

Machiavellian Medical Students Report More Academic Misconduct: A Cocktail Fuelled by Psychological and Contextual Factors

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Purpose: Maladaptive personality traits and some psychological functioning indicators have been linked to academic misbehaviour; yet their role is still poorly explored in medical students. This study aims to assess associations of academic misconduct with dark personality traits and psychological well-being.

Methods: Five hundred and ninety-one medical students attending the first, third and fifth-year at one Portuguese medical school replied to the Dark Triad Dirty Dozen, Ryff's Psychological Well-Being Scales and an original Academic Misconduct Questionnaire, using a cross-sectional design. Multiple linear regression was performed to assess associations.

Results: Fifth-year medical students who scored higher in Machiavellianism and psychological well-being and perceived greater peer fraud and lower penalty for cheating reported more academic misconduct. The explanatory power of the model was 16.6%. Machiavellianism showed the strongest associations with cheating, while sex and age were not significant predictors.

Conclusion: This study offers relevant insights into how maladaptive personalities influence academic misconduct in medical students, and how this relationship is moulded by psychological and contextual factors. These findings can help guide institutional actions to foster academic integrity in future physicians.

Keywords: academic integrity, dark personality traits, psychological well-being, medical education

Introduction

Academic integrity involves acting according to ethical and professional principles and values, including honesty, trust, fairness, respect, responsibility and courage,¹ within the practice of research and in the teaching-learning process.^{2,3} Academic integrity should be widely debated, promoted and assessed when preparing future physicians, as it is key to develop professionalism.⁴⁻⁶

Academic misconduct involves attempting or performing any action that breaches the principles of academic integrity, producing undue benefit or prejudice to any member of the academic community or society,³ and is a widespread practice among higher education students.⁷⁻⁹ Similarly, worldwide evidence,¹⁰⁻¹³ including in the Portuguese context,¹⁴⁻¹⁶ suggests that most medical students have engaged in some form of academic misbehaviour, such as exam cheating or plagiarism. Academic misconduct inhibits moral reasoning and professionalism development in medical students,^{11,12,17} while negatively affecting the quality of the educational system and student assessment, making grading unfair.¹³ Therefore, these students may not only fail to develop core professional skills and values, such as ethics

and integrity, but are also more likely to perpetuate unethical behaviour during their clinical and professional practice, compromising patient safety and public health.^{10,18,19}

Academic misconduct is a complex and multidimensional phenomenon, among other factors, deriving from a combination of contextual influences, such as student perceptions of the integrity culture within the academic institution,^{12,20–22} and individual characteristics, such as sex,^{9,23} age^{7,24} and academic year.^{12,13,15} At this level, growing evidence^{7,25} also suggests that personality traits may be associated with moral development and academic behaviour.

Personality traits and other psychological attributes are reported to play a role in the cognitive and non-cognitive performance of medical students,^{26–28} including in their clinical competence.²⁹ At this level, while some traits such as the big five personality are often assessed in medical education^{28,30,31} and school admission interviews,³⁰ less is known about the “shady side” of medical students.^{31–33}

Personality traits, such as excessive ambition, desire for success, insecurity, competitiveness, risk-taking, impulsivity, manipulative ability, insensitivity, irresponsibility and antisocial tendencies, have been linked with academic^{34–37} and professional misconduct.³⁸ Machiavellianism, psychopathy and narcissism, commonly referred as dark traits of personality, describe egocentric, callous and manipulative individuals who tend to lack moral inhibition, thus being more likely to engage in a wide range of misbehaviours.³⁶ One of these traits, Machiavellianism, was found to be relatively high among medical candidates,^{32,33,39} students and physicians³² being linked to greater intolerance of ambiguity, authoritarianism, indifference to patients and their problems, and negative attitudes towards some more vulnerable groups such as the elderly.³³

Dark traits are also associated with amorality and unethical conduct, lack of empathy, poor interpersonal skills and antisocial behaviour.^{40–42} Machiavellianism was positively associated with amorality among medical students,³⁹ while physicians with higher dark traits have been found to report more counterproductive work behaviour defined as actions that have detrimental effects on colleagues, organizational structure and policies and, ultimately, on patients.^{43,44}

Although some level of dark traits can have benefits such as Machiavellians are usually pragmatic and task orientated,⁴⁴ while narcissists have shown great adaptability,⁴³ overall these characteristics tend to be undesirable in future physicians, since as described above they can compromise the adequate development of essential professional values and attitudes.^{36,43,44} Despite growing interest around the role of dark personality traits in unethical behaviour, literature is scarce on how they relate with academic misconduct in medical students.^{37,38}

In an alternative spectrum, psychological well-being (PWB) describes relatively stable, but not unchangeable attributes for positive human functioning that can evolve and adjust over time.^{45,46} PWB is defined as autonomy to make decisions, competence in mastering environmental challenges, and ability to experience positive relationships and a sense of self-acceptance, continuous personal growth and purpose in life.^{45,46} Psychological well-being portrays desirable qualities in future physicians, linked with resilience, self-determination, versatility, curiosity, capacity for improvement, interpersonal skills and empathy which underpin ethics and humanism in medical practice.^{27,45,47–49} These represent useful resources to face adversity^{45,50} that might act as a buffer against student engagement in academic misbehaviour.^{7,51,52} Although, evidence on how psychological well-being relates with academic behaviour is still scarce.

Given the negative implications of academic misconduct in the adequate preparation of future physicians, likely to compromise confidence in academic and health institutions, and population care,^{10,53} a better understanding of factors underlying cheating behaviour among medical students is paramount. At this level, the relationship of dark personality traits and psychological well-being with academic misbehaviour remains poorly understood. Therefore, this study aims to assess their role in explaining academic misconduct in medical students, while also evaluating the impact of socio-demographic characteristics and cheating-related perceptions.

Materials and Methods

Participants

The participants of this study were Portuguese medical students enrolled in the first, third and fifth year of a six-year undergraduate medical course at the Faculty of Medicine of the University of Porto (FMUP). Among the 855 eligible medical students, 606 received the questionnaire. Of those, 4 did not agree to participate in the study and 11 returned a

blank questionnaire (response rate 97.5%). Students were approached by the researchers after classroom lectures and invited to participate in the study. Students who accepted to participate were handed paper versions of the informed consent form and anonymous questionnaires, which took around 10 minutes to fill. Data were collected cross-sectionally between February and April 2020. Data collected using the questionnaires was captured by the optical character reader TeleformTm into an Excel® (version 2016) database.

Instruments

The instruments consisted of self-report questionnaires, including multiple-choice questions on sociodemographic characteristics (sex, age and academic year). The Portuguese version⁵⁴ of the Dark Triad Dirty Dozen (DTDD)⁴¹ was used to measure three maladaptive personality traits, namely Machiavellianism (DTDD-M) as manipulative and cynical individuals with ambition for power and success; psychopathy (DTDD-P) linked to impulsivity, daring behaviour and lack of empathy; and narcissism (DTDD-N) which translates into arrogance, self-centredness, vanity and feelings of superiority.^{40,41} The DTDD comprehends a total of 12 items (4 items per subscale) on which participants indicate agreement on a five-point Likert scale (1 – “strongly disagree” to 5 – “strongly agree”). For each subscale, higher values correspond to greater levels of each dark trait. Principal components analysis (PCA) revealed the three-factor solution originally validated (items had factor loadings $>|0.50|$). The scale revealed adequate reliability (Cronbach’s $\alpha = 0.50\text{--}0.79$).⁵⁵

The Portuguese version⁵⁶ of Ryff’s Psychological Well-Being Scales (PWBS)⁵⁷ was applied as an overall measure of psychological well-being assessed using the sum score of student answers to the six dimensions that define the construct: autonomy (AU) as independence and living according to internal convictions; environmental mastery (EM) as the ability to manage life situations; personal growth (PG) linked to curiosity, openness to experience and self-actualization; positive relations with others (PR) as the ability to establish meaningful and trust-based relationships; purpose in life (PL) as a sense of meaning and direction in life; and self-acceptance (SA) which involves knowing and accepting oneself.⁴⁵ The PWBS has a total of 18 items, each presented as a descriptive statement, with a mix of positively and negatively orientated items, assessed using a six-point Likert scale (1 – “completely disagree” to 6 – “completely agree”). Negative items were inverted prior to statistical analysis. Higher values correspond to higher levels of PWB. PCA identified one-factor solution, and two items (3 and 13) were removed due to very low factor loadings ($<|0.20|$). The final scale consisting of 16 items had good reliability (Cronbach’s $\alpha = 0.86$). Item statistics for the DTDD and PWBS can be found in [Supplementary Tables S1](#) and [S2](#), respectively.

Cheating-related behaviours and perceptions were assessed using an original Academic Misconduct Questionnaire (AMQ). Thirty-one items describe various types of academic misbehaviours, such as using hidden notes during exams, copying/allowing a colleague to copy an academic work, signing/asking others to sign attendance sheets when missing a class, copying ideas without referencing the source and obtaining/providing information about exams in advance. Students are requested to rate how frequently they have engaged in each behaviour during medical school using a five-point Likert scale (0 – “never” to 4 – “very often”). Higher scores indicate greater academic misconduct.⁵⁸ PCA revealed a one-factor solution, and three items (6, 16 and 18) were removed due to very low factor loadings ($<|0.20|$). The final scale had good reliability (Cronbach’s $\alpha = 0.87$). Additionally, the scale has one item that assesses how often students perceive their peers to engage in academic cheating (Peer Fraud) using the same Likert scale, and one item measures the perceived severity of the institutional penalty if caught cheating (Severity of Penalty) using a five-point Likert scale (0 – “none” to 4 – “severe”). Higher scores indicate perceptions of greater cheating and penalty, respectively.

Statistical Analysis

Descriptive statistical analysis was calculated for sociodemographic data. Associations between dark personality traits, psychological well-being and cheating behaviour were firstly tested using Pearson correlations. Multiple linear regression was performed to assess predictors of student academic misconduct. Using the AMQ (sum score of the 28 items describing cheating behaviour) as the outcome variable, three blocks of variables were successively entered in the regression model: Block 1: sex, age/academic year; Block 2: dark personality traits and psychological well-being; Block 3: cheating-related perceptions. To assure validity of the analyses, normality of the residuals was checked through visual inspection of histograms and QQ-plots. Durbin-Watson statistic was also calculated aiming for values close to 2. To

satisfy the normality assumption for the residuals, the DTDD-M was transformed, and log (DTDD-M) was used as a predictor in all regression models. Academic year was entered in the regression equation as a set of two dummy variables (fifth-year used as reference). Adjusted coefficient of determination (R^2) was used to measure the proportion of variation explained by the regression models. The significance level was set at $p < 0.05$. Statistical analysis was performed using SPSS Statistics Bases version 26.0. R software version 3.6.1⁵⁹ was used to conduct PCA.

This research was approved by the Ethics Committee of Centro Hospitalar São João/FMUP (reference numbers 379/19 and 381/19). Students who agreed to participate in the study signed the informed consent form describing the background and purpose of the study, using neutral terms such as personal characteristics and academic behaviour, anonymity and confidentiality measures and right of refusal or withdrawal.

Results

Five hundred and ninety-one medical students participated in this study, most of them being females and were enrolled in three different academic years of the medical course. The sociodemographic information of the participants is summarized in Table 1.

Correlations between dark personality traits, psychological well-being and cheating-related behaviour (AMQ) and perceptions were initially analysed using Pearson correlations (see [Supplementary Table S3](#)). The three dark traits showed high and significant correlations with the DTDD ($r > 0.670$), as for inter-trait correlations, the highest was observed between Machiavellianism and psychopathy ($r = 0.434$) ($p < 0.01$). The DTDD ($r = 0.238$) and its dimensions were significantly and positively correlated with academic misconduct, with Machiavellianism showing the highest correlations ($r = 0.295$), followed by Narcissism ($r = 0.113$) ($p < 0.01$), and psychopathy ($r = 0.093$; $p < 0.05$). Psychological well-being was negatively correlated with the DTDD ($r = -0.173$), DTDD-M ($r = -0.168$) and DTDD-P ($r = -0.140$) ($p < 0.01$), revealing no significant correlations with academic misconduct ($r = 0.052$; $p = 0.233$). Perceptions about peer fraud and severity of penalty for cheating were positively ($r = 0.276$) and negatively ($r = -0.136$) correlated with the AMQ ($p < 0.01$), respectively. There were no statistically significant correlations between cheating-related perceptions and personality and psychological dimensions.

Socio-demographics, personality traits and cheating-related perceptions were entered step-by-step as independent variables in the regression model to determine which variables would contribute to explain a significant amount of variance in academic cheating. Due to intercorrelations between age and academic year, only the one that demonstrated the greatest significant contribution was kept in the equation model. The same was performed for the three dark personality traits, so only one (DTDD-M/P/N) was also kept in the model.

The regression model including academic year, Machiavellianism, PWB, Peer Fraud and Severity of Penalty explained 16.6% of total variance in the AMQ, with a correlation coefficient (r) of 0.42. Durbin-Watson was 1.67,

Table 1 Sociodemographic Characteristics of Medical Students

	N = 591
Sex, N (%)	
Female	394 (66.7%)
Male	197 (33.3%)
Age, Mean (SD)	
Valid, N (%)	582 (98.5%)
Academic Year, N (%)	
First Year	263 (44.5%)
Third Year	222 (37.6%)
Fifth Year	106 (17.9%)

Table 2 Multiple Linear Regression Model for Academic Misconduct (AMQ)

Predictor	Unstandardized Coefficients	Standardized Coefficients	t Statistic	p-value
	b	β	t	p
Block 1^a				
Academic Year 1 [†]	-6.415	-6.415	-6.415	< 0.001
Academic Year 3 [†]	-4.774	-4.774	-4.774	0.004
Block 2^b				
Academic Year 1 [†]	-5.829	-0.213	-3.729	< 0.001
Academic Year 3 [†]	-3.799	-0.136	-2.376	0.018
Machiavellianism	10.004	0.299	7.163	< 0.001
Psychological well-being	0.139	0.105	2.523	0.012
Block 3^c				
Academic Year 1 [†]	-3.272	-0.120	-2.081	0.038
Academic Year 3 [†]	-3.537	-0.127	-2.282	0.023
Machiavellianism	9.560	0.286	7.047	< 0.001
Psychological well-being	0.150	0.113	2.806	0.005
Peer Fraud	3.371	0.233	5.520	< 0.001
Severity of Penalty	-1.204	-0.081	-1.993	0.047

Notes: ^aAdjusted (adj.) $R^2 = 0.025$, ^badj. $R^2 = 0.110$, ^cadj. $R^2 = 0.166$, [†]Academic Year 5 used as reference. Bold indicates significant values ($p < 0.05$).

with $F(6, 532) = 18.59$, $p < 0.001$. Fifth-year medical students who scored higher in Machiavellianism and psychological well-being and perceived greater peer fraud and lighter penalty for cheating reported higher engagement in academic misconduct. Machiavellianism was the strongest predictor of cheating. When adjusted for the remaining variables, psychological well-being proved to be a significant contributor to explain academic cheating, being positively associated with it. Academic year was a better predictor of cheating than age, which did not significantly contribute to the model, as well as sex. Results of the regression model are presented in Table 2.

Discussion

This study aimed to assess relationships between dark personality traits, psychological well-being and academic cheating in medical students, while also evaluating the impact of sociodemographic characteristics and cheating-related perceptions.

Fifth-year medical students who scored higher on Machiavellianism and psychological well-being and perceived greater peer fraud and lower severity of institutional penalty for cheating were more likely to report academic misconduct. Sex was not a significant predictor of cheating in this study, which is aligned with other available evidence.^{12,60} Personality and psychological wellness explained around half (8.8%) of the total variance (16.6%) in academic misconduct, with Machiavellianism offering the greatest contribution to the model.

Of the three dark personality traits, Machiavellianism was the strongest and most significant predictor of academic cheating in this study. Machiavellianism was also the DTDD trait most strongly associated with research misconduct in PhD students and biomedical scientists³⁸ and with academic cheating in undergraduate students.⁶¹ Machiavellianism was linked with academic cheating in higher education students in three other studies,^{34–36} although in all of them

psychopathy displayed the strongest associations with cheating. In this study, psychopathy did not significantly contribute to the model, possibly due to some overlap between psychopathy and Machiavellianism, both sharing a malevolent component.^{62,63} Compared to lower scorers, students who rank higher on Machiavellianism tend to show less motivation for learning⁶⁴ and may resort to a multitude of duplicitous tactics, including academic misconduct, to achieve their goals, disregarding morality and social norms.^{36,38,65}

Among clinicians, high levels of Machiavellianism have been linked to counterproductive work behaviour,^{43,44} indifference and negative attitudes towards some groups of patients,³³ ultimately undermining patient care. Therefore, implementing mechanisms to detect and support these students may be useful not only to tackle cheating but also to prevent subsequent professional misconduct.^{18,19,43,44}

A first analysis showed no correlation between psychological well-being and academic misconduct. Although, when adjusting for the remaining information a somehow surprising positive association with cheating was observed, contrasting with evidence that reports inverse correlations of cheating with other indicators of psychological wellness, such as spiritual well-being⁶⁶ and satisfaction with life.^{51,66} Students with higher scores on PWB have a more positive self-perception, seeing themselves as more independent and competent, while also experiencing a greater meaning and purpose in life, personal development and satisfying relationships with others, compared to lower scorers.^{45,46} Machiavellian medical students who share these attributes may feel more confident in their ability to successfully conduct academic misbehaviour⁵³ and/or, also due to their greater sociability skills, to help/ask others for help to commit cheating as a manipulative strategy^{34,52} to achieve their personal goals, disregarding the ethical costs.³⁶

Fifth-year students were more likely to report academic misconduct compared to those in pre-clinical years. Other studies with medical students report similar findings^{6,12,15} and, in line with this research, also observed that academic year was a stronger predictor of cheating than age.^{13,14} Although some evidence^{7,22} supports that younger undergraduate students tend to be more likely to report academic misconduct than older ones, studies^{9,34,51} outside the medical field also report a positive association between academic year and cheating. In this study, fifth year students may disclose more cheating than their peers due to increased pressure in clinical years and higher competition for grades when approaching graduation.^{12,67} Additionally, they have been in college longer and might have developed more lenient attitudes towards cheating, while having had more opportunities to engage in such behaviour.^{14,68} Lastly, some of the behaviours assessed in the AMQ involved either cheating helped by others or to help others, and students that have been longer in college may have stronger social networks that they can use.¹⁵

Academic misbehaviour may also increase when students perceive a greater permissiveness towards cheating in their academic institution^{22,53} and a lower cost attached to their actions.²² In this study, perceived peer fraud was one of the strongest contributors to explain cheating, being positively associated with academic misbehaviour, while perceived severity of penalty was a negative predictor of cheating. Evidence^{11,12} largely supports that medical students who perceive cheating as a widespread practice among their peers are more likely to engage in such practices, possibly due to peer pressure^{22,69} or to avoid being in a disadvantageous position.⁷⁰ In such environment, these students may also develop more lenient and neutralizing attitudes towards cheating,^{8,12} exacerbating the link between academic misconduct and the amoral manipulative side of Machiavellian students.⁶⁵

In the medical field, while some evidence³³ supports that relatively high levels of Machiavellianism found in medical students are likely to sustain during career progress, others³² report that these levels may gradually decrease. Although dark personality traits are relatively stable over time, recent studies^{64,65,71} show that the predisposition to cheat linked to Machiavellianism traits can be reduced by modifying students' attitudes (how seriously they judge cheating behaviours), perceived norms (of cheating as an acceptable practice),⁷¹ and by increasing the perceived risk of detection and punishment.^{64,65}

At this level, organizational deterrence may play a useful role in countering cheating behaviour,^{9,13,22} increasing its effective costs and minimizing the potential benefits.⁶⁵ The effective and consistent communication of academic integrity standards, through an ethics committee, ethics and academic integrity codes, where consequences for cheating are also clearly stated, alongside the implementation of a monitoring system to detect academic integrity violations, including cheating detection programs, are key to achieve that.^{42,70} Other preventive strategies, such as using appropriate

assessment designs^{42,64} and increasing awareness and education on academic integrity⁴² may also contribute to disrupt the opportunity structure for misconduct.⁶⁴

Academic institutions can promote understanding, sharing and commitment to academic integrity values by engaging the entire academic community in open and critical reflections on these matters. Furthermore, all members, including students, should be encouraged to take a more active role in implementing those values by being involved in ethics committees, policies and procedures, by teaching and learning in instructional activities and acting as role models. These may offer a better insight about ethical issues, while favouring the development of important skills to address them.^{1,22} Altogether, these strategies contribute to promote moral standards and rules that help discouraging normative cheating⁶⁵ and moral disengagement³⁹ which seem to mediate the relationship between Machiavellianism and academic cheating.

Future research could benefit from a qualitative approach to further explore medical students' perceptions about the reasons behind academic misconduct such as the institutional culture, practices and commitment towards integrity values, and what strategies could be adopted to prevent misbehaviour.

This study has some limitations linked with data collection which relied on self-reports and covered medical students from only one Portuguese institution. This might lead to recall bias, while making it difficult to predict how generalizable the results might be to medical students in other institutions and regions.

Conclusion

Machiavellian medical students with higher levels of psychological well-being, who have been in medical school longer and perceive it as a more cheating-permissive context reported greater involvement in academic misconduct. These findings provide a first step to better understand how maladaptive personalities influence academic misconduct in medical students, and how this relationship is moulded by psychological and contextual factors. This study offers novel and relevant information that can help guide institutional interventions to foster academic integrity in future physicians as a means to develop ethical and competent professionals who will contribute to a better society.

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Disclosure

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