



What kind of Dr do you want to be?: A cross-sectional study measuring personality and sex effects of medical students[☆]

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ABSTRACT

Turkish medical students ($N = 376$; 145 men, 231 women) aged 18–25 ($M = 20.36$, $SD = 2.02$) reported on their personality and post-graduation specialty preferences. We found (1) sex differences in interests in psychiatry in favor of women (suppressed by Machiavellianism and competitiveness) and surgery in favor of men (mediated by psychopathy and competitiveness), (2) interests in basic/diagnostic medicine were associated with higher rates of narcissism and competitiveness in women, (3) interests in surgery were associated with higher rates of psychopathy (mediated by masculinity and competitiveness), and (4) interests in psychiatry were associated with less competitiveness. In women, psychopathy was correlated with interests in surgery more than basic/diagnostic medicine whereas competitiveness was more strongly correlated with interests in basic/diagnostic medicine than psychiatry. In men, competitiveness was more correlated with interests in psychiatry than surgery. Lastly, the relationship between interests in basic/diagnostic medicine and competitiveness was more strongly correlated in women than in men. Results are discussed in relation to sociocultural and evolutionary models of vocational interests.

1. Introduction

The reasons people make choices is determined by their personality and context; this includes their choices in professions. To date, research on medical specialty selection has (1) been limited to actual physicians (Bucknall et al., 2015), (2) focused on socially desirable personality traits (Milić et al., 2020), and (3) was quite Western in nature (Grasreiner et al., 2018). In this study, we provide a broad account of individual differences in vocational interests in medicine among Turkish medical students.

Like all other choices, the appeal of medical preferences may come down to what perceived utility each serves in people's lives. The motivational goals for being a medical doctor may center around communion (i.e., helping others) and agency (i.e., earning status) and each of these may be differently appealing to different people as a function of their personality and their sex. People characterized, either directly or indirectly, by seeking status may pursue medicine to satisfy these desires. For instance, those characterized by narcissism (e.g., sense of entitlement, grandiosity; Morf & Rhodewalt, 2001), Machiavellianism (e.g.,

pragmatism, duplicitousness; Jones & Paulhus, 2009), and psychopathy (e.g., callousness, antisociality; Hare et al., 2012), and those who enjoy competition (Buser et al., 2014) may be especially prone to seek status, compete with others (Vedel & Thomsen, 2017), and have less empathy compared to non-surgical areas (Walocha et al., 2013) which may inform their vocational interests (Jonason et al., 2014). Unsurprisingly, these traits are common in surgeons (Bucknall et al., 2015) where little direct interaction with patients is required and being a surgeon is considered particularly prestigious (Murphy, 2018); limited empathy and heightened interest in status are agentic characteristics. In contrast, where direct interaction with patients and empathy are job requirements like in psychiatry, these traits are likely not only costs, but may also dissuade people characterized by these traits to choose a profession like psychiatry. As such, more empathy should enable choices in psychiatry as a specialty reliant on emotional intelligence and interpersonal interactions (Chen et al., 2012). Therefore, we predict the Dark Triad traits and competitiveness should be associated with greater interests in surgery, whereas more empathy should be associated with greater interests in psychiatry.

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Beyond personality traits, there are sex/gender effects on medical preferences. For instance, surgery is often preferred by men whereas women tend to prefer psychiatry (Öğrenci Seçme ve Yerleştirme Merkezi, 2020; but see Milić et al., 2020). More generally, girls/women choose more “people-oriented” jobs (i.e., communal) and boys/men are more interested in jobs that require dealing with “things” (Luoto, 2020). Some researchers contend these sex differences are a function of learned social roles of what are considered appropriate jobs for men and women (Wood & Eagly, 2012) whereas other researchers contend these sex differences are manifestations of different evolved biases that enabled the reproductive fitness of our female (i.e., being more group-oriented provides protection for women) and male (i.e., acquiring status earned men greater access to mating opportunities) ancestors (Puts, 2010). Whichever perspective is correct, we think replication and extension of these sex differences and gender role effects may be revealing here.

To better understand these sex/gender effects we consider the idea of (1) sex-typical and (2) sex-atypical job preferences. First, we expect that greater masculinity should be linked to preferences for surgery, whereas greater femininity should be linked preferences to psychiatry. In reference to the second point, understanding how gender non-conforming people make their specialty choices may further elucidate sex/gender effects in preferences. For example, women who chose male-typical occupations are more assertive and tough-minded compared to women in female-typical jobs (Lemkau, 1983) and men who prefer female-typical jobs are more emotionally sensitive compared to other men preferring male-typical occupations (Lemkau, 1984). There are two ways to test these issues. First, examining whether the correlations between the personality traits and preferences differed in the sexes (i.e., moderation). For instance, if sex-typical traits, like psychopathy, are more strongly correlated with sex-typical professions, like surgery, in men than in women, we will have shown that when “properly matched”, traits predict preferences in sex-differentiated ways. Second, we test whether sex differences are a function of the personality traits. For instance, if the removal of variance of a sex-atypical trait like empathy in men makes the sex difference grow, we have shown that the sex differences are larger when considering more sex-typical people (i.e., suppression). Alternatively, men and those high in psychopathy may think of their patients as “things” more than women and those low in psychopathy, translating into a reduction of sex differences in interest for surgery by psychopathy (i.e., mediation).

Last, because surgical and psychiatric specialties may require considerably different characteristics, they might be considered as the two extreme ends of a specialty preference spectrum. Hence, we include more “neutral” specialties (i.e., basic/diagnostic medicine) requiring both patient-physician contact like psychiatry as well as some surgical practices when the occasion arises (i.e., removal of melanoma). By this, we can examine personality and sex differences in specialty preferences in a broader context.

In the current study, we examine the vocational interests (i.e., basic/diagnostic medicine, surgery, psychiatry) of medical students through the lens of personality psychology in broad (i.e., the Dark Triad traits) and narrow (e.g., competitiveness) manifestations overall and in men and women. We explore the possibilities that (1) these correlations are different in men and women, (2) sex differences in preferences may be a function of personality traits, and (3) narrowband traits may serve as the mechanisms that link broadband traits to medical specialties. Importantly, we do this in a Turkish, as opposed to a Western sample, thereby adding sampling heterogeneity to the areas of vocational interests and medical specialization preferences to see whether previous findings were Western-specific.

2. Method

2.1. Participants and procedure

Our sample size was based on the average effect size ($r \approx 0.20$) in

personality psychology (Gignac & Szodorai, 2016) and guidelines ($N \approx 250$) set for reducing estimation error in personality psychology (Schönbrodt & Perugini, 2013). Through snowball sampling (i.e., e-mail, social media), 376 Turkish students from medical schools (145 men, 231 women) completed (416 started) an online survey (≈ 10 min). Participants were informed of the nature of the study, provided tick-box consent, where asked whether they were medical students in Turkey (if they said “no” they were ejected from the study), participants completed a series of self-report measures and a demographics questionnaire, and were debriefed and thanked upon completion. This study was approved by the ethics committee at Istanbul University Cerrahpasa, Faculty of Medicine (E-83045809-604.01.02-155396).

2.2. Measures

The Dark Triad traits were measured with the Turkish translation (Özsoy et al., 2017) of the Dark Triad Dirty Dozen scale (Jonason & Webster, 2010). The scale is composed of four items measuring Machiavellianism (e.g., “I tend to exploit others towards my own end.”), four measuring psychopathy (e.g., “I tend to not be too concerned with morality or the morality of my actions.”), and four measuring narcissism (e.g., “I tend to feel that I am better than others.”). Participants were asked how much they agreed (1 = *Strongly Disagree*; 5 = *Strongly Agree*) with the statements, and their scores were averaged to create indexes of each.

Competitiveness was measured with the Turkish translation (Günay & Çelik, 2020) of the Revised Competitiveness Index (Houston et al., 2002). The translated and adapted version of the scale is made up of 11 items. We used only the enjoyment of competition subscale that has eight items (e.g., “I enjoy competing against an opponent.”). Participants were asked how much they agreed (1 = *Strongly Disagree*; 5 = *Strongly Agree*) with the statements, and their scores were averaged to create indexes of each.

Empathy was measured with the Turkish translation (Gönüllü & Öztuna, 2012) of the Jefferson Scale of Physician Empathy Student Version (Hojat et al., 2002). The scale is composed of 20 items measuring perspective taking (e.g., “I believe that empathy is an important therapeutic factor in medical treatment.”), compassionate care (e.g., “I believe that emotion has no place in the treatment of medical illness.”), and standing in patients’ shoes (e.g., “Because people are different, it is difficult to see things from patients’ perspectives.”). Participants were asked how much they agreed (1 = *Strongly Disagree*; 7 = *Strongly Agree*) with the statements, and their scores were averaged to create indexes for each.

Gender Role Identity was measured with an ad hoc, single question. Inspired by the Kinsey Scale for sexual orientation (Kinsey et al., 2003), participants were asked to report how masculine or feminine they were on a single continuum (1 = *Very Masculine*; 3 = *Androgynous*; 5 = *Very Feminine*). Participants’ responses were used to determine their gender role identity, but the measure was treated as continuous.

To measure medical specialty preferences, participants were asked how much they would prefer 20 specialties as a career in the future (1 = *Not Preferable*; 5 = *Very Preferable*). The specialties were selected from the most preferred fields according to the Medical Proficiency Exam results in 2020 in Turkey (Öğrenci Seçme ve Yerleştirme Merkezi, 2020) and were manually categorized in accordance with prior work (Grasreiner et al., 2018) as basic/diagnostic medicine (i.e., dermatology, radiology, physiotherapy, ophthalmology, otolaryngology, clinical microbiology and infectious diseases, cardiology, neurology, chest diseases, internal medicine, and anaesthesiology and reanimation), surgery (i.e., general surgery, plastic surgery, neurosurgery, cardiovascular surgery, urology, orthopaedic and trauma surgery, and obstetrics and gynaecology), and psychiatry (i.e., psychiatry, child psychiatry).

3. Results

In a 2 (sex) \times 3 (specialty) mixed model ANOVA (see Fig. 1 and Table 1), we found a main effect of medical specialties on preference ($F[2, 748] = 22.46, p < .01, \eta_p^2 = 0.06$), suggesting that in basic/diagnostic medicine and psychiatry were preferred more than surgery ($p < .01$). Although sex did not have a main effect on preference ($F = 0.47$), an interaction ($F[2, 748] = 17.93, p < .01, \eta_p^2 = 0.05$) suggested that psychiatry was preferred more by women and surgery was more preferred by men. In addition, women preferred psychiatry more ($p < .01$) than basic/diagnostic medicine and surgery, and preferred basic/diagnostic medicine more ($p = .01$) than surgery. In contrast, men preferred basic/diagnostic medicine more than surgery ($p < .01$) and psychiatry ($p < .05$).

Correlations are reported in Table 1, but we focused here solely correlations between traits and medical specialty preferences. Preferences for surgery were positively correlated with psychopathy, the enjoyment of competition, and masculinity whereas interests in psychiatry were associated with less enjoyment of competition and higher levels of femininity. Preferences for basic/diagnostic medicine were positively correlated with the enjoyment of competition only in women ($r = 0.14, p < .05$), preferences for surgery positively correlated with psychopathy only in women ($r = 0.14, p < .05$), and preferences for psychiatry was negatively correlated with the enjoyment of competition only in men ($r = -0.20, p < .05$). In women, psychopathy was correlated more ($p < .05$) with surgery ($r = -0.15, p < .05$) more than basic/diagnostic medicine ($r = -0.03, p > .05$) whereas the enjoyment of competition was more ($p < .01$) strongly correlated with interests in basic/diagnostic medicine ($r = 0.14, p < .05$) than psychiatry ($r = 0.07, p > .05$). And in men, the enjoyment of competition was more correlated ($p < .01$) with interests in psychiatry ($r = -0.20, p < .05$) more than surgery ($r = 0.02, p > .05$).

Next, we tested whether sex (men = 1, women = 2; Step 1) differences in preferences for surgery ($\Delta R^2 = 0.04, F[1, 374] = 13.41, p < .01; \beta = -0.29, p < .01$) and psychiatry ($\Delta R^2 = 0.03, F[1, 374] = 12.97, p < .01; \beta = 0.48, p < .01$) were mediated by gender role identity, empathy, and the Dark Triad traits using a series of independent (per mediator) hierarchical multiple regressions. Psychopathy ($\Delta R^2 = 0.05, F[1, 374] = 9.73, p < .01$) and the enjoyment of competition ($\Delta R^2 = 0.05, F[1, 374] = 9.61, p < .01$) partially mediated (i.e., β shrunk but remained significant) sex differences in preferences for surgery (β s = -0.24 & $-0.26, p < .01$), suggesting men may be more interested in surgery than women because they are more psychopathic and competitive. In the case of psychiatry, we found Machiavellianism ($\Delta R^2 = 0.05, F[1, 374] = 8.79, p < .01$) suppressed (i.e., β grew) sex differences in preferences for psychiatry (β s = 0.48 & $0.51, p < .01$), suggesting that when we remove gender-atypical women who scored higher in Machiavellianism, women's preference for psychiatry was more pronounced. On the other hand, the enjoyment of competition ($\Delta R^2 = 0.05, F[1, 374] = 9.10, p <$

.01) mediated (i.e., β shrunk) sex differences in preferences for psychiatry (β s = 0.48 & $0.41, p < .01$) suggesting that when we remove gender-atypical men who scored lower in the enjoyment of competition, men's preferences for psychiatry was less pronounced.

Last, to understand the potential mechanisms linking the Dark Triad traits (as distal personality traits) to medical preferences, we treated the narrowband traits of gender role identity, enjoyment of competition, and empathy as mediators. The link between psychopathy and preferences for surgery ($\Delta R^2 = 0.03, F[1, 374] = 10.67, p < .01; \beta = 0.15, p < .01$) was partially mediated by gender role identity ($\Delta R^2 = 0.05, F[1, 374] = 10.21, p < .01$) and the enjoyment of competition ($\Delta R^2 = 0.04, F[1, 374] = 8.30, p < .01$), suggesting that more psychopathic students preferred surgery because they were masculine ($\beta = 0.11, p < .02$) and competitive ($\beta = 0.13, p < .01$). In the case of the sex difference in preference for surgery, we found suppression ($\Delta R^2 = 0.02, F[1, 228] = 3.64, p < .05$) in women such that the link between psychopathy and preferences for surgery ($\beta = 0.14, p < .05$) became larger ($\beta = 0.16, p < .05$) through the removal of sex-atypical women who scored higher on psychopathy.

4. Discussion

In cross-sectional data from Turkish medical students, we attempted to understand how personality traits (i.e., gender role identity, competitiveness, empathy, the Dark Triad traits) might influence decisions to pursue a career in basic/diagnostic medicine, surgery, and psychiatry. As expected, we found interests in surgery were associated with male-typical traits like psychopathy and competitiveness while interests in psychiatry were correlated with male-atypical traits like low competitiveness and empathy. Importantly, we found sex differences and gender role effects for choices of surgery and psychiatry but not basic/diagnostic medicine; preferences for surgery were correlated with masculinity, and preferences for psychiatry were linked to femininity. The prestigious and competitive nature of surgery (Thomas, 1997) might be more compatible with men's evolved (Puts, 2010) and learned (Wood & Eagly, 2012) natures of being status-driven, thing-oriented (Luoto, 2020), and competitive while women (i.e., nurturing, communal, agreeable) are more prone to choose psychiatry as a specialty because it is associated with empathy and fewer work demands (Srinivasan, 2005).

We also found gender-atypical women with more psychopathic and competitive tendencies were more likely to choose surgery compared to psychiatry. In fact, although it was mostly men with higher levels of psychopathy, competitiveness, and masculinity who choose surgery, psychopathy was especially predictive for women to choose surgery. Additionally, preferences for basic/diagnostic medicine—the gender-neutral specialty—was correlated with narcissism and the enjoyment of competition in women. Like with psychopathy, enjoying competition was more relevant for women for choosing basic/diagnostic medicine compared to men. Even in preferences for psychiatry—the female-typical specialty—sex differences were suppressed by Machiavellianism (i.e., the presence of a male-typical trait) and less enjoyment of competition (i.e., the absence of a male-typical trait), showing the levels of male-typical traits in students are important for medical specialty selection. Despite the increasing number of women specializing in medicine, men and women are unequally distributed across specialties. However, even in the specialties where most of the female doctors practice, male doctors still make up 34 % of the medical workforce whereas female doctors make up only 1 % of the majority of specialization fields more common for men (Kuzuca & Arda, 2010). This might indicate that medicine is still a male-typical field in general (Basfirinci et al., 2019) or that men are simply more drawn to it given the rather high demands in terms of time and sacrifice relative to the potential benefits (e.g., traditional stereotypes produce covert biases that impede women's professional growth, lead to household labor disputes, which may discourage many women from pursuing a career with higher

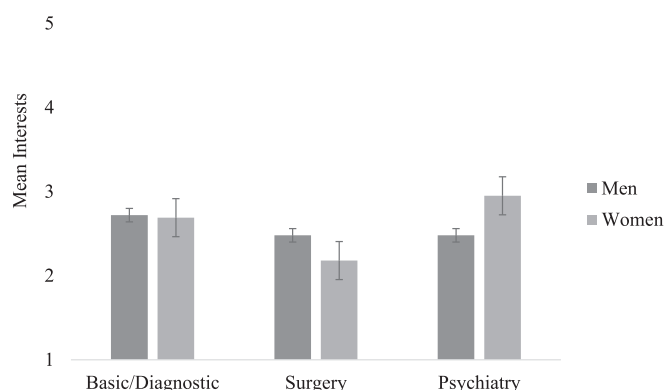


Fig. 1. Sex differences in medical specialties.

Table 1

Descriptive statistics, sex differences, and correlations for the medical specialties, the Dark Triad traits, the enjoyment of competition, empathy, and gender role identity.

	1	2	3	4	5	6	7	8	9	10	11
1. Basic medicine											
2. Surgery	0.19**										
3. Psychiatry	0.20**	-0.06									
4. Machiavellianism	0.02	0.06	0.09								
5. Psychopathy	-0.02	0.17**	0.02	0.54**							
6. Narcissism	0.04	0.04	-0.05	0.33**	0.24**						
7. Enjoyment of competition	0.04	0.16**	-0.15**	0.26**	0.24**	0.27**					
8. Standing in patients' shoes	-0.06	<0.01	0.07	-0.04	<0.01	-0.07	-0.05				
9. Compassionate care	-0.04	-0.08	0.08	-0.21**	-0.25**	-0.03	-0.09	0.11*			
10. Perspective taking	0.02	<0.01	0.11*	-0.13*	-0.14**	-0.03	<0.01	<0.01	0.55**		
11. Gender role identity	< 0.01	-0.20**	0.17**	-0.11*	-0.28**	0.02	-0.19**	0.06	0.13*	0.07	
Cronbach's α	0.69	0.68	0.70	0.78	0.63	0.75	0.92	0.48	0.67	0.80	-
Overall: M (SD)	2.70 (0.60)	2.30 (0.77)	2.77 (1.27)	2.16 (0.98)	2.02 (0.84)	3.42 (0.89)	3.08 (1.01)	4.22 (1.30)	5.83 (0.77)	5.39 (0.85)	3.16 (1.20)
Men: M (SD)	2.72 (0.63)	2.48 (0.74)	2.48 (1.17)	2.31 (1.06)	2.29 (0.93)	3.44 (0.90)	3.36 (1.06)	4.03 (1.30)	5.69 (0.87)	5.30 (0.94)	1.80 (0.63)
Women: M (SD)	2.69 (0.59)	2.18 (0.77)	2.95 (1.30)	2.07 (0.92)	1.84 (0.73)	3.41 (0.88)	2.90 (0.94)	4.33 (1.29)	5.92 (0.69)	5.44 (0.79)	4.02 (0.46)
t -Test	0.43	3.66**	-3.60**	2.36*	4.90**	0.40	4.21**	-2.19*	-2.67**	-1.42	36.72**
Cohen's d	0.05	0.39	-0.39	0.24	0.54	0.03	0.45	-0.23	-0.29	-0.15	4.02

Note. Cohen's d was calculated online (<https://www.socscistatistics.com/effectsize/default3.aspx>). For psychiatry and standing in the patients' shoes, Pearson's r was calculated instead of Cronbach's.

α because they have less than three variables. Gender role identity was measured with a single item (-) and this no index of internal consistency can be provided.

* $p < .05$.

** $p < .01$.

demands; Durante & Rittweger, 2021). Therefore, sex-typical women in medicine might experience several obstacles. For instance, the lack of fit model (Heilman & Caleo, 2018) suggests women might be judged because of a mismatch between stereotypically feminine characteristics and roles, and the characteristics necessary for success in male-typed fields, which may lead to discrimination in the workplace and an increase in the amount of competition for women. According to the red queen hypothesis (Van Valen, 1977), in the case of competition where there are unequal conditions, the disadvantaged group (i.e., women in male-typical medical specialties) may develop some characteristics (i.e., male-typical traits) to help them compete with the advantaged group (i.e., men in male-typical specialties). Therefore, because women in medical schools have already been involved in a male-typical occupation, they might adapt to the environment by developing some male-typical traits to fit in during medical school by becoming more status-driven with the urge to prove oneself and be less person- and more thing-oriented, which are evidenced in the Dark Triad traits. Alternatively, they might gravitate towards less mismatched areas of medicine (i.e., psychiatry) where they can interact with patients more and avoid competitive work environments. On the other hand, choosing psychiatry might not be as stigmatizing for men compared to women choosing female-atypical specialties, considering (1) being a doctor is stereotypically male-typical and (2) male doctors are appreciated more when they show empathy and perceived as more competent compared to women (Roter & Hall, 2014), which might be because women are already expected to be empathetic. Therefore, choosing a female-typical specialty, might not be a problem for men as long as they are still acknowledged as doctors. Hence, men who do not like competition might become psychiatrists to avoid the higher requirements of other specialties (i.e., more competitive environment, longer work hours) while still benefitting from the prestige of being a doctor.

4.1. Limitations & conclusions

While our study has several strengths that make it stand out, it still has some shortcomings. First, we categorized the medical specialties manually as per previous research (Grasreiner et al., 2018). This may

undermine the trustworthiness of our effects because manual groupings may be face-valid only. Second, as is common in the field, we relied on cross-sectional, self-report data which may be subject to response biases, especially for traits like narcissism (Carroll, 1987) and empathy (Kämpfe et al., 2009). Third, while our results were congruent with the literature, the ad hoc measure for gender role identity might be weak because it fails to capture the potentially multidimensional nature of gender roles (Williensen & Fischer, 1999) despite its utility in reducing participant fatigue. For future work, other measures could be used to understand if our method caused artifacts.

If personality traits and aspects of people's sexual identity predict vocational interests, it seems reasonable they should also predict vocational interests within specific professions. In this study, we examined how much Turkish medical students wanted to hold jobs in basic/diagnostic medicine, surgery, and psychiatry and how these preferences were associated with broadband, "dark" traits, narrowband mechanisms like empathy and competitiveness, and gender role identity along with sex differences. We found gender-typical and atypical traits played an important role in choosing a specialty for all students. Surgical fields were preferred mostly by men, while psychiatric specialties were mostly chosen by women, which might be explained by either social role theory (Wood & Eagly, 2012), the evolutionary point of view (Puts, 2010), or a mixture of both whereby evolved biases are calibrated to local conditions by evolved learning mechanisms to allow the sexes to optimize their reproductive fitness based on their internal dispositions and contextual parameters (e.g., what leads to "status" in a particular socioecology). Indeed, surgery was also preferred by gender-atypical women who have similar traits, and these traits were more important for women to fit in a male-typical specialty. Men who preferred psychiatry were less competitive, which might show they do not necessarily feel the need to fit in because medicine is considered as a male-typical field by the society. Rather, they may choose to avoid competitive environments by preferring a specialty where the majority are women, who are not stereotypically perceived as competent as men in medicine. Our results provide new insights into the role of the Dark Triad traits in medical field preferences overall, in each sex, and as a function of mechanisms like gender roles, empathy, and competitiveness.

CRedit authorship contribution statement

Irem F. Kashikchi: Conceptualization, Investigation, Writing – original draft, Formal analysis, Software. **Bayram M. Savrun:** Supervision. **Peter K. Jonason:** Supervision, Conceptualization, Methodology, Validation, Writing – review & editing.

Declaration of competing interest

The authors have no declaration of interest.

Data availability

The data that has been used is confidential.

References

- Basfirinci, C., Uk, Z. C., Karaoglu, S., & Onbas, K. (2019). Implicit occupational gender stereotypes: A research among Turkish university students. *Gender in Management: An International Journal*, *34*, 157–184.
- Bucknall, V., Burwaiss, S., MacDonald, D., Charles, K., & Clement, R. (2015). Mirror mirror on the ward, who's the most narcissistic of them all?: Pathologic personality traits in health care. *Canadian Medical Association Journal*, *187*, 1359–1363.
- Buser, T., Niederle, M., & Oosterbeek, H. (2014). Gender, competitiveness, and career choices. *The Quarterly Journal of Economics*, *129*, 1409–1447.
- Carroll, L. (1987). A study of narcissism, affiliation, intimacy, and power motives among students in business administration. *Psychological Reports*, *61*, 355–358.
- Chen, D. C., Kirshenbaum, D. S., Yan, J., Kirshenbaum, E., & Asetline, R. H. (2012). Characterizing changes in student empathy throughout medical school. *Medical Teacher*, *34*, 305–311.
- Durante, K., & Rittweger, A. (2021). Outdated gender norms continue to haunt women's workplace advancement. *Rutgers Business Review*, *6*, 189–195.
- Gignac, G. E., & Szodorai, E. T. (2016). Effect size guidelines for individual differences researchers. *Personality and Individual Differences*, *102*, 74–78.
- Gönüllü, İ., & Öztuna, D. (2012). Jefferson empati ölçeği öğrenci versiyonunun türkçe adaptasyonu [A Turkish adaptation of the student version of the Jefferson scale of physician empathy]. *Marmara Medical Journal*, *25*, 87–92.
- Grasreiner, D., Dahmen, U., & Settmacher, U. (2018). Specialty preferences and influencing factors: A repeated cross-sectional survey of first-to sixth-year medical students in Jena, Germany. *BMC Medical Education*, *18*, 1–11.
- Günay, A., & Çelik, R. (2020). Bireysel rekabetçilik ölçeği: Türkçe uyarlama, geçerlik ve güvenilirlik çalışması [The adaptation of revised individual competitiveness index]. *Süleyman Demirel Üniversitesi Vizyoner Dergisi*, *11*, 42–49.
- Hare, R. D., Neumann, C. S., & Widiger, T. A. (2012). Psychopathy. In T. A. Widiger (Ed.), *The Oxford handbook of personality disorders* (pp. 478–504). Oxford University Press.
- Heilman, M. E., & Caleo, S. (2018). Combatting gender discrimination: A lack of fit framework. *Group Processes & Intergroup Relations*, *21*, 725–744.
- Hojat, M., Gonnella, J. S., Nasca, T. J., Mangione, S., Vergare, M., & Magee, M. (2002). Physician empathy: Definition, components, measurement, and relationship to gender and specialty. *American Journal of Psychiatry*, *159*, 1563–1569.
- Houston, J., Harris, P., McIntire, S., & Francis, D. (2002). Revising the competitiveness index using factor analysis. *Psychological Reports*, *90*, 31–34.
- Jonason, P. K., & Webster, G. D. (2010). The dirty dozen: A concise measure of the dark triad. *Psychological Assessment*, *22*, 420–432.
- Jonason, P. K., Wee, S., Li, N. P., & Jackson, C. (2014). Occupational niches and the dark triad traits. *Personality and Individual Differences*, *69*, 119–123.
- Jones, D. N., & Paulhus, D. L. (2009). Machiavellianism. In M. R. Leary, & R. H. Hoyle (Eds.), *Handbook of individual differences in social behavior* (pp. 93–108). The Guilford Press.
- Kämpfe, N., Penzhorn, J., Schikora, J., Dünzl, J., & Schneidenbach, J. (2009). Empathy and social desirability: A comparison of delinquent and non-delinquent participants using direct and indirect measures. *Psychology, Crime, & Law*, *15*, 1–17.
- Kinsey, A. C., Pomeroy, W. R., & Martin, C. E. (2003). Sexual behavior in the human male. *American Journal of Public Health*, *93*, 894–898.
- Kuzuca, İ. G., & Arda, B. (2010). What can we say about gender discrimination in medicine?: A limited research from Turkey. *Ankara Üniversitesi Tıp Fakültesi Mecmuası*, *63*, 1–8.
- Lemkau, J. P. (1983). Women in male-dominated professions: Distinguishing personality and background characteristics. *Psychology of Women Quarterly*, *8*, 144–165.
- Lemkau, J. P. (1984). Men in female-dominated professions: Distinguishing personality and background features. *Journal of Vocational Behavior*, *24*, 110–122.
- Luoto, S. (2020). Sex differences in people and things orientation are reflected in sex differences in academic publishing. *Journal of Informetrics*, *14*, Article 101021.
- Milić, J., Škrlec, L., Milić Vranješ, I., Jakab, J., Plužarić, V., & Heffer, M. (2020). Importance of the Big Five in the future medical specialty preference. *BMC Medical Education*, *20*, 1–9.
- Morf, C. C., & Rhodewalt, F. (2001). Expanding the dynamic self-regulatory processing model of narcissism: Research directions for the future. *Psychological Inquiry*, *12*, 243–251.
- Murphy, B. (2018). Residency match: The 7 most competitive medical specialties. American Medical Association. Retrieved February 4, 2022, from <https://www.ama-assn.org/residents-students/specialty-profiles/residency-match-7-most-competitive-medical-specialties>.
- Öğrenci Seçme ve Yerleştirme Merkezi [Student Selection and Placement Center]. (2020). 2020 TUS 1. ve 2. Dönem Değerlendirme Raporu [MSE1. and 2. Term Evaluation Report]. osym.gov.tr. Retrieved February 4, 2022, from https://dokuman.osym.gov.tr/pdfdokuman/2020/YKS/taflo3_26082020.pdf.
- Özsoy, E., Rauthmann, J. F., Jonason, P. K., & Ardiç, K. (2017). Reliability and validity of the Turkish versions of dark triad dirty dozen (DTDD-T), short dark triad (SD3-T), and the single item narcissism scale (SINS-T). *Personality and Individual Differences*, *117*, 11–14.
- Puts, D. A. (2010). Beauty and the beast: Mechanisms of sexual selection in humans. *Evolution and Human Behavior*, *31*, 157–175.
- Roter, D. L., & Hall, J. A. (2014). Women doctors don't get the credit they deserve. *Journal of General Internal Medicine*, *30*, 273–274.
- Schönbrodt, F. D., & Perugini, M. (2013). At what sample size do correlations stabilize? *Journal of Research in Personality*, *47*, 609–612.
- Srinivasan, N. (2005). Who is a good psychiatrist?—A collective view. *Indian Journal of Psychiatry*, *47*, 182–183.
- Thomas, J. H. (1997). The surgical personality: Fact or fiction. *The American Journal of Surgery*, *174*, 573–577.
- Van Valen, L. (1977). The red queen. *The American Naturalist*, *111*, 809–810.
- Vedel, A., & Thomsen, D. K. (2017). The dark triad across academic majors. *Personality and Individual Differences*, *116*, 86–91.
- Walocha, E., Tomaszewska, I., & Mizia, E. (2013). Empathy level differences between Polish surgeons and physicians. *Folia Medica Cracoviensia*, *53*, 47–54.
- Williensen, T. M., & Fischer, A. H. (1999). Assessing multiple facets of gender identity: The gender identity questionnaire. *Psychological Reports*, *84*, 561–562.
- Wood, W., & Eagly, A. H. (2012). Biosocial construction of sex differences and similarities in behavior. In *Advances in experimental social psychology* (Vol. 46, pp. 55–123). Academic Press.