

## Students' moral reasoning, Machiavellianism and socially desirable responding: implications for teaching ethics and research integrity

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**OBJECTIVE** To investigate the relationship between psychological constructs related to professional and research integrity and moral reasoning among medical students.

**METHODS** Medical students, 2nd-year ( $n = 208$ , 85.6% of 243 enrolled students), answered the moral reasoning test—defining issues test 2 (DIT2) and the Machiavellianism and Paulhus socially desirable responding (SDR) scales.

**RESULTS** Students had the highest score on the post-conventional schema of moral reasoning (mean  $\pm$  standard deviation,  $35.2 \pm 11.6$  of a possible 95) compared with personal interest ( $27.2 \pm 12.3$ ) and maintaining norms schemae ( $29.2 \pm 11.5$ ;  $P < 0.001$ , repeated-measures ANOVA). Female students scored higher than their male colleagues on post-conventional moral reasoning ( $37.6 \pm 11.0$  versus  $31.2 \pm 22.4$ ,  $P < 0.001$ , independent-sample  $t$ -test). Of all 4 Machiavellianism subscales students scored highest on deceiving, where female students scored higher than their male colleagues ( $24.5 \pm 4.2$  versus  $22.9 \pm 5.1$  of a possible 30;  $P = 0.037$ , independent-sample  $t$ -test). Female students also scored higher on the impression management subscale, whereas their male colleagues scored higher on the self-deception subscale of the Paulhus SDR scale. Moral reasoning scores were associated with cynicism, deceiving and flattering Machiavellianism scores, but not with Paulhus SDR scores. Multiple regression analysis showed the Machiavellianism amorality score as a significant negative predictor ( $\beta = -0.183$ ,  $P = 0.017$ ) and female sex as a positive predictor ( $\beta = 0.291$ ,  $P < 0.001$ ) for the post-conventional

schema score on the DIT2. The Machiavellianism flattering score was a significant negative predictor for the personal interest schema score ( $\beta = -0.215$ ,  $P = 0.006$ ).

**CONCLUSIONS** Although moral reasoning is generally seen as independent of variables related to personality, our study indicated that Machiavellianism, especially its amorality and flattering subscales, were associated with moral reasoning. These results have important implications for teaching ethics and the responsible conduct of research in different cultural and socio-economic settings.

**KEYWORDS** EDUCATION, medical, undergraduate/ \*methods; teaching/ \*methods; \*ethics, medical/ \*psychology; \*morals; \*thinking; male; female; women/ \*psychology; men/ \*psychology.

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### INTRODUCTION

Teaching ethics has become part of the core medical curriculum in most medical schools<sup>1</sup> as a way to foster the development of professionalism and high moral character of future doctors. Recently, instruction in the responsible conduct of research and scientific integrity, as professional conduct in academic medicine, has expanded from postgraduate to graduate medical education.<sup>2,3</sup> Teaching ethics and professional integrity to medical students comes at a time in their lives when they make important life decisions and transitions, many of which have moral implications. This is also a period of significant development of moral functioning,<sup>4</sup> and educational interventions at this stage of life have a significant impact on shaping moral reasoning in adult life.<sup>5</sup>

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## Overview

### What is already known on this subject

Studying medicine comes at a time when students experience significant development of moral reasoning, and a time when teaching ethics and professional conduct fosters the development of responsible doctors.

### What this study adds

The study shows that moral reasoning of 2nd-year medical students is based mainly on moral ideals (post-conventional moral reasoning). In addition it is also shown to relate to gender and Machiavellianism, a psychological construct that relates to personality, acquired values and manipulative behaviour and describes devious, manipulative people who are motivated only by their own self-interest.

### Suggestions for further research

Development of moral reasoning may be related to personal, cultural and socio-economic factors, and this fact should be taken into consideration in teaching ethics and the responsible conduct of research in different academic settings.

Kohlberg's theory of moral development focuses on moral reasoning and discusses its development through 6 stages, separated into 3 levels.<sup>6</sup> At pre-conventional level (stages 1 and 2) an individual is concerned with personal gain or loss and what is moral is defined through consequences one experiences as a result of behaviour. At the conventional level (stages 3 and 4) an individual thinks in terms of laws and rules which allow the functioning of the society. At the post-conventional level (stages 5 and 6) an individual is concerned with justice and universal laws which can be applied to everyone, and is ready to break the rules if they are not applicable in terms of justice.<sup>6</sup> Rest and colleagues continued Kohlberg's work and developed a 4-component model of moral behaviour where moral reasoning, still at the centre of research efforts, is one of the components.<sup>4</sup> The first component is moral sensitivity, i.e. capability of recognising a moral issue when it exists. The second component is moral

reasoning – the capability to decide which potential course of action is the most morally acceptable. The third component is moral motivation, which is represented in an individual's readiness to act according to the decision. Finally, moral character represents a readiness to follow through with moral behaviour even when surrounding circumstances militate against it. Instead of viewing the development of moral reasoning as a transformational process that occurs through the replacement of lower stages of reasoning with higher ones, Rest and colleagues conceptualised it as an additive process occurring through shifts in the proportional use of 3 moral reasoning schemae from the lowest (personal interest) through intermediate (maintaining norms) to the highest (post-conventional or principled moral reasoning). These schemae are largely congruent with Kohlberg's levels, but the difference is in the process of development, which allows the parallel existence of more than one schema.<sup>7</sup>

There is evidence that moral reasoning, a component of moral functioning, is associated with decision-making ability in clinical practice and research.<sup>5</sup> A number of studies investigated the development of moral reasoning of medical students and training doctors,<sup>6–12</sup> as well as other health care professionals, including dental<sup>13</sup> and nursing<sup>14</sup> students. However, in order to understand, assess and foster adult moral growth in medical schools and decide on the best educational interventions, moral reasoning has to be viewed in a multidimensional framework of individual and social factors. The responsibility for moral conduct rests with the individual, so inter-individual differences in values, attitudes and personality traits may be related to moral reasoning development.

As a first step in understanding the relationship between moral reasoning and such psychological characteristics we investigated 2 constructs possibly related to professional and research integrity among medical students.

The first construct was Machiavellianism, a term that has come to be used to describe devious, manipulative people who are motivated only by their own self-interest.<sup>15</sup> High Machiavellians hold unflattering and cynical opinions of others, show emotional detachment in interpersonal situations and behave manipulatively.<sup>16</sup> As a psychological construct, Machiavellianism is a link among personality traits, acquired values and beliefs and manipulative behaviour.<sup>16</sup> A number of studies have shown that high Machiavellians are more willing to engage in anti-social behaviour than low Machiavellians, especially

in situations where there is a rational justification for such action.<sup>15</sup>

The second point of our interest was socially desirable responding (SDR), a construct that is defined typically as a tendency to give positive self-descriptions.<sup>17</sup> A substantial amount of research and evidence identified 2 independent psychological dimensions that underlie this tendency – self-deception and impression management.<sup>18</sup> These tendencies can take the form of either enhancement – claiming of the positive attributes, or denial – repudiation of negative attributes.<sup>19</sup>

The aim of the current research was to investigate possible relationships between medical students' moral reasoning, Machiavellianism and SDR. We considered both Machiavellianism and SDR as possible mediators of an individual's judgement or conduct in morally challenging situations. The understanding of such a relationship is important for teaching ethics, as well as the responsible conduct of research, where educational interventions are focused usually on enhancing students' moral reasoning skills.<sup>20</sup> Machiavellianism and SDR are both constructs related more to closely behaviour<sup>16,19</sup> than moral reasoning. If no association exists between these constructs and moral reasoning then educational interventions help students in their reasoning skills, but other interventions may be needed to develop proper values in order to follow through with reasoned decisions. On the other hand, if such associations exist, interventions aimed at values and attitudes could be a mediator in enhancing the effects of moral reasoning interventions.

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## METHODS

### Participants

The study was conducted at the Zagreb University School of Medicine during the summer semester of 2003. The 2nd-year medical students ( $n = 208$ , 62% women and 38% men, median age 20 years, inter-quartile range 0), were asked to complete the instruments at the opening lecture of a mandatory course on the principles of scientific research in medicine. Participation in the study was anonymous and all students present at the classes volunteered to participate in the study (85.6% of 243 students enrolled in the 2nd year). The whole procedure lasted for 60 minutes. The study was approved by the Ethics Committee of Zagreb University School of

Medicine in the autumn of 2002, prior to inviting students to participate.

### Instruments

Three instruments were used in the study: the defining issues test 2 (DIT2)<sup>4</sup> and shortened versions of the Machiavellianism and Paulhus SDR scales.<sup>21</sup>

#### DIT2

The DIT2 is a paper-and-pencil measure of moral judgement derived from Kohlberg's theory.<sup>4</sup> It presents 5 hypothetical dilemmas and asks the respondent to rate and rank 12 issues in terms of their importance for each dilemma. The scores represent the degree to which a respondent uses 3 general moral schemas in reasoning about a moral dilemma:<sup>4</sup> arguments that appeal to personal interests (personal interest), maintaining social laws and norms (maintaining norms) or moral ideals and/or theoretical frameworks for resolving complex moral issues (post-conventional schema). A confirmatory factor analysis of a megasample of more than 44 000 subjects indicated that DIT items cluster around these 3 general moral schemes.<sup>22</sup> DIT2 is an updated version of the original DIT,<sup>22</sup> and offers an additional measure of post-conventional moral thinking – the N2 score, which combines the degree to which post-conventional items receive higher and personal interest items lower ratings.<sup>22</sup>

The validity of the DIT has been investigated thoroughly in terms of 7 criteria:<sup>22</sup> (1) differentiation of various age/education groups, where 30–50% of the variance of DIT scores is attributable to education level; (2) longitudinal gains, which show effect sizes of 0.80 in freshmen to senior college students, making gains in DIT scores one of the most dramatic effects of college; (3) significant relation to cognitive capacity measures of moral comprehension, recall and reconstruction of post-conventional moral arguments, Kohlberg's interview measure and to a lesser degree to other cognitive developmental measures; (4) sensitivity to moral education interventions; (5) linkage to many 'pro-social' behaviours and desired professional decision making; (6) linkage to political attitudes and political choices, with a correlation in the 0.40–0.65 range; and (7) adequate reliability, with Cronbach's  $\alpha$  and test-retest reliability in the upper 0.70s/low 0.80s. Further, the information in a DIT score predicts to the 7 validity criteria above and beyond that accounted for by verbal ability or political attitude. The DIT is equally valid for males and females.<sup>22</sup>

Compared with the original DIT, DIT2 has updated stories and is also a shorter test, has clearer instructions, retains more subjects through reliability checks and so far does not sacrifice study validity.<sup>22</sup> With the permission of the Center for the Study of Ethical Development, University of Minnesota, USA, we translated the DIT2 into Croatian using a back-translation method for all but names of the protagonists and small sections of stories 2, 3 and 5, which were adjusted to the Croatian social environment without changing the important content of the stories. The data from the Croatian version of the test were copied to original DIT2 forms, and scored by the Center for the Study of Ethical Development, University of Minnesota, USA.

#### *The Machiavellianism scale*

We used the shortened version of the Machiavellianism scale, which was validated previously on Croatian high-school students and shown to be of the same informative value.<sup>21</sup> Like the original scale, it is a 5-point Likert-type scale and consists of 4 subscales, differing from the original scale only in the number of items (6 items per subscale):

- deceiving subscale: issues concerning honesty and fairness;
- amorality subscale: issues concerning innate goodness of human nature;
- cynicism subscale: distrust of other people and having negative attitudes towards others; and
- flattering scale: justifying strategies of flattering and telling people what they want to hear in order to achieve one's goals.

Items from the deceiving and amorality subscales were formulated positively, i.e. a higher score meant an inclination towards honesty and fairness (deceiving subscale) as well as towards seeing human nature as innately good (amorality subscale). These items were reversed so that a higher score on all 4 Machiavellianism subscales indicated a more pronounced Machiavellistic dimension.

We performed factor analysis limited to 4 factors, which confirmed the factor structure of the scale (data not shown). Reliabilities of the subscales were satisfactory (Table 1).

#### *The Paulhus SDR scale*

The Paulhus SDR scale is a questionnaire that measures a tendency to give overly positive self-descriptions.<sup>17</sup> Based on substantial theoretical and

*Table 1 Reliability of the whole Machiavellianism scale and its 4 subscales and of the Paulhus socially desirable responding (SDR) scale and its 2 subscales obtained on a sample of 208 2nd-year medical students*

Scale	Cronbach's $\alpha$
Machiavellianism	0.69
Deceiving	0.82
Amorality	0.80
Cynicism	0.76
Flattering	0.74
Paulhus SDR	0.63
Self-deception	0.58
Impression management	0.62

empirical analysis, the scale separates its content into 2 subscales: impression management (10 items) – the tendency to give inflated self-descriptions because of contextual factors (e.g. 'I always tell the truth') and self-deception (12 items) – the tendency to give honest but inflated self-descriptions.<sup>17</sup> Self-deception can be viewed further as a composite of 2 separate strategies – enhancement and denial. The former is the case of promoting one's positive qualities (e.g. 'My first impressions always turn out to be right'), and the latter of disavowing negative ones (e.g. 'I have never thought of killing someone'). These constructs are defined as aspects of personality rather than intentional strategies, which would include deliberate lying or deception.<sup>17</sup>

We used the shortened version of the scale, which was validated previously on Croatian high-school students<sup>21</sup> where the answer format was a 3-point Likert-type scale.

Factor analysis limited to 2 factors supported previously reported validation (data not shown). Reliabilities for both subscales obtained on our sample (Table 1) were in the lower range of acceptable values.<sup>23</sup>

#### **Statistical analysis**

Principal component analysis was used to evaluate the factor structure for the Machiavellianism and Paulhus deception scales. Cronbach's  $\alpha$  was computed as a measure of reliability. The Kolmogorov–Smirnov test was used to test the normality of score distributions. Pearson's  $r$  correlation coefficient and partial correlation were used to investigate bivariate relationships among variables. Stepwise multiple regression analysis was used for investigation of sex, Machiavellianism and SDR as predictors for DIT2

scores. Independent-sample *t*-tests were used to evaluate differences in the scores between women and men. A repeated-measure ANOVA was used to compare the scores among the 3 DIT schemas and 4 Machiavellianism subscales. Paired-sample *t*-tests were used to compare scores on the SDR scale after the scores were transformed into averages to compensate the difference in length between the two subscales.

## RESULTS

The total student sample had the highest score on the post-conventional schema of moral reasoning, compared with personal interest and maintaining norms schemas (Table 2,  $P < 0.001$ , repeated-measures ANOVA).

Female students scored significantly higher than their male colleagues on the post-conventional schema and significantly lower on the maintaining norms schema (Table 2). Higher scores on post-conventional schema among female students resulted in higher N2 scores ( $37.8 \pm 11.15$  versus  $32.7 \pm 10.85$  in male students;  $P = 0.001$ , independent-sample *t*-test). The N2 score is a more refined measure of moral judgement because it is a composite measure of how much post-conventional moral thinking is used and how little personal interest is used for the same judgement.<sup>22</sup> As there was no gender difference in the personal interest schema, the difference in N2 scores between male and female students was attributable solely to their differences in post-conventional moral reasoning.

For the Machiavellianism subscales, the students had the highest scores on the deceiving subscale

( $P < 0.001$  versus all other scales, repeated-measures ANOVA). This was true both for the male and female subsamples ( $P < 0.001$ ). In addition, female students scored significantly higher on the deceiving subscale than their male colleagues (Table 2).

Female students also scored higher on the impression management subscale of the SDR scale, whereas their male colleagues scored higher on the self-deception subscale (Table 2).

We investigated bivariate relationships between the scores on all 3 instruments – DIT2, Machiavellianism and SDR (Table 3). Excluding coefficients of correlation between individual DIT2 scores, which were moderate and negative, all other correlations were in the lower range, independent of the direction of association. The post-conventional moral reasoning score correlated negatively with the cynicism score of the Machiavellianism scale, whereas the personal interest score correlated negatively with the deceiving and flattering Machiavellianism scores, as well as with the impression management score of the SDR scale. The maintaining norms score correlated positively with the Machiavellianism deceiving score.

We also performed a stepwise multiple regression analysis to investigate the possibility of prediction of DIT2 scores based on Machiavellianism and SDR scores (Table 4). We included gender in the set of potential predictor variables because sex showed a significant effect in univariate comparisons (Table 2). The regression analysis revealed female gender as a positive predictor and the Machiavellianism amorality score as a negative predictor, which explained jointly around 11% of the variance in the post-conventional schema score. The flattering score

Table 2 Average moral reasoning (DIT2), the Machiavellianism scale and the Paulhus socially desirable responding (SDR) scale scores (mean  $\pm$  standard deviation) of 2nd-year medical students

Instrument	Possible range	All participants (n = 208)	Men (n = 79)	P*	Women (n = 129)
Defining issues test (DIT2)					
Personal interest	0–95	27.2 $\pm$ 12.3	29.0 $\pm$ 12.1	0.106	26.1 $\pm$ 12.4
Maintaining norms	0–95	29.2 $\pm$ 11.5	31.4 $\pm$ 11.9	0.034	27.9 $\pm$ 11.1
Post-conventional	0–95	35.2 $\pm$ 11.6	31.2 $\pm$ 11.4	< 0.001	37.6 $\pm$ 11.0
Machiavellianism scale					
Deceiving	5–30	23.9 $\pm$ 4.6	22.9 $\pm$ 5.1	0.037	24.5 $\pm$ 4.2
Amorality	5–30	19.6 $\pm$ 4.3	19.1 $\pm$ 5.3	0.205	20.0 $\pm$ 3.5
Cynicism	5–30	18.7 $\pm$ 4.4	19.1 $\pm$ 4.9	0.407	18.5 $\pm$ 4.0
Flattering	5–30	18.8 $\pm$ 4.4	18.1 $\pm$ 3.7	0.112	19.23 $\pm$ 4.7
Paulhus SDR scale					
Self-deception	0–24	11.5 $\pm$ 3.8	12.3 $\pm$ 3.4	0.033	11.0 $\pm$ 4.0
Impression management	0–20	9.6 $\pm$ 3.6	8.8 $\pm$ 3.8	0.044	10.0 $\pm$ 3.4

\*Independent-sample *t*-test.

Table 3 Pearson's correlations between the subscales of the defining issues test (DIT2), Machiavellianism and socially desirable responding (SDR) scores

Instrument	(DIT)2			Machiavellianism scale			Paulhus SDR scale		
	Personal interest	Maintaining norms	Post-conventional	Deceiving	Amorality	Cynicism	Flattering	Self-deception	Impression management
DIT2									
Personal interest									
Maintaining norms	-0.513**								
Post-conventional	-0.535**	-0.335**							
Machiavellianism scale									
Deceiving	-0.166*	0.167*	0.052						
Amorality	0.113	0.016	-0.149	0.041					
Cynicism	0.146	0.034	-0.173*	0.045	0.316**				
Flattering	-0.215**	0.095	0.126	0.195*	-0.127	-0.233**			
Paulhus SDR scale									
Self-deception	0.137	-0.075	-0.108	-0.046	0.081	-0.061	-0.041		
Impression management	-0.156*	-0.008	0.131	0.323**	-0.078	-0.032	0.174*	0.176*	

\* $P < 0.050$ ; \*\* $P < 0.001$ .

Table 4 Stepwise multiple regression analysis of the relationships between moral reasoning (DIT2) as a criterion and Machiavellianism scores and participants' gender as predictors\*

DIT2 score	r <sup>2</sup>	Significant predictors	$\beta$	P
Personal interest	0.046	Flattering	-0.215	0.006
Maintaining norms	0.028	Deceiving	0.167	0.035
Post-conventional	0.106	Sex	0.291	< 0.001
		Amorality	-0.183	0.017

\*Scores on Paulhus socially desirable responding scale were not significant predictors.

was a significant negative predictor of the personal interest schema score, explaining 5% of the variance; whereas the deceiving score was a positive predictor of the maintaining norms schema score, but explained only 3% of the variance. The SDR subscales were not significant predictors for any of the DIT2 scores.

## DISCUSSION

Our study showed that 2nd-year medical students used moral reasoning based more on moral ideals than on arguments that appealed to personal interests or maintaining social norms. At the same time, students in our sample showed relatively high scores on Machiavellianism and SDR. As we used the shortened versions of the Machiavellianism and SDR scales, the validity of which has been proven in previous research,<sup>21</sup> there were no available norms for comparison so it is impossible to categorise

definitively these results as high or low. The scores on the Machiavellianism and SDR in our study were in the middle or the upper third of the possible range, which is higher than reports for medical students in the United States: 40% of Croatian students and only 15% of US students<sup>24</sup> scored above the middle values.

We found significant gender differences on all 3 measures. Female students scored higher on the Machiavellianism deceiving subscale and SDR impression management subscale as well as on the post-conventional moral reasoning schema, whereas male students obtained a higher score on the SDR self-deception subscale. Whereas a higher post-conventional schema score in women was not a surprise,<sup>4</sup> higher deception scores among Croatian female students are in contrast with most reports of lower Machiavellianism scores in women than men.<sup>24-26</sup> Croatian female students had higher scores on the SDR impression management subscale, whereas male students scored higher on the self-deception subscale – a finding similar to other studies on college students.<sup>19</sup> Impression management is a construct of a deliberate attempt to present a socially favourable personality, whereas self-deception is an overly positive but honest bias in self-description.<sup>19</sup>

Bivariate relationships between DIT2 scores were moderate and negative, supporting the theoretical idea of using more than 1 schema for measuring moral reasoning, as well as of different representations of the schemae in moral reasoning.<sup>4</sup> A positive correlation was found between the amorality and cynicism as well the flattering and deceiving Machiavellianism scores. This may imply an additional latent structure of Machiavellianism scale beyond the 4

factors represented by its subscales. It is possible that the amorality and cynicism subscales reflect an attitude–value–personality system in which one sees other people as innately bad and unworthy of trust or kind treatment. On the other hand, deceiving and flattering subscales reflect a system in which one sees others as benevolent and trusting, yet naïve, people who can be used for one's own purposes. Additional factor analyses with larger and more heterogeneous samples are needed to address this possibility.

Our study also found an overlap between the SDR impression management subscale and the Machiavellianism deceiving subscale, as reflected in their moderate positive correlation. Both subscales deal with presenting the truth falsely in order to obtain desired outcomes. When we calculated the partial correlation between these 2 subscales controlled for sex, as women in our sample scored higher than men on the Machiavellianism deceiving subscale, the relationship did not change ( $r_{D,IM \times sex} = 0.324$ ,  $P < 0.001$ ), supporting the general overlap between these variables.

Although it is generally believed that moral reasoning scores, as measured by the DIT, should not show associations with variables related to personality or gender,<sup>4</sup> we found that the Machiavellianism scores and gender were associated significantly with moral reasoning. The Machiavellianism flattering score, the variable that deals with using flattering strategies as a means of obtaining desired outcomes from other people, was a negative predictor for the moral reasoning schema based on personal interest. The deceiving score was a positive predictor of moral reasoning based on adhering to laws and rules. The latter association may be indicative of the legalistic and hypocritical nature of the maintaining norms schema of moral reasoning, where one claims adherence to following laws and rules in resolving a moral dilemma but may be, at the same time, prone to breaking them in order to obtain his or her goals. This is opposed to a readiness to break the law in the case of injustice as a characteristic of the post-conventional schema.

Finally, the Machiavellianism amorality score, a variable that reveals a negative view of other people, was a significant negative predictor of post-conventional moral reasoning, i.e. reasoning based on the idea of equal justice and the common good. This association is not surprising, because a positive view of other people is a prerequisite of developing a sense of justice and equality with others. Female gender was also a positive predictor of post-conventional moral

reasoning and this finding was coherent with previous reports.<sup>8</sup>

Direct comparisons of variables related to personality, and especially of moral reasoning scores across geographical, cultural, economic and age differences, should be performed with caution.<sup>5</sup> Studies of moral reasoning development in medical schools have been performed mainly on American and Canadian medical students,<sup>8</sup> who start medical school at least 4 years later than Croatian and most other European university students. The early adult age (18–22 years), the entrance age for college in the United States and university in Europe, is a time of natural progression in moral development, related to maturity and education.<sup>4</sup> The DIT2 scores of Croatian medical students were higher than norms for their age counterparts (college sophomores) from the United States<sup>22</sup> (N2 score  $35.2 \pm 10.8$  in our sample versus N2 norm of  $31.2 \pm 14.9$  for US college students), but lower than 2nd-year medical students from Denmark.<sup>9</sup> However, Croatian students' scores were also lower than the 1st-year nursing students from Finland, who were also older.<sup>14</sup>

Machiavellianism has been postulated as a tracer character trait opposed to the characteristics embodied in an ideal (family) doctor.<sup>24</sup> Also, higher scores on Machiavellianism were predictive of negative attitudes of medical students towards patients with psychological problems, elderly patients or terminally ill patients.<sup>24,25,27</sup> In a population of college students, Machiavellianism was associated positively with a nihilistic, relativistic and non-idealistic ethical orientation.<sup>27</sup> High Machiavellianism among Croatian medical students and its association with moral reasoning may be a reflection of the socio-economic environment of a system in post-communist transition. In contrast to countries such as Finland and Denmark, which have virtually no corruption, Croatia is burdened by social corruption. Our recent report on academic misconduct showed that 94% of Croatian medical students admitted engaging in some form of academic misconduct.<sup>28</sup> Such an environment may be permissive for the development of psychological profiles with high Machiavellianism and a tendency towards SDR. Although further investigations are necessary to shed light on these relationships, our results show that there is some interrelatedness between moral reasoning as measured by the DIT2 and the construct of Machiavellianism. This is why research into moral reasoning and Machiavellianism is important in socio-economic systems where

the level of corruption is high and the social climate permissive towards morally unjustifiable behaviours. People who are more prone to morally questionable behaviours in these circumstances advance more easily in their professional and academic careers, thus contributing to the preservation of a corrupt social system as both policy makers and role models for the new generations. It is even more important in research settings where integrity is presumed, yet not always present, and no clear legal regulations exist for many 'grey' zones. Our findings have important implications for the institutional approach to teaching ethics and the responsible conduct of research in different cultural and socio-economic settings. One may expect that, apart from enhancing students' moral reasoning, interventions aimed at developing value systems based on honesty and openness towards others might help to develop a positive climate which could lead eventually to practices, both clinical and research, based on these same values.

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