

COLD HEARTS PLAYING WITH FIRE: THE DARK TRIAD, RISK-TAKING AND EMPATHY

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Abstract

Background: The Dark Triad personalities have been well studied, however, it is not often linked with empathy and risk-taking intentions. The present study aims to address this gap by examining the association between the Dark Triad personality traits, empathy and risk-taking intentions in the five domains – ethical, financial, health/safety, social, and recreational.

Method: A sample of 160 young adults residing in Malaysia (Male=69, Female=99, $M_{age}=22.01$, $SD=2.03$) completed the Short Dark Triad Questionnaire, Empathy Scale, and Domain-Specific Risk-Taking Scale through an online survey.

Results: Machiavellianism and Psychopathy were positively associated with the five domains of risk-taking, including social, ethical, financial, recreational and health/safety domains, and negatively associated with empathy. Narcissism, on the contrary, was positively correlated to all risk-taking domains except for recreational risk-taking, and showed no significant relationship to empathy. Empathy was a significant predictor in social risk-taking whereas Machiavellianism and Psychopathy were significant predictors in ethical risk-taking intentions.

Conclusion: This study expanded existing knowledge on the Dark Triad personalities by demonstrating a link between each Dark Triad trait, potential risk-taking behaviours and empathy.

Keywords: Dark Triad, Risk-Taking, Empathy, Ethics

Introduction

The so-called Dark Triad of personality traits – Machiavellianism, narcissism, and psychopathy - has sparked considerable research interest in the past decade. The Dark Triad has been implicated in risk-taking behaviours and a lower level of self-control (1, 2), as well as deficits in empathy (3). However, studies of the relationships between the Dark Triad and aspects of behaviour have tended to focus on specific areas such as risk-taking or empathy in isolation. Hence, there is a paucity of research examining the potential associations between the Dark Triad, risk taking and empathy deficits combined.

The Dark Triad traits are conceptualized as the basis for a “short-term, agentic, exploitative social strategy that may have evolved to enable exploitation when conspecifics are likely to avoid or punish defectors” (4). The Machiavellianism trait manifests as a tendency to be manipulative and is characterized by exploitative and

immoral behaviour for personal gain, a lack of intimacy and a maladaptive interpersonal style (5). Narcissism is exhibited as an exaggerated sense of self-worth, inflated superiority and an excessive need for admiration (6). Psychopathy is distinguished by affective coldness, impulsivity and antisocial behaviour (7). Collectively, these traits combine to form a socially aversive personality with attenuated emotional experience and a propensity to indulge in short-term, exploitative social strategies.

Risk-taking behaviours are displayed when an individual pursues a particular goal or direction despite the fact that some undesirable or even dangerous consequences may arise from that pursuit (8). Although risk-taking is largely a function of situationally-specific factors, it is also affected by a person’s general risk-taking tendency (9). Risk-taking includes a spectrum of behaviours that could lead to negative outcomes across many domains, for example, previous research found a positive association between

the ethical risk domain and self-serving dishonesty (10). Individuals who score high on health/safety risk-taking measures tend to be less concerned about health issues and would, for example, consume more alcohol regularly (11).

Empathy is defined as the ability to understand the experience of another person by adopting his/her frame of reference and vicariously experiencing similar feelings to the other person (12). Previous studies have shown that empathy is associated with altruism (13) and prosocial behaviour (14). Conversely, lack of empathy has been linked to aggression and antisocial behaviour (15).

Literature review

Individuals with high levels of the Dark Triad traits are apt to pursue their desires without concern for the impact this may have on other people. They are also prone to greater levels of *schadenfreude*, which is satisfaction at the misfortune of others (16). Hence, the constructs of the Dark Triad are often considered to be powerful psychological antecedents to unethical behaviours. Moreover, the triad are commonly associated with criminality, such as fraud and shoplifting (17).

A study on gambling risk has also demonstrated an association between disordered gambling and all three dark personalities. However, after controlling for other Dark Triad traits, psychopathy is the only element that showed unique association with the risk of engaging in disordered gambling (18). On the other hand, narcissism is another trait that is found to significantly predict gambling-related pathology (19).

The Dark Triad personalities have also been found to be strong predictors of opportunistic sexual behaviours, such as short-term sexual relationships that may result in complications including sexually transmitted diseases and unwanted pregnancies (20). Corresponding to the actions that reflect ethical, financial and health/safety risk-taking, these personality traits are expected to be positively related to similar short-term focused attributes, in particular, impulsivity (21) and immediate gratification (22).

The Dark Triad has also been linked to emotional deficits (23), with high levels of the traits being associated with difficulties in understanding and expressing emotions, accompanied with a tendency towards more utilitarian and impersonal moral decision-making (24). In particular, the Psychopathy trait has been shown to be associated with limited cognitive and affective empathy, as well as difficulty in describing one's own feelings (25). Both Psychopathy and Machiavellianism have been associated with externally oriented thinking, which is concrete thinking and an uninterest in inner feelings or sensations (25). Furthermore, the Narcissism trait is also associated with limited cognitive empathy and difficulties in identifying or expressing feelings.

Empathy is without question a keystone of human social experience. Not only do empathic skills serve as a fundamental requirement for higher social functioning, but they also support long-term social commitment (26, 27).

Indeed, empathy is a positive emotion that supports moral reasoning (28). Previous research has shown a significant positive relationship between empathy and the intention to act morally (29). Clearly this implies that empathy leads people to consider their responsibilities towards others when making ethical decisions and that empathy therefore has a positive impact on the morality of the decisions people make. Similarly, empathy affects individuals' responses in the midst of interpersonal conflict, and dispositional empathy has been found to correlate negatively with destructive responses, a lack of concern for other and self-reported aggression during conflict situations (30). These behavioural characteristics appear to emerge in children and low empathy appears to be related to all types of direct aggression in children as young as 12 years old (31). As the Dark Triad traits are evidently related to low empathy, and low empathy is related to interpersonal aggression, it seems plausible that people with high levels of these constructs may be more prone to exhibit aggression.

The apparent empirical relationships between the Dark Triad traits, risk-taking and low empathy suggests that this group of factors may have a biological explanation. Research with young men has discovered that both risk-taking and empathy influence the responsiveness of the anterior cingulate in a sensory error detection task, which in turn affects the extent of concern an individual place on the outcome of an event (32). The insular cortex has also been shown to play a central role in error-based learning through the modulation of uncertainty and internal emotional states, with those who have lower levels of empathy experiencing lower levels of uncertainty and lower capacities for learning in response to emotional changes (33). Taken together, these findings suggest that people with high levels of risk-taking and low levels of empathy are more prone to make errors and less likely to learn from the experience.

Given the apparent links between risk-taking, empathy and the Dark Triad, it is perhaps surprising that there is a relative paucity of research that has simultaneously investigated the relationships between all these factors. Furthermore, previous Dark Triad research has mostly focused on risk-taking related to finance and fidelity. The present study aims to address these gaps by examining the association between the Dark Triad, empathy, as well as risk-taking in five commonly encountered domains of risk-taking activity:

- (i) ethical – the tendency to behave immorally or make unethical decisions;
- (ii) financial – the tendency to make financial decisions in uncertain or high-stake situations;

- (iii) health/safety – behaviours that may endanger the self or others, such as excessive alcohol consumption or substance use;
- (iv) social – the likelihood of not conforming to social expectations or conventions;
- (v) recreational – the likelihood of engaging in extreme outdoor activities and sports.

In line with previous research showing that empathy predicts moral intention (29) and ethical decision making (34), an inverse association between empathy levels and the ethical risk-taking domain would be expected. In light of previous research (5, 20, 35), the Dark Triad traits would be anticipated to associate with a tendency towards risk-taking in the ethical, financial and health/safety domains. Although previous research has not examined the relationship between the Dark Triad and social risk-taking or recreational risk-taking, it seems likely that higher levels of the Triad traits would be associated with greater risk-taking in these areas.

Therefore, given the research evidenced reviewed above, it is hypothesized that:

- (1) The Dark Triad will be significantly negatively correlated with empathy and positively correlated with overall tendency to risk-taking.
- (2) Machiavellianism, Narcissism and Psychopathy will be significantly negatively correlated with empathy.
- (3) Machiavellianism, Narcissism and Psychopathy will have a significant positive correlation with all five domains of risk-taking.
- (4) Machiavellianism, Narcissism and Psychopathy and empathy will predict higher levels of *social* risk taking.
- (5) Machiavellianism, Narcissism and Psychopathy and empathy will predict higher levels of *ethical* risk taking.

Materials and Methods

Participants

A convenience sample of 160 young adults (Male=60; Female=99, other=1) were recruited from individuals residing in Malaysia. The inclusion criteria were the ability to understand English and being between 18-35 years old ($M=22.01$, $SD=2.03$). For a correlational study of this type, G*Power suggested at least 115 participants would be required to achieve 95% power ($r=0.3$, $\alpha=.05$, one-tailed; 36). The sample consisted of 5.7% Malay, 78% Chinese, 9.4% Indian and 6.9% other ethnicities. 146 participants were students and the remaining 14 were employed.

Measures

The Short Dark Triad (SD3) questionnaire (37) measures the total Dark Triad score and the three individual traits:

Machiavellianism, Narcissism and Psychopathy. The scale consists of 27 items, which were further divided into Machiavellianism, Narcissism and Psychopathy subscales. Responses were given on a 5-point Likert scale ranging from *disagree strongly* (1) to *agree strongly* (5). For the current study, the overall measure was found to have Cronbach's alpha of .83. The reliabilities of the Machiavellianism, Narcissism and Psychopathy subscales were moderately high, with Cronbach's alphas of .72, .65 and .75 respectively.

The Empathy Scale (38) measures the extent of empathy experienced for others. The scale has four items, utilizing a 5-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5). The scale had a Cronbach's alpha of .62 in the present research.

The Domain-Specific Risk-Taking (DOSPRT) scale (39) evaluates behavioural intentions or the likelihood with which respondents might engage in risky behaviours in the five domains of ethical, financial, health/safety, social, and recreational risks. This study used the revised version of the scale with 30 items utilizing a 7-point Likert scale ranging from *extremely unlikely* (1) to *extremely likely* (7). The overall scale score for this questionnaire is obtained by summing the responses to all 30 items. In the present research the scale was found to be highly reliable with a Cronbach's alpha of .90.

Procedure

After ethical approval was obtained from the Department of Psychology's Research Ethics Committee (Approval code: 201810064), an online survey was set up using Google Forms. Participants were recruited through convenience and snowball sampling. The first section of the survey consisted of the information sheet, where participants were required to give their consent before proceeding with the survey. Then participants completed the demographic questions, followed by the SD3, the Empathy Scale, and the DOSPERT Scale. The overall survey was completed within 15 minutes. Upon completion, participants were thanked for their responses and a debriefing statement was provided.

Results

Firstly, descriptive analyses were conducted on the SD3, Empathy Scale and DOSPERT scale data. The results obtained are presented in Table 1. Among the Dark Triad traits, participants scored highest on the Machiavellianism subscale ($M=30.2$, $SD=5.82$), followed by Narcissism ($M=25.4$, $SD=5.16$) and Psychopathy ($M=21.4$, $SD=6.02$). The total Dark Triad scores ranged from 43 to 115 ($M=77.1$, $SD=13.39$).

The Empathy Scale scores for the sample ranged from 8 to 20 ($M=15.9$, $SD=2.62$). As for the risk-taking subscales, social risk-taking had the smallest range, between 10 and 42 ($M=27.4$, $SD=6.09$), whereas the four remaining risk-taking subscales had identical score ranges between 6 and 42, ethical ($M=15.2$, $SD=6.46$), financial ($M=19.5$, $SD=7.50$),

Table 1: Descriptive statistics of Short Dark Triad, Empathy and DOSPERT scale (N=160)

Measures	Min	Max	M	SD
Short Dark Triad				
Machiavellianism	13	45	30.2	5.82
Narcissism	13	40	25.4	5.16
Psychopathy	9	37	21.4	6.02
Total Dark Triad	43	115	77.1	13.39
Empathy Scale				
Total empathy	8	20	15.9	2.62
DOSPERT scale				
Ethical risk taking	6	42	15.2	6.46
Financial risk taking	6	42	19.5	7.50
Health/safety risk taking	6	42	17.1	7.83
Recreational risk taking	6	42	23.9	8.35
Social risk taking	10	42	27.4	6.09
Total risk taking	48	210	103.1	27.40

DOSPERT: Domain-Specific Risk-Taking
M: Mean
SD: Standard deviation

health/safety ($M=17.1, SD=7.83$), and recreational ($M=23.9, SD=8.35$). The total risk-taking tendency scores ranged between 48 and 201 ($M=103.1, SD=27.40$).

In order to test the hypotheses, a series of parametric statistical tests were performed because the data did not violate the assumptions of normality.

Hypothesis 1: The Dark Triad will be significantly negatively correlated with empathy and positively correlated with overall tendency to risk-taking.

To examine hypothesis 1, Pearson correlations were performed on the total scores obtained from the SD3, Empathy Scale and the total score for the Dark Triad from the DOSPERT scale.

A positive correlation was found between the Dark Triad and overall risk-taking ($r=.50, p<.01$), suggesting that high Dark Triad scores were associated with a higher tendency to engage in risk-taking behaviours. A negative correlation was found between the Dark Triad and the total Empathy score ($r=-.24, p=.001$), suggesting that high Dark Triad scores were associated with lower ability to empathize. No significant correlation was identified between the total empathy score and the total risk-taking score ($r=-.04, p=.30$). Hypothesis 1 was supported.

Hypothesis 2: Machiavellianism, Narcissism and Psychopathy will be significantly negatively correlated with empathy.

To test hypothesis 2, Pearson correlations were performed on the individual Dark Triad trait scores and the Empathy score as shown in Table 2.

Table 2: Pearson correlation between Machiavellianism, narcissism, psychopathy and total empathy

Variables	Machiavellianism	Narcissism	Psychopathy	Total empathy
Machiavellianism	-	.37**	.50**	-.17*
Narcissism		-	.40**	-.12
Psychopathy			-	-.26**
Total empathy				-

** $p<.01$
* $p<.05$

Empathy was found to be modestly associated with Machiavellianism ($r=-.17, p=.02$) and Psychopathy ($r=-.26, p<.001$), but not with Narcissism. As only two out of three of the Dark Triad traits showed significant relationships with Empathy, Hypothesis 2 was only partially supported.

Hypothesis 3: Machiavellianism, Narcissism and Psychopathy will have a significant positive correlation with all five domains of risk-taking.

In order to test Hypothesis 3 Pearson correlations were performed to investigate the relationships between the five risk-taking domains of the DOSPERT scale and the SD3 Dark Triad trait subscales. The results are shown in Table 3.

Ethical risk-taking had a high positive correlation with Psychopathy ($r=.55, p<.001$), followed by Machiavellianism ($r=.42, p<.001$) and Narcissism ($r=.32, p<.001$). Similar results were obtained for financial risk-taking, Psychopathy ($r=.43, p<.001$), Machiavellianism ($r=.37, p<.001$) and Narcissism ($r=.34, p<.001$), and for health/safety risk-taking, Psychopathy ($r=.48, p<.001$), Machiavellianism ($r=.30, p<.001$) and Narcissism ($r=.19, p=.009$). This suggested that the tendency towards greater risk-taking in the ethical, financial and health/safety domains was associated with high levels of Machiavellianism, Narcissism and Psychopathy.

There was a modest positive correlation between recreational risk-taking and Machiavellianism ($r=.17,$

Table 3: Pearson correlation between Machiavellianism, narcissism, psychopathy and the five domains of risk-taking

Variables	1	2	3	4	5	6	7	8
1. Machiavellianism	-	.37**	.51**	.42**	.37**	.30**	.17*	.16*
2. Narcissism		-	.41**	.32**	.34**	.19**	.09	.20*
3. Psychopathy			-	.56**	.43**	.48**	.32**	.13
4. Ethical risk				-	.56**	.68**	.33**	.37**
5. Financial risk					-	.52**	.41**	.35**
6. Health/safety risk						-	.49**	.49**
7. Recreational risk							-	.43**
8. Social risk								-

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

p=.018) and Psychopathy (*r*=.32, *p*<.001), but not significant correlation with Narcissism. This suggested that higher levels of Machiavellianism and Psychopathy were associated with an increased tendency to recreational risk-taking.

Social risk-taking had a modest positive correlation with Machiavellianism (*r*=.16, *p*=.026), Narcissism (*r*=.20, *p*=.005) and Psychopathy (*r*=.13, *p*=.046). This implied that higher levels of each Dark Triad trait were associated with an increased propensity to social risk-taking.

Finally, all three Dark Trait subscales were found to be positively correlated with the overall risk-taking score. The strongest correlation between overall risk-taking and the Dark Triad was with Psychopathy (*r*=.51, *p*<.001), followed by Machiavellianism (*r*=.37, *p*<.001) and Narcissism (*r*=.30, *p*<.001). This indicated that all three Dark Triad traits were associated with higher increase in general risk-taking tendencies.

Overall, high Machiavellianism and Psychopathy scores were associated with higher tendencies to engage in risky behaviour across all domains, while high Narcissism scores were associated with an increased propensity for ethical, financial, health/safety and social risk-taking, but not with recreational risk taking. Thus, Hypothesis 3 was supported.

Hypothesis 4: Machiavellianism, Narcissism and Psychopathy and low Empathy will predict higher levels of social risk taking.

In order to test Hypothesis 4 a two-step hierarchical multiple regression analysis was conducted with social risk-taking as the dependent variable; results are shown in Table 4.

In Model 1, Machiavellianism, Narcissism and Psychopathy were entered to predict social risk-taking. Together the three Dark Triad variables significantly predicted social risk-taking, *R*=.22, *R*²=.05, *F* (3, 156)=2.69, *p*=.048, but none of the traits was a significant individual predictor. In Model 2, Empathy was entered as a predictor of social risk-taking and was found to be a significant individual predictor. Model 2

Table 4: Hierarchical regression with the three Dark Triad traits and empathy as predictors of social risk-taking.

	Predictors	Standardized Coefficients Beta	<i>R</i>	<i>R</i> ²	<i>F</i>
Model 1	Machiavellianism	.08	.22	.05	2.69*
	Narcissism	.16			
	Psychopathy	.03			
Model 2	Machiavellianism	.10	.37	.13	5.99**
	Narcissism	.17			
	Psychopathy	.10			
	Empathy	.30**			

***p*<.01
**p*<.05
F: Value to test the fit of regression models
R: Pearson correlation coefficient
*R*²: The coefficient of determination

had significant incremental validity compared to the Model 1, *R*² change=.09, *F* change (4, 155) = 15.17, *p*<.001, *R*=.37, *R*²=.14. This suggested that the Dark Triad accounted for approximately 5% of variance in the tendency to social risk-taking and that Empathy explained an additional 9% of variance, with the four variables combined accounting for 14% of variance in the propensity to social risk-taking.

As Empathy had a standardised Beta of .30 (*t*=3.90, *p*<.001), an increase in the Empathy score equivalent to 1 *SD* was associated with an increase social risk-taking score of .30 *SD*. Narcissism had a standardised Beta of .17 (*t*=1.97, *p*=.05). Thus, as Narcissism increased by 1 *SD*, social risk-taking scores increased by .17 *SD*.

Although Machiavellianism, Narcissism and Psychopathy did not individually predict social risk-taking, the overall Dark Triad was a significant predictor of social risk-taking. When controlling for the Dark Triad, Empathy demonstrated incremental predictive validity for social risk-taking. Thus, Hypothesis 4 was partially supported.

Hypothesis 5: Machiavellianism, Narcissism, Psychopathy and low Empathy predict ethical risk taking

To assess the extent to which the Dark Triad and Empathy might predict ethical risk-taking, a two-step hierarchical multiple regression analysis was performed. The results are shown in Table 5.

Table 5: Hierarchical regression with the three Dark Triad traits and empathy as predictors of ethical risk-taking

	Predictors	Standardized Coefficients Beta	R	R ²	F
Model 1	Machiavellianism	.17*	.58	.34	26.78**
	Narcissism	.08			
	Psychopathy	.43**			
Model 2	Machiavellianism	.17*	.57	.34	20.29**
	Narcissism	.08			
	Psychopathy	.42**			
	Empathy	-.06			

***p*<.01

**p*<.05

F: Value to test the fit of regression models

R: Pearson correlation coefficient

R²: The coefficient of determination

In Model 1, Machiavellianism, Narcissism and Psychopathy were entered to predict ethical risk-taking. Together the three traits significantly predicted ethical risk-taking, *R*=.58, *R*²=.34, *F* (3, 156)=26.78, *p*<0.001, with Machiavellianism (Beta=.17, *t*=2.25, *p*=.03) and Psychopathy (Beta=.43, *t*=5.52, *p*<0.001) being significant individual predictors. In Model 2, Empathy did not demonstrate an incremental validity over the Dark Triad in the prediction of ethical risk-taking. Machiavellianism (Beta=.17, *t*=2.25, *p*=.05) and Psychopathy (Beta=.43, *t*=5.52, *p*<.001) remained the significant individual predictors of ethical risk-taking. As Machiavellianism had a Beta of .17, an increase of 1 *SD* in the Machiavellianism score was associated with an increase of .17 *SD* in the ethical risk-taking score. Psychopathy had a Beta of .43, so as Psychopathy scores increase by 1 *SD*, ethical risk-taking scores increased by .43 *SD*. These findings suggested that Machiavellianism and Psychopathy were significant predictors of the propensity for ethical risk-taking, but Narcissism and Empathy were not, so Hypothesis 5 was only partially supported.

Discussion

The present study aimed to provide unique insights into the interactions between the Dark Triad traits, Empathy and risk-taking in the five distinct domains. Overall the findings showed that the combined Dark Triad traits were negatively correlated with Empathy and that the individual traits of

Machiavellianism and Psychopathy were also significantly negatively correlated with Empathy – Narcissism was not significantly associated with Empathy. The Dark Triad traits were positively associated with general risk-taking while Empathy was negatively associated with general risk-taking. Despite the associations between the Dark Triad and Empathy, the relationships between these factors and general risk taking were independent of each other.

Dark Triad and Empathy

The relationship between a higher Dark Triad score and lower level of Empathy was in line with earlier research (40), which proposed emotional coldness as a particular disposition linked to the Dark Traits. However, on deeper exploration of these relationships, it appeared that only Machiavellianism and Psychopathy showed significant independent correlations with Empathy. This contradicted the findings from some previous studies (23, 25), but replicated the pattern reported in Giammarco and Vernon’s study on vengeance and the Dark Triad (41). Giammarco and Vernon discovered a non-significant relationship between Narcissism and perspective taking, while Machiavellianism and Psychopathy both showed a high association with this variable. They also found that Narcissism displayed a lower correlation to empathic concern relative to those of Machiavellianism and Psychopathy. Giammarco and Vernon concluded that Machiavellianism and Psychopathy are the “darker” traits of Dark Triad (42), a contention that is partially supported by the findings of the present study that these two traits are significantly negatively associated with Empathy, but Narcissism showed no significant relationship with Empathy.

However, the lack of a significant relationship between Narcissism and Empathy could be due to cultural differences between the participants in most previous research and the current study. It is important to note that majority of the participants obtained by earlier studies came from individualistic cultures, whereas the Malaysian culture tends to be very collectivistic. Foster, Campbell and Twenge examined individual differences in Narcissism across the world and found that regions with greater individualism generally exhibited more Narcissism (43). Also, narcissists in collectivistic cultures may display a higher level of interdependent self-construal (44) which means that they may be prone to conceal their unpleasant attributes from others to a greater extent than those from individualistic cultures.

Previous research has shown that Machiavellianism and Psychopathy are associated with lower affective and cognitive empathy, whereas Narcissism is associated with limited cognitive empathy but not associated with affective empathy (25). This means that Narcissists may have difficulties in recognizing and understanding the emotions of others, but still possess the ability to vicariously share another’s emotional states. Therefore, it may be true that Narcissism is the “brighter” component of the Dark Triad.

Dark Triad and Risk-taking

Individuals with high levels of Dark Triad traits have a higher tendency to engage in risky behaviours that could lead to negative consequences. The present research showed that across the five risk domains, the Dark Triad traits were collectively and individually associated with ethical, financial and health/safety risk-taking. Psychopathy had the strongest positive association with these three risk-taking domains, followed by Machiavellianism and lastly, Narcissism. This supports the notion that Dark Triad traits may drive an individual to act unethically for personal gain (17). The content of the DOSPERT scale items used in the present study suggests that such individuals are also likely to financially invest or gamble in high stake situations, as well as exhibiting behaviours that could jeopardize their personal health or safety by engaging in activities such as unprotected sex and driving without wearing a seat belt. The stronger association found between financial risk taking and Psychopathy compared to the other Dark Triad traits is consistent with findings from previous research (18, 35), but the present study is among the first to show a significant relationship between Machiavellianism and financial risk behaviours.

Looking at the other two domains of the DOSPERT scale, recreational risk was found to be moderately correlated with Psychopathy and weakly correlated with Machiavellianism. This may be because individuals high in Psychopathy and Machiavellianism have attenuated emotional responses and are therefore more likely to respond to the thrill of extreme sports and outdoor activities. Previous research has highlighted that, as compared to controls, extreme or high-risk athletes have significantly higher levels impulsivity (45) – an attribute related to the fast life history strategy adopted by individuals high in Psychopathy and Machiavellianism (46).

The social risk domain was found to be weakly correlated with all three Dark Triad personalities. This might be explained by the fact that those scoring high for Machiavellianism, Narcissism and Psychopathy are less afraid of being different from others and are more likely to stand firm in their unpopular opinions. In essence, to manipulate others is to take the risk of being discovered to be using ugly social tactics, whereas exhibiting grandiosity is to risk being viewed as egotistical and self-absorbed. By playing mind games, Machiavellians, Narcissists and Psychopaths are risking their personal reputation and their relationships in their social groups.

Empathy and Risk-taking

Biological models associate empathy and risk-taking with the anterior cingulate (32) and insula cortex (33) suggested a broad physiological basis for a generalised propensity to take risk. However, in the present study, the relationship between Empathy and risk-taking were domain-specific rather than being consistent across all domains, with Empathy showing significant negative correlations with ethical and financial risk-taking, while displaying a positive

correlation with social risk-taking. This suggests that individuals with low Empathy are more likely to take ethical and financial risk, though less likely to engage in social risk behaviours.

The association between lower levels of Empathy and increased ethical risk taking has been reported by other researchers (28, 34), but there is a distinction between low levels of affective empathy which predict lower moral intentions in decision making process compared to low levels of cognitive empathy which predict principle-based evaluations (29). It seems probable that this distinction arises because individuals with higher affective empathy have a greater ability to reason and foresee the unfavourable outcomes that may follow their decisions (47). If so, then in the present study, the measure of Empathy may have captured affective empathy more than cognitive empathy, a contention that might also explain the negative association between Empathy and financial risk-taking.

Given the above, the positive correlation between social risk-taking and empathy might be somewhat unexpected. Empathy has been consistently paired with prosocial behaviours (14) and positive social adjustment (48), so it would be expected that individuals with higher empathy would display higher social conformity to maintain quality interpersonal relationships. Indeed, Adams studied social competence and demonstrated that empathy successfully predicted peer popularity among adolescents (49). As mentioned, the present study was conducted in a collectivist society and this leads to the following question: Would the courage in taking a social risk, such as disagreeing with an authority figure on a major issue or admitting that their tastes are different from those of a friend, cause people to be more admired and respected by their acquaintances in such a society? It is possible that those with high Empathy are better able to judge the fine line between stretching the boundaries of social convention and breaking them.

It is important to highlight that the questionnaire statements related to the social risk-taking domain were rather neutral, and the consequences of taking such risks largely dependent on the situation of individual. For instance, a person with high Empathy might disagree with a manager at work for an unreasonable demand on the team, whereas a narcissist might disagree with a manager when another colleague's proposal is chosen over his/hers. Due to the correlational nature of the study and a lack of research on this particular area, the causality of the relationship between Empathy and social risk-taking clearly remains open for future studies to explore.

The hierarchical regressions showed that the Dark Triad traits combined significantly predicted social risk-taking, but they did not do so individually. The addition of Empathy to the model increased its predictive power, but did not increase the power of the Dark Triad to predict social risk behaviour, suggesting that the potency of Empathy to impact the way people consider taking social-related

risk was independent of the Dark Triad. Conversely, the Dark Triad traits combined, and individually, the Machiavellianism and Psychopathy were significant predictors of ethical risk-taking, but Empathy was not. This again suggested that Empathy and the Dark Triad were broadly independent of each other, though the correlation between Empathy and ethical risk-taking suggests that there was a small amount of variance shared between Empathy and the Dark Triad. Thus, Machiavellianism and Psychopathy may subsume some small aspects of Empathy and play a more important role in the tendency to perform unethical acts.

Significance of research

To our knowledge, the present study is among the first to examine the association between the Dark Triad traits and domain-specific risk-taking, particularly in the domains of social and recreational risk-taking. The Dark Triad traits have been shown by previous studies to be related to unethical behaviour (17), financial misbehaviour (35), and opportunistic sexual behaviours (20), and the present study expands this list to include risk behaviours grouped under the ethical, financial, health/safety, recreational and social domains.

The inclusion of Empathy alongside the Dark Triad traits in the models predicting the tendency towards risk-taking showed that Empathy may be less important in ethical decision than the Dark Triad or perhaps that Machiavellianism and Psychopathy subsume the aspects of Empathy which are important in this domain.

The present study is perhaps the first to investigate the relevance of the Dark Triad traits and Empathy to risk-taking in the collectivistic culture of Malaysia. Cross-cultural differences in the manifestation of Dark Triad traits have been documented by several studies (50, 51) suggesting that some behaviours associated with these traits may be less undesirable in collectivistic cultures due to high power distance relationships (51). A common social tactic utilized by Machiavellians and Narcissists – to manipulate others by invoking responsibility (4), may be acceptable and even effective in Malaysia because individuals from collectivistic cultures have a strong sense of duty to their in-group members (52) and the high power distance relationship may prevent the questioning of authority. The social acceptability of such behaviours in collectivistic societies may explain why Machiavellianism was the highest scoring trait in the current sample, followed by Narcissism.

The present research has important contributions to the understanding of how Dark Triad traits may lead to societal problems at large, such as bullying, financial fraud, pathological gambling and sexual misconduct. In organizational settings, the Dark Triad has been found to correlate with counterproductive work behaviours (53) and interpersonal friction with colleagues (54). However, a number of studies have suggested that the Dark Triad may have adaptive value in some organizational settings (55, 56) and, as already mentioned, this may be even more

the case in collectivist societies. Nevertheless, the present research demonstrates that these socially adverse traits may do more harm than good.

The study is not without its limitations. First, all Dark Triad traits were studied as unidimensional constructs and any lower order facets of the traits such as primary and secondary psychopathy (7) or grandiose and vulnerable narcissism (57) were not assessed. It is possible that there are different patterns of relationships between risk-taking and these sub-facets. This study utilized a process model dependent on the notion that the Dark Triad traits and Empathy affect risk attitudes in the five domains measured. Previous studies have found evidence showing that risk-taking tendency is rooted in personality (58), but no causal inference could be established in the present study due to the reliance on correlational analyses. Therefore, it is a possibility that the interaction between the Dark Triad traits, Empathy and risk-taking is reciprocal, or that there might be unidentified extraneous variables, such as early childhood experiences and current life circumstances, that influence both the development of the Dark Triad traits and an individual's motivation to take risk. Future research would benefit from exploring the directionality of the relationships between the Dark Triad, Empathy and risk-taking.

To ensure generalizability across a wide range of samples, cross-cultural research on this topic is essential. The Dark Triad traits appear to be expressed differently across cultures (23, 51) and there appear to be differences in the levels of risk-taking propensity in individualistic cultures compared to collectivistic cultures. Also, Dark Triad research has predominantly utilized cross-sectional data gathered through convenience sampling from a single source, such as university students and online samples (59). The sample for the current research was overwhelmingly drawn from a single cultural group and this means that the findings may not be generalisable beyond that frame. Indeed, the assessment of risk-taking tendencies might be more salient and reflective of real-life risk behaviours if data were collected from working adults and criminal samples with greater life exposure and experience. Given the greater potential relevance of Dark Triad traits in legal and occupational settings, future research should perhaps focus on investigating the impact of the Dark Triad in these fields.

Conclusion

The sinister sounding Dark Triad traits have been conceptualized as a cluster of cold-hearted, socially aversive personality characteristics coupled with the tendency to promote short-term, exploitative social strategies that run counter to Empathy. In this study Machiavellianism and Psychopathy were found to be modestly correlated with low levels of Empathy, but Narcissism was not. The present study has provided some insights into the interactions of these constructs with broader societal issues by demonstrating a significant association between the Dark

Triad traits and the propensity for risk-taking in the ethical, financial, health/safety and social domains. Therefore, it might reasonably be concluded that playing with fire is within the nature of individuals with Dark Triad traits.

Competing interests

The authors declare that they have no competing interests.

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