



# Dorian Gray without his portrait: Psychological, social, and physical health costs associated with the Dark Triad<sup>☆</sup>



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## ABSTRACT

We examined how the Dark Triad (i.e., narcissism, psychopathy, and Machiavellianism) traits—as different social strategies—were associated with various health outcomes. In samples of American undergraduates ( $N = 1389$ ), Australian high school students ( $N = 2023$ ), and British undergraduates ( $N = 280$ ), we examined the physical, social, and psychological costs associated with the Dark Triad traits. Narcissism was linked to few mental and physical ailments, suggesting it may provide a social buffer from negative health outcomes (Studies 1 and 2). Psychopathy (Studies 1 and 2) and Machiavellianism (Study 2) were linked to a number of psychological and physical health conditions. In addition, psychopathy was related to diminished life expectancy, whereas narcissism was related to enhanced life expectancy (Study 3). Our findings provide evidence that each of these personality traits is linked to various psychosocial tradeoffs and different methods of coping with stress and adaptive problems.

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## 1. Introduction

*The Picture of Dorian Gray* (Wilde, 2009) details the life of a man who, upon realizing he can do anything he wants without any penalty, engages in, what evolutionary psychologists and behavioral ecologists would call a “fast” life strategy (Figueredo et al., 2006; Jonason, Webster, Schmitt, Li, & Crysel, 2012; Rushton, 1985). This fast life strategy is characterized by drug use, casual sex, and interpersonal aggression; engaging in these behaviors with seemingly little consequence. However, the damage to his body and mind are offset to a portrait of himself, creating a grossly disfigured and syphilitic shadow of the man he once was. For most people however, engaging in such behaviors may translate into diminished social, psychological, and physical health. In this study, we examine how engaging in the particular life history strategies that characterize people high on the Dark Triad traits (i.e., narcissism, psychopathy, and Machiavellianism)—traits that somewhat reflect

the character of Dorian Gray—may be related to various health outcomes.

There is a long history of research dedicated to linking personality traits, such as the Dark Triad, to various health outcomes. However, most of this work is descriptive in nature and focuses on the idea of “co-morbidity” (Friedman & Kern, 2014; Jakovljević & Ostojić, 2013). Although this concept dominates health psychology models of personality, it is based on an atheoretical research tradition. As such, we propose an alternative view of the relationships between personality traits and health outcomes. From an evolutionary perspective, personality traits reflect underlying social strategies that individuals engage in (Nettle, 2007). More specifically, evolutionary models of personality focus on the tradeoffs an individual must make between immediate and delayed gains, as well as the costs associated with engaging in a particular life strategy (Buss, 2009; Jonason, Koenig, & Tost, 2010). For instance, engaging in casual sex may come with costs of unwanted pregnancies and sexually transmitted infections. We do not contend that individuals make these tradeoffs consciously, but instead, costs are naturally occurring features linked to engaging in any one approach to solving adaptive and social challenges.

The Dark Triad traits (Jonason, Li, Webster, & Schmitt, 2009; Paulhus & Williams, 2002) are characterized by entitlement, superiority, dominance (i.e., narcissism), glib social charm, manipulativeness (i.e., Machiavellianism), callous social attitudes,

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impulsivity, and interpersonal antagonism (i.e., psychopathy). Despite the overlap between the traits, it is clear each have their own unique interpersonal and intrapersonal correlates, all of which are indicative of the different approaches to life those characterized by each trait engage in. Therefore, we make general and specific predictions below.

We expect the Dark Triad traits will be correlated with individual differences in psychological (e.g., anxiety), social (e.g., attachment), and physical health (e.g., general health). In this study we cast a wide net to detect the various health outcomes linked to the Dark Triad traits. This is based on the view that dysfunction occurs in multiple domains, rather than in a single domain. In reference to “social” factors, the Dark Triad traits are related to attachment dysfunctions (Jonason, Lyons, & Bethell, 2014), which may cause problems with other social factors (e.g., social skills), and therefore we might expect associations with both. In reference to “psychological” factors, if we treat non-clinical depression and anxiety as individual differences in mood, and subjective well-being, self-esteem, and hope as their converse, we might expect associations with the Dark Triad traits. Last, in reference to physical health, both life expectancy and self-reported general health might be associated with the Dark Triad traits.

Psychopathy is the most notorious trait of the cluster, as it is strongly linked to criminality and is commonly studied in criminal populations (Cleckley, 1976; Hare, 1985). Psychopathy is correlated with dysfunctional impulsivity (Jones & Paulhus, 2011), limited self-control (Jonason & Tost, 2010), drug use (Jonason et al., 2010), risk-taking (Adams, Luévano, & Jonason, 2014; Crysel, Crosier, & Webster, 2013), and an exploitive mating style (Jonason, Luévano, & Adams, 2012), all of which are linked to a shorter life expectancy (for review see Del Giudice, 2014). It has been linked to a wide array of socially undesirable outcomes (Figueredo, Vásquez, Brumbach, & Schneider, 2007), which indicate a preference for immediate gains and lead to behaviors that may contribute to various health dysfunctions and diminished life expectancy. Therefore, we predict that psychopathy will be associated with various adverse health outcomes. We also test whether individual differences in one’s life history strategy mediate this relationship as proximal mechanisms to better test our Life History Theory inspired predictions.

There are many conceptual similarities between Machiavellianism and psychopathy (e.g., McHoskey, Worzel, & Szyarto, 1998; Smith & Griffith, 1978), such as callousness, disagreeableness, and manipulateness (Furnham, Richards, & Paulhus, 2013). However, recent work suggests that they are distinct constructs. Machiavellianism, unlike psychopathy, appears to embody a less impulsive and less aggressive way of life (Jones & Paulhus, 2010; Reidy, Zeichner, & Martinez, 2008). Indeed, some have argued that Machiavellianism facilitates long-term strategizing (Jones & Paulhus, 2009), which may buffer those who possess this trait from adverse health outcomes. Nevertheless, long-term strategizing is likely to cause stress to a certain extent (e.g., suppressing immediate needs for long-term goals, lacking social connections), which may be evident in health indicators. Therefore, we expect that Machiavellianism will also be associated with poor health outcomes, however, for a different reason than for psychopathy; not as a function of risk-taking or a fast life strategy. This distinction might be fundamentally important from a theoretical perspective. That is, those high on psychopathy pay for their overly immediate approach to life, whereas those high on Machiavellianism pay for their overly delayed approach to life.

Psychopathy and Machiavellianism may be the “darker” aspects of the Dark Triad traits with their maladaptive tendencies (Rauthmann, 2012), in addition to limited empathy (Jonason & Krause, 2013; Jonason, Lyons, Bethell, & Ross, 2013) and disordered attachment (Jonason et al., 2014). Like psychopathy, narcissism is

linked to a tendency to satisfy one’s immediate ego needs, while downplaying long-term consequences (Morf & Rhodewalt, 2001) as a function of impulsivity and risk-taking (Campbell, Goodie, & Foster, 2004; Jones & Paulhus, 2011). Narcissism may be unique from the other traits in its “social” orientation; characterized by a tendency to seek external validation and attention (Raskin & Hall, 1979; Raskin & Terry, 1988) and high emotional intelligence (Petrides, Vernon, Schermer, & Veselka, 2011). Unlike psychopathy and Machiavellianism that may be associated with a tendency to distance oneself from others (Jonason, Wee, Li, & Jackson, 2014), narcissism may facilitate the active and passive accrual of a social network (Jonason & Schmitt, 2012; Jonason et al., 2014). This may act as a buffer (Cohen, 1988; Cohen & Wills, 1985; DiMatteo, 2004) from the deleterious health outcomes that the other traits are linked to. Indeed, narcissism is correlated with subjective well-being (Rose & Campbell, 2004), and therefore we expect few correlations with negative health outcomes and may even be related to positive health outcomes and greater life expectancy.

An evolutionary model of the relationship between the Dark Triad traits and health would also predict mediation effects (Baron & Kenny, 1986). There are well-known sex differences in health, especially in younger samples (Sweeting, 1995), and in the Dark Triad traits. Men generally have poorer health than women do (Shumaker & Hill, 1991; Verbrugge, 1989) and suffer more physical as opposed to psychological health conditions (Macintyre, Hunt, & Sweeting, 1996). Men are more characterized by all three of the Dark Triad traits around the world (Jonason, Li, & Czarna, 2013; Jonason et al., 2009) as well. Therefore, sex differences in health variables might be, in part, a function of individual differences in the Dark Triad. That is, the Dark Triad traits are some of the proximal mechanisms that account for negative health outcomes. We expect these effects to be localized to men and physical health, given the evolutionary advantage provided by risk-taking in men and not as much in women (Figueredo et al., 2006; Jonason et al., 2010). We also test for moderation, but do so in an exploratory fashion and, thus, we remain agnostic about particular effects.

In this study we attempt to understand why and how each of the Dark Triad traits are linked to various health outcomes including social (e.g., social skills), psychological (e.g., anxiety), and physical (e.g., life expectancy) factors. We examine these associations in various measures of health and the Dark Triad traits, sampled from three English-speaking countries. Instead of conceptualizing these relationships through a co-morbidity lens, we propose that engaging in any one way of life has associated health costs. In addition, we contend that individual differences in the Dark Triad traits may account for some of the sex differences in health outcomes.

## 2. Study 1

In Study 1, we assess the relationship between the Dark Triad traits and measures of social, psychological, and physical health in a large sample of American undergraduate students. We use various measures of health indicators, and therefore our discussion focuses on the average health effects by reporting the average  $\beta$  across all measures; comparable to a mini meta-analysis.

### 2.1. Method

#### 2.1.1. Participants and procedure

One thousand three hundred eighty-nine undergraduates (33% men), aged 18–50 years old ( $M = 18.88$ ,  $SD = 2.15$ ) from a southwestern American university participated in this study as part of their introductory psychology course. The majority (46%) of the

sample was of European descent, with 6% of African descent, 23% of Hispanic/Latino descent, 14% of age Asian descent, and the remainder reporting some “other” ethnic identity. Participants completed an online survey as part of mass-testing session in their introductory psychology course.

### 2.1.2. Measures

The Dark Triad Dirty Dozen (Jonason & Webster, 2010) was used to measure the Dark Triad traits. Participants were asked how much they agreed (1 = *disagree strongly*; 5 = *agree strongly*) 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  $\alpha = .74$ ), Machiavellianism ( $\alpha = .70$ ), and psychopathy ( $\alpha = .71$ ).<sup>1</sup>

We assessed psychological health in a number of ways. First, we used the depression and anxiety facets (Soto & John, 2009) of the neuroticism factor of the Big Five Inventory (BFI; Benet-Martinez & John, 1998). Participants were asked how much they agreed (1 = *disagree strongly*; 5 = *agree strongly*) with statements such as, “Is depressed, blue” (i.e., depression) and “Worries a lot” (i.e., anxiety). The corresponding items were averaged to create indexes of depression ( $\alpha = .47$ ) and anxiety ( $\alpha = .77$ ).

We also measured depression with the 10-item Center for Epidemiological Studies on Depression Scale (Insel, 1986; Radloff, 1977). Participants were asked how often they “felt this way” during the past week on a 4-point scale [0 = *rarely or none of the time* (less than 1 day); 3 = *all of the time* (5–7 days)] with statements such as “I could not get going” and “I felt lonely.” These items were averaged to create an index of depression ( $\alpha = .79$ ).

We measured social skills with an 11-item version of the Social Skills Assessment (Ireland & Pennebaker, 2010). Participants were asked how much they agreed (1 = *disagree strongly*; 5 = *agree strongly*) with statements such as “Friends say I’m a people person” and “When I talk with most people the conversation flows effortlessly”. These items were averaged to create an index of social skills ( $\alpha = .85$ ).

To measure physical health, participants were asked to rate their health in relation to others (1 = *poor*; 5 = *excellent*) with a single-item: “Compared to others your age, how would you rate your health?” Prior research has successfully used this measure (e.g., Cockerham, Sharp, & Wilcox, 1983; Idler, Kasi, & Lemke, 1990; Thomas, Kelman, Kennedy, Ahn, & Yang, 1992).

Attachment dysfunction was measured with the Experiences in Close Relationship Scale-Short Form (Wei, Russell, Mallinckrodt, & Vogel, 2007). Anxious and avoidant attachment were assessed by asking participants for their agreement (1 = *disagree strongly*; 7 = *agree strongly*) with statements like “I need a lot of reassurance that I am loved by my partner” (i.e., anxious) and “I try to avoid getting too close to my partner” (i.e., avoidant). Responses were averaged to create indexes of anxious attachment ( $\alpha = .72$ ) and avoidant attachment ( $\alpha = .78$ ).

## 2.2. Results and discussion

Table 1 (top panel) contains descriptive statistics and sex differences for the Dark Triad traits and Table 2 (top panel) contains the same information for health indicators. Men scored higher on the Dark Triad traits than women did (Jonason & Webster, 2010; Jonason et al., 2009) and reported better physical health and lower levels of anxiety and depression (only when measured with the

**Table 1**

Descriptive statistics and sex differences in the Dark Triad traits in American (Study 1), Australian (Study 2), and British samples (Study 3).

	Mean (SD)			<i>t</i>	<i>d</i>
	Overall	Men	Women		
<i>Study 1 (N = 1389)</i>					
Machiavellianism	2.99 (0.78)	3.09 (0.85)	2.93 (0.73)	3.30**	0.22
Psychopathy	2.16 (0.80)	2.43 (0.82)	2.01 (0.75)	8.75**	0.52
Narcissism	3.38 (0.73)	3.51 (0.68)	3.30 (0.75)	4.52**	0.27
<i>Study 2 (N = 2023)</i>					
Machiavellianism	1.90 (0.84)	2.02 (0.88)	1.77 (0.79)	6.79**	0.29
Psychopathy	2.13 (0.78)	2.26 (0.78)	2.02 (0.77)	6.95**	0.31
Narcissism	2.52 (0.74)	2.59 (0.76)	2.45 (0.72)	4.35**	0.19
<i>Study 3 (N = 280)</i>					
Machiavellianism	3.11 (0.53)	3.36 (0.67)	3.07 (0.49)	2.91**	0.49
Psychopathy	1.94 (0.50)	2.34 (0.59)	1.86 (0.44)	5.17**	0.92
Narcissism	2.71 (0.56)	2.92 (0.68)	2.68 (0.52)	2.29*	0.39

*d* is Cohen’s *d* for effect size.

\*  $p < .05$ .

\*\*  $p < .01$ .

BFI), diminished social skills, and greater avoidant attachment. The sexes did not differ in anxious attachment.

In Table 3 we report the zero-order correlations between the Dark Triad traits and indicators of physical and psychological health. We also report the standardized regression coefficients where the shared variance between the Dark Triad traits was controlled for by entering them all in as predictors. Generally speaking, Machiavellianism ( $\beta_{\text{Mean}} = -.05$ ) and narcissism ( $\beta_{\text{Mean}} = .02$ ) were uncorrelated with the health outcomes but psychopathy was associated with diminished health ( $\beta_{\text{Mean}} = .11$ ,  $p < .01$ ). This confirms our hypotheses related to narcissism and psychopathy.

The correlation between psychopathy and physical health was stronger (Fisher’s  $z = 2.48$ ,  $p < .05$ ) in men ( $r = -.14$ ,  $p < .01$ ) than women ( $r = .01$ ). The correlation between psychopathy and anxious attachment was stronger ( $z = -2.08$ ,  $p < .05$ ) in men ( $r = .14$ ,  $p < .01$ ) than in women ( $r = .02$ ). The correlation between psychopathy and social skills was stronger ( $z = 2.24$ ,  $p < .05$ ) in men ( $r = -.23$ ,  $p < .01$ ) than women ( $r = .10$ ). The correlation between Machiavellianism and anxious attachment was stronger ( $z = -2.17$ ,  $p < .05$ ) in men ( $r = .17$ ,  $p < .01$ ) than women ( $r = .04$ ).

We examined the Dark Triad traits as potential mediators of sex differences in various health indicators. Sex differences in physical health were partially mediated ( $\Delta R^2 = .01$ ,  $F(1, 1384) = 8.49$ ,  $p < .01$ ) by psychopathy, whereby the sex difference ( $\beta$ ) shrank from  $-.17$  to  $-.11$ . Sex differences in depression (as measured by the BFI) were partially mediated ( $\Delta R^2 = .06$ ,  $F(1, 1384) = 66.33$ ,  $p < .01$ ) by psychopathy, whereby the sex difference ( $\beta$ ) shrank from  $-.17$  to  $-.12$ . Sex differences in depression as measured by the BFI were partially mediated ( $\Delta R^2 = .03$ ,  $F(1, 1384) = 33.33$ ,  $p < .01$ ) by Machiavellianism whereby the significant sex difference ( $\beta$ ) shrank from  $-.17$  to  $-.08$ . Sex differences in anxiety (as measured by the BFI) were partially mediated ( $\Delta R^2 = .01$ ,  $F(1, 1384) = 11.86$ ,  $p < .01$ ) by narcissism, whereby the significant sex difference ( $\beta$ ) rose from  $.23$  to  $.25$ , suggesting suppression. Sex differences in avoidant attachment were partially mediated ( $\Delta R^2 = .004$ ,  $F(1, 1384) = 4.18$ ,  $p < .05$ ) by Machiavellianism, whereby the significant sex difference ( $\beta$ ) shrank from  $-.24$  to  $-.09$ . Sex differences in avoidant attachment were partially mediated ( $\Delta R^2 = .01$ ,  $F(1, 1384) = 5.22$ ,  $p < .05$ ) by narcissism whereby the significant sex difference ( $\beta$ ) shrank from  $-.24$  to  $-.11$ .

## 3. Study 2

Although Study 1 provides insight into the associations between the Dark Triad and psychological and physical health, it

<sup>1</sup> Machiavellianism was correlated with psychopathy ( $r(1215) = .38$ ,  $p < .01$ ) and narcissism ( $r(1210) = 0.39$ ,  $p < .01$ ), and narcissism was correlated with psychopathy ( $r(1211) = 0.13$ ,  $p < .01$ ).

**Table 2**

Descriptive statistics and sex differences for indicators of physical and psychological health in American (Study 1), Australian (Study 2), and British samples (Study 3).

	Mean (SD)			<i>t</i>	<i>d</i>
	Overall	Men	Women		
<i>Study 1 (N = 1389)</i>					
Physical health	2.76 (0.83)	2.87 (0.80)	2.71 (0.84)	3.39**	0.19
Depression (CES-D)	1.02 (0.56)	1.02 (0.56)	1.02 (0.56)	−0.01	−0.00
Depression (BFI)	2.85 (0.94)	2.74 (0.96)	2.91 (0.92)	−2.87**	−0.17
Anxiety	3.06 (0.92)	2.77 (0.87)	3.21 (0.91)	−7.94**	−0.47
Anxious attachment	3.79 (1.06)	3.82 (1.11)	3.76 (1.04)	0.81	0.05
Avoidant attachment	3.04 (1.07)	3.20 (0.98)	2.96 (1.08)	3.80**	0.22
Social skills	3.61 (0.69)	3.55 (0.65)	3.65 (0.63)	−2.64**	−0.16
<i>Study 2 (N = 2023)</i>					
General Health Questionnaire	1.96 (0.47)	1.87 (0.42)	2.05 (0.50)	−10.39**	−0.39
Hope	4.18 (0.84)	4.29 (0.80)	4.08 (0.86)	6.53**	0.25
Self-esteem	0.70 (0.26)	0.76 (0.22)	0.64 (0.28)	12.72**	0.48
Emotional Well-being	4.71 (1.14)	4.80 (1.10)	4.62 (1.17)	3.54**	0.16
Psychological Well-being	4.33 (1.04)	4.40 (1.05)	4.25 (1.03)	3.17**	0.14
Social Well-being	3.67 (1.21)	3.85 (1.16)	3.49 (1.23)	6.61**	0.30
<i>Study 3 (N = 280)</i>					
Life Expectancy	87.08 (9.82)	80.17 (9.51)	88.43 (9.32)	−5.48**	−0.88
K-score	5.38 (0.59)	4.99 (0.62)	5.45 (0.55)	−5.01**	−0.78
Overall risk-taking	1.59 (0.53)	1.83 (0.76)	1.54 (0.46)	3.48**	0.46
Frequency of smoking	1.33 (0.84)	1.61 (1.11)	1.28 (0.77)	1.94	0.35
Drinking alcohol	2.02 (0.68)	2.13 (0.93)	2.00 (0.62)	0.91	0.16
Dangerous sex/intravenous drug use	1.41 (0.89)	1.76 (1.29)	1.34 (0.79)	2.13*	0.39
Seatbelt wearing	3.72 (0.66)	3.61 (0.77)	3.75 (0.64)	−1.31	−0.19
Sunscreen use	2.48 (0.89)	1.85 (0.82)	2.59 (0.86)	−5.46**	−0.78

*d* is Cohen's *d* for effect size.\* *p* < .05.\*\* *p* < .01.**Table 3**

Associations between the Dark Triad traits and indicators of physical and psychological health in American undergraduates (Study 1).

Health indicators	<i>r</i> ( <i>β</i> )		
	Machiavellianism	Psychopathy	Narcissism
Physical health	−.02 (−.02)	−.07* (−.07*)	.04 (.06)
Depression (CES-D)	.13** (.06)	.19** (.16**)	.04 (−.01)
Depression (BFI)	.16** (.09**)	.22** (.19**)	.07* (.01)
Anxiety (BFI)	.02 (.01)	−.05 (−.06*)	.07* (.07*)
Anxious attachment	.13** (.03)	.10** (.07*)	.21** (.19**)
Avoidant attachment	.06* (.03)	.21** (.22**)	−.06* (−.09**)
Social skills	.09** (.15**)	−.20** (−.27**)	.13** (.10**)

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

is based on data from American college students and uses one conceptualization of the Dark Triad. Therefore, we sought to replicate the links between the Dark Triad traits with indicators of psychological and physical health in a sample of Australian secondary school students from New South Wales and Queensland (i.e., Australia). We use a face-valid measure of the Dark Triad, designed to assess these traits in adolescents. We focus on the bigger picture by reporting the overall associations in the within-study, mini meta-analysis (i.e.,  $\beta_{\text{Mean}}$ ) and provide the particulars in the Tables.

### 3.1. Method

#### 3.1.1. Participants and procedure

The sample consisted of 2023 Grade 10 adolescents attending Catholic High Schools in two states of Australia.<sup>2</sup> The mean age of participants was ( $M = 15.61$ ,  $SD = 0.45$ ) with an even sex distribution of girls (49%) and boys (51%). The majority (90%) reported being of European descent, 1% was Aboriginal, and the remaining participants

were from some “other” ethnic group. Participation required school, parental, and student consent. Questionnaires were completed anonymously in class.

#### 3.1.2. Measures

The Dark Triad traits have rarely been studied in populations under 18 years of age. We wanted to avoid the assumption that traditional measures would be sufficient for adolescents because (1) prior measures assume college-level reading comprehension and (2) validation of prior measures were completed with those over 18 years of age. We developed<sup>3</sup> 16 indicators (see Appendix A) of the three traits and subjected them to data-reduction and structural assessments; items that were based on the Dirty Dozen measure (Jonason & Webster, 2010).<sup>4</sup> Participants were asked how much they agreed (1 = *not at all*; 5 = *very much*) with each item. After excluding problematic reverse-scored items, we ran an exploratory structural equation model (ESEM) which provided a three dimensional fit for the items ( $\chi^2(75) = 454$ , RMSEA = .05, CFI = .95, TLI = .92). Psychopathy was correlated with narcissism ( $r(2021) = .34$ ,  $p < .01$ ), and Machiavellianism ( $r(2021) = .39$ ,  $p < .01$ ). Narcissism was correlated with Machiavellianism ( $r(2021) = .52$ ,  $p < .01$ ). Average standardized target factor loadings were moderate for all factors (i.e., .22–.46) and in all cases higher than the non-target loadings (i.e., .06–.20). The indicators of narcissism (Cronbach's  $\alpha = .68$ ), psychopathy ( $\alpha = .59$ ), and Machiavellianism ( $\alpha = .85$ ) had reasonable-to-good internal consistency. There was strong evidence of measurement invariance in configural ( $\chi^2(150) = 525$ , RMSEA = .05, CFI = .95, TLI = .92), weak factorial ( $\chi^2(189) = 563$ , RMSEA = .05, CFI = .95, TLI = .94), strong factorial ( $\chi^2(202) = 624$ , RMSEA = .05, CFI = .94, TLI = .93), and strict factorial ( $\chi^2(218) = 672$ , RMSEA = .05, CFI = .94, TLI = .93) models across the sexes. We also replicated sex differences in the Dark Triad traits (Table 1, middle panel). Taken together, we are confident in our ability to test our predictions regarding health and the Dark Triad.

<sup>3</sup> More detail available upon request.<sup>4</sup> We were unable to use the Dirty Dozen itself as per requirements from the approving Institutional Review Board.<sup>2</sup> Catholic Schools account for nearly 21.5% of all secondary schools in Australia (ABS, 2012).

Global self-esteem was measured using the 10-item Rosenberg's (1965) self-esteem scale. Participants were asked yes/no questions regarding their agreement with statements such as, "I feel that I am a person of value-equal to most kids my age" and "generally I feel satisfied with myself". Items were summed in order to create an overall index of health ( $\alpha = .88$ ). The Rosenberg self-esteem scale includes six negatively worded items and thus there were possibilities of negative item wording effects. This was controlled for by using *a priori* correlated residuals.

We assessed hope with the 8-item Snyder Hope Scale (Snyder et al., 1991). Participants were asked to indicate their agreement (1 = none of the time; 6 = all of the time) with statements such as "I energetically pursue my goals" and "I can think of many ways to get out of a jam". Items were averaged to create an overall score ( $\alpha = .90$ ). The scale items assess the agency aspects of hope (e.g., "I have been pretty successful in life") as well as pathways hope (e.g., "I can think of ways to get the things in life that are most important to me"). In the present research we were primarily interested in the global aspect of hope (see also Brouwer, Meijr, Weekers, & Baneke, 2008). However, the items from the same sub-factors are likely to have some covariance independent from the variance explained by the global components. This can lead to model misfit and potentially contribute to parameter estimate bias. Thus, we controlled for this potential misfit by using *a priori* correlated residuals between the agency items, and between the pathway items (see Marsh et al., 2013).

Participants' health was measured using the 12-item General Health Questionnaire (Goldberg & Hiller, 1979). Participants reported their agreement (1 = strongly disagree; 4 = strongly agree) with items regarding their health over a two-week period. Items were either positively-worded (e.g., "been able to concentrate on whatever you are doing") or negatively-worded (e.g., "been feeling unhappy and depressed"). Items were summed in order to create an overall index of health ( $\alpha = .90$ ) where higher scores mean more health problems. The GHQ includes six negatively worded items and thus there were possibilities of negative item wording effects. This was controlled for using *a priori* correlated residuals.

Subjective well-being was assessed using the 12-item Child Development Supplement-II (Keyes, 2005, 2006). Items assess emotional ( $\alpha = .90$ ), psychological ( $\alpha = .82$ ) and social ( $\alpha = .86$ ) well-being. Participants are asked about experiences they have had in the past month (1 = never; 5 = every day), such as, "How often have you felt happy?" (i.e., Emotional), "How often did you feel good at managing the responsibilities of your daily life?" (i.e., Psychological) and "How often did you feel that people are basically good?" (i.e., Social).

### 3.2. Results and discussion

We used ESEM as a general approach to test construct validity, multigroup invariance of this measure across participant's sex, and structural relationships between groups of latent variables (Asparouhov & Muthén, 2009; Dolan, Oort, Stoel, & Wicherts, 2009; Morin, Marsh, & Nagengast, 2013). Presented here are the results from a series of ESEMs with robust weighted least squares (Muthén & Muthén, 2013) and full-information-maximum-likelihood to provide a principled approach to missing data (Enders, 2010) in which the three Dark Triad factors predicted mental health and well-being. These models suggest the Dark Triad fit the data for self-esteem ( $\chi^2(321) = 1313$ , RMSEA = .04, CFI = .95, TLI = .93), hope ( $\chi^2(208) = 893$ , RMSEA = .04, CFI = .96, TLI = .94), health ( $\chi^2(303) = 1066$ , RMSEA = .04, CFI = .96, TLI = .95), and subjective well-being ( $\chi^2(291) = 1248$ , RMSEA = .04, CFI = .95, TLI = .94); standardized regression coefficients are presented in Table 4. Narcissism ( $\beta_{\text{Mean}} = .30$ ,  $p < .01$ ) was consistently associated with positive mental health and well-being attributions (with

the exception of affective empathy), and Machiavellianism ( $\beta_{\text{Mean}} = -.31$ ,  $p < .01$ ) was consistently linked to poorer mental health and well-being outcomes (with the exception of affective empathy). While psychopathy generally predicted poor health ( $\beta_{\text{Mean}} = -.09$ ,  $p < .05$ ) outcomes, Machiavellianism predicted even worse outcomes.

In Tables 1 and 2 (middle panels) we report descriptive statistics and sex differences. We replicated sex differences in the Dark Triad traits; with magnitudes that were similar to prior studies with other measures (Jonason et al., 2009, 2013), which implicitly validates our *ad hoc* measure of the Dark Triad traits among youths. Women were generally healthier than men were and men appeared to suffer from more psychological and social ailments than women did. These sex differences were mediated by the Dark Triad traits but these effects were all small ( $R^2$ s = .04–.07) suggesting that dark aspects of personality account for only a small portion of the sex differences in health of adolescents. Being bad as embodied in these traits may not be all that important on its on in predicting health in Australian teens.

## 4. Study 3

Studies 1 and 2 relied on a variety of measures to assess the links between the Dark Triad traits and health. These measures could be criticized for being too general and simply replicating (and extending) prior studies. Moreover, we used contentious (Study 1) and untested (Study 2) measures of the Dark Triad. Therefore, we examine the Dark Triad traits in relation to life expectancy and health-related behaviors using an alternative measure of the former (Jones & Paulhus, 2014). We predicted that the fast life strategy linked to psychopathy would be related to lower life expectancy (Del Giudice, 2014). However, Machiavellianism is not well linked to this fast life strategy (Jones & Paulhus, 2009), and therefore we did not expect it to be associated with life expectancy, particularly so when the shared variance with psychopathy is controlled for. Given the value that those high in narcissism place on social connections (Bogart, Benetsch, & Pavlovic, 2004), it is possible that narcissism may be linked to enhanced life expectancy despite the reasons they may desire others in their lives.

### 4.1. Method

#### 4.1.1. Participants and procedure

Two hundred and eighty individuals (16% men), aged 17–58 ( $M = 20.21$ ,  $SD = 4.90$ ) completed a battery of online questionnaires which included measures of the Dark Triad, life expectancy, health-related attitudes and behaviors, and life history. They were primarily recruited through the University of Durham (U.K.) internal participant pool advertising board; students were given course credit for their participation.

#### 4.1.2. Measures

To measure the Dark Triad, we used the Short-Dark Triad (Jones & Paulhus, 2014). Participants indicated agreement (1 = strongly disagree; 5 = strongly agree) of 27 statements such as "People see me as a natural leader" (i.e., narcissism), "Most people can be manipulated" (i.e., Machiavellianism), and "Payback needs to be quick and nasty" (i.e., psychopathy). Items were averaged to create indices of narcissism (Cronbach's  $\alpha = .73$ ), Machiavellianism ( $\alpha = .68$ ), and psychopathy ( $\alpha = .70$ ).<sup>5</sup>

<sup>5</sup> Narcissism was correlated with Machiavellianism ( $r(278) = .28$ ,  $p < .01$ ) and psychopathy ( $r(278) = .37$ ,  $p < .01$ ). Machiavellianism was correlated with psychopathy ( $r(278) = .48$ ,  $p < .01$ ).

**Table 4**  
The Dark Triad traits as predictors ( $\beta$ s) of physical and psychological health in Australian High School students (Study 2) along with total indirect effects ( $R^2$ ) for mediation of sex differences.

Health Indicators	$\beta$			$R^2$
	Machiavellianism	Psychopathy	Narcissism	
General Health Questionnaire	.11*	.02	-.08*	.05*
Hope	-.46**	-.21*	.56**	.06*
Self-esteem	-.39**	.09	.41**	.05*
Emotional Well-being	-.38**	-.16*	.34**	.06*
Psychological Well-being	-.46**	-.25**	.57**	.07*
Social Well-being	-.34**	-.09	.33**	.04*

Note: zero-order correlations are not reported given how the Dark Triad traits were measured and the resultant statistical analyses.

\*  $p < .01$ .

\*\*  $p < .001$ .

**Table 5**  
Associations between the Dark Triad traits, life expectancy, and unhealthy behaviors in a British sample (Study 3).

Health Indicators	$r$ ( $\beta$ )		
	Machiavellianism	Psychopathy	Narcissism
Life expectancy	-.17** (-.07)	-.29** (-.37**)	.13* (.29**)
K-score	-.26** (-.12)	-.41** (-.47**)	.10* (.31**)
Overall risk-taking	.02 (-.18**)	.32** (.39**)	.14* (.05)
Frequency of smoking	-.03 (-.19*)	.25** (.35**)	.43 (-.04)
Drinking alcohol	-.02 (-.11)	.13* (.17*)	.07 (.04)
Dangerous sex/ intravenous drug use	.09 (-.05)	.25** (.24**)	.16* (.08)
Seatbelt wearing	-.08 (.04)	-.23** (-.26**)	-.05 (.04)
Sunscreen use	-.26** (-.21*)	-.21** (-.12)	-.09 (.01)

\*  $p < .05$ .

\*\*  $p < .01$ .

We assessed participants' expected lifespans with the AMP Longevity Calculator (AMP, 2013). The 33-item longevity calculator is provided by AMP, an antipodean financial services company that offers life insurance to clients. AMP has been measuring the life-span of its clients relative to their behaviors for more than 150 years; this calculator is based on metrics derived from that information. Items include questions that assess Body Mass Index (i.e., BMI), hereditary disease, stress, exercise, diet, driving and workplace behaviors, educational levels, toxin consumption (e.g., alcohol/tobacco/recreational drugs), and living habits (e.g., location). Participants were asked to fill in this calculator and report their anticipated life expectancy.

We assessed participants' health-related behaviors with the Living to 100 Life Expectancy Calculator (Perls, 2013). The calculator was developed from the on-going New England Centenarian study run by Boston University School of Medicine. It is the largest of its kind, globally. Participants were asked how often (1 = *not at all*; 5 = *regularly*) they engaged in various risk factors (see Table 5). We wanted to also measure latent risk-taking based on these items. When we ran a Principle Components Analysis with various rotations we continued to find a two-factor solution. The second factor was exclusively composed of the reversed-keyed items; and recoding them so that high scores indicated more risk-taking failed to align all the items. Therefore, we dropped these two items (i.e., sunscreen, seatbelts) and re-ran our analyses with the remaining three items (i.e., risky sex, drug use, and alcohol). In this Principle Components Analysis (with a varimax rotation) we found one factor that explained 43.54% of the variance (Eigen = 1.31) with factor loadings between .58 and .67. We averaged these items to create an overall risk-taking measure.

We used the Mini-K Short Form (Figueredo, Cabeza de Baca, & Woodley, 2013) to measure life "speed" ( $r$ -K). The 20-item Mini-K is the shortened form of the 199-item Arizona Life History Battery (Figueredo, 2007). Participants indicate agreement

(-3 = *disagree Strongly*; +3 = *agree Strongly*) with statements such as "I avoid taking risks". Higher scores indicate a "slower" (high-K) life history strategy ( $\alpha = .75$ ).

#### 4.2. Results and discussion

Table 1 (bottom panel) contains descriptive statistics and sex differences for the Dark Triad traits and Table 2 (bottom panel) contains the same information for health indicators. In respect to the Dark Triad traits, men scored higher than women in narcissism, Machiavellianism, and psychopathy. Women also reported a higher life expectancy than men did, reflecting sex differences in this figure for the U.K. (Office for National Statistics, 2011), and cross-culturally (World Bank, 2013). For unhealthy behaviors, hardly any sex differences emerged. The only differences to achieve significance were men's more frequent engagement with unprotected sex and injection-based (i.e., intravenous) drug use, and women's greater use of sunscreen. In respect of life history theory, women had a "slower" life strategy and reported less risk-taking than men did.

Table 5 contains zero-order correlations between the Dark Triad traits, life expectancy, and unhealthy behaviors. It also contains standardized regression coefficients where all three of the Dark Triad traits were entered as predictors to control for their shared variance. As expected by life history theory, K-scores and risk-taking were correlated ( $r(278) = -.14$ ,  $p < .05$ ) and psychopathy was the only part of the Dark Triad linked to K-scores and risk-taking after controlling for the shared variance (Jonason et al., 2010). Life expectancy was correlated with risk-taking ( $r(278) = .30$ ,  $p < .01$ ;  $\beta = .27$ ,  $p < .01$ ) and K-scores ( $r(278) = -.27$ ,  $p < .01$ ;  $\beta = -.24$ ,  $p < .01$ ) at the zero-order and multiple regression levels.

The associations were generally similar in men and women. Across all variables, there were only three exceptions to the latter. First, the correlation between narcissism and K was stronger ( $z = -3.99$ ,  $p < .01$ ) in women ( $r = .21$ ,  $p < .01$ ) than in men ( $r = -.04$ ). Second, the correlation between narcissism and frequency of drinking was stronger ( $z = 3.31$ ,  $p < .01$ ) in men ( $r = .41$ ,  $p < .01$ ) than it was in women ( $r = -.06$ ). Third, the correlation between psychopathy and frequency of drinking was stronger ( $z = 2.19$ ,  $p < .05$ ) in men ( $r = .41$ ,  $p < .01$ ) than in women ( $r = -.12$ ). In terms of overall risk-taking, the correlation with narcissism was stronger ( $z = -2.21$ ,  $p < .05$ ) in men ( $r = .35$ ,  $p < .01$ ) than in women ( $r = .01$ ).

We tested two sets of mediation models. First, we examined whether sex differences in life expectancy were mediated by the Dark Triad traits using hierarchical multiple regression (Step 1 contained participant's sex; Step 2 included the Dark Triad traits). Step 1 was significant ( $R^2 = .10$ ,  $F(1, 278) = 22.99$ ,  $p < .01$ ) as was Step 2 ( $R^2 = .21$ ,  $F(4, 275) = 18.17$ ,  $p < .01$ ), indicating that the mediation was significant ( $\Delta R^2 = .11$ ,  $F(3, 275) = 12.95$ ,  $p < .01$ ). We found

evidence for partial mediation, whereby the sex differences ( $\beta$ ) in life expectancy shrank but remained significant from  $-.31$  to  $-.25$  and it was localized to narcissism ( $\beta = .29, p < .01$ ) and psychopathy ( $\beta = -.29, p < .01$ ).

Second, we examined whether the associations between the Dark Triad traits and life expectancy were mediated by individual differences in risk-taking and life history strategy (i.e.,  $K$ -scores). This was done to test whether these two proximal factors acted as intermediate mechanisms leading to different life expectancies. In Step 1 we entered the Dark Triad traits and in Step 2 we entered risk-taking and  $K$ -scores. Step 1 was significant ( $R^2 = .16, F(3, 276) = 17.11, p < .01$ ) as was Step 2 ( $R^2 = .20, F(5, 274) = 14.80, p < .01$ ), indicated the mediation was significant ( $\Delta R^2 = .06, F(2, 274) = 9.70, p < .01$ ). In Step 1, psychopathy ( $\beta = -.36, p < .01$ ) and narcissism ( $\beta = .29, p < .01$ ) predicted life expectancy. In Step 2, psychopathy ( $\beta = -.22, p < .01$ ), narcissism ( $\beta = .26, p < .01$ ),  $K$ -scores ( $\beta = .13, p < .05$ ), and risk-taking ( $\beta = -.22, p < .01$ ) predicted life expectancy. This suggests that both proximal factors may account for some of the life expectancy effects linked to the Dark Triad but there is unique variance that is not accounted for.

## 5. General discussion

The Dark Triad traits are a “hot topic” in personality psychology (Furnham et al., 2013; Jonason, Webster, et al., 2012). Researchers have examined various intrapersonal (Jones & Paulhus, 2011), interpersonal (Jonason et al., 2009), and behavioral (Crysel et al., 2013) correlates. In three studies we have examined a hitherto understudied aspect of the Dark Triad traits; the potential health correlates. In Studies 1 and 2, we cast a wide net of measures of social (e.g., social skills), psychological (e.g., depression), and physical (e.g., self-rated health) health indicators in young Americans and Australians. In Study 3, we examined life expectancy, risk-taking, and health-related behaviors. Although our results are not completely consistent given the wide net we cast, we do feel we have conceptually supported our hypotheses.

Specifically, results from all three studies suggest psychopathy was linked to a range of indicators of health costs. For instance, in Study 3 it was linked to lower life expectancy, more risk-taking, and a faster life history strategy (Del Giudice, 2014). In addition, the latter two accounted for some of the relationship between psychopathy and life expectancy. Highlighting the difference between Machiavellianism and psychopathy, Machiavellianism was not particularly linked to life expectancy (when controlling for shared variance) and revealed a safe and slow approach to life (Jonason et al., 2010; Jones & Paulhus, 2009). While Study 1 revealed a flat correlation between Machiavellianism and health, Study 2 revealed undesirable health correlates. All studies confirmed our predictions in relation to narcissism. It is related to few adverse health effects and even has some favorable health outcomes. For instance, in Study 3, narcissism was related to a longer life expectancy and a slow life history strategy.

While most might interpret these results through the standard health psychology model of “co-morbidity” (Friedman & Kern, 2014; Jakovljević & Ostojčić, 2013), we contend that an evolutionary lens might provide an alternative conceptualization of the relationship between personality and health, especially in relation to the Dark Triad. If personality traits are expressions of latent and evolved social strategies, and social strategies are accompanied by costs that affect individuals’ minds and bodies, then the traits should be linked to health outcomes. Given that each trait embodies its own unique approach to life, we found evidence of differential correlations with health indicators. Psychopathy is linked to poor health costs associated with risk-taking (Adams et al., 2014; Crysel et al., 2013; Jonason et al., 2010) and impulsivity (Jonason

& Tost, 2010; Jones & Paulhus, 2011). Conversely, the overly “slow” and deliberate approach to life that Machiavellianism may embody (Jonason et al., 2010; Jones & Paulhus, 2009), may impose its own costs for delaying and deferring immediate needs. Lastly, narcissism is the most “social” trait of the cluster, and it may suffer fewer health costs because of the benefits of social connections (Cohen, 1988; Cohen & Wills, 1985; DiMatteo, 2004). Importantly, this study highlights what one would expect if they viewed the Dark Triad traits as three distinct constructs (Jonason et al., 2009; Paulhus & Williams, 2002).

We replicated the sex differences in the Dark Triad traits (Jonason et al., 2009, 2013) and sex differences in health outcomes (Macintyre et al., 1996; Piccinelli & Wilkinson, 2014; Shumaker & Hill, 1991; Sweeting, 1995; Verbrugge, 1989). From an evolutionary perspective, these sex differences in health may be expressions of the tradeoffs men and women make in their respective approaches to achieving fitness outcomes (Figueredo et al., 2006). Consistent with this, we found that women engaged in a slower life history strategy and less risk-taking behaviors than men did. Sex differences in health outcomes were partially accounted for by individual differences in the Dark Triad traits. For instance, we found that sex differences in life expectancy might be, in part, driven by individual differences in the Dark Triad traits. This suggests that the Dark Triad may be instrumental in predicting different health outcomes across the sexes.

## 6. Limitations and conclusions

While this study has a number of strengths, it also suffers from a number of limitations. We (1) relied on weird samples (i.e., western, educated, industrialized, and democratic; Henrich, Heine, & Norenzayan, 2010), (2) used self-report methods, (3) used various measures (including an unvalidated, face-valid measure) to assess the Dark Triad traits, (4) attempted to maximize breadth over depth in the selection of our “health” measures, (5) suffered from some low internal consistency for our shorter measures (but see, Kline, 2000; Schmitt, 1996), (6) had some inconsistencies across studies most likely caused by method error, and (7) failed to control for social desirability effects. Nevertheless, we feel our multimethod-multisample-multimeasure approach addresses the modern replication crisis in social-personality psychology and, so long as one takes a “big picture” view of our results, we have found evidence consistent with our predictions. Nevertheless, we cannot dismiss the utility of more rigorous methods in general.

There has been a recent call for new models of the relationship between health and personality (Friedman & Kern, 2014). In this study, we provide a preliminary answer by proposing an evolutionary framework that conceptualizes “disorders” as the observed costs for engaging in various life strategies, as captured in personality traits (Buss, 2009; Nettle, 2007). As personality traits may encourage individuals to engage in a particular life history strategy, which comes with its own costs and benefits, our results indicate that the social strategies embodied by the Dark Triad traits were related to various health outcomes. In reference to Dorian Gray, he might have done better to make friends and connect with others to offset the costs of his lifestyle, instead of relying on a painting in his attic.

## Appendix A. Items measuring the Dark Triad traits in Study 2

### A.1. Narcissism

- (1) Others look up to me.
- (2) I expect special favors from others.
- (3) I want to be popular.

- (4) I'm fashionable (e.g., have the best clothes, shoes, or other items).
- (5) I'm dominant in social situations.
- (6) I like to be in charge.

### A.2. Psychopathy

- (1) I have trouble understanding others' feelings.
- (2) I don't care if other people think my actions are "wrong."
- (3) Other people's feelings don't matter to me.
- (4) The rules don't apply to me.

### A.3. Machiavellianism

- (1) I bend the truth to get what I want.
- (2) I manipulate others to get my way.
- (3) I use flattery to get my way.
- (4) I take advantage of other people.
- (5) I use people as puppets to serve my needs.
- (6) I sometimes pretend to like people in order to get them to do something for me.

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