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 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, within the practice of research and in the teaching-learning process. Academic integrity should be widely debated, promoted and assessed when preparing future physicians, as it is key to develop professionalism.

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, and is a widespread practice among higher education students. Similarly, worldwide evidence, including in the Portuguese context, 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, while negatively affecting the quality of the educational system and student assessment, making grading unfair. 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.\textsuperscript{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,\textsuperscript{12,20–22} and individual characteristics, such as sex,\textsuperscript{9,23} age\textsuperscript{7,24} and academic year.\textsuperscript{12,13,15} At this level, growing evidence\textsuperscript{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,\textsuperscript{26–28} including in their clinical competence.\textsuperscript{29} At this level, while some traits such as the big five personality are often assessed in medical education\textsuperscript{28,30,31} and school admission interviews,\textsuperscript{30} less is known about the “shady side” of medical students.\textsuperscript{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,\textsuperscript{34–37} and professional misconduct.\textsuperscript{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.\textsuperscript{36} One of these traits, Machiavellianism, was found to be relatively high among medical candidates,\textsuperscript{32,33,39} students and physicians\textsuperscript{32} 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.\textsuperscript{33}

Dark traits are also associated with amorality and unethical conduct, lack of empathy, poor interpersonal skills and antisocial behaviour.\textsuperscript{40–42} Machiavellianism was positively associated with amorality among medical students,\textsuperscript{30} 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.\textsuperscript{43,44}

Although some level of dark traits can have benefits such as Machiavellians are usually pragmatic and task orientated,\textsuperscript{44} while narcissists have shown great adaptability,\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{27,45,47–49} These represent useful resources to face adversity\textsuperscript{45,50} that might act as a buffer against student engagement in academic misbehaviour.\textsuperscript{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,\textsuperscript{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
null
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 3.6.1 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) | 20.4 (3.2)                     |
| Valid, N (%) | 582 (98.5%)                                        |
| Academic Year, N (%) |                                 |
| First Year | 263 (44.5%)                                        |
| Third Year  | 222 (37.6%)                                        |
| Fifth Year  | 106 (17.9%)                                         |
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. 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.

| Predictor                  | Unstandardized Coefficients | Standardized Coefficients | t Statistic | p-value |
|----------------------------|-----------------------------|---------------------------|-------------|---------|
| **Block 1**                |                             |                           |             |         |
| Academic Year 1 †          | -6.415                      | -6.415                    | -6.415      | < 0.001 |
| Academic Year 3 †          | -4.774                      | -4.774                    | -4.774      | 0.004   |
| **Block 2**                |                             |                           |             |         |
| 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**                |                             |                           |             |         |
| 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:** * Adjusted (adj.) $R^2 = 0.025$, *adj. $R^2 = 0.110$, *adj. $R^2 = 0.166$, †Academic Year 5 used as reference. Bold indicates significant values ($p < 0.05$).
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.\textsuperscript{62,63} Compared to lower scorers, students who rank higher on Machiavellianism tend to show less motivation for learning\textsuperscript{64} and may resort to a multitude of duplicitous tactics, including academic misconduct, to achieve their goals, disregarding morality and social norms.\textsuperscript{36,38,65}

Among clinicians, high levels of Machiavellianism have been linked to counterproductive work behaviour,\textsuperscript{43,44} indifference and negative attitudes towards some groups of patients,\textsuperscript{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.\textsuperscript{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-being\textsuperscript{66} and satisfaction with life.\textsuperscript{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.\textsuperscript{45,46}

Machiavellian medical students who share these attributes may feel more confident in their ability to successfully conduct academic misbehaviour\textsuperscript{53} and/or, also due to their greater sociability skills, to help/ask others for help to commit cheating as a manipulative strategy\textsuperscript{34,52} to achieve their personal goals, disregarding the ethical costs.\textsuperscript{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\textsuperscript{6,12,15} and, in line with this research, also observed that academic year was a stronger predictor of cheating than age.\textsuperscript{13,14} Although some evidence\textsuperscript{7,22} supports that younger undergraduate students tend to be more likely to report academic misconduct than older ones, studies\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{15}

Academic misbehaviour may also increase when students perceive a greater permissiveness towards cheating in their academic institution\textsuperscript{22,53} and a lower cost attached to their actions.\textsuperscript{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\textsuperscript{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\textsuperscript{22,69} or to avoid being in a disadvantageous position.\textsuperscript{70} In such environment, these students may also develop more lenient and neutralizing attitudes towards cheating,\textsuperscript{8,12} exacerbating the link between academic misconduct and the amoral manipulative side of Machiavellian students.\textsuperscript{65}

In the medical field, while some evidence\textsuperscript{33} supports that relatively high levels of Machiavellianism found in medical students are likely to sustain during career progress, others\textsuperscript{32} report that these levels may gradually decrease. Although dark personality traits are relatively stable over time, recent studies\textsuperscript{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),\textsuperscript{71} and by increasing the perceived risk of detection and punishment.\textsuperscript{64,65}

At this level, organizational deterrence may play a useful role in countering cheating behaviour,\textsuperscript{9,13,22} increasing its effective costs and minimizing the potential benefits.\textsuperscript{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.\textsuperscript{42,70} Other preventive strategies, such as using appropriate
assessment designs\textsuperscript{42,64} and increasing awareness and education on academic integrity\textsuperscript{42} may also contribute to disrupt the opportunity structure for misconduct.\textsuperscript{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.\textsuperscript{1,22} Altogether, these strategies contribute to promote moral standards and rules that help discouraging normative cheating\textsuperscript{65} and moral disengagement\textsuperscript{39} 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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