

# Personality Traits Predict a Medical Student Preference to Pursue a Career in Surgery

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## ABSTRACT

**Background:** In this study, we examined the impact of personality traits, assessed with the psychopathic personality inventory revised version (PPI-R), on medical students' likelihood of selecting a surgical specialty. **Methods:** This is a cross-sectional questionnaire-based study of 360 4<sup>th</sup>-year medical students at a single university. We used the PPI-R previously developed to evaluate "adaptive" traits within nonclinical (student) populations. Students were asked to express their specialty of choice. Medical specialties were categorized as surgical and nonsurgical. Logistic regression was used to identify predictors and appropriate adjustments were made for demographic factors. **Results:** The survey was completed by 335 out of 360 students. The prevalence of students aspiring to a surgical career was 23.6%. They exhibited higher PPI-R total score, self-centered impulsivity (SCI) factor score, Machiavellian egocentricity, social influence, and fearlessness content scale scores. Logistic regression showed that SCI score was a significant predictor for the likelihood of expressing interest toward a surgical career. **Discussion:** Our findings expand previous research on the usefulness of the nonclinical use of psychopathic personality traits to investigate career choice.

**Keywords:** Career choice, medical students, personality, psychopathic traits, surgery

## Background

Medical student's selection of a medical specialty is often difficult. For many students, the dilemma is to choose between a surgical and a nonsurgical specialty. Previous studies have shown that several factors influence this decision. Number of working hours, workload, gender, income, personal interest, type of patient interactions, research opportunities, and lifestyle are important factors previously associated with the choice of specialty.<sup>[1-3]</sup> Furthermore, a previous study emphasized the association between personality traits and preferred residency.<sup>[4]</sup> Yet, to date, the body of research does


not fully support the existence of unique psychological characteristics associated with the tendency to choose a surgical residency and additional studies are needed to further investigate this issue.<sup>[5]</sup> A previous report indicates that surgical residents display higher score in specific personality dimensions (conscientiousness, extraversion, and openness)<sup>[4]</sup> and it has been suggested to use personality questionnaires as a tool to identify those who would be most suited to match for a surgical residency.<sup>[6]</sup> This approach is further supported by the fact that many students decide between a surgical and nonsurgical specialty even before medical school<sup>[7]</sup> indicating a possible role for personality traits in making this decision.

A number of researchers have highlighted the importance of understanding "adaptive" psychopathic personality features within the general population<sup>[8]</sup> and within occupational settings.<sup>[9]</sup> Yet, the unique contribution of

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**How to cite this article:** Anna Muscatello MR, Bruno A, Genovese G, Gallo G, Zoccali RA, Battaglia F. Personality traits predict a medical student preference to pursue a career in surgery. *Educ Health* 2017;30:211-4.

Access this article online	
<b>Quick Response Code:</b> 	<b>Website:</b> <a href="http://www.educationforhealth.net">www.educationforhealth.net</a>
	<b>DOI:</b> 10.4103/efh.EfH_282_16

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particular psychopathological traits in career choice is still to be investigated. Classically, in criminal and forensic psychiatry, the psychopathological personality traits have been considered maladaptive. On the contrary, some traits such as fearlessness and immunity to anxiety have been associated with success in everyday life, business, and politics.<sup>[10]</sup> This is further supported by a significant literature linking psychopathological traits to remarkable achievements in high-risk, stressful careers requiring above average communication skills, decision-making ability, and creativity.<sup>[9]</sup> Furthermore, specific personality traits such as charisma, emotional resilience, comfort with threatening stimuli, and immunity to stress classically fit with the stereotypical surgical personality and might predispose medical students to select their career specialty. Thus, rather than a leadership questionnaire, a psychopathic personality scale could be a valid instrument to assess and evaluate specific personality characteristics that have been linked to successful leadership in “tough” careers. To the best of our knowledge, there have been no investigations that linked specific personality traits assessed with a psychopathic personality scale to medical student’s willingness to pursue a surgical specialty. In light of the previous literature, we hypothesized that traits included in the psychopathic personality inventory revised version (PPI-R) might be valid indicators of medical student’s career choice.

## Methods

This cross-sectional study was performed with a convenient sample on medical students at the University of Messina, Italy. Data were collected from 4<sup>th</sup>-year medical students. A total of 360 medical students were surveyed from January 2015 to April 2016. Students were informed about the scope of the survey through e-mails and advertisements posted in the campus. At the end of a lecture, the survey was handed to the students in hardcopy. After additional information about the purpose and content of the survey, the students willing to participate were asked to read carefully a statement of consent. The survey was anonymous, all questionnaires were de-identified, and the respondents were asked to seal the questionnaire in an envelope to ensure confidentiality. The study was approved by the Institutional Review Board of the University of the University of Messina.

The survey included basic demographic (age and gender), grade point average (GPA, ranging from 18 to 30 in Italian medical schools), and students’ intention to pursue a surgical residency (yes/no). Psychopathic personality traits were assessed with the PPI-R.<sup>[11]</sup> This self-report questionnaire focuses on psychopathic personality traits and behaviors and was developed for use with noncriminal samples. It measures psychopathic personality traits on a 4-point Likert scale ranging from 1 (not true) to 4 (true). This instrument consists of 154 items and produces a total score, eight content

scores: Machiavellian egocentricity [ME], social influence (SOI), coldheartedness, carefree nonplanfulness, fearlessness, blame externalization, rebellious nonconformity, and stress immunity, three factor scores and four validity scores to detect aberrant responding (virtuous responding, deviant responding and two inconsistent responding scales). The eight subscales can be organized into the three factors: (1) fearless dominance (FD) consisting of the subscales “fearlessness,” “stress immunity,” and “social potency;” (2) self-centered impulsivity (SCI), consisting of the subscales “impulsive nonconformity,” “blame externalization,” “Machiavellian egocentricity,” and “carefree nonplanfulness;” (3) coldheartedness, a standalone factor. FD assesses the affective–interpersonal traits; SCI assesses behavioral–lifestyle traits.<sup>[12]</sup> The psychometric properties of the PPI-R have been examined in noncriminal samples (community and college students) and showed reliability and internal consistency with an alpha coefficient ranging from 0.78 to 0.9.<sup>[12-14]</sup> The Italian translation of the scale was previously validated.<sup>[15]</sup>

## Statistical analyses

Data analyses were performed with SPSS Statistics for Windows Version 22.0 (IBM Corporation, Armonk, NY, USA). An alpha of 0.05 was used to test for statistical significance. We first ascertained the prevalence preferred medical specialty. Beyond descriptive statistics, Chi-square tests ( $\chi^2$ ) and ANOVAs were used to test for relationships between discrete variables. Furthermore, binary logistic regression analyses were applied to study associations between demographic variables, PPI-R scores, and career choice.

## Results

The response rate was 93% (335 responders out of 360 students). The overall mean age of respondents was  $24.3 \pm 2.1$  (standard deviation [SD]) years; 47.1% were female and the mean GPA was  $26.6 \pm 1.8$  (SD). 23.6% indicated their preference for a surgical career. Of the 79 students who expressed preference toward surgery, 46 were male ( $\chi^2(1) = 5.01, P = 0.02$ ). No difference in age and GPA was found in relation with selected medical specialties as their preferred career choice ( $P > 0.05$ ). Mean scores for the PPI-R are reported in Table 1. Students who expressed a preference toward a surgical specialty exhibited higher PPI-R total score, SCI factor score ME, SOI, and F content scale score. A logistic regression was performed to ascertain the effects of age, gender, GPA, and psychopathic personality factors on the likelihood that participants express preference for a surgical residency. Collinearity diagnostics excluded that the predictor variables are highly correlated. A test of the full model against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguished between students willing to pursue a surgical or nonsurgical specialty ( $\chi^2(6) = 20.8, P < 0.002$ ). The model

explained 9.1% (Nagelkerke R2) of the variance in preference for surgical specialty and correctly classified 75.5% of cases. The Wald criterion demonstrated that only DPP score made a significant contribution to prediction ( $P = 0.002$ ). EXP (B) value indicates that when SCI score is raised by one unit the odds ratio is 1.026 as large and therefore students are one more time likely to exhibit preference for a surgical specialty [Table 2].

## Discussion

In this study, we investigated personality traits in a cohort of medical students that were asked to express their preference for the medical specialty. Students who expressed preference toward a surgical career path exhibited higher cut in the PPI-R total score, SCI factor score and ME, SOI, and F content scale scores.

It is noteworthy to state that the PPI-R is intended to investigate psychopathy as traits that everyone possesses to a different extend. Thus, there is no PPI-R cutoff that

identifies psychopaths.<sup>[11]</sup> Consequently, our results are not to be considered “pathological” or indicative of abnormal functioning but rather highlight the fact that certain personality traits assessed with psychopathic scales predispose students to select career paths classically considered competitive, stressful, and very demanding. In the current study, we found evidence of elevated levels of both PPI-R total score and specific content scale scores that fit well with a “surgical,” career-oriented personality.<sup>[6]</sup> SCI and ME are associated to charm and interpersonal skills that might fit with a personality focused of achieving higher rank and reward.<sup>[16]</sup> This is consistent with a previous study that positively linked higher ME score to leadership level and career satisfaction.<sup>[17]</sup> Students who preferred a surgical career showed higher SOI and fearless (F) content scale score. These scales are thought to reflect perceived ability to lead others, absence of anticipatory anxiety concerning harm, and a willingness to participate in risky activity. Our results are in keeping with previous work that linked these personality traits to boldness and risk-taking job.<sup>[18]</sup> A career in surgery is stressful and stereotypically surgeons can be perceived as highly motivated professional who are concentrated on saving patients. The high SCI, SOI, and F scores might be adaptive personality traits lending a competitive edge, confidence, ambition and consequently, resolution to follow a “tougher” career path. In a profession that requires making daily challenging life-or-death decisions, these traits might be essential in the provision of high quality care. Our results are in keeping with previous works that explored the psychological profile of aspiring surgeons. Prospective surgeons are more career oriented, consider financial reward very important<sup>[19]</sup> and are willing to devote most of their time to their work.<sup>[20]</sup> In addition, students planning to enter surgical specialties have been shown to be extroverted, egocentric, and able to handle emotional situations without much stress.<sup>[21,22]</sup> Thus, the findings of the current and other studies provide evidence for the existence of “positive” psychopathic personality traits that might contribute people’s life choice toward highly demanding, stressful, and socially useful careers.

**Table 1: Descriptive characteristics of the psychopathic personality inventory-revised total score, factor scores and content scale scores between students that want to pursue a surgical or nonsurgical specialty**

Scale	Surgery		Non-surgical specialty		P
	Mean	SE	Mean	SE	
PPI-R total	293.3	3.6	278.1	1.7	<0.001**
FD factor	142.2	2.5	137.2	1.1	0.52
SCI factor	118.2	2	10.5	0.9	<0.001**
C factor	33.1	0.6	31.7	0.3	0.09
ME content scale score	48.8	1	39.9	0.5	0.008**
RN content scale score	39.9	0.8	33	0.4	0.3
BE content scale score	31.5	0.8	31.4	0.4	0.8
CN content scale score	33.7	0.7	32.7	0.3	0.2
SOI content scale score	49	1.1	46.5	0.5	0.03*
F content scale	36.3	0.9	32.7	0.4	<0.001**

\* $P < 0.05$ , \*\* $P < 0.01$ . PPI-R=Psychopathic personality inventory-revised, SCI=Self-centered impulsivity, FD=Fearless dominance, BE=Blame Externalization, C=Coldheartedness, CN=Carefree nonplanfulness, F=Fearlessness, ME=Machiavellian egocentricity, RN=Rebellious nonconformity, SOI=Social influence, STI=Stress immunity, SE=Standard error

**Table 2: Association between the psychopathic personality inventory-revised scores and the preference to pursue a surgical specialty**

Predictors	B	SE	Wald	df	Significance	Exp(B)	95% CI for EXP(B)	
							Lower	Upper
Age	0.142	0.105	1.812	1.000	0.178	0.868	0.706	1.067
Gender (1)	0.260	0.287	0.822	1.000	0.365	0.771	0.440	1.353
GPA	0.004	0.076	0.003	1.000	0.959	0.996	0.858	1.156
FD factor	0.007	0.007	1.176	1.000	0.278	1.007	0.994	1.021
SCI factor	0.026	0.008	9.605	1.000	0.001**	1.026	1.009	1.043
C factor	0.018	0.023	0.643	1.000	0.423	1.018	0.974	1.065
Constant	2.097	4.024	0.272	1.000	0.602	0.123		

\*\* $P < 0.01$ . SCI=Self-centered impulsivity, FD=Fearless dominance, C=Coldheartedness, GPA=Grade point average, SE=Standard error, CI=Confidence interval

We acknowledge few limitations. First, the sample was drawn from a single medical school. In addition, the cross-sectional design does not allow conclusions with respect to causality and self-reported measures have the potential to result in inaccurate reporting. Although the results are notable, a replication of this study is necessary before one can generalize the findings and longitudinal studies should be encouraged to identify causal models. In spite of aforementioned limitations, there are noteworthy strengths to this study. This research was the first study known to assess psychopathic traits as a predictor of specialty choice in a nonclinical sample of medical students. In addition, the sample size was large enough to detect differences.

In conclusion, some medical specialties seem to attract doctors with specific personality patterns. We believe that our study adds some new knowledge concerning the mechanisms of medical specialty choice. Several studies predict a future shortage of surgeons.<sup>[23]</sup> Thus, the study of personality traits could be used as a tool to identify students more likely to devote themselves to surgery. Furthermore, there is a need to develop abbreviated versions of psychopathy measures specific for a medical student population that can be more easily applied to test the idea that students with such nonpathologic traits may be drawn to specialties wherein they could successfully express their personalities.

### Acknowledgments

We thank the students who participated in this study.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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