

Personality Profiles of Incoming Male and Female Medical Students: Results of a Multi-Site 9-Year Study

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Abstract:

Purpose: This study conveys findings of a 9-year multi-site study of personality traits among incoming medical students. The purpose of the study was twofold. First, it assessed gender differences by exploring personality traits of incoming male and female medical students. Second, it sought to illuminate personality factors associated with those who choose a career in medicine by comparing personality characteristics of medical students to those of the general population. **Methods:** The Sixteen Personality Factor Questionnaire (16PF) was administered at four medical schools to two thousand one hundred seventy seven first-year medical students (1021 females; 1156 males). **Results:** Study findings revealed significant personality differences between male and female medical students on 11 of 16 personality factors as well as substantial differences in personality functioning between medical students and the general population. Findings are described and future directions for analyses are presented.

Keywords: gender, medical students, personality

This paper presents the reporting of first-phase study analyses of incoming male and female medical students' personality traits, compared to one another and with regard to the general population, as measured by the Sixteen Personality Factor Questionnaire (16PF) 5th Edition.¹ The data are aggregate data of a multisite project involving collaboration among four US medical schools for more than nine years. Although previous studies of personality differences of male and female medical students have been conducted, typical samples have represented only one medical school, making it difficult to generalize findings.^{2,3} Additionally, many earlier studies are becoming dated and/or employ measures no longer in widespread use.^{4,5} The current study sought to test the hypothesis that relevant personality differences exist between male and female medical students. Secondly, it sought to explore how personality factors associated with individuals who choose a career in medicine differ as compared to the general population (i.e., the normative sample). Comparison studies using norm groups have been carried out for non-medical professions (Bartram, 1992).⁶

Method

Sample - Two thousand one hundred seventy seven first-year medical students (1021 females and 1156 males) at four medical schools completed the 16PF between 1995 and 2003.

Procedure - Medical students were invited to participate in the study during new student orientation or during the first semester of medical school. Administration of the 16PF was standardized across sites. At all schools, the purpose of the study was explained as part of obtaining informed consent in accordance with Institutional Review Board (IRB) approval and procedures. Each medical school received approval from their respective IRBs.

Instrument - The 16PF measures the primary components of personality.⁷ It has been described as an instrument that assesses adult personality in terms of rea-

Table 1 16PF Mean Raw Scores for Personality Factors in Male and Female Medical Students (N=2177)

Personality Factor	Male		Female		F	p-value
	M	SD	M	SD		
1. Warmth	13.29	4.19	15.84	3.78	219.95**	.000
2. Reasoning	12.91	1.71	12.82	1.76	1.46	.228
3. Emotional Stability	15.42	4.19	14.38	4.90	31.11**	.000
4. Dominance	13.37	3.90	12.35	4.34	33.49**	.000
5. Liveliness	13.70	4.28	13.41	4.44	2.55	.111
6. Rule-Consciousness	13.26	5.04	14.23	4.68	21.55**	.000
7. Social Boldness	11.16	6.19	11.34	6.59	.40	.526
8. Sensitivity	8.47	4.76	14.57	4.66	908.96**	.000
9. Vigilance	11.77	3.99	10.93	4.10	23.14**	.000
10. Abstractedness	8.61	5.44	7.28	5.14	33.93**	.000
11. Privatness	10.94	5.20	9.75	5.57	26.30**	.000
12. Apprehension	11.33	5.15	13.87	4.84	139.55**	.000
13. Openness to Change	18.89	5.26	19.21	5.35	1.95	.163
14. Self-Reliance	7.78	4.76	7.23	4.77	7.17*	.007
15. Perfectionism	11.19	4.96	12.47	4.99	36.06**	.000
16. Tension	9.83	4.91	10.86	4.84	24.51**	.000

*p < .01, **p < .001

sonably independent and essentially normal categories or “factors” and that can be used in a variety of settings to measure life behaviors.⁸ The 16PF 5th Edition is a self-administered questionnaire containing 185 multiple choice items that measure 16 bipolar factors.⁷ Warmth, Reasoning, Emotional Stability, Dominance, Liveliness, Rule Consciousness, Social Boldness, Sensitivity, Vigilance, Abstractedness, Privatness, Apprehension, Openness to Change, Self-Reliance, Perfectionism, and Tension comprise the primary factors. The 16PF has a fifth-grade reading level.⁷ Its normative sample (N=2,500) ranged in age from 15-92 years and in education from ranging 7-25 years of schooling. Internal consistency estimates

for the 16PF range from .64-.85 with an average of .74. Test-retest reliability estimates have been reported to be approximately .80 for a 2-week interval and .70 for a 2-month interval.⁸

Results

For purposes of hypothesis testing and to control for experiment-wise error, a multivariate analysis of variance (MANOVA) was used to determine if significant gender differences existed for medical students on personality traits as measured by the 16PF. Results of the MANOVA (see Table 1) revealed significant differences by gender

Table 2 16PF Mean Raw Score Differences Comparing Female Medical Students (n = 1021) with 16PF Normative Sample for Females (n = 1255)

Personality Factor	Norm Group		Students		t
	M	SD	M	SD	
1. Warmth	15.67	4.28	15.84	3.78	1.44
2. Reasoning	9.31	3.27	12.82	1.76	63.82**
3. Emotional Stability	12.81	5.30	14.38	4.90	28.55**
4. Dominance	12.40	4.42	12.35	4.34	-0.37
5. Liveliness	12.13	5.06	13.41	4.44	9.22**
6. Rule-Consciousness	13.69	5.15	14.23	4.68	3.68**
7. Social Boldness	10.65	6.37	11.34	6.59	3.34**
8. Sensitivity	15.64	4.13	14.57	4.66	-7.34**
9. Vigilance	10.72	4.78	10.93	4.10	1.75
10. Abstractedness	7.78	5.26	7.28	5.14	3.13*
11. Privatness	10.67	5.11	9.75	5.57	-5.28**
12. Apprehension	12.79	5.30	13.87	4.84	7.13**
13. Openness to Change	17.13	5.50	19.21	5.35	12.43**
14. Self-Reliance	8.02	5.20	7.23	4.77	-5.29**
15. Perfectionism	11.91	4.88	12.47	4.99	3.59**
16. Tension	11.34	5.08	10.86	4.84	-3.17*

*p < .05, **p < .003

Table 3 16PF Mean Raw Score Differences Comparing Male Medical Students (n = 1156) with 16PF Normative Sample for Males (n = 1245)

Personality Factor	Norm Group		Students		t
	M	SD	M	SD	
1. Warmth	12.83	4.53	13.29	4.19	3.74**
2. Reasoning	8.94	3.56	12.91	1.71	79.40**
3. Emotional Stability	13.69	5.10	15.42	4.19	14.06**
4. Dominance	13.60	3.86	13.37	3.90	-2.00*
5. Liveliness	11.54	4.67	13.70	4.28	17.14**
6. Rule-Consciousness	13.57	5.23	13.26	5.04	2.09*
7. Social Boldness	10.79	6.06	11.16	6.19	2.06*
8. Sensitivity	8.91	4.69	8.47	4.76	-3.14*
9. Vigilance	11.50	4.63	11.77	3.99	2.30*
10. Abstractedness	8.57	5.24	8.61	5.44	0.25
11. Privatness	12.22	4.66	10.94	5.20	-8.37**
12. Apprehension	10.03	5.30	11.33	5.15	8.67**
13. Openness to Change	16.32	5.12	18.89	5.26	2.41*
14. Self-Reliance	8.74	5.33	7.78	4.76	-6.86**
15. Perfectionism	11.80	4.78	11.19	4.96	-4.18**
16. Tension	10.80	5.17	9.83	4.91	-6.73**

* $p < .05$, ** $p < .003$

($p < .01$) for 12 of 16 factors. The significance level was adjusted to $p < .001$ using the Bonferroni procedure to control for family-wise error because multiple comparisons were made. Results supported that gender differences were measured for 11 of 16 personality factors.

Additional analyses using t -tests ($p < .05$) were conducted to compare mean scores by gender for medical students with scores of the general population (i.e., the normative sample) to determine differences in personality. T -tests were used because only means and standard deviations for 16PF factors, rather than the raw-score norm data, for the general population were available. The testing company that publishes the 16PF does not provide the raw norm data. Results indicated that medical students indeed presented with quite different personality traits than the general population (see Table 2 & 3). The significance level was adjusted to $p < .003$ using the Bonferroni procedure to control for family-wise error because multiple comparisons were made. Results supported the conclusion that personality differences existed between medical school students and the general population on 9 of 16 factors for men and 11 of 16 factors for women.

Discussion

Who are today's entering women and men medical students? - Results of the primary study analyses revealed distinct personality differences between male and female medical students. Female medical students tested as being more warm and outgoing (Warmth), more dutiful (Rule-Consciousness), more sensitive (Sensitivity), more self-doubting and worried (Apprehension), more

organized and self-disciplined (Perfectionism), and more tense and driven (Tension) than their male counterparts. On the other hand, male medical students appear to be more adaptive and mature (Emotional Stability), more forceful and assertive (Dominance), more suspicious and skeptical (Vigilance), more imaginative and idea-oriented (Abstractedness), more private and discreet (Privatness) than female medical students.

These descriptions rely on statistically significant differences. The strength of the relationship determined by calculating the effect size (difference between males' scores and females' scores on a given factor divided by the standard deviation of the factor scores) varies from smaller than typical to larger than typical in our study. We are recommending that caution be used in interpreting the practical and clinical significance of these findings. As suggested by Morgan, Leech, Gloeckner, & Barrett, "what constitutes a large or important effect depends on the specific area studied, the context, and the methods used." (p. 91).⁹ While respecting this caution, observed large effect sizes for Warmth and Apprehension and the moderate effect size for Sensitivity may indeed point toward distinctions between medical students in this study, revealing important information regarding personality dynamics.

The women - There are limitations to group data (i.e., data may fail to describe any one individual). This understood, women medical students who participated in this study clearly evidenced more interpersonal warmth and sensitivity than their male medical student peers. They may also be experienced as being more

humble. Entering female medical students may also be prone to more self-pressure and/or harbor doubts as to whether they will attain their personal goals or have the wherewithal to do so.

Findings suggested that women in the study may also be more affected by feeling states and/or vulnerable to stress than their male peers. It is imperative to recognize, however, that this is a relative statement - such hypotheses position entering female students in direct comparison with their male student peers as opposed to the general population. Our entering men and women students both revealed themselves (psychometrically) as being far more resilient and emotionally stalwart when compared to general population norms.

The men - Apart from demonstrating less warmth and sensitivity than female student peers, our entering males presented themselves as being quite self-assured and poised. However, while their female peers may, at times, err in being too hard on themselves, men in the study may sometimes over-estimate their abilities. They may also be less rule-bound than the participating women and more critical, even skeptical, in their analyses of situations and circumstances. Quite assertive, competitive, and potentially perceived as sometimes stubborn, in comparison to female peers, the men showed a propensity for preferring the facts of a situation. Nonetheless, males in this study evidenced high creativity and the ability to engage in innovative thinking.

How do our students differ from “regular” folks (i.e., the general U.S. population)? - Distinctions between the female medical students and male medical students, with regard to norm group data composites, can also be described. A number of differences in personality style and functioning are evidenced when comparing our student sample with the general population normative sample of the 16 PF, 5th Ed. (see Table 2 & 3; Conn & Rieke, 1994).¹⁰ It should be underscored that these findings are not simply an artifact of large study sample size, as our sample size approximates that of the normative sample (n = 2177 vs. n= 2500). Indeed, a recent study conducted in the United Kingdom also established important personality differences between medical providers and the general public which they serve.¹¹ Clack et al¹⁰ felt their findings present implications for the quality and efficacy of the communication and consultation process between doctor and patient. We concur and propose that our findings reveal like issues, concerns, and training implications for medical education.

Our research demonstrates that both male and female students presented as being significantly livelier (Liveliness), more adaptive (Emotional Stability), more abstract (Reasoning), more self-doubting (Apprehensive), more disclosing (Privateness), and more group oriented (Self-Reliance) than males and females of the general U.S. population. Male students, as compared to males in the general population, were also less perfectionistic (Perfectionism). Female students, however, tested as being more perfectionistic than general population females. Male students presented as being significantly more attentive to others (Warmth) and with greater patience (Tension) than general population males. Female students appeared to be less timid (Social Boldness) and less sensitive but more rule-conscious (Rule Consciousness) and open to change (Openness to Change) than general population females.

Based on the student normative sample generated by our study, males and females entering the field of medicine appear to have distinct personality differences as compared to the general population. Whether such observed differences are based upon medical school selection of students with such traits and temperaments requires further exploration.

Implications - Demographics in medicine are changing. Although men continue to make up the majority of physicians, increasing numbers of women are entering medical school.¹² In 1969-70, slightly more than 8.4% of U.S. medical school graduates were women; in 1979-80, it was 23%; in 1989-90, it was 34%.¹³ The U.S. medical schools' “class of 2006” was 48.6% women.¹⁴ The findings of this study are particularly pertinent in the context of a November 2003 press release by the Association of American Medical Colleges (AAMC) that announced “for the first time ever” women made up the majority of medical school applicants.¹⁵

This trend is likely to continue; given that there are distinct differences between men and women who choose medicine as a career, medical admissions committees should consider potential implications and impacts such differences may exert during the interview and selection process. As example, how might female applicants (who present as more outgoing and attentive) likely be perceived by interviewers, as compared to males who present with less demonstrative traits? What about males who present as more assertive compared to female applicants? What about a female's heightened sense of worry or self-doubt or, for males, their likelihood of being more private and discreet in their presentation?

The current study's findings of differences between men and women who enter medicine may also have implications for curriculum, teaching, and assessment. If

male and female students vary significantly in important source traits which establish personality (and the medical student body is approximately half/half), what should curriculum developers pay attention to in designing instruction methodologies aimed at maximizing teaching efficacy? And, as more and more women physicians enter into the professional work force, will their personality differences, revealed as students, continue to be observed as they become physician providers in the health care delivery system? If so, what effects may this have upon the practice of medicine and upon the evolution of the doctor-patient relationship?

Future analyses of this multi-site data set and similar data sets which have been established by personality researchers are called for, given the noted distinctions revealed and questions brought forth. Additionally, our research intentions include an investigation of differences in student residency choice and specialty selection as correlated with personality trait or trait patterns – both collapsed across gender and with consideration for gender.

Acknowledgements

The authors are grateful to colleagues Hugo Seibel, PhD (Virginia Commonwealth University School of Medicine) and Barbara Cubic, PhD (Eastern Virginia Medical School) for their enduring commitment and assistance with test administration, data gathering, and securing institutional approvals at their respective medical schools.

Data were collected when Drs. Meit and Borges were affiliated with West Virginia University School of Medicine and Northeastern Ohio Universities College of Medicine, respectively.

Portions of this paper were presented in poster format at AAMC's Central Group on Educational Affairs Meeting (Indianapolis, IN March 2007) and at the 112th Annual Convention of the American Psychological Association (Honolulu, HI July 2004)

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