



The big five among male and female students of different faculties

Gidi Rubinstein *

Psychotherapy, School of Behavioural Sciences, Netanya Academic College, 23 Dubnov Street, Tel-Aviv 64-369, Israel

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Abstract

Costa and McCrae's (1992) NEO-PI-R (Big Five) questionnaire has become an accepted instrument for the measurement of occupational propensities and includes scales for evaluating levels of Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. A Hebrew translation of its shortened version was administered to 320 Israeli male and female students of the natural sciences, law, the social sciences and art (mean age = 24.03 years). It was found that Neuroticism is negatively related to both Conscientiousness and to Agreeableness, which is positively related to both Openness and Conscientiousness; the latter are negatively related to one another. Women are significantly more agreeable and conscientious than men. Law students are significantly less agreeable and open to experience than students of all other faculties, and more neurotic than natural science students. Female students of the natural sciences are significantly more agreeable than both their male counterparts in the natural sciences and than law students. The results are discussed in light of the specific characteristics of the different fields of study and in context of traditional gender role expectations from men and women.

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* Corresponding author. Tel.: +972 3 6969697; fax: +972 3 6919831.

E-mail address: gidirubi@netvision.net.il

1. Introduction

The question of which personality variables are relevant to career choice and job satisfaction has been considered by several personality theories. For instance it has been suggested by [Osipow and Fitzgerald \(1996\)](#) that career choice is based on an assumption that professional occupation and need satisfaction are linked. Theories of this kind have given rise to not a few studies into how certain professions and certain personality traits might be related. [Roe \(1956\)](#), for instance, found evidence supporting a linkage between family background and career choices. She suggested, for instance, that children who had been raised in homes in which parents were sensitive to their needs and maintained warm and satisfying relations with them choose people-oriented professions. [Holland \(1992\)](#) suggested a classification of six personality types according to which an individual can be classified as (1) Realistic; (2) Investigative; (3) Artistic; (4) Social; (5) Enterprising and (6) Conventional. He further proposed that individuals of the same personality type tend to flock together and create work environments that suit their needs. Thus artistic individuals are wont to foster work environments that reward creative thinking and behavior. As, according to Holland, an individual is usually a combination of mbpes (e.g., realistic–investigative, or artistic–social), he or she will probably seek an occupation which meets a variety of needs.

Empirical evidence has suggested that the choice of different professions does seem to be associated with specific personality types ([Tokar, Fischer, & Mezydlo-Subich, 1998](#)). According to this line of findings, hysterical individuals are attracted to literary and theatrical careers and enjoy leisure activity which encourages social interaction, use of intuition, and emotional and expressiveness. Obsessive individuals, on the other hand, prefer professional and leisure activities in which technological skills are required and obsessive traits are rewarded. Engineers, continuing with these findings, are predominantly obsessive, accountants seem to be particularly paranoid, theater and drama students are extremely hysterical and narcissistic, and students of medicine share the latter's propensity for narcissism ([Silver & Malone, 1993](#)). [Kline and Lapham \(1992\)](#) found that students of engineering and the natural sciences are also highly obsessive and that students of art and social science students are sociable and sensitive to sensory experiences, whereas [Harris \(1993\)](#) proposed that students of natural science are particularly accurate. According to [Wilson and Jackson \(1994\)](#) physicists are introverted, reserved, cautious, and unsociable in comparison to professionals in the fields of industry, research, and instruction. Ambition, achievement, and low affection are typical of marketing students, according to [Matthews and Oddy \(1993\)](#), whereas in [Granleese and Barrett's \(1990\)](#) study, accountants were found to manifest introversion, conformity and sociability. Three Israeli studies indicated that students of engineering and natural sciences students are more authoritarian than psychology and philosophy students ([Weller & Nadler, 1975](#)), natural science students are more authoritarian, religious and right-wing than social science students ([Rubinstein, 1997](#)), and that students of interior and product design are significantly more creative and less authoritarian than both behavioral science and law students ([Rubinstein, 2003](#)).

Since the rates of men and women are different within the various fields of study (e.g., natural science students are mainly men, while humanity students are mainly women), sex differences seem most relevant to the study of personality traits, which are characteristic of individuals who choose different vocations. Certain sex differences may be of particular interest with respect to vocational differences. For instance, rates of depression among women are twice that of rates among men,

and women are much more likely to seek professional help (Carson, Butcher, & Mineka, 1998). Men are more authoritarian than women (Rubinstein, 1995, 1997, 2003). Nurturing behavior seems to be typical to women (e.g., more than half of the women in the American labor market are engaged in clerical and service positions, and most of the women in professional positions are teachers and nurses (U.S. Department of Labor, 1980)). Traditional feminine gender roles are associated with avoidance (e.g., Eagly & Steffen, 1986), whereas aggressive behavior is seen as more socially legitimate for boys than for girls (Fagot & Hagan, 1985; Slife & Rychiak, 1982). In Costa, Terracciano, and McCrae (2001) meta-analytic review differences are replicated across cultures for both college-age and adult samples, and differences are broadly consistent with gender stereotypes: Women reported themselves to be higher in Neuroticism, Agreeableness, Warmth, and Openness to Feelings, whereas men were higher in Assertiveness and Openness to Ideas.

The current study used the “Big Five” scale to study the personality traits of male and female students of the natural sciences, law, social sciences, and art. On the basis of the empirical and theoretical literature reviewed above it is hypothesized that (1) art students would be found to be more neurotic than students of the other three groups, (2) social science, art and law students would be found to be more extraverted than students of natural science, (3) art students would be found to be more open than students of law and the natural sciences, (4) students of law and the natural sciences are more agreeable than art students, (5) students of law and the natural sciences are more conscientious than art and social science students, and (6) women would be found to be more neurotic, open, agreeable and conscientious, and less extraverted than men.

2. Method

2.1. Subjects

Three hundred and twenty Israeli Jewish freshman university and college students (160 male and 160 female; mean age = 24.03, standard-deviation = 3.96 years) participated in the study. Students were recruited from Tel-Aviv University, which is the largest university in Israel, and a college. Five overall ANOVAs of the Big Five between the university and the college students yield no significant differences. Participants included eighty natural science (mathematics, physics, chemistry, and computers) students, 80 social science (psychology, sociology, political sciences, and communication) students, 80 law students, and 80 students of arts. Although in some of these faculties there are more men than women, while in others the reverse is true, the sample included equal numbers of men and women from each faculty to allow for investigation of gender effects. Eighty percent of the students defined themselves as secular, 16% as traditional, and 4% as religious. So as to avoid the possible influence of educational socialization on the dependent variable, questionnaires were distributed only to first year students.

2.2. Measures

Demographic questionnaire consisting of questions about gender, age, country of birth, year of immigration to Israel (to avoid cultural differences and include only born Israelis), parents’

country of birth, faculty, family status, religion, and religiosity level (subjects' self-definition as secular, traditional, orthodox, or ultra-orthodox), which is strongly positively related to authoritarianism and negatively related to creativity (Rubinstein, 2003), and therefore may be most relevant to openness in this study.

NEO-FFI: The short form of the NEO-FFI (Costa & McCrae, 1992) was translated into Hebrew and then back into English by five English teachers who are fully proficient in both languages. The items were corrected until full agreement among translators was achieved. The NEO-FFI consists of 60 items, 12 for each of the "Big Five" variables. For each item, subjects express agreement or disagreement on a five-point Likert type scale ranging from "completely disagree" (1) to "fully agree" (5). So as to avoid response set bias, half of the items in each sub-scale are worded positively, and the other half negatively. The items for the different sub-scales are mixed, so that each sixth item represents one of the Big Five. Cronbach's alphas for the present study were 0.85 for *N*, 0.78 for *E*, 0.76 for *O*, 0.73 for *A*, and 0.83 for *C*.

2.3. Procedure

The research forms were distributed during classes in the presence of instructors and two research assistants. Response rate was 100%. All the forms were collected immediately after their completion. The objective was to reach a quota of 40 male and 40 female subjects for each field of study.

3. Results

Pearson correlation coefficients between the Big Five and all demographic variables showed no significant results. However, an ANOVA of *O* by religiosity level, accompanied by Scheffe post hoc test, show that secular participants ($M = 3.53$) score significantly higher than both traditional ($M = 3.07$) and orthodox ($M = 3.02$) participants, $F(2, 318) = 14.06$, $p < .001$, without a significant difference between these last two groups (no one of the participants defines him or herself as ultra-orthodox). This finding is in accord with a significant negative correlation between religiosity and creativity (Rubinstein, 2003) and a strong positive correlation between religiosity and authoritarianism (Rubinstein, 1995, 1997, 2003).

Five ANOVAs, with *N*, *E*, *A*, and *C* as dependent variables and Field of Study and Gender as independent variables were conducted in order to test the hypotheses. Means and standard-deviations for the Big Five by faculty and gender, and the results of the Scheffe post hoc test are presented in Table 1.

Women ($M = 2.77$) were indeed found to be more neurotic than men ($M = 2.64$), as predicted, but this difference was statistically significant only at the $p < .10$ level, $F(3,318) = 2.80$. Significant *N* differences were found between the different fields of study, $F(3,318) = 3.74$, $p < .05$. As predicted, the *N* level of art students ($M = 2.84$) was indeed higher than those of both social ($M = 2.66$) and natural ($M = 2.50$) science students, but contrary to prediction, according to the Scheffe test, the law students ($M = 2.83$) were found to be significantly more neurotic

Table 1
Big five means and standard deviations of male and female students of different faculties

Faculty and gender	<i>n</i>	<i>E</i>		<i>A</i>		<i>O</i>		<i>C</i>		<i>N</i>		
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Law	Men	31	4.72	1.20	3.34 _c	0.32	3.18	0.51	3.62	0.56	2.82	0.40
	Women	41	4.52	0.49	3.58	0.39	3.17	0.51	3.81	0.53	2.84	0.57
	Total	72	4.60	0.87	3.47 _a	0.78	3.17 _a	0.50	3.73	0.55	2.83 _a	0.50
Social sciences	Men	40	4.32	0.42	3.54	0.46	3.85	0.53	3.45	0.59	2.72	0.71
	Women	40	4.68	0.34	3.77	0.49	3.53	0.45	3.93	0.47	2.55	0.60
	Total	80	4.44	0.43	3.62 _b	0.47	3.74 _b	0.52	3.61	0.60	2.66	0.67
Natural sciences	Men	40	4.30	0.44	3.40 _{ae}	0.51	3.37	0.42	3.64	0.65	2.40	0.59
	Women	40	4.36	0.42	3.95 _{bf}	0.45	3.57	0.34	3.81	0.64	2.65	0.56
	Total	80	4.33	0.43	3.63 _b	0.55	3.45 _b	0.40	3.71	0.65	2.50 _b	0.59
Arts	Men	40	4.48	0.44	3.67	0.42	3.65	0.30	3.59	0.73	2.75	0.61
	Women	40	4.29	0.42	3.55	0.54	3.63	0.56	3.60	0.64	2.88	0.63
	Total	80	4.34	0.43	3.58 _b	0.51	3.64 _b	0.50	3.59	0.65	2.84	0.62
Total	Men	160	4.46	0.79	3.44 _c	0.44	3.45	0.53	3.58 _a	0.61	2.64	0.59
	Women	160	4.43	0.45	3.68 _d	0.48	3.42	0.52	3.77 _b	0.58	2.77	0.59
	Total	320	4.45	0.63	3.56	0.47	3.43	0.52	3.68	0.60	2.71	0.59

Note: Means with different subscripts differ significantly at $p < .05$, according to Scheffe test (a vs. b, c vs. d, and e vs. f).

than the natural science students. No gender \times faculty interaction effects were found in this analysis.

Unlike the predictions made in the second and sixth hypotheses, no significant *E* differences were found between either the genders or the fields of study. Similarly, no gender \times faculty interaction effect was evident in the analysis.

Significant differences for *O* were found in relation to field of study, $F(4,317) = 7.69$, $p < .01$, the law students being significantly less open than the other three groups. No significant gender or interaction effects were found. The significant *O* differences between students of the four faculties are obviously not in accord with the predictions of the third hypothesis.

Both the fourth and the sixth hypotheses are supported by the results, with the exception of art students, with respect to *A*. Significant *A* differences were found both between students of different faculties, $F(3,317) = 2.94$, $p < .05$, and between men and women, $F(1,317) = 9.88$, $p < .01$. As predicted, women were found to be significantly more agreeable than men, and law students were found to be less agreeable than all other three groups, according to the Scheffe test. Only the art students did not differ from both the natural and the social sciences students, as hypothesized. A significant gender \times faculty interaction effect was also found, $F(3,317) = 3.49$, $p < .05$, natural science *female* students being significantly more agreeable than both *male* natural science and law students, according to the Scheffe test.

Finally, as predicted, women were found to be significantly more conscientious than men, $F(1,237) = 4.86$, $p < .05$, but no significant *C* differences were found between the four groups of students, notwithstanding the predictions of the fifth hypothesis.

4. Discussion

4.1. Differences between faculties

Statistically significant differences in *N* were found between students from different faculties, but not always in accordance with the hypotheses of the study. While it was predicted that art students would be more neurotic than students of the other three groups, it was the law students who were proven significantly more neurotic than both the social and the natural science students. The *N* level of the art students is highest, as foreseen, although it is very close to that of the law students. Only Holland's (1992) artistic type scored above 66 in *N* and confirmed Howard and Howard's (2001) findings, which were the basis for the hypothesis that they would be highly neurotic. A recent study (Rubinstein, 2003), however, found Israeli law students to score higher in authoritarianism and lower in creativity than other students. In the current study, law students were also found to be significantly less open to experience than all other three groups. Being high in *N*, this group might tend to cling somewhat defensively to rules, a factor which might account for their high scores in authoritarianism and low scores in creativity. This would seem to be the case at least at the time that they choose to study law, although these tendencies may shift both during their studies, and later when they actually practice law (Rubinstein, 2003).

Although students of the natural sciences seem to have chosen a field of study which is not conducive to fostering inter-personal relationships, as far as the results of this study are concerned, they are as extraverted as the other groups.

Law students were also found to be less open than the other three groups. Their low *O* scores are compatible with the findings of Rubinstein's (2003) study in which law students were found to score higher than other students on authoritarianism and lower on creativity. Once again, this is presented only as an indication of the scores they received during their first year of law school. It is assumed that during the initial phases of their studies they may need to be more rigid, but that the actual practice of law might foster greater openness to experience.

On the basis of what has already been learned about law students in this study, it should not come as a surprise that individuals who are both more neurotic and less open to experience than their peers, are also less agreeable. Some of the traits typical to the low *A* scorer, or "Challenger" as they are called in Howard and Howard's (2001) study, such as cynicism, aggressiveness, competitiveness, and naturalheadedness (Howard & Howard, 2001), might match stereotypes about lawyers. Nonetheless, the hypothesis that students of natural science would be more agreeable than law and art students is partly supported by the interactions, in which it was seen that female students of the natural sciences are significantly more agreeable than both their male natural science counterparts and the law students. These findings are discussed in the context of gender differences below.

Although both the enterprising and the conventional types in Holland's (1992) Hexagon scored above 55 and both the investigative and the artistic types scored 45 in *C* (Howard & Howard, 2001), no significant *C* differences between students of the different faculties are found in this study. Gender *C* differences might override the differences between the four groups of students.

4.2. Gender differences

Regardless of their field of study, female participants in the study were found, as predicted, to be significantly more agreeable and more conscientious than male participants. A gender \times faculty interaction indicates that women who study the natural sciences are significantly more agreeable than both *male* natural science and law students on the whole. Psychological studies on masculine stereotypes clearly show that men are expected to be aggressive and that they are indeed found to be more aggressive and extreme than women on aggression-related variables such as assertiveness and competitiveness (e.g., Broverman, Vogel, Broverman, Carlson, & Rosenkrantz, 1972; Ruble & Ruble, 1982; Ruble, 1983). When one takes into account that traditionally the feminine role is associated with avoidance, obedience, and cautiousness (e.g., Eagly & Steffen, 1986; Fagot & Hagan, 1985; Slife & Rychiak, 1982), and that on Costa and McCrae's (1992) scale, order, dutifulness, and self-discipline, are attributes of *C*, the high *C* levels of women in the study become clear. Although being significant only at $p < .10$ level, most of the *N* means (see Table 1) show women to score higher than men. This trend is in accord with the fact that depression is twice as high among women than among men, and that women are much more likely than men to seek professional help (Carson et al., 1998). However, the non-significant gender differences are in accord with Costa et al.'s (2001) meta-analytic review where secondary analyses of revised NEO Personality inventory data from 26 cultures ($N = 23,031$) suggest that gender differences are small relative to individual variation within genders.

Unlike findings of previous studies, which indicated that men are more authoritarian than women (authoritarianism being identified with non-receptiveness to experience Rubinstein, 1995, 1997, 2003) and that women are more creative than men (Rubinstein, 2003), women in the present study were not found to be more open than men, as was predicted. Low authoritarianism and high creativity might, then, be related but not fully identical to *O*, as measured by the NEO-FFI. Moreover, although the traditional feminine gender role is characterized by avoidance (e.g., Eagly & Steffen, 1986), whereas aggressive behavior is more socially legitimate among boys than among girls (Fagot & Hagan, 1985; Slife & Rychiak, 1982), women in the present study were not found to be significantly more extraverted than men, as hypothesized.

It may also be the case that gender differences were not found with respect to *E* because some aspects of *E* are more typical of men while others are more typical of women, so that an average of the scores indicates no significant gender differences. Specifically, for instance, it is of note that women have been found to be more verbally skilled than men (Hyde & Linn, 1988) and also more nurturing (Baber & Dreyer, 1986; Basow, 1992; Gerson, 1985; Kaye & Applegate, 1990).

In conclusion, this study offers additional support to the claim that personality patterns may play a part in vocational decision making processes. Although they were expected to interact intensively with others, law students in the study were found to be significantly less agreeable and open to experience than students of all other faculties, and more neurotic than students of the natural sciences. At this point it would be valuable to make comparisons on the Big Five variables between law students and practicing lawyers, as well as between different practicing professionals. While the purpose of this study was to neutralize the possible effect of academic socialization by choosing students at the onset of their studies, conducting similar studies among seasoned professionals, might possibly, on the other hand, detect the impact of work experience

and reality concerns on the Big Five variables. It has been suggested, for instance, that work experience might reduce authoritarianism and increase creativity among law students (Rubinstein, 2003). A follow-up longitudinal study of students at the onset and conclusion of their studies would also help to understand the effect of academic studies on personality. Such investigations may contribute to the evaluation of the NEO-PI in understanding vocational choices.

Last but not least, cross-cultural differences with respect to the Big Five should be taken into consideration. Recent secondary analyses of Revised NEO Personality inventory data from 26 cultures show that the magnitude of gender differences varied across cultures and gender differences were most pronounced in European and American cultures in which traditional sex roles are minimized (Costa et al., 2001).

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