

Un(desirable) traits? The Dark Tetrad across academic disciplines in higher education

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Abstract

Research suggests that students in certain disciplines, particularly economics and business, may display higher levels of self-interested behaviour than those in other fields. However, it remains unclear whether such differences reflect self-selection, disciplinary socialisation, or their interaction within higher education contexts. Addressing this gap, the present study examined whether Dark Triad and Dark Tetrad traits (Machiavellianism, narcissism, psychopathy, and sadism) differed across disciplinary groupings. Across two studies, university students were categorised into business, law, and economics; natural sciences and engineering; and arts, humanities, and social sciences. In Study 1 ($N = 400$), students in business, law, and economics reported significantly higher Dark Triad scores than those in arts, humanities, and social sciences, with natural sciences and engineering students also scoring higher than the latter group. Study 2 ($N = 213$) replicated these findings using Dark Tetrad measures and examined risk-taking and amorality, both of which positively predicted Dark Tetrad traits. Overall, students in business-, law-, and economics-related disciplines reported higher levels of socially aversive traits. However, given the cross-sectional design, findings reflect associations rather than causal effects. Results are consistent with both self-selection and socialisation explanations and have implications for curriculum design, student development, and employability in higher education.

Keywords

academic disciplines, dark tetrad, dark triad, higher education, student behaviour

Higher education institutions are not only sites of knowledge transmission but also environments in which disciplinary cultures shape student identities, behaviours, and career trajectories (Becher and Trowler, 2001; Bourdieu, 1988). Academic disciplines differ in their epistemological structures, social organisation, and normative expectations, which may influence both the types of students they attract and the behaviours they reinforce (Biglan, 1973; Kolb, 1981). Within this context, examining personality differences across disciplinary groupings offers insight into how higher education systems interact with individual dispositions. Following established classifications of disciplinary differences (Biglan, 1973; Kolb, 1981), academic disciplines can be broadly grouped into hard–soft and pure–applied domains. In the present study, disciplinary groupings (e.g., business, law, and economics; natural sciences and engineering; arts, humanities, and social sciences) are interpreted within this framework, allowing for a theoretically grounded comparison of student characteristics across disciplinary contexts.

Despite growing psychological research on dark personality traits, there remains a gap in higher education research regarding how such traits are distributed across disciplinary groupings and what this may imply for educational practice. This study therefore addresses both a knowledge gap (the distribution of Dark Tetrad traits across disciplines) and a policy-relevant gap (how disciplinary environments may relate to student development within higher education contexts).

One area of growing interest concerns the distribution of socially aversive personality traits -- collectively referred to as the Dark Triad and its extension, the Dark Tetrad --

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across academic disciplines. Paulhus and Williams (2002) developed the Dark Triad theory to refer to a cluster of overlapping socially aversive or dark personality traits (*Machiavellianism*, *narcissism*, and *psychopathy*). Recently, the Dark Triad expanded to include *sadism* (Buckels et al., 2013; Chabrol et al., 2009; Johnson et al., 2019; Paulhus, 2014), creating a new group of socially aversive traits, referred to as the *Dark Tetrad* (Blötnner et al., 2021; Dinić et al., 2020). Each of these traits has distinct characteristics that contribute to the overall profile of the *Dark Tetrad*, yet they often overlap in their anti-social manifestations. For instance, *Machiavellianism* is often characterised by manipulative planning (Jones and Paulhus, 2011; Muris et al., 2017) and ruthlessness (Zettler and Solga, 2013), and its four proposed facets include distrust, status striving, desire for control, and amorality (Dahling et al., 2009). Thus, Machiavellianism can be linked to a strong motivation to lead, strategic thinking, and power dynamics within complex business environments (Liyanagamage and Fernando, 2023). These patterns may reflect an alignment between individual dispositions and disciplinary environments. Specifically, individuals with Dark Tetrad characteristics may be more likely to pursue disciplines such as business or law, driven by a desire for power, status, and career success.

Narcissism, in turn, can be characterised by grandiosity, need for admiration, entitlement, and lack of empathy (APA, 2013; Kernberg, 1985). It positively predicts general and emotional engagement, as well as attitudes towards employability (Mooney, 2023). Research has consistently shown that business students, particularly finance students, exhibit higher levels of narcissism and lower levels of empathy compared to students in other fields (e.g., Brown et al., 2010; Sautter et al., 2008). A study of Generation Z business students found one of the highest mean Narcissistic Personality Inventory scores in the literature, with finance students scoring higher than other business students (Wood et al., 2021).

Interestingly, higher levels of narcissism among business students appears to persist across generations. For instance, Narcissistic traits have been linked to unethical decision-making and academic dishonesty, with exploitative attitudes potentially mediating this relationship (Menon and Sharland, 2011). Additionally, narcissism was found to be higher among male students, younger students, and leaders of student organisations (Wood et al., 2021).

Psychopathy is a pervasive pattern of antisocial behaviour (APA, 2013) defined by lack of remorse, lack of empathy, impulsiveness (Levenson et al., 1995), hot temper (Blackburn and Maybury, 1985) and immoral behaviour (Berg et al., 2015). In an academic context, Himes et al. (2021) found that business students exhibited higher levels of psychopathy and lower ethical attitudes compared to psychology students. Similarly, Clow and Scott (2007) reported that students with higher psychopathic

personality scores, particularly in Machiavellian Egocentricity, were more likely to choose criminal justice over nursing as a major. Furthermore, Göncü Köse and Ekren (2019) investigated the Dark Triad traits across various disciplines, suggesting that these personality characteristics influence career choices. In the context of business specifically, Shank et al. (2021) discovered a positive relationship between overall psychopathy scores and the linearity of cumulative prospective utility functions. Specifically, they also found that specific psychopathic traits, such as self-centred impulsivity and stress immunity, were associated with financial risk preferences and higher time preference discount rates.

Finally, sadism, a related antisocial characteristic, is defined as behavioural tendencies towards the enjoyment of inflicting physical or psychological pain towards others (Reidy et al., 2011), as well as seeking opportunities to watch others suffer (Paulhus, 2014). In an academic context, several studies have found associations between dark personality traits and academic behaviours, with Machiavellianism and sadism positively related to study addiction, particularly in males (e.g., Kircaburun et al., 2021).

Thus, numerous studies seem to justify the ‘dark’ adjective applied to the tetrad with the identification of notable negative correlates of these traits, including bullying (Jones and Paulhus, 2014; Pilch and Turska, 2015; Regnaud, 2011), acceptance of corporal punishment (Chung et al., 2021), lying and cheating (Jones and Paulhus, 2009), poor teamwork (Zettler et al., 2011), uncivil behaviour towards supervisors and co-workers (Meier and Semmer, 2013), poor job performance (O’Boyle et al., 2013), less citizenship behaviours (Becker and Dan O’Hair (2007)), self-perception of being good leaders despite being actually viewed by others as socially aversive (Zuroff et al., 2010), and criminal attitudes (Mededović and Kovačević, 2021), among others.

However, it has also been suggested that *Dark Tetrad* traits provide individuals with advantages over their co-workers (Coleman, 2021) and facilitate their success in highly competitive societies (Paulhus and Williams, 2002; Zettler et al., 2011). For example, features like manipulation, charm, and need for excitement, frequently shown by individuals with psychopathic traits (e.g., Muñoz et al., 2011), have been found to prevail among successful corporate workers (Sutton, 2013), and it is sensible to expect that narcissistic individuals will prefer high-status occupations (Daicoff, 1996). Not surprisingly, whilst about one per cent of the population may be expected to present high psychopathy (Hare et al., 1991; Sanz-García et al., 2021), it has been suggested that in economic professions the number may be as high as four (Babiak and Hare, 2006) to ten percent (DeCovny, 2012). In addition, previous research found that the Dark Tetrad has been consistently more associated with males than with females (e.g., Jonason et al., 2012; Paulhus and Williams, 2002).

Recent research has extended the study of Dark Triad and Dark Tetrad traits into occupational and applied contexts, demonstrating their relevance for workplace behaviour, career preferences, and performance outcomes (Furnham and Treglown, 2021). From a career development perspective, personality traits have been shown to shape educational and occupational trajectories, reinforcing the importance of examining these traits within disciplinary contexts (Spur et al., 2019). Importantly, more recent meta-analytic and review evidence has further strengthened this line of inquiry, demonstrating consistent associations between dark personality traits and counterproductive work behaviours, occupational preferences, and performance outcomes (Miao et al., 2023; Verma et al., 2026). Emerging research has also begun to map these traits onto vocational interests and occupational niches, highlighting how specific dark trait facets align with particular career pathways (Du et al., 2026). Within higher education, emerging research has begun to directly examine Dark Triad traits in relation to academic discipline choice and student populations (Kokkinos et al., 2025; McCleskey et al., 2025).

Moreover, evidence highlights the nuanced nature of dark personality traits, with some traits (e.g., narcissism) showing associations with adaptive characteristics such as leadership emergence or resilience (Denovan et al., 2021; Papageorgiou et al., 2018, 2019, 2023), while others (e.g., psychopathy) remain more consistently maladaptive, as demonstrated in recent meta-analytic work (Liang et al., 2024). However, replication concerns and cultural variability in disciplinary differences have also been noted (Vedel and Thomsen, 2017), supporting the need for further research in contemporary higher education contexts.

Within higher education research, disciplinary cultures have been shown to shape student learning approaches, identity formation, and professional trajectories (Becher and Trowler, 2001). However, relatively little work has examined how these disciplinary contexts relate to socially aversive personality traits, representing an important gap at the intersection of psychology and higher education research.

Study I

A related study on high school educational profiles and personality found that the displayed self-perceptions of competence corresponded with their reported achievement in French and math, independently of their levels of achievement (Smith et al., 2024). Previous research suggests that disciplinary choice is associated with personality differences, particularly within business, law, and economics (Vedel and Thomsen, 2017). Within higher education, these differences may reflect both self-selection processes and the influence of disciplinary environments. For instance, business students, as compared to psychology students, have been found to score higher in *narcissism*

(Westerman et al., 2012), *Machiavellianism* (McLean and Jones, 1992), and *psychopathy* (Vedel and Thomsen, 2017), as well as being more likely to engage in immoral behaviour and express the love of money (Li-Ping Tang et al., 2008). Interestingly, Economics students also behave in more self-interested ways than individuals on STEM courses (e.g., astronomy course; Frank et al., 1993). Furthermore, commerce and law students scored higher on psychopathy than students in other disciplines (Wilson and McCarthy, 2011). However, it remains unclear whether these patterns reflect self-selection (i.e., individuals selecting into disciplines consistent with their traits) or socialisation processes (i.e., traits reinforced through disciplinary training) (Daicoff, 1996; Elegido, 2009). For instance, Brewer and Williams (2007) highlighted how lawyers are taught to use manipulative tactics, which suggests that the personality of students may change with advancing years of study (Daicoff, 1996). On the other hand, Elegido (2009) found that students choosing economics and business students were more self-interested before entering their courses, which may indicate that the exposure to the economic models during their studies could further deepen that predisposition rather than create it.

Studies in this area are still limited though, and changes in society, education, and the workplace make us wonder whether the differences in Dark Tetrad traits reported in the past decades do faithfully illustrate the personality ‘profiles’ of current university students. Measuring those differences is the first purpose of the present study. Following the literature above, we hypothesised (H_1) that regardless of gender, Business, Law, and Economics students would score higher on the *Dark Triad* than students of other disciplines; (H_2) that postgraduate Business, Law, and Economics students would score higher on the *Dark Triad* traits than undergraduate students; and (H_3) that men would score higher on the *Dark Triad* than women.

It was already shown that morality may mediate the associations between personality and academic discipline preference by its associations with both (Goff et al., 2022). Risk-taking may be another explanation for associations between dark personality traits and academic discipline choice (e.g., Abercrombie et al., 2022). Although risk in terms of profession could be relative (i.e., is choosing art as a major risky because the likelihood of high income is low, or is perceived risk computationally assessed in a more visceral way; For example, physically risky such as working as lawyer; see, Paola and Gioia, 2011). Finally, it is possible that darker personality traits are associated with cognitive or motivational characteristics that may influence academic discipline choice.

Method

Design and analytic approach. A between-subjects factorial design was employed, utilising a 2 (Gender: Male; Female)

x 3 (Academic Discipline Category: Natural Sciences and Engineering; Business, Law and Economics; Arts, Humanities and Social Sciences) independent ANOVA to test the hypotheses, with scores on each of the *Dark Triad* traits as the dependent variable.

Participants. G*Power (Erdfeider et al., 1996) estimated 339 participants was required given a medium effect size ($f^2 = .17$), $\alpha = .05$ and power of .80. Participants were recruited via social media. We excluded participants who identified their gender as 'other' due to only 4 responses that could not be generalised. In total, 400 university students from multiple universities of different countries (UK, the Netherlands, US, Australia, Czechia) completed the study (261 females; 139 males). Mean age was 24.34 years ($SD = 5.81$, range 18–56). Participants were recruited from universities in these countries to increase the generalisability of findings across Western educational contexts and to capture variability in academic disciplines (not to test cross-national differences). University students were selected as the target population due to their accessibility and relevance to the constructs under investigation, particularly in relation to academic discipline and emerging adult personality traits. Inclusion criteria required participants to be currently enrolled undergraduate or postgraduate students aged 18 years or older. No restrictions were placed on gender or field of study. Participants were excluded if they provided incomplete responses.

Two-hundred fifty-one (63%) were undergraduate students, 124 (31%) postgraduate, 15 (4%) doctorate and 10 (3%) defined as other. Furthermore, 63 (16%) participants fell within the Natural Sciences, Engineering group, 157 (39%) were studying Business, Law, Economics, and the largest sample of 180 (45%) participants fell within the Arts, Humanities, Social Sciences group.

Materials. The *Dark Triad* traits were measured using the 27-item Short Dark Triad Questionnaire (SD3; Jones and Paulhus, 2014); example items include 'It's not wise to tell your secrets.' (Machiavellianism), 'People see me as a natural leader.' (Narcissism), and 'I like to get revenge on authorities.' (Psychopathy). Items were anchored on a 5-point Likert scale ranging from 1 ('Disagree strongly') to 5 ('Agree strongly'). Cronbach's α reported by the original authors for Machiavellianism was .71, psychopathy $\alpha = .77$ and narcissism $\alpha = .74$ (Jones and Paulhus, 2014). The tool has been validated against the Self-Report Psychopathy Scale (Paulhus et al., 2009; psychopathy, $\alpha = .92$), Mach-IV (Christie and Geis, 1970; Machiavellianism, $\alpha = .83$) and NPI (Raskin and Hall, 1979; narcissism, $\alpha = .89$).

Procedure and ethics. The study received approval from the first author's university's research ethics committee. Questionnaires were applied online and included the participant information sheet, consent form – participants who

did not express their consent were redirected to the debriefing sheet.

Results

Descriptives. Internal consistency was acceptable for all Dark Triad subscales: Machiavellianism ($\alpha = .76$), narcissism ($\alpha = .71$), and psychopathy ($\alpha = .74$).

Means and standard deviations for Dark Triad scores by academic discipline and gender are presented in Table 1.

Overall, students in Law, Business, and Economics reported the highest Dark Triad scores, followed by Natural Sciences and Engineering, and Arts, Humanities, and Social Sciences.

A 2 (gender) $\times$ 3 (academic discipline) between-subjects ANOVA was conducted on Dark Triad scores. There was a significant main effect of academic discipline, $F(2, 394) = 4.28$, $p = .015$, $\eta_p^2 = .021$. Post hoc comparisons (Tukey's HSD) indicated that students in Law, Business, and Economics scored significantly higher than those in Arts, Humanities, and Social Sciences ($p < .001$). Students in Natural Sciences and Engineering also scored higher than those in Arts, Humanities, and Social Sciences ($p = .034$). There was no significant difference between Law, Business, and Economics and Natural Sciences and Engineering ($p = .507$).

There was also a significant main effect of gender, $F(1, 394) = 19.94$, $p < .001$, $\eta_p^2 = .048$, with men reporting higher Dark Triad scores than women. The interaction between academic discipline and gender was not significant, $F(2, 394) = 0.97$, $p = .381$, $\eta_p^2 = .005$.

Additional analyses examined differences by level of study within disciplines. Among Law, Business, and Economics students, there was no difference between undergraduate and postgraduate students, $t(144) = -0.02$, $p = .98$, $d = -0.01$. Among Arts, Humanities, and Social Sciences students, postgraduate students scored higher than undergraduates, $t(167) = -1.95$, $p = .05$, $d = 0.30$; however, this difference did not remain significant after correction for family-wise error ($p < .016$).

Discussion

The findings of Study 1 provide partial support for existing research indicating that students in Law, Business, and

Table 1. Dark triad means and standard deviations by gender and academic major.

	Male		Female	
	M	SD	M	SD
Natural sciences	2.85	.63	2.72	.39
Business, law, economics	3.01	.45	2.74	.45
Arts, humanities, social sciences	2.88	.42	2.54	.48
Overall	2.94	.48	2.63	.47

Economics report higher Dark Triad traits (Vedel and Thomsen, 2017). Unexpectedly, students in Natural Sciences and Engineering also scored higher on the Dark Triad compared to those in Arts, Humanities, and Social Sciences. In addition, postgraduate students in Arts, Humanities, and Social Sciences scored higher than their undergraduate counterparts. As hypothesised, male participants scored higher than female participants across academic disciplines, supporting previous research on gender differences in socially aversive traits. However, contrary to expectations, postgraduate students in Law, Business, and Economics did not score higher than undergraduates in these fields.

Although these differences were statistically significant, their magnitude was relatively modest. The effect of academic discipline on Dark Triad scores was small and the effect of gender, while somewhat larger, remained in the small-to-moderate range. This suggests that, although systematic differences exist, academic discipline and gender account for only a limited proportion of variance in Dark Triad traits. Accordingly, these factors should be understood as contributing influences rather than strong determinants, and interpretations of group differences should remain cautious.

The observed patterns may reflect either self-selection or socialisation processes, although causal conclusions cannot be drawn due to the cross-sectional design. One possible explanation is that individuals develop stronger Machiavellian tendencies over time, as such traits have been associated with long-term goal orientation and may be reinforced through experience (Jones and Paulhus, 2012). Alternatively, it is possible that individuals with higher levels of socially aversive traits are more likely to progress within certain disciplines, particularly in Arts, Humanities, and Social Sciences (Gruda et al., 2023).

The interaction between academic discipline and gender was not statistically significant, indicating that the effect of gender on Dark Triad scores did not vary across academic disciplines. In other words, the observed gender difference was consistent across Law, Business, and Economics; Natural Sciences and Engineering; and Arts, Humanities, and Social Sciences. To further examine these possibilities, *Study 2* aimed to replicate the effect of level of study on socially aversive traits and to investigate potential underlying mechanisms, specifically morality and risk-taking.

Study 2

Building on Study 1, Study 2 aimed to extend the Dark Triad findings by examining Dark Tetrad traits alongside potential explanatory mechanisms. Wilson and McCarthy (2011) found commerce and law students to score higher on psychopathy than students in other disciplines. In particular, risk-taking and amorality were examined as factors that may help explain disciplinary differences. Therefore, it was hypothesised that independent of gender, *Law, Business,*

and Economics students would score higher on all *Dark Tetrad* traits, *Risk-Taking* and *Amorality* compared to *Natural Sciences, Engineering* and *Arts, Humanities, Social Science* students. It was also hypothesised that the scores of *Risk-Taking* behaviour and *Amorality* would be positive predictors of the scores on *Dark Tetrad* traits. Moreover, based on previous research (Jonason et al., 2009), it was predicted that men would score higher than women on *Dark Tetrad* traits, *Risk-Taking* and *Amorality*. Given the suggestion that the personal characteristics of students may develop with advancing years of study (Daicoff, 1996), it was hypothesised that postgraduate *Law, Business, and Economics* students would score higher on the *Dark Tetrad* compared to undergraduate *Law, Business, and Economics* students.

Method

Design and analytic approach. A between-subject quasi-experimental design tested the hypothesis that mean *Dark Tetrad* scores, *Risk-Taking* scores and *Amorality* scores would differ by academic discipline independent of gender. Specifically, a 2 (*Gender: Male/Female*) x 3 (*Academic Discipline Category: Natural Sciences, Engineering/Law, Business, Economics/Arts, Humanities, Social Sciences*) between-subjects MANOVA was employed to test the primary hypothesis using *Dark Tetrad*, *Risk-Taking*, and *Amorality* as dependent variables. Lastly, independent sample t-test was used to screen for differences between the *Dark Tetrad* scores of undergraduate and postgraduate students of *Law, Business, and Economics*.

Participants. G*Power 3.1.9.2 (Erdfelder et al., 1996) estimate that 117 participants were needed with an effect size of $f^2 = .17$, $\alpha = .05$ and power of .80. Participants were recruited via social media. A filter was applied to exclude participants that identified their gender as 'other' due to a low number of responses that could not be generalised. In total 213 university students from multiple universities of different countries (UK, the Netherlands, US, Australia, Czechia) were included in the sample. The sample consisted of young adults ($M_{age} = 26.40$, $SD_{age} = 7.25$) in a range between 20 and 75 years. Most participants were female ($N = 172$; 81%). In the overall sample, the largest group were postgraduate students ($N = 128$; 60%), followed by undergraduate ($N = 68$; 32%), doctorate ($N = 12$; 6%) and 5 identified as other ($N = 5$; 2%). Twenty-eight (13%) students identified as *Natural Sciences, Engineering* students, 66 (31%) fell within the *Law, Business, Economics* group and 119 (56%) fell within the *Arts, Humanities, Social Sciences* group.

Materials. Following informed written consent, participants completed the Short Dark Triad Questionnaire (SD3), Varieties of Sadistic Tendencies scale (VAST), Amorality

Scale (AMRL-9), and Domain-Specific Risk-Taking (Adult) Scale (DOSPRT). The 27-item Short Dark Triad Questionnaire (Jones and Paulhus, 2014) consisting of a 5-point Likert scale anchored from 1 (Strongly disagree) to 5 (Strongly agree) was used to measure Machiavellianism ('Most people can be manipulated.'), narcissism ('Many group activities tend to be dull without me.'), and psychopathy ('Payback needs to be quick and nasty.'). The 16-item Varieties of Sadistic Tendencies scale (Paulhus et al., 2011) consisting of a 5-point Likert scale anchored from 1 (Strongly disagree) to 5 (Strongly agree) was used to measure sadism scores. The Sadistic Tendencies scale further consists of two subscales; Vicarious Sadism ('In video games, I like the realistic blood spurts.') and Direct Sadism ('I enjoy physically hurting people.').

Paulhus et al. (2011) examined the internal consistency of the Sadistic Tendencies scale and reported Cronbach's α ranging from .77 to .83 for Direct Sadism and from .81 to .84 for Vicarious Sadism. In the present study, the reliability of Cronbach's α was .87 for the Dark Tetrad (43 items) inclusive of 4 subscales; narcissism ($\alpha = .74$, 9 items), psychopathy ($\alpha = .72$, 9 items), Machiavellianism ($\alpha = .75$, 9 items), and sadism ($\alpha = .79$, 16 items; $\alpha = .75$ for 7 items of Vicarious Sadism, $\alpha = .65$ for 9 items of Direct Sadism). The 18-item Amoralism Scale (Knežević et al., 2008) consisting of a 5-point Likert scale anchored from 1 (Totally disagree) to 5 (Totally agree) was also used. This scale distinguishes three themes; *Lascivia* (amoralism caused by low impulse control; 'I could not stand a life of discipline.'), *Frustralia* (amoralism caused by frustration; 'A smart person trusts no one'), and *Crudelia* (amorality involving brutality; 'Doing good deeds brings joy to the heart.' (reverse coded); Knežević et al., 2008). Knežević et al. (2008) reported the coefficient of Cronbach's α of .78. Similarly, O'Meara et al. (2011) reported Cronbach's α of .86., and Buckels (2012) reported Cronbach's α of .87. In the current sample, the reliability of Cronbach's α was .77 for the Amoralism scale (18 items) inclusive of three subscales *Lascivia* ($\alpha = .60$, 6 items), *Frustralia* ($\alpha = .60$, 6 items), and *Crudelia* ($\alpha = .66$, 6 items).

The 30-item Domain-Specific Risk-Taking (Adult) Scale (Blais and Weber, 2006) consisting of 7-point Likert scale ranging from 1 (Extremely Unlikely) to 7 (Extremely Likely) was selected to measure risk-taking behaviour. The DOSPERT scale further recognises five subscales; Ethical ('Having an affair with a married man/woman.'), Financial ('Betting a day's income at the horse races.'), Health/Safety ('Engaging in unprotected sex'), Recreational ('Going camping in the wilderness.'), and Social ('Starting a new career in your mid-thirties.'). Blais and Weber (2006) reported that Cronbach's alpha of the risk perception scores ranged from .74 to .83 for all the subscales and of the risk-taking scores (self-reported likelihood of engaging in questioned behaviours) ranged from .71 to .86. In the current study the reliability of Cronbach's α was .88 for the risk-

taking scale. Alphas for the subscales were Social ($\alpha = .66$), Recreational ($\alpha = .82$), Financial ($\alpha = .77$), Health/Safety ($\alpha = .74$), and Ethical ($\alpha = .69$).

Results

Descriptive statistics indicated that, across both genders, the highest Dark Tetrad scores were observed among students in Law, Business, and Economics (LBE; Table 2).

A 2 (gender: male, female) $\times$ 3 (academic discipline: LBE, NSE, AHSS) between-subjects MANOVA was conducted with Dark Tetrad, Amoralism, and Risk-Taking as dependent variables.

For Dark Tetrad scores, there was a significant main effect of academic discipline, $F(2, 206) = 7.29$, $p = .001$, $\eta_p^2 = .066$. Post hoc comparisons (Tukey's HSD) indicated that students in LBE scored higher than those in AHSS ($p = .005$), while no other pairwise differences were significant.

There was also a significant main effect of gender, $F(1, 206) = 12.72$, $p < .001$, $\eta_p^2 = .058$, with men scoring higher than women.

A significant interaction between academic discipline and gender was observed, $F(2, 206) = 4.78$, $p = .009$, $\eta_p^2 = .044$. Follow-up analyses indicated that gender differences were present only within LBE ($p < .001$), with no significant gender differences in NSE or AHSS ($p > .20$).

Further analyses showed that the effect of academic discipline on Dark Tetrad scores was significant for men, $F(2, 38) = 7.87$, $p = .001$, $\eta_p^2 = .293$, but not for women, $F(2, 169) = 0.54$, $p = .586$.

A simple linear regression indicated that Amoralism was a significant positive predictor of Dark Tetrad scores, $\beta = .601$, $F(1, 210) = 62.73$, $p < .001$, $R^2 = .230$.

A second regression showed that Risk-Taking was also a significant positive predictor of Dark Tetrad scores, $\beta = .480$, $F(1, 210) = 118.82$, $p < .001$, $R^2 = .361$.

No significant differences were observed between undergraduate and postgraduate students across disciplines. Specifically, no differences were found for LBE, $t(64) = -1.13$, $p = .262$, $d = .03$; NSE, $t(26) = -0.35$, $p = .732$, $d = .01$; or AHSS, $t(117) = 0.57$, $p = .569$, $d = .01$.

Descriptive statistics indicated that the highest Risk-Taking scores were observed among students in NSE (Table 3).

Table 2. Dark tetrad means & SDs for the dark tetrad by gender and academic major.

	Male		Female	
	M	SD	M	SD
Natural sciences, engineering	2.77	.53	2.55	.36
Law, economics, business	3.07	.32	2.56	.38
Arts, humanities, social sciences	2.54	.30	2.51	.39

There was a significant main effect of academic discipline on Risk-Taking, $F(2, 206) = 4.09, p = .018, \eta_p^2 = .038$. Post hoc comparisons indicated that NSE students scored higher than AHSS students ($p = .013$), with no other significant differences.

A significant main effect of gender was also observed, $F(1, 206) = 6.40, p = .012, \eta_p^2 = .030$, with men scoring higher than women.

A small but significant interaction between academic discipline and gender was found, $F(2, 206) = 3.16, p = .045, \eta_p^2 = .030$, such that gender differences were present only within LBE ($p = .001$).

Descriptive statistics are presented in Table 4.

There was a significant main effect of academic discipline on Amoralism, $F(2, 206) = 7.19, p = .001, \eta_p^2 = .065$. Post hoc comparisons indicated that both LBE ($p = .002$) and NSE ($p = .026$) scored higher than AHSS.

A significant main effect of gender was also observed, $F(1, 206) = 4.76, p = .030, \eta_p^2 = .023$, with men scoring higher than women.

A significant interaction between academic discipline and gender was found, $F(2, 206) = 3.29, p = .039, \eta_p^2 = .031$. Follow-up analyses indicated that this effect was driven by male students in LBE, who scored higher than other groups ($p = .001$), whereas no significant gender differences were observed in NSE or AHSS ($p > .70$).

The effect of academic discipline on Amoralism was significant for men, $F(2, 38) = 7.00, p = .003, \eta_p^2 = .269$, but not for women, $F(2, 168) = 2.70, p = .070$. Post hoc comparisons indicated that male LBE students scored higher than male AHSS students ($p = .002, d = 0.55$).

Discussion

It was hypothesised that *Law, Business, and Economics* students would score higher on all the Dark Tetrad traits, *Risk-Taking* and *Amoralism* compared to students of other disciplines. *Law, Business and Economics* students compared to students of other academic disciplines had higher scores on the *Dark Tetrad*. Thus, the hypothesis was only partially supported. Unexpectedly, the highest *Risk-Taking* mean score was found amongst students of *Natural Sciences and Engineering*. Similarly, the highest overall *Amoralism* mean score was found amongst students of

Table 3. Risk-taking means & SDs for risk-taking by gender and academic major.

	Male		Female	
	M	SD	M	SD
Natural sciences, engineering	3.91	.75	3.56	.68
Law, economics, business	3.88	1.09	3.10	.73
Arts, humanities, social sciences	3.19	.62	3.21	.82

Table 4. Amoralism means & SDs for amoralism by gender and academic major.

	Male		Female	
	M	SD	M	SD
Natural sciences, engineering	2.51	.31	2.45	.47
Law, economics, business	2.79	.42	2.35	.44
Arts, humanities, social sciences	2.26	.40	2.23	.43

Natural Sciences and Engineering. However, when further broken down by gender, men within the *Law, Business, and Economics* group scored the highest on the *Amoralism* scale, whereas the largest score on the *Amoralism* scale amongst female was detected within the *Natural Sciences and Engineering* group. Surprisingly, higher *Amoralism* scores were found among students of *Natural Sciences and Engineering* compared to *Arts, Humanities, and Social Sciences*.

In addition, it was predicted that the scores of *Risk-Taking* and *Amoralism* would be positive predictors of the scores on Dark Tetrad traits. Significant results were found, and the hypothesis was fully supported. This suggests that risk-taking and amoralism may function as underlying mechanisms linking disciplinary context to socially aversive personality traits. Furthermore, it was hypothesised that male participants would score higher on the Dark Tetrad, *Risk-Taking* and *Amoralism* compared to female participants. In line with the hypothesis, it was found that male participants scored higher compared to female in each academic discipline for the Dark Tetrad and *Amoralism*. Surprisingly, female students of *Arts, Humanities, and Social Sciences* scored higher than male on the *Risk-Taking* scale; therefore, this hypothesis was only partially supported. However, a significant interaction between academic discipline and gender was found for the *Dark Tetrad, Risk-Taking*, and *Amoralism*. Lastly, there was no statistically significant differences between undergraduate and postgraduate students in this sample.

General discussion

Although in *Study 1*, the interaction between academic discipline and gender was not statistically significant, in general men had higher Dark Triad scores than women. Interestingly, even though *Business, Law, Economics* and *Natural Sciences and Engineering* students did not differ on the scores, *Natural Sciences and Engineering* students had higher Dark Triad scores compared to *Arts, Humanities, Social Sciences* students. These findings are consistent with both self-selection and socialisation explanations, rather than indicating a simple causal relationship between discipline and personality. Importantly, as highlighted in prior debates (Daicoff, 1996; Elegido, 2009), cross-sectional

designs cannot disentangle self-selection from socialisation processes. Therefore, the present findings should not be interpreted as evidence that disciplines shape personality, but rather as reflecting associations that may arise from both processes. *Study 2* results, on the other hand, suggest students in *Law, Business, and Economics* had the highest Dark Tetrad scores, particularly among males, who scored significantly higher than females. It also revealed that men generally scored higher on the *Dark Tetrad* across all academic disciplines. Additionally, significant interactions were found between academic discipline and gender, with male students in *Law, Business, and Economics* displaying the highest scores on both *Dark Tetrad* and risk-taking behaviours. These findings suggest a strong association between academic discipline, gender, and the prevalence of Dark Tetrad traits.

The findings from this research have implications for higher education policy and practice. Disciplines associated with higher levels of Dark Tetrad traits may benefit from embedding ethical reasoning, reflective practice, and interpersonal skills development within curricula. Such approaches may help balance the potential advantages of these traits with their associated risks. Additionally, admissions and student support practices may benefit from recognising diversity in personality traits without pathologising or excluding individuals. Interventions should focus on fostering ethical decision-making and collaborative skills rather than attempting to screen out particular personality profiles.

Several limitations of the research should be acknowledged. We relied on convenience sampling, and no demographic weighting or stratification procedures were applied. Gender was included as a factor in the analysis, allowing us to directly account for gender differences in Dark Triad scores. Importantly, the interaction between gender and academic discipline was not significant, suggesting that the observed effects of academic discipline were consistent across gender. We acknowledge that additional demographic controls (e.g., age, socioeconomic background) and weighting procedures would strengthen the generalisability of the findings. However, such information was not available in sufficient detail to permit reliable weighting in the current dataset.

Grouping disciplines such as “Business, Law, and Economics” and “Natural Sciences and Engineering” may obscure meaningful variation between sub-disciplines (e.g., potential differences between finance and marketing, or between physics and engineering). In the present paper, broader disciplinary categories were used to ensure sufficient sample sizes within each group and to maintain adequate statistical power for the planned analyses. However, we acknowledge that this approach reduces granularity and may conceal within-group heterogeneity.

Regarding the internal consistency of some subscales falling below the conventional .70 threshold, this may

reflect the brevity of the instruments used, as shorter scales often yield lower reliability estimates. Additionally, no formal measurement invariance testing was conducted across gender or academic discipline. Consequently, it is unclear whether the constructs were measured equivalently across groups, which may affect the interpretation of group differences. Future research should employ longer instruments where feasible and test for measurement invariance using approaches such as multi-group confirmatory factor analysis.

The cross-sectional design limits the ability to draw causal inferences regarding the relationship between academic discipline and dark personality traits, as such designs cannot differentiate processes of self-selection and socialisation (Spector, 2019). The use of self-report measures introduces the possibility of response biases, including social desirability and common method variance, which may inflate observed associations (Paulhus and Vazire, 2007; Podsakoff et al., 2003). Although participants were recruited internationally, the sample may still reflect WEIRD (Western, Educated, Industrialised, Rich, and Democratic) populations, limiting the generalisability of the findings across cultural contexts (Henrich et al., 2010). The study relied on trait-based measures without incorporating behavioural outcomes, limiting insight into how these personality traits translate into real-world academic or professional behaviour (Baumeister et al., 2007). The grouping of participants into broad disciplinary categories may obscure important within-discipline variation, particularly given established classification systems such as the Biglan (1973) typology. Finally, interpreting disciplinary differences in dark personality traits carries a risk of stigmatisation, and findings should therefore be understood as reflecting group-level tendencies rather than deterministic individual characteristics (Link and Phelan, 2001). Relatedly, academic discipline was self-reported and grouped into broad categories, which may have obscured within-discipline variation. Future research should employ more precise classification systems to better capture disciplinary differences.

Conclusion

In conclusion, the present research demonstrates that students in different academic disciplines report systematically different levels of Dark Triad and Dark Tetrad traits. These differences are consistent with both self-selection and socialisation explanations, although causal conclusions cannot be drawn. Importantly, the findings highlight the relevance of disciplinary context for understanding student characteristics within higher education. Future research should adopt longitudinal designs to disentangle developmental processes and further examine how disciplinary environments interact with personality over time.

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