



RESEARCH ARTICLE

The associations of temperament, character, anxiety, and specialty choice among sixth-year medical students: a cross-sectional study

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ABSTRACT

Objective: This study aimed to investigate the effects of anxiety, temperament, and character dimensions on the preferences of final-year medical students for postgraduate education.

Method: Participants were 161 students in a sixth-year medical class. The primary outcome variables of the study were the preferred main specialty category and branch. Independent study variables were age, gender, perception of the economic situation, place of birth, and State-Trait Anxiety Inventory and Temperament and Character Inventory scores. Results for 151 participants were analyzed.

Results: The mean (\pm SD) age of the participants was 23.66 ± 1.18 years, and 57.6% ($n=87$) were females. The participants stated that they would choose mostly internal (64.2%, $n=97$) and surgical (35.1%, $n=53$) disciplines, while the basic sciences were the least favored (0.7%, $n=1$). The most popular specialties were psychiatry (9.9%, $n=15$), orthopedics and traumatology (8.6%, $n=13$), and physical therapy and rehabilitation (8.6%, $n=13$). There was no significant difference between state ($\chi^2=1.93$, $p=0.382$) and trait ($\chi^2=2.31$, $p=0.315$) anxiety levels and the specialty category selections. Harm avoidance (HA), fear of uncertainty (HA2), shyness (HA3), fatigability (HA4), and sentimentality (RD1) scores of students opting for internal medicine were statistically higher than scores for surgical sciences ($p<0.05$). In addition, the resourcefulness (SD3) scores of the aspiring internists were statistically lower than scores for surgery ($p<0.05$).

Conclusion: Temperament and character have some degree of influence on the choice of specialty, whereas anxiety was shown not to have such an impact. These findings may be helpful to medical educators or career counselors in the specialty choice of medical students.

Keywords: Anxiety, character, medical education, medical specialties, temperament

INTRODUCTION

“Postgraduate medical education (PME) is defined as the phase of medical training where doctors, after having obtained a formal medical qualification, can develop additional competencies in a defined area of their choice” (1). In particular, the undergraduate

period is a stage at which medical students begin to know themselves professionally, and thus they are directed to the specialty branch corresponding to their temperament and personality traits. A significant number of physicians who complete basic medical education choose to continue postgraduate medical training and specialize in a specific field. The rates of

How to cite this article: Akinci E. The associations of temperament, character, anxiety, and specialty choice among sixth-year medical students: a cross-sectional study. *Dusunen Adam The Journal of Psychiatry and Neurological Sciences* 2020;33:170-179.

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Received: November 06, 2019; **Revised:** December 19, 2019; **Accepted:** February 18, 2020

participation in the specialty examination in medicine, which is decisive in PME, indicate that physicians' preference for PME is directed towards receiving a specialist education. The most important motivation for PME in Turkey is the desire for professional satisfaction and specialization; the ability to plan a career after graduation is another important factor (2,3).

In recent years, a significant change in the choice of specialty exams in medicine has led to a noticeable variation in the minimum scores required for individual specialty branches. It is noteworthy that ratings for some basic science specialties, such as medical biochemistry and medical microbiology, are rising (4,5). Professional ideals and career plans, working conditions, shift duty, medical responsibility, malpractice concerns, financial rewards, and the effects of workload on doctors' private lives are some of the factors affecting post-graduate specialty selection. However, nowadays factors such as financial return and comfort come to the forefront in the choice of specialty (6-8). Furthermore, it is reported that students' experiences in medical faculties have an effect on their preferences. The choice of specialty is determined by environmental factors as well as the predisposition of the person, gender, temperament, and character traits (9,10).

Cloninger defines personality with two primary components: temperament and character (11). The temperament dimensions persistence, novelty seeking (NS), reward dependence (RD), and harm avoidance (HA) are essential characteristics that affect an individual's life plans and decisions. Temperament reflects the hereditary aspect of individual behavioral differences and preferences. Self-directedness (SD), cooperation, and self-transcendence (ST) define the dimensions of character. The character aspect of personality matures through personal, environmental, and socio-cultural processes (12). The analysis of personality traits that characterize students may elucidate a generalizable relationship with their specialty preferences. Using the Temperament and Character Inventory (TCI) could lead to the description of personality traits that characterize particular medical students and predict their success in performing the tasks entailed by different specialties (13).

Career psychologists have argued that career choice and personality interfere with each other. There is limited knowledge of personality profiles and how they are related to specialty choice (14). According to cognitive theory, anxiety can be explained as the tendency to overestimate the potential for danger.

Persons with anxiety disorders tend to imagine the worst possible scenario and avoid supposedly dangerous situations, such as crowds, heights, or social interaction (15). It was suggested that temperament traits may be related with adaptive roles, such as depressive traits increasing the sensitivity to suffering, cyclothymic traits being relevant to creativity, and hyperthymic traits being implicated in generally more active pursuits (16). The effects of anxiety on choosing specialties have not been examined.

Clarifying the factors that underlie the choice of specialties may provide a better understanding of students' preferences for a given specialty and may be helpful in the development of health education. Among these factors, the personality traits of medical students are important elements that cannot be ignored. We hypothesized that there could be an association of the temperament and characters of the candidates for specialty-training and the selected specialties.

This study aimed to investigate the effects of anxiety, temperament, and character dimensions on final-year medical students' preferences for postgraduate education. The results are expected to provide objective data that will increase the satisfaction of medical students in their specialty choice.

METHOD

Study Design

The study with a cross-sectional analytical design was conducted at Canakkale Onsekiz Mart University Faculty of Medicine between July 2018 and March 2019. Study reporting was done as per the STROBE guidelines (17). The study protocol was approved by the local ethics committee at Canakkale Onsekiz Mart University (No: 15-07-Date: July 25, 2018). Each participant signed an informed consent form in conformity with the Declaration of Helsinki.

Setting

Canakkale Onsekiz Mart University is located in the northwest of Turkey. It operates a tertiary-level hospital serving a population of around 750.000 people. Medical students receive three years of pre-clinical education, followed by two years of clinical clerkships and a one-year internship training. During the study, there were 161 students in the internship year and in total nearly 900 students enrolled in the medical school. In the internship year, most of the training was carried out uninterrupted in the hospital environment for 52 weeks.

Participants

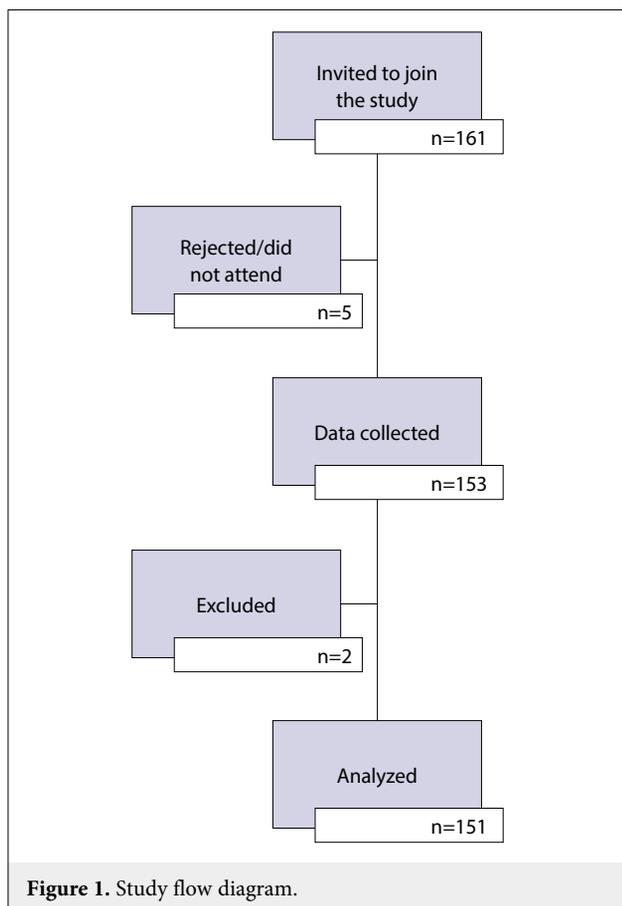
Participating students were members of the sixth-year medical class, defined as the internship year at Canakkale Onsekiz Mart University Faculty of Medicine. The intern trainees were visited in their workplaces, and all 161 students were invited to answer the study questions in an empty and silent room. Under the supervision of the project leader and researchers, the students completed the self-report research questionnaire. Five students refused to join, and two were excluded due to insufficient and unreliable data. The results for 151 participants were analyzed (Figure 1). The participation rate was 93.8% (151/161).

Measures

The data collection tool consisted of three parts: the Personal Data Form, State-Trait Anxiety Inventory (STAI), and the TCI. The primary outcome variables of the study were the preferred main specialty area, the favorite specialty branch, and reasons to choose a particular specialty. Independent study variables were age (years), gender, perception of the economic situation, place of birth, STAI scores, and TCI dimension scores.

State-Trait Anxiety Inventory: Developed by Spielberger et al. (18), it was designed to measure overall anxiety in adults on a four-point Likert-type scale (STAI Form X). In 1983, the STAI was revised to reduce the overlap with depression and emphasize better-described factors of state and trait anxiety (STAI Form Y) (19). The STAI is a psychological self-report inventory consisting of 40 questions. The STAI measures two types of anxiety – state anxiety, or anxiety about an event, and trait anxiety, or anxiety level as a personal characteristic. The scores obtained from both scales can range between 20 and 80. Higher ratings indicate higher anxiety levels. The scores received from the scale were categorized as 1) <37 minimal anxiety, 2) 37-41 slight anxiety, and 3) >41 high anxiety. The scale was adapted and validated for the Turkish language by Oner and LeCompte (20). The values for reliability coefficients ranged between 0.26 and 0.68 for state anxiety and between 0.76 and 0.86 for trait anxiety.

Temperament and Character Inventory: Developed by Cloninger et al. (11), the TCI was designed to provide a comprehensive evaluation of normal personality and all its dimensions. The TCI includes statements for which the subject should select ‘true’ or ‘false.’ The TCI is a 240-item self-administered questionnaire constructed to assess personality in seven dimensions, divided into “temperament” and “character.” Temperament is identified through the following four aspects: NS, HA, RD, and persistence (PS), while character is identified through the following three dimensions: SD, cooperativeness (C), and ST. The scale was adapted and validated for Turkish language by Kose et al. (12). Cronbach’s alpha coefficients for the Turkish version of the TCI were reported to be between 0.60 and 0.85 in the temperament dimensions and between 0.82 and 0.83 in the character dimensions. Except for PS, all dimensions were subdivided into 3 to 5 subdimensions. In the temperament dimension, NS (Exploratory excitability [NS1], Impulsiveness [NS2], Extravagance [NS3], Disorderliness [NS4]), and HA (Anticipatory worry [HA1], Fear of uncertainty [HA2], Shyness [HA3], Fatigability [HA4]) have 4 subscales, and RD (Sentimentality [RD1], Attachment [RD2], Dependence [RD3]) has 3 subscales. In the character dimension, SD (Responsibility [SD1], Purposefulness [SD2], Resourcefulness [SD3], Self-acceptance [SD4], Enlightened second nature [SD5]), and C (Social acceptance [C1], Empathy [C2], Helpfulness [C3], Compassion [C4], Pure-hearted conscience [C5]) have 5 subscales and ST (Self-forgetful [ST1], Transpersonal identification [ST2], Spiritual acceptance [ST3]) has 3



subscales. The scale scores consist of the sum of the subscale scores. For example, the T total NS score is calculated as (NS1+NS2+NS3+NS4).

Bias

The questionnaire included brief information about the research to ensure that the study data were obtained correctly, and participants were asked not to record their identities on the questionnaire form. To prevent bias, data collection was done by anonymous self-reporting, and error checking and debugging were made after entering the data into the computer.

Statistical Analysis

Data were digitized and analyzed using SPSS Statistics version 25.0 (Armonk, NY: IBM Corp.). The results were presented as frequencies, percentages, means, and standard deviations (SD). Normal distribution of the numerical data was analyzed using the Kolmogorov-Smirnov test. Homogeneity of variance was examined by Levene's test. For the comparison of the preferred main specialty sections, which were internal medicine and surgery, independent samples Student's t-test was used for TCI dimensions and sub-dimensions, as well as

the mean STAI scores. All hypotheses were two-sided, and a p value of <0.05 was considered statistically significant.

RESULTS

Participants

The study included 151 intern trainees. The mean (\pm SD) age of the participants was 23.66 ± 1.18 years, and 57.6% (n=87) were females. The participants were born mostly in Turkey's most populous cities such as Istanbul (16.7%, n=24), Bursa (9.7, n=14), and Ankara (7.6%, n=11), or locally in Canakkale and surroundings (4.2%, n=7). Nearly half of the intern trainees (49.7%, n=74) did not have economic problems, 18.8% (n=28) had slight livelihood difficulties. Sociodemographic variables of the intern trainees are presented in Table 1.

Descriptive Data

The majority of the intern trainees (88.1%, n=133) wanted to continue PME, and more than half felt that PME was necessary. The most common reasons for requesting specialty training were occupational satisfaction (43.6%, n=41) and career opportunities (31.9%, n=30), respectively (Table 2).

The majority of participants stated that they would choose internal (64.2%, n=97) and surgical (35.1%, n=53) disciplines, while the basic sciences (0.7%, n=1) were the

Table 1: Basic characteristics of the participants

Variable	n	(%)
Sex		
Female	87	57.6
Male	64	42.4
Place of birth (province)*		
Istanbul	24	16.7
Bursa	14	9.7
Duzce	13	9.0
Ankara	11	7.6
Balikesir	8	5.6
Canakkale	7	4.9
Erzurum	6	4.2
Izmir	5	3.5
Eskisehir	5	3.5
Other	51	35.4
Perception of economic situation**		
Possibility to spend comfortably	21	14.1
No problems	74	49.7
Slight difficulty with livelihood	28	18.8
Moderate subsistence difficulty	23	15.4
Intense livelihood difficulties	3	2.0

SD: Standard deviation, *: Data missing for 10 participants, **: Data missing for two participants

Table 2: Opinions of intern trainees about postgraduate education

Variable	n	(%)
Thinking of continuing postgraduate training		
Yes	133	88.1
No	3	2.0
Undecided	15	9.9
Thinking that postgraduate medical education is necessary		
Yes	94	62.3
No	41	27.2
Undecided	16	10.6
Reasons for requesting specialty training in medicine		
Occupational satisfaction	41	43.6
Career opportunities	30	31.9
Prestige and status	9	9.6
Other	6	6.4
Family and environmental pressure	4	4.3
Financial gain	4	4.3

Table 3: Distribution of intern trainees' preferences for areas and branches of specialties

Variable	n	(%)
Preferred main specialty area		
Internal Medicine	97	64.2
Surgery	53	35.1
Basic Medical Sciences	1	0.7
First preferred specialty		
Psychiatry	15	9.9
Orthopedics and Traumatology	13	8.6
Physical Therapy and Rehabilitation	13	8.6
Ear, Nose, and Throat Diseases	12	7.9
Family Medicine	12	7.9
Dermatology	11	7.3
Gynecology and Obstetrics	10	6.6
Cardiology	7	4.6
Eye Diseases	6	4.0
Neurology	5	3.3
Internal Medicine	5	3.3
Chest Diseases	5	3.3
General Surgery	4	2.6
Radiology	4	2.6
Child and Adolescent Psychiatry	4	2.6
Emergency Medicine	4	2.6
Medical Genetics	3	2.0
Pediatrics	3	2.0
Plastic, Reconstructive and Aesthetic Surgery	2	1.3
Neurosurgery	2	1.3
Anesthesiology and Reanimation	2	1.3
Nuclear Medicine	2	1.3
Infectious Diseases	2	1.3
Medical Pathology	1	0.7
Cardiac Surgery	1	0.7
Public Health	1	0.7
Medical Microbiology	1	0.7
Medical History and Ethics	1	0.7
Second preferred specialty		
Physical Therapy and Rehabilitation	16	12.0
Ear, Nose, and Throat Diseases	12	9.0
Internal Medicine	11	8.3
Neurology	8	6.0
Family Medicine	8	6.0
Eye Diseases	7	5.3
Psychiatry	7	5.3

Table 3: Distribution of intern trainees' preferences for areas and branches of specialties

Variable	n	(%)
Gynecology and Obstetrics	6	4.5
Cardiology	6	4.5
Emergency Medicine	6	4.5
Cardiac Surgery	4	3.0
Infectious Diseases	4	3.0
Pediatrics	4	3.0
Medical Biochemistry	4	3.0
Neurosurgery	3	2.3
Anesthesiology and Reanimation	3	2.3
Medical Genetics	3	2.3
Medical Microbiology	3	2.3
Orthopedics and Traumatology	2	1.5
General Surgery	2	1.5
Dermatology	2	1.5
Plastic, Reconstructive, and Esthetic Surgery	1	0.8
Chest Surgery	1	0.8
Radiology	1	0.8
Nuclear Medicine	1	0.8
Public Health	1	0.8
Chest diseases	1	0.8
Medical Pharmacology	1	0.8
Forensic Medicine	1	0.8
Physiology	1	0.8
Medical History and Ethics	1	0.8
Biophysics	1	0.8
Anatomy	1	0.8

least popular choice. The most requested specialties were psychiatry (9.9%, n=15), orthopedics and traumatology (8.6%, n=13), and physical therapy and rehabilitation (8.6%, n=13). In case they could not be allocated to their favorite specialties, the participants' most common second choices were physical therapy and rehabilitation (12.0%, n=16), ear, nose, and throat diseases (9.0%, n=12), or internal medicine (8.3%, n=11) (Table 3).

The first three among the main reason for choosing a specialty were compliance with temperament and character (29.2%, n=42), lifestyle suitability (18.1%, n=26), and working conditions (14.6%, n=21), respectively. The second and third reasons for specialty choice were similar (Table 4).

The mean (\pm SD) STAI state and trait scores of the participants were 38.01 ± 8.79 and 42.28 ± 8.84 . The

Table 4: Distribution of specialty preference reasons for the intern trainees

Reasons	n	(%)
Main reason for choosing a specialty		
Compliance with temperament and character	42	29.2
Lifestyle suitability	26	18.1
Working conditions	21	14.6
Job satisfaction	19	13.2
Open to development	9	6.3
Low risk and responsibility	8	5.6
Financial reasons	6	4.2
Placement exam scores	4	2.8
Career plans	4	2.8
Possibility to study abroad	3	2.1
Contact with patients	2	1.4
Second reason for choosing a specialty		
Compliance with temperament and character	31	21.5
Lifestyle suitability	26	18.1
Job satisfaction	21	14.6
Working conditions	17	11.8
Reasons such as risk and responsibility	11	7.6
Career plans	8	5.6
Placement exam scores	7	4.9
Open to development	7	4.9
Financial reasons	6	4.2
Contact with patients	5	3.5
Possibility to study abroad	4	2.8
Other	1	0.7
Third reason for choosing a specialty		
Lifestyle suitability	29	20.1
Working conditions	19	13.2
Compliance with temperament and character	15	10.4
Reasons such as risk and responsibility	14	9.7
Financial reasons	13	9
Placement exam scores	12	8.3
Open to development	12	8.3
Job satisfaction	10	6.9
Career plans	9	6.3
Possibility to study abroad	6	4.2
Contact with patients	3	2.1
Availability of positions after graduation	2	1.4

intern trainees' high state and trait anxieties were 31.1% (n=47) and 57.6% (n=87) according to the STAI.

For the temperament dimensions of TCI, the mean (\pm SD) values were as follows: NS (19.35 \pm 5.09), HA

(18.77 \pm 7.03), RD (13.88 \pm 3.68), and PS (4.90 \pm 2.14). Character dimensions were as follows: SD (29.88 \pm 6.93), C (29.09 \pm 6.23), and ST (15.60 \pm 6.14). The intern trainees' TCI dimension and sub-dimension scores are given in Table 5.

Outcome Data

Although 27 different specialty preferences were mentioned, the categories were merged into internal medicine and surgical disciplines during comparisons.

Using the STAI anxiety categories as dependent variable, the mean state and trait anxiety scores were compared using the independent samples t-test, which showed no significant difference between the groups. State anxiety scores for internal (n=95) and surgical (n=52) disciplines were 38.55 \pm 8.98 and 36.87 \pm 8.39, respectively (t=1.110, p=0.269). On the other hand, trait anxiety scores for internal (n=93) and surgical (n=49) areas were 43.05 \pm 9.01 and 40.61 \pm 8.33, respectively (t=1.574, p=0.118).

Using the different mean TCI subscale scores as dependent variables, independent samples t-test was performed to compare between study preferences. HA (19.95 \pm 6.89 & 16.36 \pm 6.84), HA2 (4.69 \pm 1.77 & 3.62 \pm 2.03), HA3 (4.6 \pm 2.14 & 3.67 \pm 2.08), HA4 (4.72 \pm 2.26 & 3.92 \pm 2.17) and RD1 (6.65 \pm 1.85 & 5.92 \pm 1.85) scores of internal medicine were statistically higher than surgery scores (p<0.05). The SD3 (3.23 \pm 1.28 & 4.08 \pm 1.04) scores for internal medicine were statistically lower than scores for surgery (p<0.05). There was no statistical difference between the other TCI scale dimension and sub-dimension scores concerning the main medical specialty categories (p>0.05) (Table 6).

DISCUSSION

The majority of intern trainees wanted to continue PME, and more than half felt that PME was necessary. The most common reasons for requesting specialty training were occupational satisfaction and career opportunities. On the other hand, only one participant (0.7%) opted for basic medical sciences; all the other students chose internal or surgical disciplines. The most popular specialties were psychiatry, orthopedics and traumatology, and physical therapy and rehabilitation. The three most common answers to the question about the main reason for selecting a particular specialty were compliance with temperament and character, lifestyle suitability, and working conditions.

There was no statistically significant difference between state and trait anxiety levels and the selection

Table 5: Intern trainees' TCI dimension and sub-dimension scores

Dimension	Subscales	n	Mean	SD	
Temperament	Novelty seeking (NS)	136	19.35	5.09	
	Exploratory excitability (NS1)	146	6.14	2.28	
	Impulsiveness (NS2)	143	3.78	2.33	
	Extravagance (NS3)	146	4.81	1.85	
	Disorderliness (NS4)	145	4.57	1.79	
	Harm avoidance (HA)	133	18.77	7.03	
	Anticipatory worry (HA1)	145	5.61	2.70	
	Fear of uncertainty (HA2)	148	4.32	1.93	
	Shyness (HA3)	140	4.28	2.15	
	Fatigability (HA4)	146	4.45	2.27	
	Reward dependence (RD)	137	13.88	3.68	
	Sentimentality (RD1)	146	6.38	1.87	
	Openness to warm communication (RD2)	143	4.31	1.92	
	Attachment (RD3)	146	3.02	1.52	
	Persistence (PS)	145	4.90	2.14	
	Character	Self-directedness (SD)	131	29.88	6.93
		Responsibility (SD1)	143	5.64	2.01
		Purposeful (SD2)	148	5.83	1.80
		Resourcefulness (SD3)	144	3.53	1.27
Self-acceptance (SD4)		145	5.39	2.79	
Enlightened second nature (SD5)		141	9.50	2.00	
Cooperativeness (C)		130	29.09	6.23	
Social acceptance (C1)		142	6.20	1.76	
Empathy (C2)		147	4.35	1.52	
Helpfulness (C3)		149	4.72	1.31	
Compassion (C4)		143	6.76	2.86	
Pure-hearted conscience (C5)		143	7.00	1.57	
Self-transcendence (ST)		128	15.60	6.14	
Self-forgetful (ST1)		143	5.06	2.34	
Transpersonal identification (ST2)		139	4.06	2.24	
Spiritual acceptance (ST3)	136	6.62	3.35		

SD: Standard deviation

of the specialty fields. However, HA and RD1 scores for internal medicine were statistically higher than scores for surgical disciplines. The SD3 scores for internal medicine were statistically lower than those for surgery. There were no significant differences in the other TCI scale dimension and sub-dimension scores regarding the main medical specialty areas.

In our study, both trait and state anxiety levels were high (especially trait anxiety). In a systematic review, anxiety levels were reported to be higher among US and Canadian medical students than in the general population (21). In a study conducted in Egypt, the

prevalence of anxiety among medical students was 73% (22). The prevalence of anxiety was reported to be 32.9% in a systematic review and meta-analysis examining mental health problems among medical students in Brazil (23). A multicenter study using the STAI scale in medical students reported state-anxiety to be 81.7% and trait-anxiety to be 85.6% (24).

One of the reasons why intern trainees want to specialize in internal medicine departments rather than in surgical departments may be the high level of anxiety among residents who choose surgical disciplines (25). We could not find any Turkish or English publications

Table 6: Comparison of the TCI scale and subscale scores according to medical specialty categories

Dimension	Preferred main specialty area*						t	p
	Internal Medicine			Surgical Disciplines				
	Mean	SD	n	Mean	SD	n		
Novelty seeking (NS)	19.30	5.18	86	19.47	5.01	49	-0.18	0.856
Exploratory excitability (NS1)	5.87	2.23	92	6.68	2.23	53	-2.10	0.037
Impulsiveness (NS2)	3.78	2.29	92	3.74	2.42	50	0.10	0.918
Extravagance (NS3)	4.98	1.97	92	4.51	1.62	53	1.47	0.144
Disorderliness (NS4)	4.62	1.85	93	4.45	1.71	51	0.55	0.584
Harm avoidance (HA)	19.95	6.89	88	16.36	6.84	44	2.83	0.005
Anticipatory worry (HA1)	5.82	2.70	94	5.28	2.67	50	1.15	0.253
Fear of uncertainty (HA2)	4.69	1.77	95	3.62	2.03	52	3.35	0.001
Shyness (HA3)	4.60	2.14	91	3.67	2.08	48	2.48	0.014
Fatigability (HA4)	4.72	2.26	92	3.92	2.17	53	2.08	0.040
Reward dependence (RD)	14.22	3.53	88	13.38	3.84	48	1.25	0.213
Sentimentality (RD1)	6.65	1.85	94	5.92	1.85	51	2.26	0.026
Openness to warm communication (RD2)	4.35	1.80	91	4.31	2.11	51	0.11	0.910
Attachment (RD3)	3.13	1.43	93	2.85	1.66	52	1.08	0.283
Persistence (PS)	4.73	2.09	94	5.30	2.17	50	-1.53	0.128
Self-directedness (SD)	29.61	7.48	84	30.59	5.71	46	-0.77	0.441
Responsibility (SD1)	5.51	2.11	93	5.96	1.73	49	-1.29	0.199
Purposeful (SD2)	5.76	1.84	95	6.04	1.68	52	-0.91	0.363
Resourcefulness (SD3)	3.23	1.28	91	4.08	1.04	52	-4.05	<0.001
Self-acceptance (SD4)	5.46	2.93	91	5.23	2.55	53	0.49	0.627
Enlightened second nature (SD5)	9.55	2.09	89	9.49	1.78	51	0.17	0.863
Cooperativeness (C)	29.36	6.04	85	28.86	6.40	44	0.44	0.663
Social acceptance (C1)	6.15	1.76	92	6.35	1.73	49	-0.63	0.528
Empathy (C2)	4.46	1.52	95	4.20	1.48	51	1.02	0.309
Helpfulness (C3)	4.68	1.27	95	4.79	1.41	53	-0.48	0.632
Compassion (C4)	7.03	2.66	89	6.38	3.11	53	1.33	0.185
Pure-hearted conscience (C5)	7.04	1.59	85	6.98	1.50	44	0.23	0.817
Self-transcendence (ST)	15.60	6.51	84	15.61	5.45	44	-0.02	0.987
Self-forgetful (ST1)	5.08	2.39	93	5.04	2.28	50	0.09	0.932
Transpersonal identification (ST2)	3.94	2.26	90	4.35	2.20	48	-1.03	0.307
Spiritual acceptance (ST3)	6.71	3.70	86	6.53	2.67	49	0.30	0.767

SD: Standard deviation, *Basic medical sciences were not included in the analysis as there was only one selection

examining the effect of anxiety on specialty selection. Our study showed that the levels of state and trait anxiety did not affect the choice of the main areas of specialty.

Vaidya et al. (26) used the TCI scale to examine the relationship between the temperament and characteristics of medical students and the choice of specialty, finding students choosing surgery, emergency medicine, and obstetrics and gynecology to be higher in NS than the other students. The potential future

surgeons were lower in HA and RD than the others. Students choosing primary care specialties, emergency medicine, and obstetrics and gynecology were all high in RD, with students aiming at entering pediatrics having the highest scores.

Many studies have reported that the personality trait is a common intrinsic factor in the specialty choice (27-29). Our findings suggest that temperament (HA and RD1) and character (SD3) influence specialty choice. HA, associated with the neurotransmitter serotonin, is

the tendency to avoid or give up certain behaviors as an intense response to aversive stimuli manifesting itself as fear of uncertainty, shyness of strangers, quick fatigability, and pessimistic worry of future problems. RD, which is associated with the neurotransmitter noradrenaline, is a tendency towards intense response to reward, seen as sentimentality, social attachment, and dependence on approval of others. SD refers to self-determination, being able to control, regulate, and adapt behavior per own goals and values, to be self-sufficient, self-acceptant, responsible, reliable, and effective (30). In our study, students choosing surgery were as cooperative as the other students. However, Schwartz et al. (31) found surgeons to be especially high in C and SD. There may indeed be a surgical personality characterized by extraversion, C, and SD.

Some limitations of this study deserve mention. First, research was conducted in only one class of final-year students at a single medical school during one academic year in Turkey. Therefore, it is difficult to generalize the findings. Second, this research did not closely examine other motivational factors such as lifestyles, beliefs, competitiveness, and duration of the residency program. Third, the data collection method bears the limitations of questionnaire studies. Finally, our sample is not large enough to analyze each specialty in detail. Since this was not a sampling study, a sample size calculation was not performed; the whole population was invited to join.

In conclusion, the present results suggest that temperament and character have some influence on specialty choice, whereas anxiety did not demonstrate such an impact. These findings may be beneficial to medical educators or career counselors for the specialty choice of medical students. Despite its limitations, this study may be helpful to medical students, professors, and medical educators in the process of specialty choice. Further research with larger sample sizes, including other grades of students, will be required to evaluate the more intricate factors associated with specialty choice.

Contribution Categories		Author Initials
Category 1	Concept/Design	E.A.
	Data acquisition	E.A.
	Data analysis/Interpretation	E.A.
Category 2	Drafting manuscript	E.A.
	Critical revision of manuscript	E.A.
Category 3	Final approval and accountability	E.A.
Other	Technical or material support	N/A
	Supervision	N/A

Ethics Committee Approval: The study protocol was approved by the local ethics committee at Çanakkale Onsekiz Mart University (No: 15-07-Date: 25.07.2018).

Informed Consent: Each participant signed an informed consent form following the Declaration of Helsinki.

Peer-review: Externally peer-reviewed.

Conflict of Interest: No conflict of interest.

Financial Disclosure: This study was not funded by any organization.

REFERENCES

- Busari OJ, Duits A. Postgraduate medical education: In Walsh K (editor). Oxford Textbook of Medical Education. Oxford University Press, 2013, 1-20.
- Bati H. Stages and characteristics of medical education: In Sayek I (editor). Medical Trainer Handbook. Ankara: Gunes Tip Kitabevleri, 2016, 29-42. (Turkish)
- Goktas Dortyol B. Future thoughts and career choices of last year of medical faculty students and affecting factors. Tip Egitimi Dunyasi 2017; 16:12-21. (Turkish)
- Kaya A, Akturk Z, Cayir Y, Tastan K. Medical specialization exams between 2007-2013: A trend analysis. Ankara Med J 2014; 14:53-58. (Turkish)
- OSYM. TUS Evaluation Reports. <https://www.osym.gov.tr/TR,14999/tus-degerlendirme-raporlari.html>. Accessed September 1, 2019.
- Tan MN, Ozcakar N, Kartal M. Resident doctors' professional satisfaction and its effect on their lives. Marmara Medical Journal 2015; 25:20-25.
- Tekin C, Gunes G, Turkol E. Residency choices of medical students at Inonu University Medical Faculty and the factors to affect these choices. İnönü Üniversitesi Sağlık Bilimleri Dergisi 2013; 1:5-10. (Turkish)
- Lefevre JH, Roupert M, Kerneis S, Karila L. Career choices of medical students: a national survey of 1780 students. Med Educ 2010; 44:603-612.
- Goldacre MJ, Turner G, Lambert TW. Variation by medical school in career choices of UK graduates of 1999 and 2000. Med Educ 2004; 38:249-258.
- Woolf K, Elton C, Newport M. The specialty choices of graduates from Brighton and Sussex Medical School: a longitudinal cohort study. BMC Med Educ 2015; 15:46.
- Cloninger CR, Svrakic DM, Przybeck TR. A psychobiological model of temperament and character. Arch Gen Psychiatry 1993; 50:975-990.
- Kose S, Sayar K, Ak I, Aydin N, Kalelioglu U, Kirpinar I, et al. Turkish version of the TCI: Reliability, validity, and factorial structure. Bulletin of Clinical Psychopharmacology 2004; 14:107-131. (Turkish)
- Borges NJ, Savickas ML. Personality and medical specialty choice: A literature review and integration. Journal of Career Assessment 2002; 362-380.

14. Kosif R, Konuk N. Cloninger's temperament and character inventory profiles of anatomists: is there a relation with specialty choice? *Bratisl Lek Listy* 2016; 117(112-118).
15. Aikins DE, Craske MG. Cognitive theories of generalized anxiety disorder. *Psychiatr Clin North Am* 2001; 24:57-74.
16. Maremmani I, Dell'Osso L, Rovai L, Pacini M, Arduino G, Montagnari A, et al. TEMPS-A[p] temperament profile related to professional choice: A study in 1548 applicants to become a cadet officer in the Italian air force. *J Affect Disord* 2010; 124:314-318.
17. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Ann Intern Med* 2007; 147:573-577.
18. Spielberger CD, Gorsuch RL, Lushene RE. *Manual for the State-Trait Anxiety Inventory (Self Evaluation Questionnaire)*. Palo Alto, CA: Consulting Psychologists Press Inc., 1970.
19. Spielberger CD, Gorsuch RL, Lushene R, Vagg PR, Jacobs GA. *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press Inc., 1983.
20. Oner N, Le Compte A. *Manual for the State Trait Anxiety Inventory-Turkish form*. Istanbul: Bogazici Universitesi, 1985. (Turkish)
21. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. *Acad Med* 2006; 81:354-373.
22. Fawzy M, Hamed SA. Prevalence of psychological stress, depression and anxiety among medical students in Egypt. *Psychiatry Res* 2017; 255:186-194.
23. Pacheco JP, Giacomini HT, Tam WW, Ribeiro TB, Arab C, Bezerra IM, et al. Mental health problems among medical students in Brazil: a systematic review and meta-analysis. *Braz J Psychiatry* 2017; 39:369-378.
24. Brenneisen Mayer F, Souza Santos I, Silveira PS, Itaquí Lopes MH, de Souza AR, Campos EP, et al. Factors associated to depression and anxiety in medical students: a multicenter study. *BMC Med Educ* 2016; 16:282.
25. Marzouk M, Ouanes-Besbes L, Ouanes I, Hammouda Z, Dachraoui F, Abroug F. Prevalence of anxiety and depressive symptoms among medical residents in Tunisia: a cross-sectional survey. *BMJ Open* 2018; 8:e020655.
26. Vaidya NA, Sierles FS, Raida MD, Fakhoury FJ, Przybeck TR, Cloninger CR. Relationship between specialty choice and medical student temperament and character assessed with Cloninger Inventory. *Teach Learn Med* 2004; 16:150-156.
27. Jafrani S, Zehra N, Zehra M, Abuzar Ali SM, Abubakar Mohsin SA, Azhar R. Assessment of personality type and medical specialty choice among medical students from Karachi; using Myers-Briggs Type Indicator (MBTI) tool. *J Pak Med Assoc* 2017; 67:520-526.
28. Kwon OY, Park SY. Specialty choice preference of medical students according to personality traits by Five-Factor Model. *Korean J Med Educ* 2016; 28:95-102.
29. Fang JT, Lii SC. Relationship between personality traits and choosing a medical specialty. *J Formos Med Assoc* 2015; 114:1116-1121.
30. Garcia D, Lester N, Cloninger KM, Cloninger CR. Temperament and Character Inventory (TCI): In Zeigler-Hill V, Shackelford T (editors). *Encyclopedia of Personality and Individual Differences*. Cham, Switzerland: Springer, 2017, 1-3.
31. Schwartz RW, Barclay JR, Harrell PL, Murphy AE, Jarecky RK, Donnelly MB. Defining the surgical personality: a preliminary study. *Surgery* 1994; 115:62-68.