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

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

**ABSTRACT**

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

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

**Results:** The mean ( $\pm$ SD) age of the participants was  $23.66 \pm 1.18$  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 preferred the least (0.7%, n=1). The most preferred 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 the 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 internal medical sciences were statistically higher than surgical medical sciences scores ( $p<0.05$ ). Also, the resourcefulness (SD3) scores of the internal medical sciences were statistically lower than surgical medical sciences scores ( $p<0.05$ ).

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

**Keywords:** Medical education, medical specialties, temperament, character, anxiety.

**Altıncı sınıf tıp öğrencilerinde mizaç, kaygı ve uzmanlık tercihi arasındaki ilişkiler: Kesitsel bir çalışma****ÖZET**

**Amaç:** Bu çalışmada, intörn hekimlerin mezuniyet sonrası eğitimlerine yönelik tercihlerinde kaygı, mizaç ve karakter boyutlarının araştırılması amaçlanmaktadır.

**Yöntem:** Çalışmaya altıncı sınıf öğrencilerinden 161 kişi katıldı. Çalışmanın birincil sonuç değişkenleri tercih edilen ana uzmanlık kategorisi ve uzmanlık dalı olmuştur. Bağımsız çalışma değişkenleri yaş, cinsiyet, ekonomik durum algısı, doğum yeri, Durumluk ve Sürekli Kaygı Envanteri (STAI), Mizaç ve Karakter Envanteri (TCI) puanlarıdır. 151 katılımcı için sonuçlar analiz edildi.

**Bulgular:** Katılımcıların ortalama ( $\pm$  SD) yaşı  $23.66 \pm 1.18$  yıl ve % 57.6'sı (n=87) kadındı. Katılımcılar çoğunlukla dahili (% 64.2, n=97) ve cerrahi (% 35.1, n=53) uzmanlık dallarını seçeceklerini belirtirken, temel bilimler en az tercih edildi (% 0.7, n=1). En çok tercih edilen uzmanlık dalları psikiyatri (% 9.9, n=15), ortopedi ve travmatoloji (% 8.6, n=13) ve fizik tedavi ve rehabilitasyon (% 8.6, n=13) idi. Durumluk ( $\chi^2 = 1.93$ , p= 0.382) ve sürekli ( $\chi^2 = 2.31$ , p= 0.315) kaygı düzeyleri ve uzmanlık kategorisi seçimleri arasında anlamlı bir fark bulunamamıştır. Dahili tıp bilimlerini seçen grubun zarardan kaçınma (HA), belirsizlik korkusu (HA2), yabancılardan çekinme (HA3), çabuk yorulma ve dermansızlık (HA4) ve duygusallık (RD1) puanları istatistiksel olarak cerrahi tıp seçenlere oranla daha yüksekti (p <0.05). Ayrıca, dahili tıp bilimlerinin beceriklilik (SD3) puanları cerrahi tıp bilimleri puanlarından istatistiksel olarak daha düşüktü (p <0.05).

**Sonuç:** Mizaç ve karakter, uzmanlık seçiminde bir miktar etkiye sahipken, kaygının böyle bir etkisinin olmadığı görülmüştür. Bu bulgular, tıp eğitimcilerine veya kariyer danışmanlarına tıp öğrencilerinin uzmanlık seçiminde yardımcı olabilir.

**Anahtar Sözcükler:** Tıp eğitimi, tıpta uzmanlık, mizaç, karakter, kaygı

## Introduction

### Background/rationale

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 in which medical students begin to know themselves professionally, and thus, they are directed to the specialty branch according to their temperament and personality traits. A significant number of physicians who complete basic medical education prefer to continue postgraduate medical training and specialize in a specific field. The rates of participation in the specialty examination in medicine, which is decisive in PME, indicate that physicians' preference for PME is in the direction of receiving specialist education. The most important motivations for PME in Turkey are the desire for professional satisfaction and specialization; having a career planning 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 the specialty branches. It is noteworthy that some basic science specialties, such as medical biochemistry and medical microbiology, rise in ratings (4,5). Professional ideals and career plans, working conditions, shifts, physician responsibility, malpractice concerns, financial returns, and the effects of workload private life 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). Besides, it is reported that students' experiences of medical faculties have an effect on their preferences. The choice of specialty is determined by environmental factors as well as the preferences of the person, gender, temperament, and character traits (9,10).

Cloninger defines personality with two primary components: temperament and character (11). Persistence, novelty seeking, reward dependence, and harm avoidance temperament dimensions are essential characteristics that affect an individual's life plans and decisions. Temperament reflects the hereditary aspect of behavioral individual differences and preferences. Self-directedness, cooperation, and self-transcendence 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 the generalizable relationship with their specialty preferences. Using the Temperament and Character Inventory could lead to the description of personality traits that characterize particular medical students and predict 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 on how they are related to their specialty choices (14). Cognitive theory has explained anxiety as the tendency to overestimate the potential for danger. Persons with anxiety disorders tend to imagine the worst possible scenario and avoid situations they think are dangerous, 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 issues that cannot be ignored. We hypothesized that there could be an association of the temperament and characters of the specialty-training candidates and the selected specialties.

## Objectives

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

## Methods

### Study design

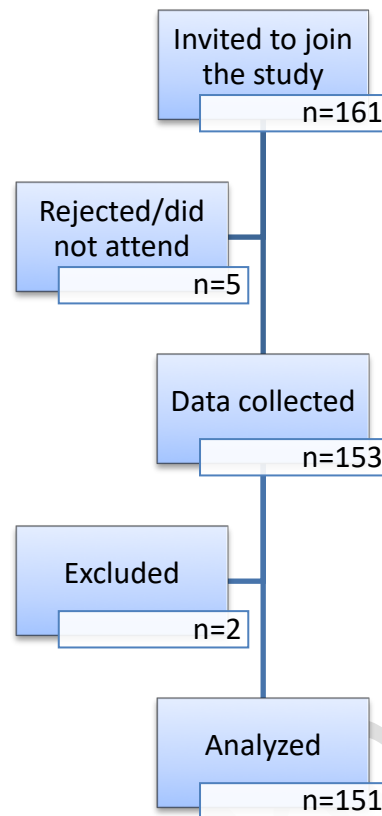
The study was conducted in a cross-sectional analytical plan, at Çanakkale Onsekiz Mart University Faculty of Medicine between July 2018 and March 2019. Study reporting was done per the STROBE guidelines (17). The study protocol was approved by the local ethics committee at Çanakkale Onsekiz Mart University (No: 15-07-Date: 25.07.2018). Each participant signed an informed consent form following the Declaration of Helsinki.

### Setting

The Çanakkale Onsekiz Mart University is located in the north-west of Turkey. It is a tertiary-level hospital serving a population of around 750 thousand people. Medical students receive three years of pre-clinical education, followed by two years of clinical clerkships and one-year internship training. During the study, there were 161 students in the internship year and nearly 900 total students 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, considered as the internship year at the Çanakkale Onsekiz Mart University Faculty of Medicine. The intern doctors were visited in their workplaces, and all 161 students were invited to respond to the study questions in an empty and silent room. Under the supervision of the project leader and researchers, the students took the self-responded 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).



**Figure 1:** Study flow diagram

## Measures

The data collection tool consisted of three parts: the “Personal data form, State –Trait Anxiety Inventory (STAI), and the Temperament and Character Inventory (TCI).” The primary outcome variables of the study were the preferred main specialty section, the favorite specialty, and reasons to choose a 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 (STAI):** Developed by Spielberger et al., it was designed to rate the overall adult anxiety, and is formulated as a four-point Likert scale (STAI “Form X”). (18). A revision of the STAI, which reduced the overlap with depression and placed emphasis on better-described state and trait anxiety factors, was published in 1983 (STAI “Form Y”) (19). The STAI is a psychological inventory and consists of 40 questions on a self-report basis. 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 theoretically vary 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 Turkish language by Oner and LeCompte. The values for reliability coefficients ranged between .26 and .68 for state anxiety, and .76 and .86 for trait anxiety (19, 20).

**Temperament and Character Inventory (TCI):** Developed by Cloninger et al., the TCI was designed to provide a comprehensive evaluation of normal personality and all its dimensions (11). The TCI has statements for which the subject should indicate 'true' or 'false.' The TCI is a 240-item self-administered questionnaire constructed to assess personality that includes seven dimensions, divided into "temperament" and "character." Temperament is identified through the following four aspects: novelty seeking (NS), harm avoidance (HA), reward dependence (RD), and persistence (PS). On the other hand, the character is identified through the following three dimensions: self-directedness (SD), cooperativeness (C), and self-transcendence (ST). The scale was adapted and validated for Turkish language by Kose et al. The Cronbach's coefficients for the Turkish version of the TCI were reported as between 0.60 and 0.85 on the temperament dimensions, and between 0.82 and 0.83 on the character dimensions (12). Except for PS, all dimensions were subdivided between three and five. 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)) have 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 scales consist of the sum of the subscales. For example, the Total NS score is calculated as (NS1 + NS2 + NS3 + NS4).

## Bias

In the questionnaire, there was brief information about the research to ensure that the study data were obtained correctly, and participants were asked not to put 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 the data was entered into the computer.

## Statistical methods

Data was entered into the computer and analyzed using the SPSS 25.0 software (SPSS Inc., Chicago, IL, USA). The results were presented as frequencies, percentages, means, and standard deviations (SD). The normal distribution of the numerical data was analyzed by the Kolmogorov-Smirnov test. The homogeneity of the variances was examined by the Levene's test. For the comparison of the preferred main specialty section, which is internal and surgical medical sciences, the 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 doctors. The mean ( $\pm$ SD) age of the participants was  $23.66 \pm 1.18$  years, and 57.6% ( $n=87$ ) were females. The participants were born mostly in Turkey's largest-populated cities such as Istanbul (16.7%,  $n=24$ ), Bursa (9.7,  $n=14$ ), and Ankara (7.6%,  $n=11$ ), or Çanakkale and surroundings (4.2%,  $n=7$ ). Nearly half of the intern doctors (49.7%,  $n=74$ ) did not have economic



problems, 18.8% (n=28) had slight livelihood difficulties. Sociodemographic variables of intern doctors are given in Table 1.

**Table 1:** Basic characteristics of the participants

Variable		n	(%)
Sex	Female	87	57.6
	Male	64	42.4
Place of birth (province)*	İstanbul	24	16.7
	Bursa	14	9.7
	Düzce	13	9.0
	Ankara	11	7.6
	Balıkesir	8	5.6
	Çanakkale	7	4.9
	Erzurum	6	4.2
	İzmir	5	3.5
	Eskişehir	5	3.5
	Other	51	35.4
Perception of economic situation**	Possibility to spend comfortably	21	14.1
	No problem	74	49.7
	Slight difficulty in 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.

## Descriptive data

The majority of the intern doctors (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).

**Table 2:** Opinions of intern doctors 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

The participants stated that they would choose mostly internal (64.2%, n=97) and surgical (35.1%, n=53) disciplines, while the basic sciences (0.7%, n=1) were preferred the least. The most preferred specialties were psychiatry (9.9%, n=15), orthopedics and traumatology (8.6%, n=13), and physical therapy and rehabilitation (8.6%, n=13). If they could not be placed on their favorite specialties, the participants' most common second choices would be 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).

**Table 3:** Distribution of intern doctors' main and sub-branch specialty preferences

Variable		n	(%)
Preferred main specialty section	Internal Medical Sciences	97	64.2
	Surgical Medical Sciences	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 Deontology	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
	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 Aesthetic 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 Deontology	1	0.8
	Biophysics	1	0.8
	Anatomy	1	0.8

The most three first reason for choosing a specialty was 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 to choose a specialty were similar (Table 4).

**Table 4:** Distribution of specialty preference reasons for the intern doctors

Reasons	n	(%)
First 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
Causes 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
Causes 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

The mean ( $\pm$ SD) STAI state and trait scores of the participants were  $38.01 \pm 8.79$  and  $42.28 \pm 8.84$ . The intern doctors' high state and trait anxieties were 31.1% (n=47) and 57.6% (n=87) according to the STAI.

The temperament dimensions of TCI, the mean (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 TCI dimension and sub-dimension scores of intern doctors are given in Table 5.

**Table 5:** The TCI dimension and sub-dimension scores of intern doctors

Dimension	Subscales	n	Mean	SD
Temperament	<b>Novelty seeking (NS)</b>	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
	<b>Harm avoidance (HA)</b>	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
	<b>Reward dependence (RD)</b>	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
	<b>Persistence (PS)</b>	145	4.90	2.14
Character	<b>Self-directedness (SD)</b>	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
	<b>Cooperativeness (C)</b>	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
	<b>Self-transcendence (ST)</b>	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.

## Outcome data

Although 27 different preferred specialties were mentioned, the categories were merged into internal and surgical medical sciences during comparisons.

Using the STAI anxiety categories as dependent variable, the mean state and trait anxiety scores were compared with the independent samples t-test, which showed no significant difference between the groups. State anxiety scores for internal (n=95) and surgical (n=52) medical sciences 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) medical sciences 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, the 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 medical sciences were statistically higher than surgical medical sciences scores ( $p < 0.05$ ). The SD3 ( $3.23 \pm 1.28$  &  $4.08 \pm 1.04$ ) scores of the internal medical sciences were statistically lower than surgical medical sciences scores ( $p < 0.05$ ). 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).

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

Dimension	Preferred main specialty section*							
	Internal Medical Sciences			Surgical Medical Sciences			t	p
	Mean	SD	n	Mean	SD	n		
<b>Novelty seeking (NS)</b>	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
<b>Harm avoidance (HA)</b>	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
<b>Reward dependence (RD)</b>	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
<b>Persistence (PS)</b>	4.73	2.09	94	5.30	2.17	50	-1.53	0.128
<b>Self-directedness (SD)</b>	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
<b>Cooperativeness (C)</b>	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
<b>Self-transcendence (ST)</b>	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 due to only one selection.

## Discussion

The majority of intern doctors 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%) preferred basic medical sciences; all the other chose internal or surgical disciplines. The most preferred specialties were psychiatry, orthopedics and traumatology, and physical therapy and rehabilitation. The most three first reasons for selecting the given 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 of the specialty categories. However, HA and RD1 scores of internal medical sciences were statistically higher than surgical medical sciences scores. The SD3 scores of internal medical sciences were statistically lower than surgical medical sciences scores. There were no significant differences between the other TCI scale dimension and sub-dimension scores regarding the main medical specialty categories.

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 as 32.9% in a study, where mental health problems among medical students in Brazil were examined by a systematic review and meta-analysis (23). In a multicenter study using the STAI scale in medical students, state-anxiety was reported as 81.7%, and trait-anxiety as 85.6% (24).

One of the reasons why intern doctors want to choose internal medical science departments rather than surgical medical science departments may be the high level of anxiety among residents who choose surgical medical sciences (25). We could not find any Turkish or English publications examining the effect of anxiety on the selection of specialty. Our study showed that the levels of state and trait anxiety did not affect the choice of the main specialties.

In the study, Vaidya et al., the relationship between the temperament and characteristics of medical students and the choice of specialty by using the TCI scale were examined (26), where students choosing surgery, emergency medicine, and obstetrics and gynecology were 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 on RD, pediatrics having the most top 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 the specialty choice. HA, associated with the neurotransmitter serotonin, is the tendency to avoid or cease behaviors due to intense response to aversive stimuli expressed as a fear of uncertainty, shyness of strangers, quick fatigability, and pessimistic worry of future problems. RD, associated with the neurotransmitter noradrenaline, is the tendency to respond intensively to reward expressed as sentimentality, social attachment, and dependence of 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-acceptance, 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 C and SD. There may, indeed, be a surgical personality characterized by extraversion, C, and SD.

Some limitations of this study deserve mention. First, it was conducted in only one class of internship students at a single medical school, at one point in a time within 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 the specialty choice, whereas anxiety did not demonstrate such an impact. These findings may be beneficial to medical educators or career counselors in the specialty choice of medical students. Despite the limitations, this study may be helpful to medical students, professors, and medical educators in the specialty choice process. Further research with larger sample sizes, including other grades of students, will be required to evaluate the more meticulous factors associated with specialty choice.

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### **Conflict of interest**

The authors declare no conflict of interest for this study.



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