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# Ability of prospective assessment of personality profiles to predict the practice specialty of medical students

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Medical practice encompasses a diverse spectrum of specialties. Factors that impact selection of clinical disciplines by young physicians may have recently evolved associated with changes in medical school demographics. We assessed whether physicians gravitate to certain practice specialties due to preexisting personality traits. The Neuroticism-Extraversion-Openness Personality Inventory Revised Test was administered prospectively to 130 first-year students the week before they began medical school. Scores for five traits (neuroticism, extraversion, openness, agreeableness, conscientiousness) were compared with the selection among nine medical residencies at the conclusion of medical school. Personality scores for medical students selecting psychiatry residencies showed greater degrees of neuroticism ( $P < 0.01$ ) and openness ( $P < 0.03$ ). Students electing family practice also deviated from other specialties, showing a lower degree of neuroticism ( $P < 0.03$ ). Unexpectedly, personality traits in prospective surgical residents did not differ from those of students choosing nonsurgical residencies. Personality profiles present before medical school appear to predict the selection of some residencies and clinical specialties but not others.

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**M**edicine is a heterogeneous profession in which a variety of clinical specialties are associated with differences in clinical environment, physician responsibility, and patient exposure (1–6). It perhaps follows intuitively that physicians practicing in certain disciplines may also share distinctive personality characteristics that differ from those demonstrated by their colleagues in other specialties. Indeed, previous studies have reported that personality profiles identifiable at entry to or during medical school may be predictive of, or associated with, the specialty ultimately selected by students (7–19). These observations have also promoted the notion that disciplines within the medical profession attract specific personality traits, which in turn are determinants of career choices.

However, in the 10 to 15 years that followed the publication of such data, the methodologies and measures available to assess personality have evolved. In addition, the demographics of medical students have changed considerably. For example, the number of women in medical school has greatly increased, and women now comprise approximately 50% of most classes. Financial demands, and incurred debt with the rising cost of

medical education, may also ultimately dictate specialty choice. Further, students' perceptions of the lifestyle related to various medical specialties have changed, given their diverse urban and rural backgrounds, the changing public imagery of medicine, and the growing complexity of medical practice. Prior studies have suggested that variables as diverse as student academic standing and achievement in medical school, religious preference, family medical traditions, medical school curriculum, strong faculty mentors, and lifestyle considerations may play important roles in determining the choice of specialty. Many of these factors may have altered the landscape sufficiently to make personality factors less important in the selection of a medical specialty.

Therefore, it is of potential value to reexamine these issues to assess in a prospective fashion the relationship between the personality characteristics present just before medical studies begin and the type of residency program selected by these same students at the conclusion of medical school.

## METHODS

### Selection of study subjects

The test subjects comprised the entering first-year medical school class of Tulane University School of Medicine (New Orleans, Louisiana) in August 1999. The medical school assembles a diverse student body with respect to personality, experiences, and geographic origin, although a large proportion of students come from southeastern states. The Neuroticism-Extraversion-Openness Personality Inventory Revised Test (NEO PI-R) (20) was administered to 146 (96%) of the 152 medical students. Of these 146 students, 9 were not included in the analysis due to class attrition (e.g., school transfer or delayed graduation). For the remaining 137 students, medical specialty selection was obtained from the National Residency Matching Program as published by Tulane University (*Table 1*). For purposes of statistical power, only specialties chosen by  $\geq 7$  students were

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**Table 1. Medical residencies selected by fourth-year students**

Specialty	n	Men:Women
Internal medicine	30	15:15
Surgery*	24	16:8
Pediatrics	15	4:11
Radiology	14	11:3
Anesthesiology	12	10:2
Family medicine	12	8:4
Psychiatry	9	4:5
Emergency medicine	7	5:2
Obstetrics-gynecology	7	1:6

\*In addition to general surgery (n = 10), includes neurosurgery (n = 1), orthopedics (n = 6), otolaryngology (n = 4), ophthalmology (n = 2), and urology (n = 1).

included in the analysis (excluding 7 other students). Therefore, the final study group comprised 130 students (74 men, 56 women), distributed among 9 medical specialties. The project was approved by the institutional review board of Tulane University School of Medicine.

### Testing procedure

The test was administered during a single session as part of the student orientation activities and was supervised by the principal investigator (B.A.M.). Personalized identification numbers were used to protect anonymity and maintain test result confidentiality. Participants were debriefed regarding the implications and limitations of the personality inventory and were provided full disclosure of their test results.

About 4 years after administration of the personality test, the residency specialty selection of each participant was obtained. Based on the residency matching results, participants were assigned to one medical specialty category. In some cases, specialty categories with small numbers were combined; for example, subjects who chose the surgical subspecialties of neurosurgery, orthopedics, otolaryngology, ophthalmology, or urology were analyzed together with general surgery. For residencies in neurology (n = 1), dermatology (n = 1), combined psychiatry and medicine (n = 1), and physical medicine and rehabilitation (n = 2), students were included for analysis in the internal medicine category.

### Test inventory

The NEO PI-R form S English version test was used in this study (20). This personality test has been widely used in cardiovascular medicine and has been shown to have high reliability (21). The test is designed for adult subjects and requires approximately 1 hour for completion. It consists of 240 questions that assess general personality type, as characterized by five major domains: neuroticism, extraversion, openness, agreeableness, and conscientiousness (NEOAC) (Table 2). A domain is defined as one of these five personality traits, which taken together form the common thread of an individual's personality type. Internal consistency for each of the five domains—i.e., the

**Table 2. Definition of personality traits analyzed in relation to medical specialty**

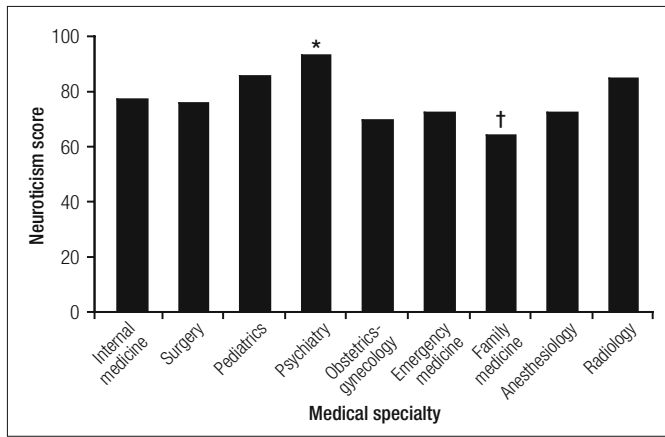
Personality domain	Definition	Facets
Neuroticism	General tendency to experience negative affects (e.g., fear, embarrassment, anger) in response to stress	Anxiety Angry hostility Depression Self-consciousness Impulsiveness Vulnerability
Extraversion	General sociability with a cheerful disposition and strong interest in enterprising occupations	Warmth Gregariousness Assertiveness Activity Excitement-seeking Positive emotions
Openness	General attentiveness to inner feelings, intellectual curiosity, and independence of judgment	Fantasy Aesthetics Feelings Actions Ideas Values
Agreeableness	A measure of interpersonal tendencies, assessing how an individual values different aspects of a relationship	Trust Straightforwardness Altruism Compliance Modesty Tender-mindedness
Conscientiousness	Management of impulses and desires with predisposed investment in planning, organizing, and carrying out tasks	Competence Order Dutifulness Achievement striving Self-discipline Deliberation

degree to which different questions for a given domain measure the same construct—is 0.86 to 0.957. Retest reliability for the domains—i.e., the extent to which individuals approximate the same scores on two different occasions—is 0.86 to 0.917. Each of these domains is, in turn, composed of several specific inter-correlated traits, termed facets. A cluster of six specific personality facets comprises a personality domain (internal consistency = 0.56 to 0.81; retest reliability = 0.66 to 0.92).

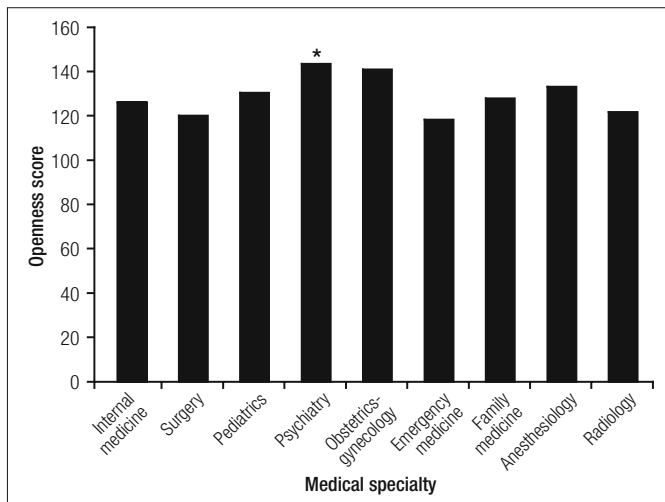
Administration of the test and scoring were conducted in compliance with the inventory guidelines outlined in the NEO PI-R instructions. There are eight questions per facet, and answers to questions fall along a scale between “strongly agree” and “strongly disagree.” Respondent answers are awarded a numerical value, and these are summed, resulting in an overall facet score. Facet scores are, in turn, summed to obtain a given domain score.

### Statistical analysis

To assess whether patterns of scores across the five personality trait domains (NEOAC) differed as a function of medical specialty, analysis of variance (ANOVA) was performed with the medical specialty representing the intersubject factor and scores on each of the five NEOAC categories representing the intrasubject factor. Also, one-way ANOVAs were conducted



**Figure 1.** Relationship between the nine medical specialties chosen by fourth-year students and their neuroticism personality score. \* $P < 0.01$ ; † $P < 0.03$ .



**Figure 2.** Relationship between the nine medical specialties chosen by fourth-year students and their openness personality score. \* $P < 0.03$ .

on specific personality dimensions, with the medical specialty the intersubject factor.

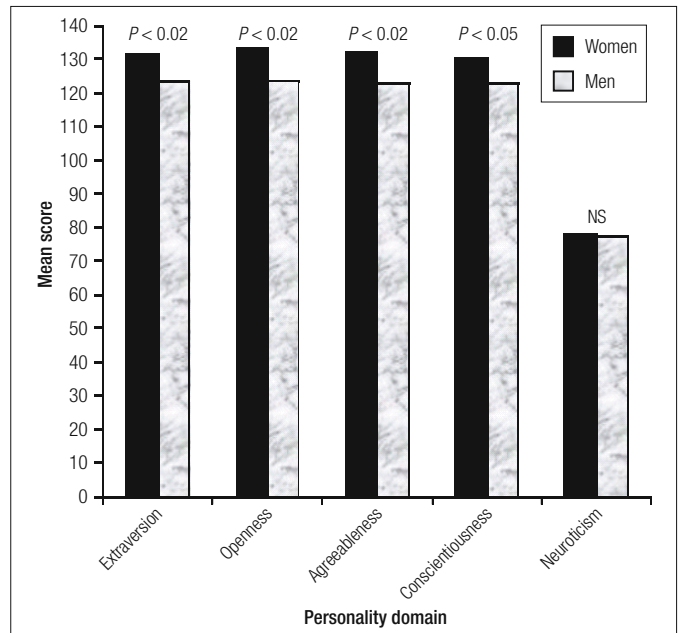
## RESULTS

### Group analysis

A mixed-model ANOVA showed a statistically significant overall relationship between the scores on the five personality trait domains and the nine medical specialties selected by students through the National Residency Matching Program ( $P = 0.02$ ). Therefore, the distribution of the specialties selected by medical students was not random and deviated as a function of personality profile.

### Individual medical specialty analysis

**Psychiatry.** The specialty that deviated most with respect to overall pattern of NEOAC personality scores from the other medical disciplines analyzed was psychiatry ( $P < 0.01$ ). Specifically, compared with other students, those choosing psychiatry showed significantly higher neuroticism ( $P < 0.01$ ) (Figure 1) and openness ( $P < 0.03$ ) (Figure 2). In addition, psychiatry students scored lower on extraversion than did those choosing other specialties, although this difference did not achieve statistical



**Figure 3.** Relationship between mean personality score and gender with respect to the five personality domains.

significance ( $P = 0.1$ ). There were no discernable differences between students specializing in psychiatry and other disciplines with regard to agreeableness and conscientiousness ( $P > 0.05$ ).

**Family practice.** Students choosing family practice deviated from those selecting other medical specialties on overall NEOAC personality scores (ANOVA  $P = 0.05$ ). In addition, compared with others, family medicine students scored particularly low in neuroticism ( $P < 0.03$ ) (Figure 1). Students choosing family practice scored higher in agreeableness and conscientiousness than did those selecting other specialties, although these differences did not achieve statistical significance ( $P = 0.1$ ).

**Other specialties.** None of the remaining seven clinical specialties demonstrated an overall personality profile that deviated significantly from the others. However, scores on certain specific personality traits did differ among the medical specialties. For example, students selecting internal medicine scored higher in agreeableness than did those selecting other specialties ( $P = 0.05$ ). Students in surgery scored lower in openness compared with those in other specialties, although this analysis only achieved borderline significance ( $P = 0.06$ ). There were no statistically significant differences with regard to personality traits between students selecting internal medicine and those selecting surgery.

In addition, students specializing in anesthesiology scored lower in conscientiousness than did other subjects ( $P = 0.01$ ), and those selecting radiology scored lower in agreeableness, although only with borderline significance ( $P = 0.06$ ).

### Gender

Significant differences by gender emerged for four of the five personality domains. Women scored higher than men, independent of specialty, in extraversion ( $P < 0.02$ ), openness ( $P < 0.02$ ), agreeableness ( $P < 0.02$ ), and conscientiousness ( $P < 0.05$ ) (Figure 3). There were no gender differences with regard to neuroticism.

## DISCUSSION

The selection of a medical specialty is a profound decision that defines the professional career of a physician. However, the practice of medicine is extraordinarily diverse, including disciplines and lifestyles as varied as surgery, pediatrics, family practice, and radiology. Indeed, the spectrum of medical specialties available to medical students likely draws upon different attributes, motivations, and personality traits (7–18, 22–33).

In this study, we found evidence that certain personality traits, present even at the early juncture of exposure to medicine, were in fact associated with the ultimate decision to elect specialization in family practice and psychiatry. The personality traits associated with psychiatry and family practice intuitively correspond to results of prior reports and the perceptions and stereotypes traditionally attributed to practicing physicians in those specialties (7–9, 11, 34). However, it is also noteworthy that our data do not appear to support assumptions regarding the personality types associated with other medical specialties such as surgery (12, 31–33). For example, Zeldow and Daugherty (7–9) conducted a comprehensive analysis of the relationship between personality and medical specialty choice in the early 1990s and found significant linkage between a distinctive psychological profile and the selection of a surgical residency. Certainly, those data are consistent with the general stereotypical profile that persists among the general public and health care professionals—i.e., that the special requirements of surgery dictate a highly dominant and aggressive personality, low in inhibition (12, 31–33). Also, given the methodical and detail-oriented nature of surgical practice, we expected students choosing that residency to deviate from others in personality dimensions such as conscientiousness and perhaps extraversion. Nevertheless, despite our original intuition and the prevalent stereotypes, we found that prospective surgical residents entered medical school with personality profiles that were indistinguishable from the remainder of their class. These data suggest that personality profile is only one variable playing a role in specialty residency choices and that these decisions may ultimately be shaped by a myriad of other factors, either in the background of the students (such as temperament and character) or the experiences or events occurring during medical school (7, 18).

We found that the basic personality traits of women students differed distinctly from those of men at the onset of medical school (32). Their attributes of greater extraversion, openness, agreeableness, and conscientiousness are generally regarded as consistent with good medical practice. However, the present study sample was not of sufficient size to permit analysis of personality determinants of residency selection specifically with respect to gender. Even in those specialties dominated by women such as obstetrics-gynecology and pediatrics, female personality traits were not statistically significant determinants of medical specialty selection.

In the study design, we did not conduct intermediate personality assessments during the 4 years of medical school, in contrast to prior studies of students at Rush Medical School (9). However, the present study was not designed to assess the impact of medical education itself on personality dynamics.

Rather, we prospectively chose a strategy focused only on the extent to which basic personality traits evident *prior* to medical school influenced future choices in medicine.

Our findings raise the question of whether prospectively ascertained personality profiles could be of any practical value in medical student selection or career counseling. For example, personality profiles could possibly be of value in manpower planning by identifying students predisposed to enter certain specialties, such as family practice and psychiatry. When shortages exist in specific medical specialties, personality-based methodologies could influence the demographics of medical practice. Whether such considerations would prove to be practical, or even desirable, is presently unresolved.

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