

# Attitudes toward professionalism in medical students and its associations with personal characteristics and values: a national multicentre study from Slovenia raising the question of the need to rethink professionalism

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**Background:** Professionalism is becoming one of the main competencies that all medical students should develop during their education. The attitudes of medical students to professionalism in the study process can change, depending on the curriculum and methods of teaching. Factors associated with attitudes to professionalism can be divided into the characteristics of the physician and the context, eg, education about professionalism and the health system; however other student characteristics are also important. This study focused on the factors associated with attitudes toward professionalism and took into account student demographic characteristics, personality and their personal values.

**Methods:** A convenience sampling method was employed in the academic year 2015–2016 in the fourth and final year medical students at the two Medical Faculties in Slovenia. The instrument consisted of questionnaires examining the Big Five personality traits questionnaire (BFQ), the scale of personal values and demographic and family background data. The outcome measure was the validated professionalism attitude scale (PAS).

**Results:** A total of 323 students participated, of which 101 (31.3%) were men and 222 (68.7%) were women. The samples of the two faculties did not differ in any demographic characteristics and were analyzed together. Of the personal values, partner/love, profession/work and sport activity were significantly associated with the total score of the PAS ( $\beta=0.22$ ,  $p=0.033$ ;  $\beta=0.24$ ,  $p=0.003$ ;  $\beta=0.17$ ,  $p=0.040$ , respectively). After the adjustments for the BFQ dimensions, only profession/work kept significance ( $\beta=0.19$ ,  $p=0.016$ ). Women scored significantly higher on attitudes toward professionalism (total PAS score:  $M_w=93.4\pm5.1$ ,  $M_m=89.1\pm9.8$ ,  $p=0.001$ ), and this significance remained in multivariate modeling ( $\beta=-0.20$ ,  $p=0.001$ ). Of the hereditary traits, only acceptability was associated with attitudes toward professionalism ( $\beta=0.25$ ,  $p<0.001$ ).

**Conclusions:** It seems that personal characteristics and values are important in students' concept of their future professional behavior. Further research will show whether these patterns are prerequisites for enrollment in the study process.

**Keywords:** medical students, personal values, attitudes, professionalism, personal traits

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## Background

Professionalism has been described as a collection of attitudes, values, behaviors and relationships that act as the foundation of a health professional's contract with society.<sup>1</sup> Although it has been a common theme in academic health care

curricula,<sup>2,3</sup> health care professionals and educators struggle to develop a common definition for it.<sup>4</sup> The American Board of Internal Medicine suggested professionalism has six components: altruism, accountability, excellence, duty, honor/integrity and respect.<sup>5</sup> Other groups described fundamental principles of professionalism to include<sup>6</sup> patient welfare, patient autonomy and social justice manifested through professional responsibilities, such as integrity, compassion, altruism, continuous improvement, excellence and working in partnership with team members.<sup>7</sup>

Given that there have been numerous warnings that inappropriate professional attitudes may lead to damage to patients' welfare and health, as well as to physicians' morale,<sup>8</sup> professionalism is becoming one of the main competencies that all medical students should achieve during their education.<sup>9</sup> Much has already been studied about the role of education in creating appropriate attitudes of future physicians toward professionalism, since education was shown to be crucial to attain or maintain appropriate attitudes toward professionalism; without education, appropriate attitudes may even tend to deteriorate.<sup>10,11</sup> Deterioration of appropriate attitudes was evident in studies in which senior medical students expressed a more negative attitude than younger students toward idealism, empathy and the perception of a physician's status and income, as well as a more negative view of the primary level of health care and of the importance of lifestyle and the patient's family.<sup>10,12–14</sup> Developing appropriate attitudes toward professionalism depends in part upon a student's formal learning,<sup>10</sup> with most success if the learning occurs early in the curriculum.<sup>15</sup> The best methods of teaching have been shown to be role-modeling, personal reflection<sup>16,17</sup> and clinical discussions with mentors, peers and other health care workers.<sup>10</sup>

Researchers in one study found that medical students had already partly formed attitudes toward professionalism before they started studying medicine.<sup>18</sup> These attitudes were largely based on their own experience with the health care system and physicians.<sup>18</sup> There were also associations between the inherited characteristics of the students and early social learning, ie, values, with professionalism, identified; and also empathy, one of the main components of professionalism, which shows to be gender-related and possibly inherited characteristic.<sup>19</sup> Moreover, the empathy levels of students can be predicted by their personality which has a genetic component.<sup>20</sup> Besides personality, coping, motivation, and approach to learning were also characteristics shown to partially predict future

professional performance,<sup>21</sup> and conscientiousness was yet another characteristic found to be associated with professionalism.<sup>7</sup> Attitudes (defined as the combination of evaluation, emotion and cognition in relation to different social situations and objects) function as a permanent readiness to behave in a certain manner.<sup>22,23</sup> They are formed through interactions in social environments, ie, social learning, and affect the behavior of individuals.<sup>22</sup> A general consensus exists that there is a strong correlation between attitudes and behavior,<sup>24</sup> emphasizing that this association runs both ways, with attitudes leading to behavior and behavior (experience) affecting attitudes.<sup>25,26</sup>

To our knowledge, many researchers have focused on the definition of professionalism, its measurement and the impact of different curricula,<sup>1–6,10–17</sup> but as yet no researchers focused on factors associated with attitudes toward professionalism and have taken into account demographic characteristics, personality and values. The association between personality, values and attitudes raised our research interest, since values have not yet been recognized as viable predictors, and we wanted to explore the factors associated with a change in attitudes toward professionalism. In this study, hypotheses whether “Personality traits are associated with the total score of Scale for Assessment Attitudes toward Professionalism (PAS)” and “Values as a result of upbringing are associated with attitudes towards professionalism (total score of PAS) in medical students” were tested.

## Methods

### Type of study and settings

This was a cross-sectional study of undergraduate students at both Faculties of Medicine in Slovenia (Ljubljana and Maribor). It was one aspect of a nationwide longitudinal study on professionalism in undergraduate medical students which started in the academic year 2016/2017 and will continue as a 6-year longitudinal study to determine if personal values and basic personality traits predict attitudes toward professionalism in medical students, and if it would be possible to affect attitudes through values, taking into account that late adolescence/young adulthood is developmentally a very challenging phase of life.

The research was carried out in accordance with the terms of the Declaration of Helsinki for recommendations guiding physicians in biomedical research involving human subjects.<sup>27</sup>

The National Medical Ethics Committee of the Republic of Slovenia approved the protocol of the study (document number 0120–710/2015/12). Within the approved protocol, a process of informed consent provision from participants has been described in detail.

## Participants and procedures

All medical students enrolled in the fourth and sixth (final) years at both faculties were invited to participate. They were provided with an explanatory statement about the research and about the instrument. They were informed that participation was voluntary. In the academic year 2016/2017 at the Faculty of Medicine in Ljubljana, there were 207 students enrolled in the fourth year and 211 in the sixth year, while in Maribor there were 91 students in the fourth year and 67 in the sixth year. The students needed approximately 45 mins to complete the questionnaire. They signed the statement about their consent.

## Instruments

The main personality traits were measured by the Big Five Questionnaire (BFQ), which was developed by Caprara, Barbaranelli and Borgogni.<sup>28,29</sup> The BFQ measures five personality traits: extraversion, agreeableness, conscientiousness, neuroticism and openness. The inventory consists of 132 items graded with 5-point ratings (from 1= very false for me to 5= very true for me). The Slovenian version of the BFQ has been used and demonstrated to show adequate reliability and validity.<sup>30</sup> In the present study, the Cronbach's alpha coefficients of extraversion, agreeableness, conscientiousness, neuroticism and openness were 0.73, 0.76, 0.73, 0.77 and 0.70, respectively.

The BFQ was designed to assess the constellation of traits defined by the Five Factor Theory of Personality drawn from John & Srivastava.<sup>31</sup> The factor structure used by the BFQ is described by sub-scales:

- Extraversion is characterized by talkativeness, assertiveness and energy. This factor is sometimes referred to as surgency or energy.
- Agreeableness is characterized by good-naturedness, cooperativeness and trust. While this factor is most commonly called agreeableness, it can also be seen as a combination of friendliness and compliance.
- Conscientiousness is characterized by orderliness, responsibility and dependability. This factor is sometimes referred to as dependability.
- Neuroticism is characterized by how easily one is upset and is the polar opposite of emotional stability. This factor is sometimes scored in the opposite direction and then is referred to as emotional stability.
- Openness is characterized by originality, curiosity and ingenuity. This factor is sometimes referred to as culture because of its emphasis on intellectualism and independence of mind, or as intellect because of its emphasis on intelligence, sophistication and reflection.

The scale of personal values (SPV) is a psychodiagnostic tool that provides a quick insight into the motivational structure of adolescents and adults. Values are assessed as life guidance or idealized goals – those which are absolutely worthwhile to strive for and invest energy in. The author of this scale psychologically defined values as concepts of the basic categories of desirability. Values are rational, declarative expressions of a person's (relatively) lasting motivation. Research results showed values to be structured around two bipolar macrodimensions: existential (fulfillment related) and Dionysian–Apollonian values. At a lower level, however, there are also clusters of narrow-scale values.<sup>32</sup>

The SPV has proved useful in the field of clinical psychology, counseling and industrial and school practices, since it highlights the personality from different angles and has been shown to be perfectly complemented by other psychological diagnostic instruments. The SPV comprises 24 values (partner/love; children; hobbies/free time; personal safety/health; moral/ethical principles; sport activity; friends; profession/work; social gathering; self-esteem; freedom/independence; new experiences; sexuality; knowledge/wisdom; food/drink; parents/home; rest; beauty/art; comfort/pleasure; creativity; property/money; faith/God; power/influence; and prestige/fame) classified by an individual into seven categories from the most to the least important. The scale was shown to be reliable (test–retest 0.90 or 0.46–0.95,  $M_e = 0.75$ ).<sup>32</sup> Results have shown that the SPV reliably identifies a person's top five to ten values.<sup>32</sup>

The PAS was developed in Slovenia by Klemenc-Ketis and Vrecko and introduced to peers in 2014.<sup>33</sup> The PAS, consisting of 22 items, was shown to be reliable and valid when assessing professionalism attitudes in undergraduate medical students. Factor analysis revealed three factors: empathy and humanism (10 items), professional relationship and development (8 items) and responsibility (4 items). A composite score was recommended,

using the Baker & Hearnshaw equation to range the scale's score from 0 to 100.<sup>34</sup> A higher score indicates better attitudes toward professionalism.

## Data analysis

The sample data were presented by frequencies and percentages or by means and SDs. The Fisher's exact test was used to explore the demographic differences between the two Slovenian Faculties of Medicine. A hierarchical linear regression analysis was used to determine the factors associated with medical students' attitudes toward professionalism. The calculation included the beta coefficient, *t* value and *p*-value. For each step of the analysis, we also provided  $R^2$  together with  $R^2$ -change ( $\Delta R^2$ ). Statistical analysis was performed using IBM SPSS 23.0 software (IBM Corp., Armonk, NY, USA).  $p < 0.05$  was marked as statistically significant.

Using the G\*Power software (version 3.1.9),<sup>35</sup> a total of 323 students were calculated to have a >95% power to detect a significant association for linear regression (using an alpha of 0.05, considering 40 predictors and assuming a medium effect size of 0.15).

## Results

### Characteristics of the study sample

Of 576 invited students, 323 participated in the study (56.1% response rate). At the Faculty of Medicine in Ljubljana, 206 of 416 students participated (49.5% response rate) and at the Faculty of Medicine in Maribor, 117 of 158 participated (74.1% response rate). There were 222 (68.7%) women in the sample (Table 1). The participants were aged  $23.5 \pm 1.9$  years, the youngest being 21 and the oldest 27 years of age.

### Attitudes toward professionalism, personal values and personal traits

The mean  $\pm$  SD of the total score on the PAS was  $92.6 \pm 6.1$  points. The minimum PAS score was 75.0 and the maximum 100.0 points. Women scored significantly higher on attitudes toward professionalism than men ( $93.4 \pm 5.1$  vs  $89.1 \pm 9.8$ ,  $p = 0.001$ ).

Of the personal values, the top ten preferences were partner/love ( $5.5 \pm 1.2$ ), personal safety/health ( $4.9 \pm 1.3$ ), freedom/independence ( $4.8 \pm 1.1$ ), friends ( $4.7 \pm 0.9$ ), parents/home ( $4.7 \pm 1.1$ ), profession/work ( $4.6 \pm 0.9$ ), self-esteem ( $4.6 \pm 1.1$ ), moral/ethical principles ( $4.5 \pm 1.0$ ), hobbies/free time ( $4.3 \pm 0.8$ ), knowledge/wisdom ( $4.3 \pm 1.2$ ) and children ( $4.3 \pm 1.2$ ) (Figure 1).

Of the personal traits, the score of conscientiousness was  $50.4 \pm 9.3$ , of acceptability  $47.4 \pm 9.9$ , of extraversion  $45.4 \pm 9.2$ , of emotional stability  $46.7 \pm 9.3$  and of openness  $46.1 \pm 9.1$ . The score of the L scale was  $49.2 \pm 8.2$ .

In bivariate analyses, profession/work correlated significantly though weakly with the total sum on PAS ( $r = 0.152$ ;  $p = 0.010$ ).

In multivariate modeling, the following variables were independently associated with a higher score on the PAS after step 3: female gender, profession/work and acceptability. In step 1 of the hierarchical linear regression modeling, 14% of variance was explained; in step 2, personal values additionally explained 17% and basic personality traits in step 3 contributed another 5% to a total of 36% of explained variance in attitudes toward professionalism. Of values as a result of upbringing and social learning, partner/love, profession/work and sport activity were significantly associated with the total score of the PAS. After adjustments for the BFQ dimensions in step 3, significance was lost for partner/love and sport activity. Of the background variables, only the mother's education was associated with PAS, yet after the BFQ dimensions were included in the regression modeling in step 3, significance was lost. The same happened with the year of study (Table 2).

## Discussion

To our knowledge, this is the first national study dealing with medical students' attitudes toward professionalism and personal traits, values, family background and previous experience with physicians. The results showed that of traits associated with hereditary, only acceptability was significantly associated with the total score of the PAS. In traits associated with values as a result of upbringing and social learning, only profession/work was significantly associated with the total score of the PAS. Of the background variables, only gender was significantly associated with attitudes toward professionalism. The same result was found in the study of Klemenc-Ketiš and Vrečko performed at Maribor Faculty of Medicine.<sup>33</sup>

In our study, only the value profession/work remained significant after the modeling, indicating the importance of this factor. It also shows that students are aware that the profession they are being trained for is labor-intensive. According to Caprara et al,<sup>30</sup> acceptability acts as a good predictor of satisfactory interpersonal relationships and represents the following subtraits: altruism, morality, cooperation and sympathy. This personality trait was the

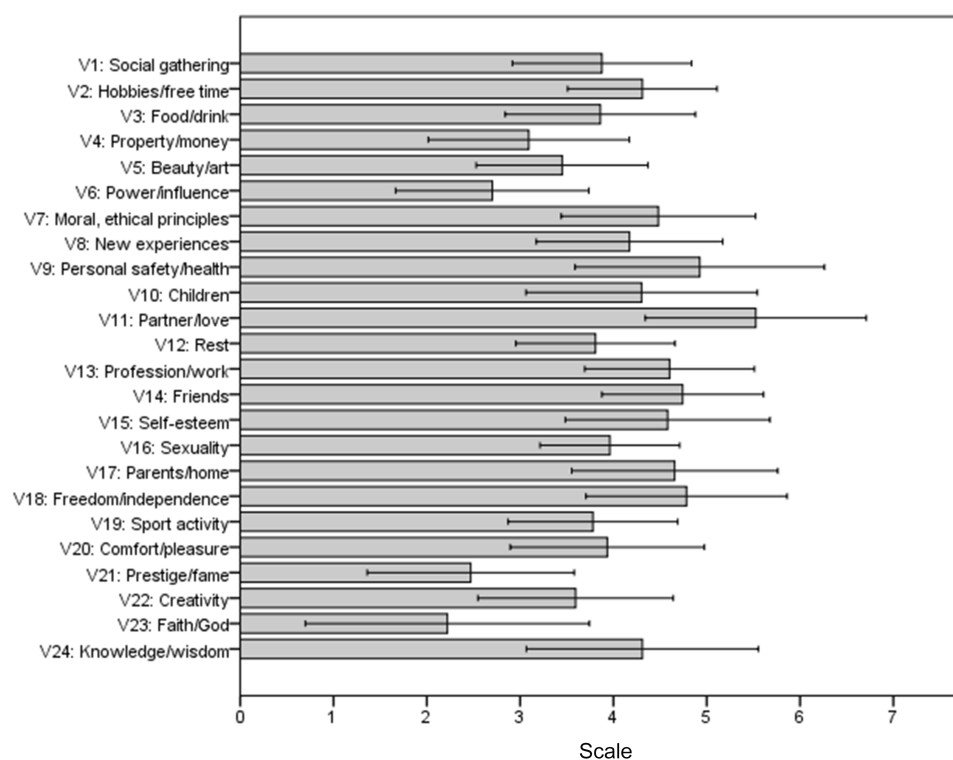
**Table I** Family background and other sociodemographic characteristics of the participating medical students

	All n=323 (%)	MF LJ n=206 (%)	MF MB n=117 (%)	p
Gender				0.385#
Female	222 (68.7)	138 (67.0)	84 (71.8)	
Male	101 (31.3)	68 (33.0)	33 (28.2)	
Year of study				0.200#
Fourth	183 (56.7)	111 (53.9)	72 (61.5)	
Sixth	140 (43.3)	95 (46.1)	45 (38.5)	
Achieved grade on the external high school leaving exam (Matura)				0.223#
Very good	40 (12.4)	22 (10.7)	18 (15.4)	
Excellent	283 (87.6)	184 (89.3)	99 (84.6)	
Environment of origin				0.227#
Urban	210 (65.0)	139 (67.5)	71 (60.7)	
Rural	113 (35.0)	67 (32.5)	46 (39.3)	
Siblings				0.103*
None	56 (17.3)	29 (14.1)	27 (23.1)	
One or two	236 (73.1)	155 (75.2)	81 (69.2)	
Three or more	31 (9.6)	22 (10.7)	9 (7.7)	
Education father				0.375*
Elementary school	8 (2.5)	5 (2.4)	3 (2.6)	
High school	106 (32.8)	62 (30.1)	44 (37.6)	
College, university or more (MSc, PhD)	209 (64.7)	139 (67.5)	70 (59.8)	
Education mother				0.119*
Elementary school	10 (3.1)	4 (1.9)	6 (5.1)	
High school	74 (22.9)	43 (20.9)	31 (26.5)	
College, university or more (MSc, PhD)	239 (74.0)	159 (77.2)	80 (68.4)	
Employment father				0.552*
Public sector	100 (31.0)	61 (29.6)	39 (33.3)	
Private sector	131 (40.6)	81 (39.3)	50 (42.7)	
Self-employed	56 (17.3)	40 (19.4)	16 (13.7)	
Retired, unemployed, other	36 (11.1)	24 (11.7)	12 (10.3)	
Employment mother				0.643*
Public sector	182 (56.3)	111 (53.9)	71 (60.7)	
Private sector	68 (21.1)	47 (22.8)	21 (17.9)	
Self-employed	39 (12.1)	25 (12.1)	14 (12.0)	
Retired, unemployed, other	34 (10.5)	23 (11.2)	11 (9.4)	
Parents – physicians				0.094#
No	278 (86.1)	172 (83.5)	106 (90.6)	
Yes	45 (13.9)	34 (16.5)	11 (9.4)	
Relatives – physicians				0.082#
No	259 (80.2)	159 (77.2)	100 (85.5)	
Yes	64 (19.8)	47 (22.8)	17 (14.5)	
Past experience with physicians				0.845*
Bad	8 (2.5)	6 (2.9)	4 (1.7)	
Neutral	63 (19.5)	40 (19.4)	23 (19.7)	
Good	218 (67.5)	140 (68.0)	78 (66.7)	
Very good	34 (10.5)	20 (9.7)	14 (12.0)	

**Notes:** \*Hi-square test, #Fisher's Exact Test.

**Abbreviations:** MF LJ, Faculty of Medicine Ljubljana; MF MB, Faculty of Medicine Maribor.





**Figure I** The scale of personal values (mean  $\pm$  SD).

only one significantly associated with attitudes toward professionalism. This fact is not surprising given that empathy and humanism were the most important in the factor analysis of the PAS.<sup>36</sup> Studies of empathy, one of the main components of professionalism, show that empathy is gender and specialty preference related and higher in female medical students and in patient-oriented specialties.<sup>19</sup> Moreover, personality has been shown to be a significant predictor of empathy in students, while openness to experience and agreeableness were found to be associated with higher empathy.<sup>20</sup> Conscientiousness was another characteristic found to be associated with professionalism,<sup>7</sup> although not in the results of this study.

Of the personal traits, all but conscientiousness were below the Slovenian norm for this age group.<sup>30</sup> This has also been shown in other studies<sup>37</sup> and may indicate a possibly problematic area. However, as this was a cross-sectional study, no firm conclusions could be drawn and further research should be done within this field.

According to a qualitative study conducted at the Medical Faculty in Maribor in 2014, there were no significant differences in attitudes toward professionalism between students of the first and fifth years, but fifth-year students identified more categories of professionalism than their younger counterparts.<sup>36</sup> In this study, the older

students also identified factors associated with attitudes to professionalism and divided them into characteristics of the physician (or the medical student) and the context (external factors). Elsewhere, the characteristics of the physician associated with professionalism were the physician's personal development and role modeling.<sup>36,38–41</sup> They also stressed the expertise of the physician, which is usually described as a component of professionalism.<sup>36,38,42</sup> In the factors related to context, education on professionalism and the health system stand out.<sup>36,42,43</sup> In our study, professionalism scores were almost identical to the previous study on professionalism in undergraduate medical students.<sup>33</sup> This indicates the validity and reliability of our results.

Since the results presented in this article are a part of a longitudinal study, we are aiming to find out whether personal values and basic personality traits predict attitudes toward professionalism in medical students, and whether it would be possible to affect attitudes through values, taking into account that late adolescence/young adulthood is developmentally a very challenging phase of life. Specifically, the study years are known as an important period of transition from adolescence to young adulthood which can very often be difficult, due to interactions between an individual's psychological characteristics and common stressors such as academic demands, changes in

**Table 2** Associations between attitudes toward professionalism, family background, basic personality traits, personal values and previous experience with physicians (n=323)

	Step 1			Step 2			Step 3		
	Beta	t	p	Beta	t	p	beta	t	p
Sociodemographic characteristics									
Year of study (6th vs 4th)	-0.08	-1.38	0.169	-0.12	-2.02	0.044	-0.11	-1.89	0.061
Gender (male vs female)	-0.29	-4.93	<0.001	-0.20	-3.10	0.002	-0.20	-3.26	0.001
Environment of origin (rural vs urban)	0.01	0.13	0.895	-0.06	-0.98	0.330	-0.06	-0.98	0.327
Achieved grade in high school	0.08	1.35	0.179	0.02	0.32	0.752	0.03	0.53	0.593
Achieved grade on the external high school leaving exam (Matura)	0.00	0.04	0.970	-0.01	-0.11	0.913	-0.01	-0.10	0.922
Number of siblings	-0.01	-0.10	0.918	-0.03	-0.43	0.665	0.01	0.15	0.877
Education father	0.07	0.91	0.362	0.07	1.02	0.310	0.08	1.16	0.246
Education mother	0.15	2.16	0.032	0.15	2.21	0.028	0.14	1.97	0.050
Parents - physicians (yes vs no)	0.00	-0.03	0.974	0.01	0.22	0.825	0.01	0.13	0.900
Relatives - physicians (yes vs no)	0.01	0.09	0.929	0.03	0.54	0.591	0.03	0.57	0.569
Past experience with physicians	0.06	0.97	0.334	0.05	0.97	0.334	0.04	0.69	0.493
Personal values SPV									
V1: Social gathering				-0.04	-0.49	0.622	-0.08	-0.95	0.342
V2: Hobbies/free time				0.08	0.98	0.328	0.04	0.54	0.589
V3: Food/drink				0.02	0.22	0.825	0.02	0.17	0.865
V4: Property/money				-0.19	-2.13	0.034	-0.16	-1.76	0.079
V5: Beauty/art				0.03	0.37	0.711	0.00	-0.02	0.984
V6: Prestige/fame				0.03	0.39	0.696	0.05	0.58	0.565
V7: Moral/ethical principles				0.05	0.50	0.615	0.02	0.20	0.845
V8: New experiences				0.09	0.93	0.354	0.06	0.68	0.494
V9: Personal safety/health				0.20	1.82	0.069	0.14	1.30	0.194
V10: Children				0.02	0.21	0.830	0.01	0.11	0.913
V11: Partner/love				0.22	2.15	0.033	0.15	1.50	0.136
V12: Rest				0.04	0.57	0.571	0.04	0.47	0.636
V13: Profession/work				0.24	2.99	0.003	0.19	2.42	0.016
V14: Friends				0.10	1.15	0.251	0.05	0.67	0.504
V15: Self-esteem				0.16	1.82	0.070	0.13	1.55	0.122
V16: Sexuality				0.06	0.86	0.393	0.08	1.13	0.259
V17: Parents/home				0.11	1.13	0.258	0.10	1.08	0.282
V18: Freedom/independence				0.09	0.92	0.356	0.08	0.89	0.372
V19: Sport activity				0.17	2.07	0.040	0.12	1.51	0.131
V20: Comfort/pleasure				0.05	0.58	0.560	0.04	0.45	0.657
V21: Power/influence				0.02	0.24	0.810	0.02	0.26	0.797
V22: Creativity				0.11	1.12	0.265	0.10	1.00	0.318
V23: Faith/God				0.05	0.40	0.687	0.00	0.02	0.983
V24: Knowledge/wisdom				0.09	0.87	0.388	0.06	0.55	0.586
Personal traits of BFQ									
Extraversion/energy							-0.10	-1.66	0.098
Acceptability							0.25	3.82	<0.001
Conscientiousness							0.07	1.12	0.263
Emotional stability							0.03	0.58	0.564
Openness							-0.02	-0.30	0.762
F	df=11, F=4.012*			df=35, F=3.169*			df=40; F=3.410*		
R <sup>2</sup> ( $\Delta R^2$ )	0.140			0.311 (+0.171)			0.361 (+0.050)		

Abbreviation: SPV, scale of personal values.

lifestyle, moving away from home, separating from family, inadequate living conditions, physical and emotional problems and financial concerns.<sup>44–46</sup> Aside from personality, coping, motivation and approach to learning were characteristics shown to partially predict future professional performance,<sup>21</sup> so university faculty members should become better role models and inspire their students and peers. Given this, the authors would recommend empowering university faculty members to improve their professional behavior, since it could have both direct and indirect effects on improving the professionalism of medical students.

## Strengths and limitations of the study

The strength of our study is its national character, as we included all the Faculties of Medicine in Slovenia, ensuring that the results are representative.

Our study also has some limitations. The first is response rate. In the Ljubljana Faculty of Medicine, the response rate was lower than in the Maribor Faculty of Medicine, which could be a source of a selection bias.

The cross-sectional survey design is inherently limited and, together with reliance on self-reported data, raises questions about the potential for method variance (ie same-source measurement bias) to account for our findings. Although the phenomena being studied could only have been assessed by asking students to report their experience or perception, it would be useful in further research over time (a prospective study) to mitigate the potential effects of method variance and test the effect of adolescent developmental dynamics.

Regression modeling explained only 36% of the variance of attitudes toward professionalism, 5% of the variance being covered by personality, which clearly indicates that hereditary factors in further study design need to be monitored. The stability of the associations should be analyzed in future research, and more variables should be included to expand the explained variance, especially to reveal as yet unrecognized determinants of attitudes toward professionalism.

## Conclusions

It seems that personal characteristics and values are important in professional behavior. Further research will show whether these patterns are prerequisites for enrollment in the study process. At this phase of our study, we could assume that strengthening attitudes toward professionalism in students would benefit the most from social learning interventions.

Although the concept of professionalism includes clinical excellence, the focus is also on the personal aspect. Do we need to rethink the definition of professionalism?

## Abbreviation list

BFQ, Big Five personality traits questionnaire; SPV, scale of personal values; PAS, professionalism attitude scale.

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## Disclosure

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