

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

# Personality and Individual Differences

journal homepage: [www.elsevier.com/locate/paid](http://www.elsevier.com/locate/paid)

## Seeing the world in black or white: The Dark Triad traits and dichotomous thinking



Peter K. Jonason<sup>a,\*</sup>, Atsushi Oshio<sup>b</sup>, Tadahiro Shimotsukasa<sup>b</sup>, Takahiro Mieda<sup>b</sup>, Árpád Csathó<sup>c</sup>,  
Maria Sitnikova<sup>d</sup>

<sup>a</sup> Western Sydney University, Australia

<sup>b</sup> Waseda University, Japan

<sup>c</sup> University of Pécs, Hungary

<sup>d</sup> Moscow School of Social and Economic Sciences, Russia

### ARTICLE INFO

#### Keywords:

Dark Triad  
Psychopathy  
Narcissism  
Machiavellianism  
Dichotomous thinking

### ABSTRACT

In contrast to work examining motivational and affective biases, we examined potential cognitive biases, in the shape of dichotomous thinking (i.e., a tendency to see the world as black or white), linked to the Dark Triad traits. In Study 1 ( $N = 712$ ), Japanese participants revealed that the latent variance—the ostensible “adaptive” competent of the Dark Triad traits—was linked to a tendency to see the world as black or white. In Study 2 ( $N = 1489$ ), we replicated effects from Study 1 using a multinational sample and structural equation modeling and revealed some moderation by participants' sex and country in the relationship between the Dark Triad traits and dichotomous thinking. We discuss our results in terms of life history theory, contending black and white thinking might be part of the cognitive adaptations that make the Dark Triad traits function.

In the epic lightsaber battle between Obi Wan Kenobi and, the soon-to-be Darth Vader (spoiler alert), Anakin Skywalker in the Star Wars movie—*Revenge of the Sith*—Obi Wan points out that only the Sith (the evil Jedi) talk in ultimatums like “you are either with us or against us.” While this line was likely a subtle poke at former President George W. Bush's stance in relation to dealing with terrorists from the 9–11 attack in New York City, it may also reflect something about the likely thinking patterns associated with antisocial personality traits. Such a way of thinking may facilitate antagonistic social and reproductive strategies. In this study, we conceptualize the dark side of human nature as individual differences in the Dark Triad traits (i.e., narcissism, psychopathy, and Machiavellianism) and we conceptualize individual differences in black-and-white thinking as assessed by the Dichotomous Thinking Inventory (i.e., preferences for dichotomies, dichotomous beliefs, and profit-and-loss thinking; Oshio, 2009). We assess the correlations between each in one study drawn from just Japan and a second from four countries; we test whether these correlations are stable across participant's sex (Studies 1 and 2) and country (Study 2 only); and compare the contributions of the unique and shared variance by testing measurement invariance using structural equation modeling.

There has been a recent spate of interest in the Dark Triad traits (see Furnham, Richards, & Paulhus, 2013). The Dark Triad traits are characterized by grandiosity and self-centeredness (i.e., narcissism),

manipulation and cynicism (i.e., Machiavellianism), and callous social attitudes and impulsivity (i.e., psychopathy). While typically viewed as pathologies (Cleckley, 1964), some work suggests these traits may merely be characterized by different motivational, emotional, and cognitive biases than most people have. For instance, the traits appear to be linked to motivational biases towards status, prestige, and power (Semenya & Honey, 2015), aggression (Jonason & Webster, 2010), and limited empathy (Jonason, Lyons, Bethell, & Ross, 2013), all of which may enable the active exploitation of conspecifics.

One type of bias that has not been well studied in relation to the Dark Triad traits are cognitive in nature. A tendency to see the world in simplistic, black-and-white terms might be one that characterizes the Dark Triad traits and facilitates the exploitive behavior those high in the Dark Triad traits engage in (Furnham et al., 2013). For instance, seeing the world in “shades of grey” may foster deliberation which may waste time in the expedient accrual of resources (Richardson & Hardesty, 2012) making overt, deliberative processing potentially maladaptive because of missed opportunity costs. Those high in the Dark Triad traits may have had sufficiently harsh and unpredictable childhoods (Jonason, Icho, & Ireland, 2016) that make nuanced thinking problematic and unlikely, which may be why they engage in the various socially undesirable behaviors they are noted for. These behavioral strategies may be associated with underlying

\* Corresponding author at: School of Social Sciences and Psychology, Western Sydney University, Penrith, NSW 2751, Australia.  
E-mail address: [pjonason@westernsydney.edu.au](mailto:pjonason@westernsydney.edu.au) (P.K. Jonason).

**Table 1**  
Descriptive statistics and zero-order correlations between the Dark Triad traits and individual differences in dichotomous thinking in Japan (Study 1).

	1	2	3	4	5	6
1. Machiavellianism	–	0.61**	0.58**	0.23**	0.26**	0.15*
2. Narcissism		–	0.41**	0.24**	0.17**	0.17**
3. Psychopathy			–	0.16**	0.22**	0.12
4. Preference for dichotomy				–	0.57**	0.69**
5. Dichotomous beliefs					–	0.34**
6. Profit-and-loss thinking						–
Mean (SD)	2.53 (0.87)	2.83 (0.87)	2.69 (0.72)	3.05 (0.72)	2.55 (0.81)	3.41 (0.74)

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

cognitive processes which help to quickly identify critical resources and threats, and, therefore, the Dark Triad traits may be associated with a reliance on quick and automatic processing as seen in black-and-white thinking.

To link the Dark Triad traits to individual differences in black-and-white thinking we assessed people's tendencies to think in terms of dichotomies (Oshio, 2009, 2012). The higher-order construct of dichotomous thinking may be composed of individual differences in (1) preferences for dichotomy (i.e., a thinking style that leads to a preference for distinctness rather than ambiguity), (2) dichotomous beliefs (i.e., the notion that anything can be divided into all-or-nothing categories), and (3) profit-and-loss thinking (i.e., the motivation to gain access to benefits and avoid disadvantages). There is some empirical evidence suggesting that these cognitive biases might be associated with the Dark Triad traits. For instance, dichotomous thinking is associated with Cluster B (i.e., antisocial, borderline, narcissistic, and histrionic) personality disorders (Oshio, 2012), aggression (Oshio, Mieda, & Taku, 2016), and subclinical narcissism (Oshio, 2009). Such a cognitive bias may also link to substance use (Richardson & Hardesty, 2012), as the Dark Triad also are linked to (Stenason & Vernon, 2016). Therefore, we expect all the Dark Triad traits to be associated with dichotomous thinking and the correlations should be rather stable across participants' sex and country.<sup>1</sup>

We present here the first set of studies to examine one potential cognitive bias in the Dark Triad traits; dichotomous or black-and-white thinking. We expect all three of the Dark Triad traits to be unified (the shared variance) by a tendency to see the world in black or white terms as such dichotomous thinking styles should facilitate swift action and undermine more measured cautious/nuanced approaches to the world. In so doing, we advance a position that what is represented in personality traits—at least the Dark Triad—are systematic and organized biases that color the way people orient themselves to the world and others.

## 1. Study 1

In Study 1, we sampled exclusively participants from Japan as there were validated and published measures of both at the time of collection. We also tested for potential sex differences in dichotomous thinking and the Dark Triad traits. And, we compared the correlations in men and women and analysed whether sex differences in the Dark Triad traits might be a function of individual differences in dichotomous thinking.

<sup>1</sup> We test for measurement invariance to ensure the constructs have the same meaning across the groups.

## 1.1. Method

### 1.1.1. Participants and procedure

Participants were 712 Japanese (453 females,  $M_{age} = 21.42$ ,  $SD_{age} = 1.38$ ,  $Range = 18–25$ ) undergraduate college students who participated in an online survey. They were recruited from 2.3 million members of comprehensive internet survey panels through an online survey research company in Japan (Rakuten Research, Inc.). We provided the participants with an informed consent. Participants completed the questionnaires below (and others not reported here). Upon completion, they were debriefed and thanked for their participation, and received a small monetary compensation.

### 1.1.2. Measures

We used the Japanese version of the Dark Triad Dirty Dozen (Tamura, Oshio, Tanaka, Masui, & Jonason, 2015), which is a psychometrically validated (i.e., structural and nomological network) Japanese translation of the English version (Jonason & Webster, 2010). Participants were asked how much they agreed (1 = *Not at all*; 5 = *Very much*) with statements (in Japanese) 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 indexes of Machiavellianism (Cronbach's  $\alpha = 0.84$ ), psychopathy ( $\alpha = 0.61$ ), and narcissism ( $\alpha = 0.80$ ).

The Dichotomous Thinking Inventory (Oshio, 2009) was used to assess individual differences in an all-or-nothing thinking style. The scale consists of 15 items and has a three-factor structure (Oshio, 2009), measuring preferences for dichotomy (e.g., “all things work out better when likes and dislikes are clear”), dichotomous beliefs (e.g., “There are only 'winners' and 'losers' in this world”), and profit-and-loss thinking (e.g., “I want to clearly distinguish what is safe and what is dangerous”). Items were averaged to obtain an index of individual differences in all three scales ( $\alpha$ 's = 0.75, 0.82, 0.79, respectively).

### 1.1.3. Results and discussion

Table 1 contains descriptive statistics and correlations among the Dark Triad traits and individual differences in dichotomous thinking (SPSSv22). As expected (1) the Dark Triad traits were correlated with each other, (2) individual differences in dichotomous thinking were correlated with each other, and (3) the Dark Triad traits were all weakly ( $r$ s = 0.17 to 0.28) correlated with individual differences in the dichotomous thinking. Given this, we built a structural equation model (AMOSv22) to examine the covariance among the constructs. This model (Fig. 1) indicated a reasonable fit ( $\chi^2(8) = 50.69$ ,  $p < 0.001$ , CFI = 0.97, RMSEA = 0.09, 90%CI [0.07, 0.11]) and the covariance between the latent Dark Triad and the latent dichotomous thinking was significantly positive, suggesting the shared variances in each were well correlated.

To examine sex differences, we conducted measurement invariance using multi-group confirmatory factor analysis (Vandenberg & Lance, 2002) using AMOS (v22). For the analysis, we tested a (1) model with no equivalence hypothesized across men and women, and there were no constraints on the variables ( $\chi^2(16) = 91.77$ ,  $p < 0.001$ , CFI = 0.97, RMSEA = 0.08, 90%CI [0.07, 0.10], AIC = 167.77); a (2) model with the same factor loadings hypothesized, and factor loadings from each factor on observed variables were equalized across the sexes ( $\chi^2(20) = 97.33$ ,  $p < 0.001$ , CFI = 0.97, RMSEA = 0.07, 90%CI [0.06, 0.09], AIC = 165.33); a (3) model with scalar invariance and item intercepts constrained to be equal across the sexes in addition to Model 2 ( $\chi^2(24) = 106.49$ ,  $p < 0.001$ , CFI = 0.97, RMSEA = 0.07, 90%CI [0.05, 0.08], AIC = 166.49); a (4) model with strict invariance and item residual variances constrained to be equal across the sexes in addition to Model 3 ( $\chi^2(30) = 114.10$ ,  $p < 0.001$ , CFI = 0.97, RMSEA = 0.06, 90%CI [0.05, 0.07], AIC = 162.10); and a (5) model where covariances between the latent variables were constrained to be the same in each

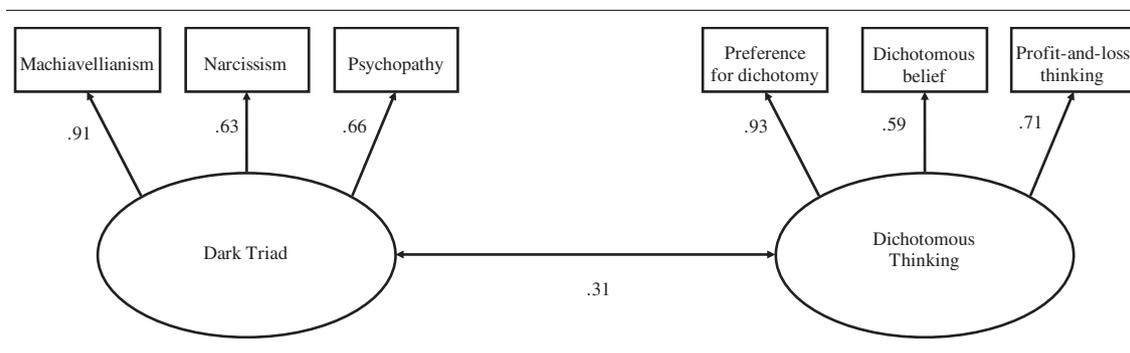


Fig. 1. Path diagram describing relationships between latent variances in the Dark Triad traits and individual differences in dichotomous thinking (Study 1). Note. Error variables are abbreviated. All path coefficients were standardized, and statistically significant,  $p < 0.01$ .

sex ( $\chi^2(31) = 114.22, p < 0.001, CFI = 0.97, RMSEA = 0.06, 90\%CI [0.05, 0.07]$ ). Model 5 fit better than the Model 4 ( $AIC = 160.22, \Delta\chi^2(1) = 0.12, n.s.$ ) and revealed that only dichotomous thinking was lower for women than men ( $Mean\ Difference = 0.12, p < 0.05$ ). The result suggests few sex differences in the relationship between dichotomous thinking and the Dark Triad traits.

## 2. Study 2

While we found support for our primary hypothesis in Study 1, we failed to find much of a role for participants' sex. This may be a country-specific effect, where sex differences in the Dark Triad traits appear muted in Japanese samples (Tamura et al., 2015). In addition, in Study 1 we relied on the Dirty Dozen measure of the Dark Triad traits which is potentially problematic; especially for the psychopathy measure which may have limited convergent validity (Miller et al., 2012). Therefore, we replicate Study 1 here, but expand the sample to include Australians, Hungarians, Japanese, and Russians and using a broader measure of the Dark Triad traits.

### 2.1. Method

#### 2.1.1. Participants and procedure

Participants ( $N_{Grand} = 1489; M_{age} = 21.58, SD_{age} = 4.41$ ) were 310 Australian (213 females,  $M_{age} = 19.17, SD_{age} = 3.70$ ), 457 Hungarian (317 females,  $M_{age} = 24.88, SD_{age} = 5.52$ ), 351 Japanese (216 females,  $M_{age} = 21.42, SD_{age} = 1.41$ ), and 371 Russian (277 females,  $M_{age} = 19.72, SD_{age} = 2.35$ ) undergraduate, college students. Participated awarded extra credit as part of a larger online study (Jonason et al., 2017) with the addition of 157 additional Hungarian participants to add to this study alone.

#### 2.1.2. Measures

We used the 27-item Short Dark Triad (Jones & Paulhus, 2014) to assess Machiavellianism (e.g., "I like to use clever manipulation to get my way."), narcissism (e.g., "I insist on getting the respect I deserve."), and psychopathy (e.g., "people who mess with me always regret it."). Participants indicated their agreement to each item (1 = *Strongly Disagree*; 5 = *Strongly Agree*). The Japanese version of this measure was recently validated (Shimotsukasa & Oshio, 2017), and the factorial validities of Russian and Hungarian versions were confirmed in the previous study (Jonason et al., 2017). Items were averaged to create indexes of Machiavellianism ( $\alpha$ 's = 0.69 to 0.78), narcissism ( $\alpha$ 's = 0.68 to 0.79), and psychopathy ( $\alpha$ 's = 0.72 to 0.78).<sup>2</sup>

<sup>2</sup>In the full sample, there were significant positive correlations between Machiavellianism and narcissism ( $r = 0.11, p < 0.01$ ), Machiavellianism and psychopathy ( $r = 0.14, p < 0.01$ ), and narcissism and psychopathy ( $r = 0.18, p < 0.01$ ). Country-specific correlations available upon request.

The Dichotomous Thinking Inventory (Oshio, 2009) was used to assess individual differences of all-or-nothing thinking style. Responses used a 5-point Likert scale (1 = *Strongly Disagree*; 5 = *Strongly Agree*) in Australia, Japan, and Russia, and a 6-point scale (1 = *Strongly Disagree*; 6 = *Strongly Agree*) in Hungary. Because we had different endpoints, we standardized this data before conducting the correlation analysis in full sample. The Japanese and English versions of the Dichotomous Thinking Inventory have already been developed in the previous studies. In Russia and Hungary, we checked the factorial validity of the translations with a confirmatory factor analysis and found fair fit ( $CFIs \approx 0.89$  and  $RMSEAs \approx 0.06$ ). Items were averaged together to create indices of preferences for dichotomy ( $\alpha$ 's = 0.68 to 0.76), dichotomous beliefs ( $\alpha$ 's = 0.76 to 0.83), and profit-and-loss thinking ( $\alpha$ 's = 0.67 to 0.81).<sup>3</sup>

#### 2.1.3. Results and discussion

In Table 2 we report the correlations between the Dark Triad traits and individual differences in dichotomous thinking (SPSSv22). Overall, we replicated our results from Study 1.<sup>4</sup> The Dark Triad traits were associated with individual differences in dichotomous thinking. These correlations were particularly weak (albeit not significantly so) in Russia.

In the overall sample, the correlation between Machiavellianism and preferences for dichotomies was stronger (Fisher's  $z = 2.01, p < 0.05$ ) in men ( $r = 0.28, p < 0.01$ ) than in women ( $r = 0.17, p < 0.01$ ) which was driven by an isolated effect in Japan ( $z = 2.91, p < 0.01$ ) and the correlation between Machiavellianism and profit-and-loss thinking was stronger ( $z = 2.08, p < 0.05$ ) in men ( $r = 0.43, p < 0.01$ ) than in women ( $r = 0.33, p < 0.01$ ) which was driven by an isolated effect in Hungary ( $z = 2.77, p < 0.01$ ) with a weak reversal in Russia ( $z = -1.98, p < 0.05$ ). In Hungary only, narcissism was correlated with beliefs in dichotomies more strongly ( $z = 2.65, p < 0.01$ ) in men ( $r = 0.32, p < 0.01$ ) than in women ( $r = 0.06$ ) and

<sup>3</sup>In the full sample, there were significant positive correlations between preferences for dichotomies and dichotomous beliefs ( $r = 0.42, p < 0.01$ ), preferences for dichotomy and profit-and-loss thinking ( $r = 0.71, p < 0.01$ ), and dichotomous beliefs and profit-and-loss thinking ( $r = 0.53, p < 0.01$ ). Country-specific correlations available upon request.

<sup>4</sup>We took this opportunity to compare countries in dichotomous thinking. We conducted three 2 (sex)  $\times$  4 (country) ANOVAs to compare the scores among countries and sex. There were significant interactions for the preference for dichotomy ( $F(3, 1481) = 3.81, p < 0.05, \eta_p^2 = 0.01$ ) and for the profit-and-loss thinking ( $F(3, 1481) = 2.79, p < 0.05, \eta_p^2 = 0.01$ ) which are the country-specific effects we noted above; remarkably weak effects. There were significant country effects for the preference for dichotomy ( $F(3, 1481) = 173.82, p < 0.01, \eta_p^2 = 0.26$ ), the dichotomous belief ( $F(3, 1481) = 167.03, p < 0.01, \eta_p^2 = 0.25$ ), and the profit-and-loss thinking ( $F(3, 1481) = 35.08, p < 0.01, \eta_p^2 = 0.07$ ). Post-hoc comparison using Tukey's HSD test ( $p < 0.05$ ) revealed as follows: Preference for dichotomy and profit-and-loss thinking was the highest in Russia while Australia showed the least. Dichotomous belief was the highest in Australia and the weakest in Hungary. However, given the atheoretical nature of these tests, we urge caution in their (over)interpretation.

**Table 2**  
Descriptive statistics and zero-order correlations between the Dark Triad traits and individual differences in dichotomous thinking in four countries (Study 2).

	DT	Preference		Belief		Profit-and-Loss	
Machiavellianism	Mean (SD)	<i>r</i>	Mean (SD)	<i>r</i>	Mean (SD)	<i>r</i>	Mean (SD)
Full sample	3.03(0.68)	0.18**	3.33 (0.91)	0.27**	2.57 (0.96)	0.30**	3.39 (0.77)
Australia	2.72 (0.54)	0.37**	2.51 (0.91)	0.43**	3.46 (0.73)	0.44**	3.12 (0.62)
Hungary	2.62 (0.55)	0.14*	3.62 (0.69)	0.36**	2.13 (0.81)	0.42**	3.27 (0.78)
Japan	3.39 (0.53)	0.24**	3.08 (0.73)	0.21**	2.62 (0.83)	0.43**	3.41 (0.76)
Russia	3.03 (0.60)	0.08	3.89 (0.70)	0.15**	2.49 (0.86)	0.15**	3.75 (0.75)
Narcissism							
Full sample	2.62 (0.67)	0.14**	3.30 (0.85)	0.20**	2.64 (0.93)	0.20**	3.42 (0.73)
Australia	2.98 (0.61)	0.30**	2.62 (0.91)	0.20**	3.51 (0.70)	0.26**	3.10 (0.62)
Hungary	2.47 (0.67)	0.06	3.61 (0.70)	0.16**	2.13 (0.81)	0.16**	3.20 (0.79)
Japan	2.37 (0.62)	0.17**	3.12 (0.69)	0.12*	2.66 (0.81)	0.01	3.36 (0.77)
Russia	2.95 (0.64)	0.11	3.72 (0.71)	0.09	2.52 (0.80)	0.14**	3.76 (0.66)
Psychopathy							
Full sample	2.38 (0.67)	0.12**	3.34 (0.93)	0.20**	2.54 (0.97)	0.17**	3.38 (0.79)
Australia	1.99 (0.57)	0.41**	2.46 (0.90)	0.16**	3.44 (0.74)	0.28**	3.10 (0.62)
Hungary	2.80 (0.53)	-0.10*	3.66 (0.67)	0.23**	1.95 (0.78)	0.14*	3.20 (0.79)
Japan	2.47 (0.58)	0.24**	3.05 (0.75)	0.32**	2.60 (0.85)	0.16**	3.45 (0.75)
Russia	1.94 (0.59)	-0.11*	3.95 (0.69)	0.13*	2.47 (0.89)	-0.02	3.75 (0.78)

Note. DT is Dark Triad traits.

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

narcissism was correlated with profit-and-loss thinking more strongly ( $z = 2.38, p < 0.01$ ) in men ( $r = 0.31, p < 0.01$ ) than in women ( $r = 0.07$ ). The correlation between Machiavellianism and preference for dichotomy was stronger in Australia than in Hungary ( $z = 3.45, p < 0.01$ ) and in Russia ( $z = 3.73, p < 0.01$ ). The correlation between Machiavellianism and dichotomous belief was stronger in Australia than in Russia ( $z = 3.75, p < 0.01$ ) and in Japan ( $z = 3.12, p < 0.01$ ). Russia showed the weakest correlation between Machiavellianism and profit-and-loss thinking across the countries. There was a significant difference in the correlation between narcissism and preference for dichotomy between Australia and Hungary ( $z = 3.45, p < 0.01$ ). Australia showed a stronger correlation between narcissism and profit-and-loss thinking than Japan ( $z = 3.32, p < 0.01$ ). The correlations between psychopathy and preference for dichotomy were stronger in Australia and Japan than in Hungary and Russia. The correlation between psychopathy and profit-and-loss thinking was higher in Australia than in Russia ( $z = 4.00, p < 0.01$ ).

Given (1) the array of significant correlations, (2) that the Dark Triad traits in each country were correlated, and (3) the dichotomous thinking scores were correlated in each country, we tested a used multi-group confirmatory factor analysis (AMOSv22) to examine measurement invariance (Vandenberg & Lance, 2002). For the analysis, we tested a (1) model with no equivalence hypothesized among countries, and there were no constraints on the variables ( $\chi^2(32) = 335.44, p < 0.001, CFI = 0.91, RMSEA = 0.08, 90\%CI [0.07, 0.09], AIC = 487.44$ ); a (2) model with the same factor loadings hypothesized, and factor loadings from each factor on observed variables were equalized across the countries ( $\chi^2(44) = 465.70, p < 0.001, CFI = 0.87, RMSEA = 0.08, 90\%CI [0.07, 0.09], AIC = 593.70$ ); a (3) model with scalar invariance and item intercepts constrained to be equal across the countries in addition to Model 2 ( $\chi^2(62) = 465.70, p < 0.001, CFI = 0.87, RMSEA = 0.07, 90\%CI [0.06, 0.07], AIC = 557.70$ ); and a (4) model with strict invariance and item residual variances constrained to be equal across the countries in addition to Model 3 ( $\chi^2(80) = 937.56, p < 0.001, CFI = 0.73, RMSEA = 0.08, 90\%CI [0.08, 0.09], AIC = 993.56$ ). Model 1 had the best fit to the data from the point of view of CFI and AIC. The second-best fit was found in the Model 3 which showed the best RMSEA in the five models. Because the strict invariance model showed good fit, we tested the path coefficient between the Dark Triad factor and the dichotomous thinking factor among countries (Fig. 2). The model with an unconstrained path between the Dark Triad factor and the dichotomous thinking factor

across countries ( $\chi^2(62) = 465.70, p < 0.001, CFI = 0.87, RMSEA = 0.07, 90\%CI [0.06, 0.07], AIC = 557.70$ ) had a negligibly better fit than the model with constrained path ( $\chi^2(65) = 484.39, p < 0.001, CFI = 0.87, RMSEA = 0.07, 90\%CI [0.06, 0.07], AIC = 570.39; \Delta\chi^2(3) = 18.69, p < 0.001$ ). The models tended to have better fit when the paths between the Dark Triad factor and the dichotomous thinking factor were constrained except for Japan ( $\chi^2(64) = 467.20, p < 0.001, CFI = 0.87, RMSEA = 0.07, 90\%CI [0.06, 0.07], AIC = 555.20, \Delta\chi^2(1) = 1.50, n.s.$ ). The path between the Dark Triad factor and the dichotomous thinking differed among the countries, but there were significant relationships between the latent factors in all countries.

And last, we conducted measurement invariance using multi-group confirmatory factor analysis to compare sex for each country. In Australia and Hungary, the model with strict invariance, when item residual variances were constrained to equal in each sex, was the best fit ( $CFI = 0.92$  and  $0.85$ ). In Japan and Russia, the model with the same factor loadings hypothesized, when factor loadings from each factor on observed variables were constrained to equal in each sex, was the best fit ( $CFI = 0.81$  and  $0.96$ ). The estimated mean of the Dark Triad among men was higher than women in Australia (*Mean Difference* = 0.34,  $p < 0.001$ ), Hungary (*Mean Difference* = 0.40,  $p < 0.001$ ), and Russia (*Mean Difference* = 0.23  $p < 0.001$ ); the estimated mean of dichotomous thinking among men was higher than women in Hungary (*Mean Difference* = 0.16,  $p < 0.01$ ). The model where the covariance between the latent Dark Triad and the dichotomous thinking factors was constrained to be same in each sex was a better fit than the model with unconstrained covariance in Australia, Japan, and Russia.

### 3. General discussion

It is a truism to say that people differ in how they view the world. One way they may differ is that some people tend to see shades of grey whereas others see things more black or white. But why might such differences exist? Arguably the world would be better if we could all appreciate the nuance. However, doing so might be problematic to some. The two studies reported here aimed at examining how the Dark Triad traits were associated with a dichotomous thinking style. Specifically, we predicted that all the Dark Triad traits should be linked to a tendency to see the world as black or white; results confirmed these predictions using two different brief measures of the Dark Triad traits and in four different countries with different ecological and

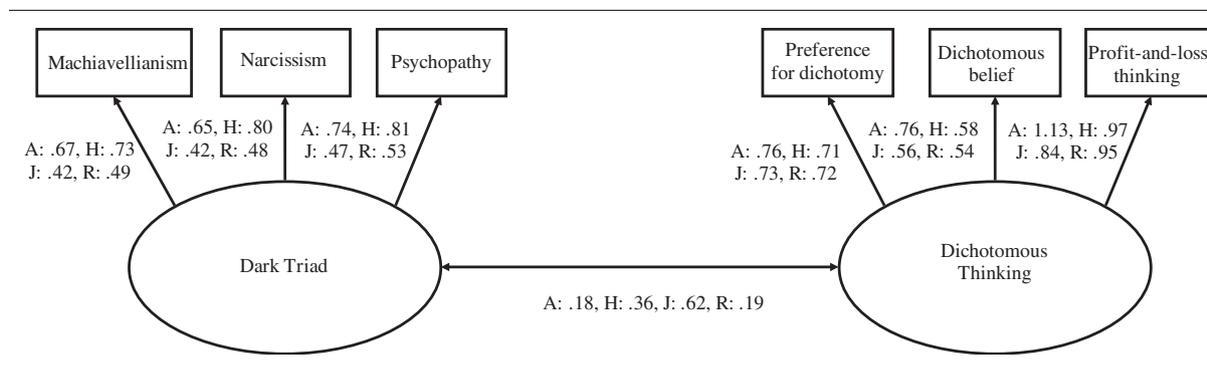


Fig. 2. Path diagram describing relationships between latent variances in the Dark Triad traits and individual differences in dichotomous thinking (Study 2).

Note. Error variables are abbreviated. A = Australia, H = Hungary, J = Japan, and R = Russia. All path coefficients were standardized, and statistically significant,  $p < 0.01$ .

socioecological conditions/histories.

The obvious interpretation would be that a black-and-white thinking style might be part of the undesirable nature of these traits (Cleckley, 1964). However, assuming these traits and their *sequelae* are ubiquitously problematic might be a logical error. Instead, we contend that dichotomous thinking might be a necessary cognitive bias for anyone pursuing an exploitive life history strategy geared towards the immediate satisfaction of goals at the sacrifice of delayed outcomes. Natural selection may have shaped adaptations for exploitation with motivational, affective, and cognitive biases that facilitate *r*-selected tasks like acquiring mates and status, creating an immediate survival focus (Richardson & Hardesty, 2012)—which may appear like impulsivity (Jones & Paulhus, 2011)—minimizing opportunity costs by minimizing deliberation. The Dark Triad traits might be conditional adaptations to childhood conditions that that orient people towards the successful pursuit of adaptive tasks (e.g., acquiring mates and status) in a shortened timeline. Importantly, this conditional adaptive system may be somewhat universal (i.e., invariance across countries) given that in all four countries we investigated—countries with different geographical, economic, and cultural features—the tendency for black-and-white thinking was linked to Dark Triad traits.

#### 4. Limitations and conclusions

Despite the use of multinational data, our study was characterized by a few limitations. First, the sample could still be described as educated, industrialized, rich, and democratic (Henrich, Heine, & Norenzayan, 2010) and an unbalanced sex ratio; common limitations using undergraduate psychology samples. Second, while internal consistency estimates mostly passed the standard (i.e., 0.70) threshold (Nunnally, 1978), a few only passed the more liberal threshold (i.e., 0.50) as set out for basic research (Schmitt, 1996). Third, we adopted two short measures of the Dark Triad traits which may not have been as well tested as longer alternatives and such measures are not reducible to constituent facets (e.g., grandiose narcissism) to provide even finer grained detail in the analysis (Miller et al., 2012). Fourth, while we found effects that were rather robust to cross-country variance, the sampled countries cannot fully reject the possibility of such variance. Future work should endeavor to address these limitations in more cross-culturally and methodologically diverse samples.

In this study, we examined a potential cognitive bias that might characterize the Dark Triad traits. Seeing the world in simple, black and white terms may facilitate the active exploitation and impulsive approach to life that characterize the Dark Triad traits. Such a cognitive bias may be instrumental in facilitating a *fast* approach to life. That is, by minimizing time deliberating on actions in either an affective

(Jonason et al., 2013) or cognitive manner, one may more expediently accomplish their goals. We encourage future work on other potential cognitive biases to understand how those characterized by these traits conceptualize and interact with the world.

#### References

- Cleckley, H. M. (1964). *The mask of sanity* (4th ed). St. Louis, MO: Mosby.
- Furnham, A., Richards, S. C., & Paulhus, D. L. (2013). The Dark Triad of personality: A 10-year review. *Social Psychology and Personality Compass*, 7, 199–216.
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, 33, 61–83.
- Jonason, P. K., Icho, A., & Ireland, K. (2016). Resources, harshness, and unpredictability: The socioeconomic conditions associated with the Dark Triad traits. *Evolutionary Psychology*, 14, 1–11.
- 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*, 54, 572–576.
- Jonason, P. K., Foster, J. D., Oshio, A., Sitnikova, M., Birkas, B., & Gouveia, V. V. (2017). Self-construals and the Dark Triad traits in six countries. *Personality and Individual Differences*, 113, 120–124.
- 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.
- 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.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed). New York, NY: McGraw Hill.
- Oshio, A. (2009). Development and validation of the dichotomous thinking inventory. *Social Behavior and Personality*, 37, 729–742.
- Oshio, A. (2012). An all-or-nothing thinking turns into darkness: Relations between dichotomous thinking and personality disorders. *Japanese Psychological Research*, 54, 424–429.
- Oshio, A., Mieda, T., & Taku, K. (2016). Younger people, and stronger effects of all-or-nothing thoughts on aggression: Moderating effects of age on the relationships between dichotomous thinking and aggression. *Cogent Psychology*, 3, 1244874.
- Richardson, G. B., & Hardesty, P. (2012). Immediate survival focus: Synthesizing life history theory and dual process models to explain substance use. *Evolutionary Psychology*, 10, 731–749.
- Schmitt, N. (1996). Uses and abuses of coefficient alphas. *Psychological Assessment*, 8, 350–353.
- Semenya, S. W., & Honey, P. L. (2015). Dominance styles mediate sex differences in Dark Triad traits. *Personality and Individual Differences*, 83, 37–43.
- Shimotsukasa, T., & Oshio, A. (2017). Development and validation of the Japanese version of the Short Dark Triad (SD3-J). *Japanese Journal of Personality Psychology*, 26, 12–22.
- Stenason, L., & Vernon, P. A. (2016). The Dark Triad, reinforcement sensitivity, and substance use. *Personality and Individual Differences*, 94, 59–63.
- Tamura, A., Oshio, A., Tanaka, K., Masui, K., & Jonason, P. K. (2015). Development, reliability, and validity of the Japanese Version of Dark Triad Dirty Dozen (DTDD-J). *The Japanese Journal of Personality*, 24, 26–37.
- Vandenbergh, R. J., & Lance, C. E. (2002). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 2, 4–69.