




The Association Between Personality Traits and Specialty Preference Among Medical Students in Jordan

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Aim: To assess the association between personality traits by the five-factor model and specialty choice preference among medical students and immediate medical graduates in Jordan and to identify if there were any significant differences in personality profiles between those planning to pursue different career pathways.

Methods: This is a cross-sectional study including fifth- and sixth-year medical students and post-graduate internship doctors at five universities in Jordan. An online survey was used to collect data from participants, which included their general characteristics, their personality profile using the Big Five Inventory–2, and questions about their most preferred specialty choice.

Results: One thousand and twelve participants were enrolled in this study. Only 4.9% were interested in pursuing a specialty in basic medical sciences, and about 12% wanted to be non-practicing medical doctors. Almost half of all participants wanted to pursue a career in surgery-oriented specialties. Those were more extraverted, more conscientious, and had less negative emotions than students who chose medicine-oriented specialties. Students who decided to pursue clinical specialties and students who wanted to be practicing doctors were more extraverted and more conscientious.

Conclusion: Medical students and fresh medical graduates from Jordan who exhibited higher extraversion and conscientiousness and lower negative emotions preferred to be practicing clinicians. They were more inclined to pursue a career in surgery-oriented specialties. These findings might be helpful in understanding the preferences of young doctors and in counseling them about their career paths. Medical educators may wish to incorporate personality trait evaluation in planning post-graduate programs.

Keywords: five-factor model, medical students, personality, specialty choice, medical education

Introduction

The number of medical schools in the Middle East has increased from 82 to 142 from 2000 through 2014.¹ Despite the increase in the number of medical graduates, there is an imbalance in doctors' distribution among different subspecialties. Some specialties are experiencing a desperate shortage, whereas other specialties are overwhelmed.² Medical students in the final years of medical school stand at a critical juncture in their careers to decide upon residency programs or further training. This decision is complex and individualized, with multiple factors affecting specialty choice, including gender, expected income, lifestyle, academic interest and specialty spots availability. There have been very few studies reporting on internal factors such as personality and gender.³

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Despite the lack of studies tackling the mal-distribution of specialties in Jordan, unofficial reports point towards a need for qualified doctors in neurosurgery, rehabilitation medicine and psychiatry. There is also high demand for professionals in the basic medical sciences. Saturated specialties include dermatology and ophthalmology.

The five-factor model of personality traits, which is also known as “The Big Five” model of personality is a taxonomy for personality traits.⁴ The model details five personality attributes: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Openness to experience is characterized by creativity, art admiration, intellectual curiosity, and high awareness of feelings. Conscientiousness is distinguished by being competent, achievement-oriented, self-disciplined, planning tasks carefully, and by a tendency to be persistent and organized. Extraversion represents a tendency for social interaction and being active and positive. Agreeableness is characterized by being cooperative, trustful, altruistic, empathic, friendly, and seeking to compromise. Finally, neuroticism is characterized by mood dysregulation, vulnerability and low emotional stability, being anxious, nervous or depressed, and feeling negative emotions.

Studies have evaluated the relationship between personality traits and medical specialty choice/interest. Personality was found to affect medical students’ specialty choice even after adjusting for setting-specific variables.⁵ Personality traits were found to predict medical students’ preference to pursue a career in certain medical specialties.⁶ Reports have associated surgery with more conscientiousness, openness, extraversion and lower agreeableness and neuroticism, and pediatric surgeons scored higher on agreeableness, conscientiousness, and openness to experience.^{7–10} On the other hand, internal medicine was associated with more agreeableness, higher neuroticism and less openness to experience.^{8,11,12} Extraversion was a controversial trait in internal medicine doctors with conflicting reports by different studies.^{8,13} Moreover, a lower degree of neuroticism was found among the family medicine specialty.¹⁴ Higher extraversion was associated with pediatrics, while some studies have found that psychiatry is associated with higher openness, more neuroticism and less conscientiousness.^{5,9,14}

The current literature on the association between personality traits and the specialty choice preference among medical students in Arab countries is limited. In this study, we aim to explore the relationship between personality traits by five-factor model and specialty choice preference among medical students and immediate medical graduates

in Jordan and to identify if there are differences in personality profiles between those planning to pursue different career pathways.

Methodology

Ethical Consideration

Institutional ethical approval was obtained from the IRB committee at Jordan University Hospital (Approval # 10/2020/7994), and participation was voluntary; all participants had the right to withdraw from the study at any time. Names of participants were not included in the study questionnaire to ensure complete privacy. All obtained data were completely confidential; codes were used in order to ensure anonymity.

Participants

In this cross-sectional study, we included fifth- and sixth-year medical students and immediate internship postgraduate doctors at five universities in Jordan (the University of Jordan, Jordan University of Science and Technology, University of Mutah, Yarmouk University and Hashemite University). Convenience sampling using an online survey service was used to collect data from participants. A well-designed survey, including a consent form, was distributed to the participants using online Facebook groups that included all fifth- and sixth-year medical students and internship postgraduate doctors at each university.

Data Collection

Data collection started in March 2020 and concluded in April 2020. We collected information about the general characteristics of the participants, including; age, gender, university, academic year, nationality, and place of permanent residency. We used the Big Five Inventory–2 (BFI-2) to assess the personality traits of each participant.¹⁸ This Inventory has been found to be a reliable and valid personality measure, and has been replicated across several studies.³³ However, as with other personality inventories, the BFI-2 is limited by its self-reporting nature. The BFI-2 was administered in English language, which is the teaching language in all medical schools in Jordan. An Arabic translated BFI-2 test was not used as no validated version of the test was available.

Questions about the most preferred specialty, preference of clinical or basic medical sciences, preference to be a practicing or non-practicing medical doctor, and other factors that influence students in their specialty choice were asked. Basic medical sciences included fundamental health sciences

that are taught to students early in medical school such as anatomy, biochemistry, cell biology, genetics, histology, immunology, microbiology, pathology, pharmacology, and physiology. Medicine-oriented specialties included all clinical specialties where no surgeries are performed (internal medicine and its subspecialties, pediatrics, emergency medicine, neurology, dermatology, forensics, family medicine, radiology, and psychiatry). Surgery-oriented specialties included general surgery, obstetrics and gynecology, anesthesiology, and surgical subspecialties such as neurosurgery, orthopedics, ophthalmology, otorhinolaryngology and urology. Moreover, the term practicing doctors denoted doctors with direct interaction with patients while non-practicing doctors included those who had no direct interaction with patients or those exclusively working in administrative positions in the healthcare system.

Answers were provided via a 5-point strongly agree to strongly disagree (Likert) scale. The questionnaire took 10.8 (± 5.2) minutes to be filled. Reliability was measured using Cronbach's alpha (α) and ranged from acceptable to good; neuroticism ($\alpha = .84$), conscientiousness ($\alpha = .83$), extraversion ($\alpha = .80$), agreeableness ($\alpha = .72$) and openness ($\alpha = 0.64$).

Statistical Analysis

After data collection, the BFI-2 score for the personality traits was calculated. Data entry and analysis were performed using the Statistical Package for Social Sciences software (SPSS) version 25.0. We used mean \pm SD to describe continuous data and used frequency (percentage) to express categorical data. A two-sided P-value < 0.05 was considered statistically significant.

As the normality assumption has been met, we used Independent Samples *t*-Test to assess the difference in personality traits score among medical students' choices between medicine-oriented specialties and surgery-oriented specialties. Moreover, we used Independent Samples *t*-Test to determine if there was a difference in personality profiles between students who chose to become practicing or non-practicing medical doctor and between students who wanted to pursue a career in basic sciences or in clinical sciences. We used Levene's test to evaluate equality of variances assumption. One-way ANOVA was utilized to assess the personality profile differences among different specialties and the number of specialties chosen by each participant (in case he/she chose more than one specialty). Equality of variances assumption was tested using Homogeneity of Variances test, which showed that the variances were equal. Post

hoc comparisons, using the Tukey HSD procedure were conducted to determine which pairs differed significantly. Only statistically significant differences were provided.

Results

Overall, 5252 fifth- and sixth-year medical students and new graduates were targeted by the survey, and 1012 participants responded by completing the questionnaire. The mean age of participants was 23.3 (± 1.2) and around 60% were females. The number of participants who were interested in knowing their personality profile by requesting to receive the BFI-2 score on their emails was 730 (72.1%).

Participants who wanted to pursue basic medical sciences were 50 (4.9%), and those who decided to remain non-practicing medical doctors were 122 (12.1%). Around half of the studied sample desired surgery-oriented specialties. Only 16.4% chose one specialty; 46.5% chose two specialties while 37.1% chose three specialties or more as possible options. Details regarding participants' characteristics, personality profiles, and chosen specialties are provided in Table 1.

Responders who chose clinical specialties were more extraverted (mean difference = 7.9, $p < 0.001$, Cohen's $d = 0.60$), and more conscientious (mean difference = 5.2, $p = 0.006$, Cohen's $d = 0.38$) than those who chose basic medical science specialties. Furthermore, participants who chose surgery-oriented specialties were more extraverted (mean difference = 3.7, $p < 0.001$), more conscientious (mean difference = 2.0, $p = 0.015$), and had less negative emotions (mean difference = 3.2, $p < 0.001$) than their peers who chose medicine-oriented specialties. Although not statistically significant, responders who chose surgery were also less agreeable (mean difference = 1.2, $p = 0.079$).

Pursuing a career as a practicing doctor was associated with being more extraverted (mean difference = 9.2, $p = < 0.001$), more conscientious (mean difference = 3.9, $p = 0.002$), and had less negative emotions (mean difference = 5.3, $p < 0.001$) compared to those pursuing a career as non-practicing medical doctors. Table 2 summarizes the differences in personality traits between medical students in relation to their choice of specialty.

Participants who chose surgery followed by students who chose obstetrics and gynecology had the highest mean score for extraversion trait, while students who chose anesthesiology had the lowest mean score. Those who chose pediatrics and anesthesiology had the highest mean scores in agreeableness. Regarding conscientiousness, anesthesiology and surgery had the highest mean scores in this trait. The highest mean score in

Table 1 Participants' Characteristics, Personality Profiles and Preferred Specialty Choices

		n (%)	Mean	SD
Age (years)			23.3	1.2
Gender	Male Female	398 (39.3%) 614 (60.7%)		
University	Jordan University of Science and Technology Mutah University Hashemite University The University of Jordan Yarmouk University	300 (29.6%) 141 (13.9%) 151 (14.9%) 308 (30.4%) 112 (11.1%)		
Academic Year	Fifth Year Sixth Year Internship	413 (40.8%) 360 (35.6%) 239 (23.6%)		
Personality Traits	Extraversion Agreeableness Conscientiousness Negative Emotionality Open-Mindedness		66.0 75.6 75.1 60.2 72.4	12.9 10.9 13.2 14.6 10.3
Medical Parts	Basic Medicine Clinical Medicine	50 (4.9%) 962 (95.1%)		
Medical Fields	Non-practitioner Practitioner	122 (12.1%) 890 (87.9%)		
Specialty (General)	Medicine oriented Surgery oriented	510 (50.4%) 502 (49.6%)		
Specialty	Anesthesiology Emergency Medicine Medicine (and subspecialties) Obstetrics & Gynecology Pediatric Surgery (and subspecialties)	9 (0.9%) 20 (2.0%) 354 (35.0%) 93 (9.2%) 119 (11.8%) 400 (39.5%)		
Number of Specialties of Interest	One specialty Two specialties Three specialties or more	166 (16.4%) 471 (46.5%) 375 (37.1%)		

negative emotionality was observed in subjects who chose emergency medicine. Medicine and surgery specialties had the highest mean scores in open-mindedness trait. The overall mean values of the personality traits for each specialty are shown in [Table 3](#).

Upon comparing the difference in personality traits using one-way ANOVA test, we found that students who picked surgery were more extraverted than students who picked medicine (mean difference = 3.6, $p = 0.002$) and pediatrics (mean difference = 4.8, $p = 0.006$), less agreeable than obstetrics and gynecology (mean difference = 4.0, $p = 0.019$) and had less negative emotions than medicine (mean difference = 3.4, $p = 0.022$) ([Table 4](#)). Moreover, students who preferred

the pediatrics specialty were more agreeable than students who picked basic medicine (mean difference = 9.5, $p = 0.011$), emergency medicine (mean difference = 8.3, $p = 0.022$), medicine (mean difference = 4.2, $p = 0.004$) and surgery (mean difference = 5.6, $p < 0.001$). Furthermore, students who chose two specialties were more extraverted than students who picked 3 or more specialties (mean difference = 2.5, $p = 0.010$) ([Table 5](#)). Other comparisons were not statistically significant.

Discussion

There are systematic differences between the personalities of medical students and junior doctors who decide to

Table 2 Difference in Personality Traits Among Medical Students in Relation to Their Choice of Specialty

		Mean (SD)	MD	P value**	95% CI of the Difference		Effect Size*
					Lower	Upper	
Extraversion	Medicine	64.1	-3.7	<0.001 [‡]	-5.3	-2.2	0.29
	Surgery	67.9					
	Basic	58.4	-7.9	<0.001 [‡]	-11.6	-4.3	0.60
	Clinical	66.3					
	Non-practitioner Practitioner	57.8 67.1	-9.2	<0.001 [‡]	-11.6	-6.8	0.74
Agreeableness	Medicine	76.2	1.2	0.079	-0.1	2.5	0.11
	Surgery	75.0					
	Basic	73.8	-1.9	0.216	-5.0	1.1	0.16
	Clinical	75.7					
	Non-practitioner Practitioner	75.0 75.7	-7	0.490	-2.7	1.3	0.06
Conscientiousness	Medicine	74.1	-2.0	0.015 [‡]	-3.6	-4	0.15
	Surgery	76.2					
	Basic	70.2	-5.2	0.006 [‡]	-9.0	-1.4	0.38
	Clinical	75.4					
	Non-practitioner Practitioner	71.7 75.6	-3.9	0.002 [‡]	-6.4	-1.4	0.28
Negative Emotionality	Medicine	61.8	3.2	<0.001 [‡]	1.4	5.0	0.22
	Surgery	58.5					
	Basic	62.5	2.4	0.253	-1.7	6.5	0.17
	Clinical	60.1					
	Non-practitioner Practitioner	64.8 59.5	5.3	<0.001 [‡]	2.5	8.0	0.37
Open-Mindedness	Medicine	72.1	-6	0.321	-1.9	0.6	0.06
	Surgery	72.8					
	Basic	70.7	-1.8	0.209	-4.8	1.0	0.17
	Clinical	72.5					
	Non-practitioner Practitioner	71.2 72.6	-1.4	0.146	-3.4	0.5	0.13

Notes: *Cohen's d, **Significance (2-tailed), [‡]Significant at 0.05 level.

Abbreviations: MD, mean difference; t, t-value; SD, standard deviation; CI, confidence interval.

Table 3 Personality Score for Each Specialty

	Extraversion Mean (SD)	Agreeableness Mean (SD)	Conscientiousness Mean (SD)	Negative Emotionality Mean (SD)	Open Mindedness Mean (SD)
Anesthesiology	58.1 (16.0)	78.7 (8.5)	77.9 (11.7)	61.2 (15.5)	72.0 (10.1)
Basic Medicine	61.4 (13.3)	70.2 (11.2)	72.8 (12.6)	59.4 (12.0)	69.6 (9.5)
Emergency Medicine	62.9 (11.7)	71.5 (10.8)	67.6 (17.1)	65.5 (17.2)	68.1 (11.1)
Medicine	64.5 (13.1)	75.6 (11.1)	74.4 (13.6)	61.7 (13.9)	72.7 (10.1)
Obstetrics & Gynecology	67.6 (12.9)	78.2 (9.9)	75.6 (13.3)	59.5 (12.4)	70.5 (10.1)
Pediatric	63.3 (13.5)	79.8 (10.4)	74.7 (12.6)	61.8 (14.5)	71.4 (11.0)
Surgery	68.1 (12.0)	74.2 (10.6)	76.2 (12.7)	58.3 (15.4)	73.3 (10.2)

Abbreviation: SD, standard deviation.

Table 4 One-Way ANOVA to Compare Personality Profile Among Different Specialties

	Pair	MD	F	Sig. for ANOVA test	Sig. for Post hoc Analysis	Effect Size*
Extraversion	Surgery - Medicine	3.6	4.93	<0.001 [‡]	0.002	0.028
	Surgery - Pediatric	4.8			0.006	
Agreeableness	Pediatric - Basic medicine	9.5	6.42	<0.001 [‡]	0.011	0.036
	Pediatric - Emergency medicine	8.3			0.022	
	Pediatric - Medicine	4.2			0.004	
	Pediatric - Surgery	5.6			<0.001	
	Obstetrics & Gynecology - Surgery	4.0			0.019	
Conscientiousness Negative Emotionality	Medicine - Surgery		1.94	0.070	0.022	0.011
			2.52	0.020 [‡]		0.014
Open-Mindedness			2.12	0.049		0.012

Notes: [‡]Significant at 0.05 level. *Partial Eta Squared. Only statistically significant pairs are shown.

Abbreviations: MD, mean difference; Sig, significance (2-tailed).

Table 5 One-Way ANOVA to Compare Personality Profiles Among Number of Specialties of Interest

	Pair	MD	F	Sig. for ANOVA test	Sig. for Post hoc Analysis	Effect Size*
Extraversion	Two versus 3 or more specialties	2.5	4.27	0.014 [‡]	0.010 [‡]	0.008
Agreeableness			2.08	0.125		0.004
Conscientiousness			2.55	0.078		0.005
Negative Emotionality			0.61	0.543		0.001
Open-Mindedness			1.98	0.138		0.004

Notes: [‡]Significant at 0.05 level. *Partial Eta Squared. Only statistically significant pairs are shown.

Abbreviations: MD, mean difference; Sig, significance (2-tailed).

pursue different specialties. Few studies have tackled those issues in the Arab region, with one study from Saudi Arabia showing that students who preferred surgery were higher in openness, extraversion, and neuroticism traits.¹⁵ Al-Alawi et al found that Omani residents in surgery had higher psychoticism and neuroticism while radiology and psychiatry residents showed lower traits.¹⁶ Further projects maintained that personality traits play an important role in career choice and in predicting the performance in doing the tasks required for each specialty.^{17,19}

In our study, only a small minority (4.9%) of our respondents was interested in pursuing a specialty in the basic medical sciences, and about 12% wanted to be non-practicing medical doctors. Preference for surgery-oriented specialties

was associated with being more extraverted, more conscientious, and experiencing less negative emotions and this is consistent with the findings from other studies.⁵⁻⁹ However, there was no significant difference in agreeableness or open-mindedness in our sample.

Although the literature is very consistent in the finding that surgeons are typically higher in conscientiousness, data is less clear-cut regarding agreeableness and neuroticism.^{5,6,8} This variation in findings can be influenced by many factors such as the level of education at the time of questioning, the definition of surgery-oriented specialties according to the study and the social norms and cultural settings in that particular environment. For example, it is established that females tend to score higher on agreeableness and neuroticism when compared to

males.^{28,29} In addition, males tend to dominate surgical specialties (except for obstetrics and gynecology) in developing countries.^{30–32} Therefore, one of the possible factors accounting for the lower levels of agreeableness and neuroticism in our report is the lower numbers of female participants aspiring to become surgeons. Evaluation of this trait with stratification by gender may shed more light and address this potential confounder.

Conscientiousness is widely agreed to be a significant positive predictor of academic achievement. Medical students who are high in conscientiousness have been shown to score higher General Point Averages (GPAs). Because surgery-oriented specialties tend to be more competitive and necessitate being organized and persistent, it is expected that students aspiring to be surgeon exhibit a greater tendency towards this trait.^{20,21}

Doctors who choose to pursue a career in Surgery have been described as extraverted and outgoing, and this is in line with our findings.^{22,23} Lower neuroticism in surgery can be attributed to the demanding and risk-taking nature of surgical specialties, which may attract doctors with lower tendencies to experience negative emotions in response to stressful events. Kwon et al found that there was no difference in extraversion, conscientiousness, and neuroticism between students who chose medicine and students who chose surgery. A possible explanation is the inclusion of one class of year 4 at a single medical school and the small sample size ($n = 105$), which was insufficient to attain statistical power and generalize the results.¹¹

Although medicine has been associated with higher scores on conscientiousness, and are characterized by their high self-dependence,¹⁷ we found that students who choose medicine were lower on conscientiousness. This might be attributed to the fact that it encompasses a heterogeneous group of subspecialties. Some internal medicine subspecialties have been associated with high conscientiousness (eg, endocrinology, gastroenterology, dermatology and immunology/allergy medicine), whereas other subspecialties (eg, forensic medicine, clinical genetics) scored lower in conscientiousness.^{5,9} In this cohort, we found that students preferring medicine were more likely to be less extraverted possibly owing to the focus on ideas and critical thinking rather than social communication.²⁴

Interestingly, respondents who preferred to specialize in basic medical sciences were significantly lower in extraversion and conscientiousness, with a strikingly large effect size in comparison to those who preferred clinical medicine (Cohen's $d = 0.60$ and 0.38 , respectively). A

career in basic sciences generally tends to involve less social interaction and less talkativeness. There was no significant difference in agreeableness, negative emotionality or open-mindedness in our study. Contrary to the report by Kwon et al,¹¹ more agreeableness was associated with clinical versus basic medicine, and there was no difference in extraversion and conscientiousness.

Pursuing a career as a practicing doctor was associated with being more extraverted, more conscientious, and less negative emotions compared to those pursuing a career as non-practicing medical doctors. Our data are consistent with Mullola's findings where lower extraversion was associated with doctors not interacting with patients.⁶ Participants who chose obstetrics and gynecology were more agreeable than those who chose surgery. Again, perhaps this specialty might be more attractive for female students in our country due to social and religious reasons.

Agreeableness and openness to experiences may facilitate physician–patient relationships and improve clinical outcomes.²⁵ In our study, those who chose pediatrics showed higher agreeableness compared to all other groups. This trait has been shown to increase the quality of interpersonal relationships and increase trust.²⁶ Such a skill can be useful in this specialty as it is largely communication-focused and involves constant care-taking and patient counseling. Gaining the friendship and trust of their young patients allows pediatricians to be effective in their role, something that may be more challenging for others from different specialties.

Our study is limited by its cross-sectional design as it does not deal with the possible future effect of medical specialty and work environment on personality. It cannot be extended directly to the specialists in particular fields of medicine. Although personality traits are assumed to be inherited and relatively stable over time, those traits may still change or emerge in participants as they get into residency, inviting further studies to explore those relationships.²⁷ Other confounding factors may come into play when considering a future career direction in medicine such as academic interests, specialty lifestyle, future income, and perceived prestige. More studies are encouraged to evaluate such factors and to assess which personalities succeed in each specialty rather than what personalities best match different specialties. To the best of our knowledge, this is one of the largest studies in the region to study personality traits and specialty preferences.

In conclusion, choosing a medical specialty is a multifaceted process, and personality traits are among many

factors that come into play. Medical students and fresh medical graduates with more extraversion and conscientiousness preferred to be practicing clinicians and were more likely to pursue their career in surgery-oriented specialties. These findings might help in understanding the preferences and perceptions of young doctors towards different specialties and aid in counseling them regarding possible career paths. It is our hope that this research will help higher education governing bodies and medical schools in advocating certain specialties and steering candidates towards specific career choices, thereby correcting the uneven specialty distribution. Personality traits and its correlates can be used by medical educators in orientation sessions and post-graduate programs planning.

Data Sharing Statement

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Ethics Approval

Institutional ethical approval was obtained from the IRB committee at Jordan University Hospital (Approval # 10/2020/7994). This research complies with the tenants of the Declaration of Helsinki. All enrolled participants provided written informed consent.

Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

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No conflict of interest has been declared by the authors.

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