indexes.

Last, we used the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988) to measure positive and negative affectivity. Participants were asked their agreement (1 = *Not at all*; 5 = *Very much*) as to whether a series of adjectives described her/himself.

¹ We do so to address the discrepancies in the various measures available in Reinforcement Sensitivity Theory research (Corr, 2016).

² Machiavellianism was correlated with psychopathy ($r(298) = .61, p < .01$) and narcissism ($r(298) = .62, p < .01$), and narcissism was correlated with psychopathy ($r(298) = .37, p < .01$).

Responses to items such as “enthusiastic” and “interested” were averaged to create a measure of positive affectivity ($\alpha = .91$). Responses to items such as “hostile” and “irritable” were averaged to create a measure of negative affectivity ($\alpha = .93$).

4. Results and discussion

In order to reduce Type 1 error inflation we set p to .01.³ Men (vs. women) scored higher on the measures of the Dark Triad traits, the fight response, reward sensitivity, and functional impulsivity (Table 1). Women (vs. men) scored higher in flee and freeze responses but also in the Behavioral Inhibition System measured by the Carver and White measure. Correlational analyses (Table 2) revealed that all three of the Dark Triad traits were positively correlated with negative affectivity, reward sensitivity, and dysfunctional impulsivity, confirming our hypotheses. Psychopathy was positively correlated with a fight disposition (as predicted). Narcissism was positively correlated with behavioral inhibition in both measures of BIS/BAS (not predicted). Narcissism was positively correlated with a sensitivity to punishments (not predicted). Machiavellianism and narcissism were associated with a drive motivation (not predicted). These correlations were largely similar in men and women.

We tested whether sex differences in the Dark Triad traits might be a function of underlying cognitive biases. To reduce Type 1 error inflation, we conducted an omnibus test using the Dark Triad composite (e.g., Jonason et al., 2009) as the dependent variable. Sex differences in the Dark Triad composite were partially mediated by punishment sensitivity ($\Delta R^2 = .03$, $F(1, 292) = 8.70$, $p < .01$), when measured with the SPSRQ, and partially mediated by reward sensitivity ($\Delta R^2 = .23$, $F(1, 292) = 96.48$, $p < .01$), when measured with the SPSRQ, where the main effect of participant's sex ($\beta = .28$, $p < .01$) reduced in both cases ($\beta = .17$, $p < .01$; $\beta = .13$, $p < .01$, respectively). Such results are consistent with predictions. When we reanalyzed (albeit not predicted) these effects using all three of the traits (instead of the composite), we found that effects replicated for all three of the traits when reward sensitivity was the mediator and even became full mediation for Machiavellianism. When punishment sensitivity was used as the mediator, the effect was localized to narcissism.

5. Study 2

Study 1 cast a wide net to understand the utility of Reinforcement Sensitivity Theory in hopes of understanding the Dark Triad traits. However, Study 1 was limited by (a) its reliance on a college-student sample and (b) a contentious measure of the Dark Triad (Miller et al., 2012, but see Jonason & Luévano, 2013; Webster & Jonason, 2013). In Study 2, we replicate and improve on what can be gleaned about the Dark Triad traits by framing them in relation to Reinforcement Sensitivity Theory.

6. Method

6.1. Participants

Participants were 204 team managers (47% female) from various American companies who were paid US\$20 for completing a series of online measures using the YWeDo online laboratory operated by the second author. The average participant was 33.80 years old ($SD = 9.23$; $Range = 18$ – 67). The system restricts people from taking the measure more than one time.

Table 1

Descriptive statistics and sex difference tests for the Dark Triad traits and measures of individual differences in reinforcement sensitivity (Study 1).

	Mean (SD)			<i>t</i>	<i>g</i>
	Overall	Men	Women		
<i>Dark Triad</i>					
Psychopathy	1.82 (0.70)	2.17 (0.78)	1.69 (0.62)	−4.88*	−0.64
Machiavellianism	1.97 (0.77)	2.24 (0.83)	1.88 (0.73)	−3.41*	−0.45
Narcissism	2.25 (0.86)	2.67 (0.86)	2.24 (0.84)	−3.83*	−0.50
<i>PANAS</i>					
Positive affectivity	34.16 (7.63)	35.74 (7.65)	33.61 (7.56)	−2.13	−0.28
Negative affectivity	20.87 (8.67)	20.94 (8.45)	20.85 (8.76)	−0.01	−0.01
<i>Jackson-5</i>					
Behavioral activation	3.61 (0.75)	3.64 (0.88)	3.60 (0.70)	−0.39	−0.05
Behavioral inhibition	3.72 (0.70)	3.63 (0.72)	3.75 (0.69)	1.37	0.18
Fight	3.03 (0.83)	3.31 (0.83)	2.94 (0.82)	−3.48*	−0.46
Flee	2.93 (0.80)	2.44 (3.10)	3.10 (0.76)	6.75*	0.89
Freeze	2.81 (0.76)	2.56 (0.79)	2.89 (0.73)	3.32*	0.44
<i>SPSRQ</i>					
Reward sensitivity	7.56 (4.17)	9.35 (4.31)	6.92 (3.94)	−4.38*	−0.58
Punishment sensitivity	11.00 (6.03)	9.64 (6.16)	11.47 (5.92)	2.28	0.30
<i>Carver and White</i>					
<i>BIS/BAS</i>					
Behavioral inhibition system	3.00 (0.59)	2.76 (0.60)	3.09 (0.56)	4.24*	0.56
Behavioral activation – reward	3.40 (0.52)	3.28 (0.60)	3.44 (0.48)	2.00	0.26
Behavioral activation – drive	2.66 (0.70)	2.70 (0.71)	2.65 (0.70)	−0.54	−0.07
Behavioral activation – fun seeking	2.84 (0.68)	2.88 (0.69)	2.82 (0.68)	−0.66	−0.09
<i>Impulsivity</i>					
Functional	5.40 (3.15)	6.55 (3.41)	5.00 (2.96)	−3.57*	−0.47
Dysfunctional	3.57 (3.13)	4.00 (3.23)	3.42 (3.08)	−1.38	−0.18

Note. *g* is Hedge's *g* for effect size with unbalanced cells. PANAS = Positive and Negative Affect Schedule; SPSRQ = Sensitivity to Punishment Sensitivity to Reward Questionnaire; BIS/BAS = Behavioral Inhibition System Behavioral Activation System.

* $p < .01$.

6.2. Measures

We again used the Dark Triad Dirty Dozen (Jonason & Webster, 2010). Participants were asked how much they agreed (1 = *Completely Disagree*; 5 = *Completely Agree*) with statements. Items were averaged together to create an index of narcissism (Cronbach's $\alpha = .84$), Machiavellianism ($\alpha = .81$), and psychopathy ($\alpha = .81$).⁴

We also used the Short Dark Triad (Jones & Paulhus, 2014). It is a concise, 27-item personality inventory. Participants are asked to report their agreement (1 = *Completely Disagree*; 5 = *Completely Agree*) with statements measuring Machiavellianism (e.g., “Most people are suckers”), narcissism (e.g., “I am an average person”), and psychopathy (e.g., “I like to pick on losers”). Items were averaged to create indices of Machiavellianism ($\alpha = .82$), narcissism ($\alpha = .75$), and psychopathy ($\alpha = .81$).⁵

We again used the Jackson-5 (Jackson, 2008) which provides scales of the Behavioral Activation System ($\alpha = .82$), the Behavioral Inhibition System ($\alpha = .71$), the Fight response ($\alpha = .69$), the Flight response

⁴ Machiavellianism was correlated with psychopathy ($r(202) = .60$, $p < .01$) and narcissism ($r(202) = .44$, $p < .01$), and narcissism was correlated with psychopathy ($r(202) = .34$, $p < .01$).

⁵ Machiavellianism was correlated with narcissism ($r(202) = .22$, $p < .01$) and psychopathy ($r(202) = .57$, $p < .01$) and narcissism was correlated with psychopathy ($r(202) = .27$, $p < .01$).

³ More details available upon request.

Table 2
Correlations for the links between the Dark Triad and measures used in Reinforcement Sensitivity Theory research (Study 1).

	Psychopathy	Machiavellianism	Narcissism
<i>PANAS</i>			
Positive affectivity	-.13	-.06	-.04
Negative affectivity	.18*	.21*	.25*
<i>Jackson-5</i>			
Behavioral activation	.02	.04	.09
Behavioral inhibition	-.00	.11	.35*
Fight	.18*	.15	.04
Flee	-.12	-.08	.02
Freeze	-.08	.00	.11
<i>SPSRQ</i>			
Reward Sensitivity	.37*	.46*	.49*
Punishment Sensitivity	.02	.08	.19*
<i>Carver and White BIS/BAS</i>			
Behavioral inhibition system	-.13	-.01	.23*
Behavioral activation – reward	-.15	-.02	.06
Behavioral activation – drive	.09	.17*	.21*
Behavioral activation – fun seeking	.08	.08	.09
<i>Impulsivity</i>			
Functional	.15	.07	-.03
Dysfunctional	.23*	.21*	.17*

Note. PANAS = Positive and Negative Affect Schedule; SPSRQ = Sensitivity to Punishment Sensitivity to Reward Questionnaire; BIS/BAS = Behavioral Inhibition System Behavioral Activation System.

* $p < .01$.

($\alpha = .72$), and the Freeze response ($\alpha = .69$). Participants were asked their agreement (1 = *Completely Disagree*; 5 = *Completely Agree*) with the statements and appropriate items were averaged to compute the scales.⁶

7. Results and discussion

Again, we reduced p to .01.⁷ We reported sex differences tests in Table 3. In the Dirty Dozen measure, men scored higher than women did in psychopathy and Machiavellianism but not narcissism. This may reflect either measurement or sampling effects. Psychopathy was the only trait that revealed a sex difference in the Short Dark Triad measure. Given the general failure to replicate sex differences across measures, it may be a sampling problem with only the “darkest” of the traits revealing the purported and often reported effects in a sample of company leaders. We also replicated the above reported sex differences in the fight response and the flee response but failed to replicate the sex difference in the freeze response. When examining only the associations where both Dark Triad measures agreed, narcissism was positively correlated with a heightened behavioral activation system but also a heightened behavioral inhibition (replicating results from Study 1) system and all three of the Dark Triad traits revealed a fight disposition (Table 4).

We examined whether sex differences in the Dark Triad traits were mediated by individual differences in the fight system. When using the Dirty Dozen measure, we found partial mediation ($\beta_{\text{Step 1}} = -.23$, $p < .01$; $\beta_{\text{Step 2}} = -.18$, $p < .05$) for sex differences in psychopathy ($\Delta R^2 = .03$, $F(1, 195) = 6.64$, $p < .05$) and full mediation (respectively, $\beta_{\text{Step 1}} = -.20$, $p < .01$; $\beta_{\text{Step 2}} = -.12$, ns ; $\beta_{\text{Step 1}} = -.15$, $p < .05$; $\beta_{\text{Step 2}} = -.06$, ns) for Machiavellianism ($\Delta R^2 = .08$, $F(1, 195) =$

⁶ Because we measured the Dark Triad traits in two ways, the use of this measure was motivated by a desire to minimize participant's fatigue while maintaining some reasonable degree of breadth of measurement within *r*-RST. While this measure is an advance by including the FFF system, it may be retrograde in its treatment of BAS as a unidimensional construct (Corr, 2016).

⁷ More details available upon request.

Table 3
Descriptive statistics and sex difference tests for the Dark Triad traits and the Jackson-5 measure for *r*-RST (Study 2).

	Mean (SD)			<i>t</i>	<i>d</i>
	Overall	Men	Women		
<i>Dirty Dozen</i>					
Machiavellianism	2.12 (0.89)	2.29 (0.92)	1.93 (0.82)	2.89*	0.41
Psychopathy	1.83 (0.87)	2.01 (0.90)	1.62 (0.79)	3.26*	0.46
Narcissism	2.55 (0.99)	2.68 (1.02)	2.40 (0.95)	2.06	0.29
<i>Short Dark Triad</i>					
Machiavellianism	3.00 (0.71)	3.05 (0.73)	2.96 (0.68)	0.93	0.13
Psychopathy	2.06 (0.75)	2.23 (0.78)	1.87 (0.66)	3.41*	0.48
Narcissism	2.97 (0.67)	3.03 (0.68)	2.91 (0.66)	1.29	0.18
<i>Jackson-5</i>					
Behavioral activation	3.80 (0.72)	3.80 (0.68)	3.80 (0.76)	-0.04	0.01
Behavioral inhibition	3.81 (0.63)	3.80 (0.60)	3.81 (0.65)	-0.16	0.02
Fight	2.80 (0.76)	2.94 (0.69)	2.67 (0.80)	2.58*	-0.36
Flee	2.78 (0.72)	2.83 (0.63)	2.74 (0.80)	0.95	-0.13
Freeze	3.13 (0.72)	2.91 (0.68)	3.34 (0.70)	-4.47*	0.63

Note. *d* is Cohen's *d* for effect size with balanced cell sizes.

* $p < .01$.

17.57, $p < .01$) and narcissism ($\Delta R^2 = .08$, $F(1, 195) = 18.23$, $p < .01$) by individual differences in the fight system ($\beta_{\text{Psychopathy}} = .18$, $p < .05$; $\beta_{\text{Machiavellianism}} = .29$, $p < .01$; $\beta_{\text{Narcissism}} = .30$, $p < .01$). When using the Short Dark Triad measure we only had sex differences in psychopathy. Nevertheless, sex differences in psychopathy ($\beta = -.24$, $p < .01$) were fully mediated (Step 2 $\beta = -.13$, ns ; $\Delta R^2 = .13$, $F(1, 195) = 31.59$, $p < .01$) by individual differences in the fight system ($\beta = .38$, $p < .01$).

8. General discussion

In the current study, we provided new details about the Dark Triad traits by examining them through the lens of Reinforcement Sensitivity Theory. This theory is based in neurobiology and evolutionary theory and attempts to frame individual differences based on systematic differences in people's brains (DeYoung, 2010). It acts as a mid-level, organizing paradigm to understand personality variance (Corr, 2016) and, indeed, was useful in understanding the Dark Triad traits.

Three important findings emerged. The Dark Triad traits were (a) correlated with negative affectivity and sensitivity to rewards (SPSRQ), (b) sex differences in the Dark Triad traits were mediated by individual differences sensitivity to rewards, and (c) sex differences in the Dark Triad traits were mediated by individual differences in the fight system. These results are consistent with adaptationist approaches (Jonason et al., 2009; Jonason & Webster, 2012) to these traits that suggest that the Dark Triad traits might be part of a coordinated system for active exploitation of one's socioecology for one's personal and often short-term agendas (Jonason, Duineveld, & Middleton, 2015). Negative affectivity, like limited empathy (Jonason et al., 2013), and sensitivity to

Table 4
Testing the methodological and sampling robustness of the correlations between the Dark Triad traits and the Jackson-5 measure for *r*-RST (Study 2).

	Machiavellianism		Narcissism		Psychopathy	
	SD3	DTDD	SD3	DTDD	SD3	DTDD
<i>Jackson-5</i>						
Behavioral Activation	.04	-.07	.34*	.14	-.02	-.22*
Behavioral Inhibition	.25*	.10	.31*	.27*	-.04	-.10
Flight	.19*	-.01	.10	.17*	.11	.06
Freeze	.23*	.13	.05	.25*	-.22*	-.16
Fight	.48*	.33*	.28*	.32*	.42*	.23*

Note. SD3 = Short Dark Triad; DTDD = Dark Triad Dirty Dozen; comparisons of the correlations available open request.

* $p < .01$.

rewards (at least measured by the SPSRQ) may be instrumental in overcoming the challenges faced by engaging in a cheater approach to life (Mealey, 1995).

Several auxiliary findings were also detected. Narcissism was associated with sensitivity to rewards and punishment regardless of measure or conceptualization (i.e., Carver and White; Jackson-5; SPSRQ), which is promising given the differences between measures used in Reinforcement Sensitivity research (Corr, 2016). These correlations may reflect how narcissists rely on feedback from the environment to modify their behavior and attain the admiration they desire. For instance, sensitivity to rewards and punishments might expedite learning because it comes in two forms. Indeed, as Machiavellianism was also associated with the same drive measure of BAS in Study 1 as narcissism, this contention seems reasonable. And last, we demonstrated that all three of the traits are associated with dysfunctional impulsivity not trait-specific associations as previously reported (Jones & Paulhus, 2011), which may reflect sampling or measurement error.

8.1. Limitations and conclusions

Although this study includes various psychometric and theoretical strengths, it still contains limitations. We did not control for the shared variance among the Dark Triad traits through the use of some variant of multiple regression. While it is common to do this (Jonason & Tost, 2010; Jonason & Webster, 2012), it lacks meaning because the unshared variance no longer reflects its original trait. In addition, the very premise of the Dark Triad traits is that they co-occur in individuals making any attempt at understanding each trait in a vacuum limited in ecological validity.⁸ Another criticism is our reliance on WEIRD (i.e., Western, Educated, Industrialized, Rich, and Democratic; see Henrich, Heine, & Norenzayan, 2010) samples despite using undergraduates, volunteers, and remunerated employees. Lastly, there might be cause to mistrust the validity of the Carver and White measure for its inductively derived factor structure and the Jackson-5 for its limited construct validity (Corr, 2016). In hopes of addressing this we cast a wide nomological network by including other measures like impulsivity. Other measures might be worth including in future research. Importantly, we found inconsistent evidence across measures of sensitivity to rewards and punishment if we consider BAS and BIS measures of those, respectively. This suggests each measure is not fully equivalent, warranting more psychometric work on these measures.

As this was the first (we know of) attempt to associate the Dark Triad traits with the Reinforcement Sensitivity paradigm, many questions remain. More advanced studies are called for, moving beyond self-report measures of, for instance, sensitivity to rewards and punishments. Various laboratory and real-life tests (Foster & Trimm, 2009) might be worth adopting for future studies. Nevertheless, tentatively, it appears that all the Dark Triad traits are associated with sensitivity to reward (SPSRQ), narcissism is associated with an approach and avoidance bias no matter the measure, and sex differences in the Dark Triad traits are mediated by individual differences in sensitivity to rewards and punishments (SPSRQ) and fight systems.

References

- Blanchard, D. C., & Blanchard, R. J. (1990). Anti-predator defence as models of animal fear and anxiety. In P. F. Brain, R. J. Parmigiani, R. J. Blanchard, & D. C. Blanchard (Eds.), *Fear and defence* (pp. 89–105). Chur, Switzerland: Harwood Academic.
- Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology*, 67, 319–333.
- Corr, P. J. (2004). Reinforcement sensitivity theory and personality. *Neuroscience and Biobehavioral Reviews*, 28, 317–332.
- Corr, P. J. (2016). Reinforcement sensitivity theory of personality questionnaires: Structural survey with recommendations. *Personality and Individual Differences*, 89, 60–64.
- Dickman, S. J. (1990). Functional and dysfunctional impulsivity: Personality and cognitive correlates. *Journal of Personality and Social Psychology*, 58, 95–102.
- DeYoung, C. G. (2010). Mapping personality traits onto brain systems: BIS, BAS, FFFS, and beyond. *European Journal of Personality*, 24, 404–407.
- Foster, J. D., & Trimm, R. F. (2009). On being eager and uninhibited: Narcissism and approach–avoidance motivation. *Personality and Social Psychology Bulletin*, 34, 1004–1017.
- Gray, J. A. (1982). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system*. Oxford, England: Oxford University Press.
- Gray, J. A., & McNaughton, N. (2000). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system* (2nd ed.). Oxford, England: Oxford University Press.
- Harmon-Jones, E., & Sigelman, J. (2001). State anger and prefrontal brain activity: Evidence that insult-related relative left–prefrontal activation is associated with experienced anger and aggression. *Journal of Personality and Social Psychology*, 80, 797–803.
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, 33, 61–83.
- Jackson, C. J. (2003). Gray's reinforcement sensitivity theory: A psychometric critique. *Personality and Individual Differences*, 34, 533–544.
- Jackson, C. J. (2008). Measurement issues concerning a personality model spanning temperament, character, and experience. In G. Boyle, G. Matthews, & D. Saklofske (Eds.), *Handbook of personality testing* (pp. 73–93). Sage Publishers.
- Jonason, P. K. (2015). An evolutionary perspective on interpersonal violence: Sex differences and personality links. In M. DeLisi, & M. G. Vaughn (Eds.), *International handbook of biosocial criminology* (pp. 32–45). New York, NY: Routledge.
- Jonason, P. K., Duineveld, J. J., & Middleton, J. P. (2015). Pathology, pseudopathology, and the Dark Triad of personality. *Personality and Individual Differences*, 78, 43–47.
- Jonason, P. K., Li, N. P., Webster, G. W., & Schmitt, D. P. (2009). The Dark Triad: Facilitating short-term mating in men. *European Journal of Personality*, 23, 5–18.
- Jonason, P. K., & Luévano, V. X. (2013). Walking the thin line between efficiency and accuracy: Validity and structure of the Dirty Dozen. *Personality and Individual Differences*, 55, 76–81.
- Jonason, P. K., Lyons, M., Bethell, E., & Ross, R. (2013). Different routes to limited empathy in the sexes: Examining the links between the Dark Triad and empathy. *Personality and Individual Differences*, 57, 572–576.
- Jonason, P. K., & Tost, J. (2010). I just cannot control myself: The Dark Triad and self-control. *Personality and Individual Differences*, 49, 611–615.
- Jonason, P. K., & Webster, G. D. (2012). A protean approach to social influence: Dark Triad personalities and social influence tactics. *Personality and Individual Differences*, 52, 521–526.
- Jonason, P. K., & Webster, G. D. (2010). The Dirty Dozen: A concise measure of the dark triad. *Psychological Assessment*, 22, 420–432.
- Jones, D. N., & Paulhus, D. L. (2011). The role of impulsivity in the Dark Triad of personality. *Personality and Individual Differences*, 51, 679–682.
- Jones, D. N., & Paulhus, D. L. (2014). Introducing the Short Dark Triad (SD3): A brief measure of dark personality traits. *Assessment*, 21, 28–41.
- Mealey, L. (1995). The sociobiology of sociopathy: An integrated evolutionary model. *The Behavioral and Brain Sciences*, 18, 523–599.
- Miller, J. D., Few, L. R., Seibert, L. A., Watts, A., Zeichner, A., & Lynam, D. R. (2012). An examination of the Dirty Dozen measure of psychopathy: A cautionary tale about the costs of brief measures. *Psychological Assessment*, 24, 1048–1053.
- Paulhus, D. L., & Williams, K. M. (2002). The dark triad of personality: Narcissism, Machiavellianism, and psychopathy. *Journal of Research in Personality*, 36, 556–563.
- Smillie, L. D. (2008). What is reinforcement sensitivity theory? Neuroscience paradigms for approach–avoidance process theories of personality. *European Journal of Personality*, 22, 359–384.
- Smillie, L. D., Pickering, A. D., & Jackson, C. J. (2006). The new reinforcement sensitivity theory: Implications for personality measurement. *Personality and Social Psychology Review*, 10, 320–335.
- Torrubia, R., Avila, C., Caseras, X., & Molto, J. (2001). The sensitivity to punishment and sensitivity to reward questionnaire (SPSRQ) as a measure of Gray's anxiety and impulsivity dimensions. *Personality and Individual Differences*, 31, 837–862.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS Scales. *Journal of Personality and Social Psychology*, 47, 1063–1070.
- Webster, G. D., & Jonason, P. K. (2013). Putting the "IRT" in "Dirty": Item Response Theory analyses of the Dark Triad Dirty Dozen—An efficient measure of narcissism, psychopathy, and Machiavellianism. *Personality and Individual Differences*, 54, 302–306.
- Wilson, M., & Daly, M. (1985). Competitiveness, risk-taking and violence: The young male syndrome. *Ethology and Sociobiology*, 6, 59–73.

⁸ The interested reader is welcome to contact the first author for a summary of these analyses.