
A Behavioral Genetic Study of the Dark Triad of Personality and Moral Development

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The present study is the first behavioral genetic investigation of relationships between the Dark Triad of personality — Machiavellianism, narcissism, and subclinical psychopathy — and moral development. Participants were 154 monozygotic twin pairs and 82 same-sex dizygotic twin pairs. Higher scores on Machiavellianism and psychopathy were positively correlated with low levels of moral development; high psychopathy scores also correlated negatively with high levels of moral development. Individual differences in lower levels of moral development were attributable to genetic and nonshared environmental factors but, very interestingly, individual differences in the highest levels of moral development showed no genetic basis but were entirely attributable to shared and nonshared environmental factors. Finally, correlations between the Dark Triad and moral development variables showed no genetic basis while correlations among the moral development variables were variously attributable to correlated genetic and correlated environmental factors.

Keywords: dark triad, moral development, twin study

Within the study of individual differences several personality clusters have been proposed to account for variation in human personality. For example, Eysenck's Giant Three (Eysenck, 1994) focuses on introversion/extraversion, neuroticism, and psychoticism, and more recently the Big-Five Factors of Personality identify Openness to Experience, Agreeableness, Conscientiousness, Neuroticism, and Extraversion (McCrae & Costa, 1985).

Another recently developed personality cluster is the Dark Triad, which focuses on Machiavellianism, narcissism, and psychopathy (Paulhus & Williams, 2002). The term Machiavellianism, named after Renaissance diplomat and writer Niccolò Machiavelli, refers to cold and manipulative behaviors along with insincerity and callousness. Narcissism is characterized by an excessive love for one's self, feelings of superiority, attention-seeking, and use of exploitation in relationships with others. Psychopathy refers to a sense of high impulsiv-

ity, low remorse, and thrill-seeking. Narcissism and psychopathy can be viewed from both clinical and non-clinical perspectives.

Paulhus and Williams (2002) argue that the Dark Triad traits are moderately correlated with one another in normal (nonclinical) populations because they each share a number of features such as social malevolence and tendencies toward self-promotion, coldness, aggressiveness, and duplicity. Other research has supported this position (Jakobwitz & Egan, 2006; Lee & Ashton, 2005).

Researchers have also investigated relationships between the Dark Triad and other personality clusters. Paulhus and Williams (2002) found that narcissism was positively correlated with extraversion ($r = .42$) and openness ($r = .38$), and had a negative correlation with agreeableness ($r = -.36$). It was also reported the Machiavellianism was negatively correlated with agreeableness ($r = -.47$) and conscientiousness ($r = -.34$) and that psychopathy was correlated with all of the Big Five traits: extraversion ($r = .34$), agreeableness ($r = -.25$), conscientiousness ($r = -.24$), neuroticism ($r = -.34$) and openness ($r = .24$). Correlations such as these were also reported by Lee and Ashton (2005).

A recent study by Vernon, Villani, et al. (2008) further explored the relations between the Dark Triad variables and the Big-Five. They found significant correlations between each of the Dark Triad variables and several of the Big-Five variables: narcissism correlated positively with extraversion and openness and correlated negatively with agreeableness. Machiavellianism correlated negatively with agreeableness and conscientiousness and correlated positively with neuroticism. Psychopathy correlated negatively with agreeableness and conscientiousness. Using twin methodology, Vernon, Villani, et al. (2008) also showed that these

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phenotypic correlations were largely attributable to correlated genetic factors.

A potentially interesting correlate of the Dark Triad traits, which has not yet been investigated using behavioral genetic methodology, is moral development or moral reasoning. Moral reasoning refers to constructs such as ethical standards, sympathy, empathy, the ability to think through moral dilemmas and a belief in the existence of standards of right and wrong (Tarry & Emlar, 2007). High moral reasoning is seen as a desirable aspect of personality, often conceptualized as a higher-order developmental stage. As such, it might be expected that high levels of moral development would be negatively correlated with some if not all of the three Dark Triad variables, and an empirical examination of this is one of the goals of the present study. Some previous studies have investigated relationships between moral development and narcissism (Yocum, 2007), Machiavellianism (Hren et al., 2006), and psychopathy (Blair, 1995) individually, but ours is the first to include measures of all three of the Dark Triad variables.

A second goal of our study is to investigate the extent to which individual differences in moral development can be attributed to genetic and/or environmental factors. Behavioral genetic investigations of moral reasoning per se have been quite limited, although Vernon et al. reported a high heritability for psychopathy (.64) and narcissism (.59). Insofar as these traits are related to lower moral development, it may therefore be expected that moral reasoning will show similar heritability. Finally, our third goal is to examine the extent to which any phenotypic correlations that we observe between the Dark Triad and moral development are themselves attributable to correlated genetic and/or correlated environmental factors: to the extent that these variables are genetically correlated this would indicate that those genes that contribute to individual differences in the Dark Triad also contribute to individual differences in moral reasoning.

Method

Participants

Participants were 154 monozygotic (MZ) twin pairs and 82 same-sex dizygotic (DZ) twin pairs. All were adults between 18 and 72 years of age ($M = 33.9$, $SD = 6.2$); 372 individuals were female. These twins were a subset of a larger sample of 456 twin-pairs who had taken part in a previous study (Vernon, Martin et al., 2008), at which time their zygosity had been determined using Nichols and Bilbro's (1966) zygosity questionnaire. Two hundred and fifty pairs were invited to participate in the current study; thus, almost 95% of those who were approached consented to take part.

Materials

The Defining Issues Test-2, or DIT-2 (Bebeau & Thoma, 2003), was used to assess moral development. The DIT-2 is a paper and pencil measure of moral rea-

soning which stems from Kohlberg's theory of moral development (Kohlberg, 1984). It comprises five one-paragraph short stories that each presents a different moral dilemma. Participants are told to respond as if they are the main actor in each dilemma. After reading each passage, the participant is asked to decide what they think the main actor should do, by selecting one of three forced-choices, and to then rate how important each of a given list of 12 options is in terms of helping them reach a decision. Finally, they are asked to select what they think are the 4 most important of the 12 options.

The DIT-2 categorizes responses as fitting into one of three schemas: the Personal Interest Schema (DIT-PI), Maintaining Norms Schema (DIT-MN), or Post-Conventional Schema (DIT-PC). DIT-PI represents the schema used by those who focus on advantages to the actor in deciding what the actor should do. High DIT-PI scores correspond to Stages 2 and 3 of moral development in Kohlberg's model. DIT-MN represents the schema adopted by participants who focus on the existing legal system and organizational structures. High DIT-MN scores correspond to Stage 4 in Kohlberg's model. Finally, DIT-PC represents the schema used by participants who focus on guarding basic rights, justice, ideals, and due process. High DIT-PC scores correspond to Stages 5 and 6 in Kohlberg's model. Reliabilities (coefficient alphas) of DIT-2 scores have been reported as .61 (DIT-PI), .73 (DIT-MN), and .74 (DIT-PC) (Bebeau & Thoma, 2003).

The Self-Report Psychopathy Scale, or SRP-III (Paulhus et al., 2006), was used as a measure of sub-clinical psychopathy. This measure consists of 31 items answered on a 5-point Likert scale. A sample item measuring psychopathic tendencies within a normal population is 'I never feel guilty over hurting others'. Cronbach's alpha for this measure is .88.

The MACH-IV (Christie & Geis, 1970) served as the measure of Machiavellianism. This measure is a 20-item Likert format scale. A sample item from this measure is 'Anyone who completely trusts anyone else is asking for trouble'. The reliability of this measure is .79.

Finally, the Narcissistic Personality Inventory, or NPI (Raskin & Hall, 1979), served as the measure of Narcissism. The NPI is a 40-item, forced-choice scale in which subjects choose which one of two statements best describes them. An example item would require subjects to choose either 'I have a natural talent for influencing people' or 'I am not good at influencing people'. The reliability of this scale is estimated to be .75.

Procedure

Participants were sent the four questionnaires (and three others which are not pertinent to the present report), as well as a letter of information and informed consent by mail. Each twin was instructed to complete the measures individually and not to consult with their

Table 1

Correlations Within and Between the Dark Triad Variables and Moral Development Variables

	Measures						Mean	Standard Deviation
	NPI	MACH	SRP	DITPI	DITMN	DITPC		
NPI	1	.18	.31**	.06	-.13	.06	.44	.13
MACH		1	.55**	.20**	-.12	-.04	2.47	.40
SRP			1	.14*	.10	-.21**	2.07	.39
DITPI				1	-.27**	-.50**	29.28	12.07
DITMN					1	-.62**	31.95	13.86
DITPC						1	33.25	15.42

Note: ** correlation is significant at the 0.01 level, * correlation is significant at the 0.05 level.

Table 2

Twin Correlations and Model-Fitting Estimates for the Moral Development Variables

Variable	r		Causal estimates		
	MZ	DZ	a^2	c^2	e^2
DIT-PI	.30	.13	.34		.66
DIT-MN	.33	.04	.58		.42
DIT-PC	.38	.39		.38	.62

Note: a^2 = additive genetic effects, c^2 = shared environmental effects, e^2 = nonshared environmental effects

twin. They were also instructed to take their time and to complete the questionnaires at their own pace. Each participant who returned a full set of completed questionnaires received \$25 compensation as well as a debriefing form describing the study and its predictions. DIT-2 response sheets were sent to the Center for the Study of Ethical Development at the University of Minnesota for scoring; NPI, MACH-IV, and SRP-III questionnaires were scored by hand.

Results

Pearson correlations were calculated within and between the Dark Triad and moral development variables and are reported in Table 1 along with these variables' means and standard deviations. Replicating Vernon, Villani, et al. (2008) the Dark Triad variables showed low to moderate positive correlations with each other. As would be expected, DIT-PI, DIT-MN, and DIT-PC scores were negatively correlated with one another, with the largest negative correlation being between DIT-MN and DIT-PC. Machiavellianism and psychopathy had low positive correlations with DIT-PI scores (representing the lowest levels of moral development); psychopathy also showed a significant negative correlation with DIT-PC (representing the highest levels of moral development).

Shown in Table 2 are MZ and DZ twin correlations for the DIT-2 variables and the results of univariate behavioral genetic analyses performed with the software package Mx (Neale et al., 2002). These analyses estimate the extent to which individual differ-

Table 3

Bivariate Genetic Analyses of Dark Triad Scales and Moral Development Scales

	DIT-PI	DIT-MN	DIT-PC
NPI	rg = 0 rc = -.00 (-.37 to .34) re = .14 (-.08 to .35)	rg = 0 rc = -.14 (-.48 to .22) re = -.12 (-.33 to .10)	rg = 0 rc = .11 (-.21 to .43) re = .00 (-.22 to .22)
MACH	rg = 0 rc = .68 (.34 to 1.00) re = -.14 (-.35 to .08)	rg = 0 rc = -.08 (-.42 to .30) re = -.19 (-.39 to .03)	rg = 0 rc = -.33 (-.67 to .01) re = .26 (.04 to .45)
SRP	rg = 0 rc = .58 (.19 to .99) re = -.07 (-.28 to .15)	rg = 0 rc = .05 (-.37 to .43) re = .16 (-.06 to .36)	rg = 0 rc = -.54 (-.20 to .86) re = -.02 (-.24 to .19)
DIT-MN	rg = -.18 (-.54 to .28) rc = 0 re = -.36 (-.12 to -.56)		rg = 0 rc = -.72 (-.42 to -.92) re = -.53 (-.35 to -.67)
DIT-PC	rg = -.56 (-.22 to -.77) rc = 0 re = -.49 (-.27 to -.66)		

Note: rg = genetic correlation, rc = shared environmental correlation; re = non-shared environmental correlation. Numbers appearing in brackets represent the 95% confidence interval values.

ences in variables can be attributed to additive genetic effects (a^2), or to the shared (c^2) or the nonshared (e^2) environment. Although MZ correlations are more than twice as large as DZ correlations for DIT-PI and DIT-MN, suggesting the presence of dominance genetic effects, we did not try to estimate dominance effects due to the lack of power arising from our relatively small samples (Martin et al., 1978).

As can be seen in Table 2, MZ correlations are larger than DZ correlations for DIT-PI and DIT-MN and model-fitting showed that individual differences in these lower level dimensions of moral development are attributable to genetic and non-shared environmental effects. For DIT-PC, however, MZ and DZ correlations are essentially the same, meaning that individual differences in this highest level of moral development are entirely attributable to environmental factors, mostly non-shared.

Finally, shown in Table 3 are the results of bivariate BG model-fitting which indicate, first, that all of the phenotypic correlations between the Dark Triad and moral development in Table 1 are entirely attributable to correlated environmental factors. Some of the shared environmental correlations between these variables are quite large: for example, .68 between Machiavellianism and DIT-PI, .58 between psychopathy and DIT-PI, and $-.54$ between psychopathy and DIT-PC. In contrast, the largest nonshared environmental correlation between any of the Dark Triad and DIT-2 variables is only .26. As can also be seen in Table 3, phenotypic correlations among the three DIT-2 variables are attributable to different combinations of genetic, shared, and nonshared environmental factors. A large ($-.56$) genetic correlation exists between DIT-PI and DIT-PC, whereas the correlation between DIT-MN and DIT-PC shows no shared genetic influence.

Discussion

Replicating Vernon, Villani et al. (2008), the three Dark Triad variables showed low to moderate positive correlations with each other, indicating that these variables do form a cluster of partially overlapping traits. As expected, the three moral development variables were negatively correlated with one another: higher scores on the lower levels of moral development having to be associated with lower scores on the higher levels of development. Some support was also obtained for the prediction that higher scores on the Dark Triad variables would be related to lower levels of moral development. This was especially true for psychopathy, for which high scores correlated positively with low moral development and correlated negatively with high moral development. High scores on Machiavellianism also had a significant positive correlation with low moral development and correlated negatively, albeit not significantly, with higher levels of moral development.

Based on previous BG research with personality traits, it was predicted that individual differences in moral development would be attributable to genetic and non-shared environmental factors (Johnson et al., 2008). Partial support for this was obtained with the two lower levels of moral development. Individual differences in DIT-PC, representing the highest levels of moral development over and above personal interest or legal concerns, however, were entirely attributable to environmental factors. This is of considerable interest because it indicates that high moral development may be acquired through experiences: perhaps parents, teachers, role-models, and other people and things that we encounter can be influential in determining whether we attain a high level of moral development. Moreover, insofar as high moral development relates to other personality traits, it represents one of a very few, if any, such traits that show no genetic influence.

Finally, the bivariate BG analyses yielded a very interesting pattern of results. Unlike most other personality traits, correlations between the Dark Triad and the three moral development variables had no genetic basis, but were largely attributable to correlated environmental factors. Thus, experiences that family members share appear to co-contribute to people's moral development and, in particular, to their levels of Machiavellianism and psychopathy. Correlations among the three DIT-2 variables were variously attributable to correlated genetic and environmental factors. A large genetic correlation was observed between DIT-PI and DIT-PC, representing the lowest and highest levels of moral development, respectively, while correlated environmental factors contributed to the correlation between the other levels of moral development.

In conclusion, this study is the first BG investigation of factors contributing to individual differences in moral development and of the genetic and/or environmental basis of relations between moral development and the three traits comprising the Dark Triad: Machiavellianism, narcissism, and psychopathy. Our study yielded some very interesting results that we are currently building upon, both by collecting data from larger samples of twins and by including other measures of personality that may be related to moral development.

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