Exploring Emotional Intelligence and Thinking Style in Saudi Residents: A Cross-Sectional Study

Adel Omar Bataweel [ORCID]**, Mohammed Gaffar Mohammed Ahmed**

Patient Safety and Risk Management Administration, King Fahad Medical City, Riyadh, Saudi Arabia
Email: adelbataweel@hotmail.com, abataweel@kfmc.med.sa, mgahmed@kfmc.med.sa

Abstract

Background: Emotional Intelligence (EI) and style of thinking (Rational style, RS and Experiential style, ES) are stable constructs that could be used to highlight how we think and behave, which is extremely important, especially in the healthcare sector, as it is complex and human-dependent. This study explored the EI and style of thinking of Saudi residents together with demographic data to see how they could relate and the implications of this on residents and patient safety. **Design:** This was a cross-sectional study. **Methods:** A sample (of 245) with different specialty backgrounds was used. Participants completed an online self-report survey, which included demographic information, followed by questionnaires to measure their thinking style and emotional Intelligence. **Results:** The main findings were a positive and significant correlation between RS and EI: rs = .482, n = 245, *p* < .001, and a positive and significant correlation between ES and EI: rs = .326, n = 245, *p* < .001. Additionally, there was a significant relationship between error rate and RS style of thinking: H (1) = 7.597, *p* = .006, and a significant relationship between error rate and EI: U = 5619.000, z = −3.387, *p* < .001. **Conclusion:** Medical Organizations could benefit from assessing their healthcare workers' EI and thinking style to understand their differences and behaviors toward healthier workers and better patient care outcomes.

Keywords

Patient Safety, Emotional Intelligence, Thinking Style, Rational Style, Experiential Style, Medical Error, Burnout

1. Introduction

Success in life or career could be due to two factors like the Intelligence Quotient

(IQ), which might count for approximately 20%, and the remaining was argued to be due to Emotional Intelligence (EI) as it affects behavior like how to act in social life, memory and attention and better decision making (Weinstein, 2011).

EI is considered a stronger predictor of happiness than other measures, such as the Big Five personality factors (Weinstein, 2011; Bukhari & Khanam, 2014). EI has also been negatively associated with psychological distress and depression among healthcare providers, such as residents, because of long working hours (Montvilaitė & Antinienė, 2020; Sinclair & Feigenbaum, 2012; Fix & Fix, 2015). It was also found that EI was correlated with impulsive behavior and difficult interpersonal relationships, which are negative characteristics for any patient's quality of care. Additionally, psychopathy is related to low EI, which is a crucial issue to be known and acknowledged, because it leads to disruptive, maladaptive anti-social behaviors towards colleagues and patients (Jauk, Freudenthaler, & Neubauer, 2016; Szabó & Bereczkei, 2017).

EI has been shown to help people manage and regulate their emotions and stress and to protect them from self-harm and psychological distress better (Badri et al., 2021; Mikolajczak, Petrides, & Hurry, 2009). EI also, through its self-control components, helps people to face their problems to resolve them instead of avoiding them, which would make the situation worse and more stressful (Mikolajczak, Petrides, & Hurry, 2009). This is a critical issue in healthcare providers, where it was found that suicidal ideation and attempts were high, and EI played a protective role against such an adverse event to healthcare providers and their patients (Aradilla-Herrero, Tomás-Sábado, & Gómez-Benito, 2014; El-Khodary et al., 2021). Another critical dimension in healthcare is the empathic attitude towards patients, which was found to increase with high EI scores (Shi & Du, 2020).

Burnout is a severe issue for healthcare providers, as it can lead to poor self-esteem, suicide, substance abuse, lower productivity, and lower patient care by physicians, and it affects female and young physicians more than others (Dutheil et al., 2019; Kalmoe et al., 2019; Swider & Zimmerman, 2010). The male physician suicide rate is about 40% higher than that of the general population, and the female physician rate is almost 130% (Kalmoe et al., 2019). Some specialties are at greater risk than others, such as anesthetists, psychiatrists, general surgeons, and general practitioners (Dutheil et al., 2019). Medical residents are vulnerable to depression; where one study found 20% of them met the criteria for this, and 74% met the criteria for burnout, and this made them more likely to make more medical errors with up to 6.2 times than other residents (Kalmoe et al., 2019) with the US having the third cause of death are medical errors (Dutheil et al., 2019). Highly trait emotionally intelligent people cope better with stress more effectively, and this helps, in turn, with their performance and academic and occupational success and protects them from burnout as burnout starts with stress (Di Fabio & Palazzeschi, 2015; Khesroh et al., 2022; Nyarko et al., 2020; Sanchez-Gomez & Breso, 2020). Burnout, stress, and suicidal attempts affect

healthcare people differently, and it depends on their personality characteristics which are closely related to EI (Weinstein, 2011; Dutheil et al., 2019) and also it is a country and cultural specific (Dutheil et al., 2019; Sánchez-Ruiz, Mavroveli, & Petrides, 2021), with female medical students showing higher levels of stress than male medical students (El-Khodary et al., 2021). From a cultural point of view, it was found that Lebanese participants had higher scores in EI factors such as sociability than UK participants, which might be expected due to the differences in the emphasis on family and friends and between the individualistic and collectivistic nature of the Middle East compared to Western society (Sánchez-Ruiz, Mavroveli, & Petrides, 2021). One interesting finding in their study was that the Lebanese scored less in optimism, which the author contributed to the harsh political climate of the country for many years, affecting and changing people's perceptions about the future, and EI was sensitive enough to pick this up (Sánchez-Ruiz, Mavroveli, & Petrides, 2021).

Other studies looked at EI and gender for healthcare leaders as essential elements for dealing with patients in an administrative way, and they found that gender had an effect on EI, where females scored higher (Waidler, 2021). Additionally, it was found that EI will protect the origination in time of change, and females had better scores than males, indicating that more females are needed during the time of change (Null, 2019). In contrast, other studies found that male medical students had higher scores than female students (Skokou et al., 2019), and other studies found no difference (Jauk, Freudenthaler, & Neubauer, 2016; Abe, Niwa, Fujisaki, & Suzuki, 2018; Lin, Kannappan, & Lau, 2013).

EI has also shown positive effects on academic achievement and performance and better social and emotional adjustment (Ahmed, Asim, & Pellitteri, 2019; Krajniak et al., 2018), and studies have encouraged EI to be part of the curricula to improve nurses' EI for better performance, well-being, and patient care (Görgens-Ekermans & Brand, 2012). High trait EI is positively associated with creativity in the workplace and better divergent thinking, which is essential in healthcare when diagnosing patients (Sánchez-Ruiz et al., 2011). On the other hand, low EI is associated with depression and addiction (Henning, Crane, Taylor, & Parker, 2021) and is also a predictor of depression among healthcare providers, such as general surgery residents, which could affect them, their colleagues, and patient safety (Lin et al., 2016a).

Styles of thinking (Rational and Experiential) will also be explored in this study to see if there is a relationship between them and EI. Styles of thinking were reported to help in reducing medical errors as it would make healthcare providers more conscious of different types of biases that could be caused by their way of thinking (Bataweel, 2022; Ludolph & Schulz, 2018). Even coping with stress at the workplace, which is vital in healthcare settings, especially with long hours, is affected by the style of thinking, where it was found that males with a rational thinking style and females with an experiential style coped better (Bavolar, 2017).

There are limited studies looking at the relationship between EI and style of

thinking, especially in healthcare, as far as the authors are concerned. However, some studies found that good-quality decision-making required different factors, two of which were EI and style of thinking (Salehi & Mohammadi, 2017). Their study used different scales for these two components, and their participants were managers; however, never the less, they found that these two factors had a direct and positive effect on the quality of decision-making. Similarly, another study found that thinking style affected EI, but again, the scales differed from this study (Darvish & Ayagh, 2013). The only study found similar to ours was done for university psychology students and using the shorter version for EI (Jokić & Puric, 2019). Their findings were interesting, as they found that EI was high if both styles of thinking (Rational and Experiential) scored high; however, EI was low if both styles of thinking had low scores, and there were no differences if one of the styles of thinking was high compared to the other. A Ph.D. thesis examined retail managers in the US and compared their EI and style of thinking (Hovencamp, 2014) using the same scale for style of thinking but different scales for EI; however, it was found that both EI and style of thinking were correlated, and had a positive relationship with each other.

Many of the demographic data that will be collected either have had an impact on EI or style of thinking from previous studies, and others were not and would be investigated for better understanding. For example, a study on Saudi plastic surgery residents did not find any significant association between EI and the following variables: age, gender, marital status, level of residency, and smoking (Bin Dahmash et al., 2019), which was also confirmed by a similar study for plastic surgery residents but in the UK (Serebrakian et al., 2021). However, contrary to this study that looked at marital status and whether there was an association between it and EI, they found that EI was significantly lower in single general surgery residents compared to married or divorced (Lin et al., 2016a). Finally, interestingly, as part of this study, we found how blood groups are associated with EI. One study found a significant association between blood groups and EI; for example, Group O was found to be more emotionally intelligent. However, they recommended large-scale studies worldwide to explore this further (Shaikh et al., 2020). Another study also found significant differences between blood groups and EI; however, it was more specific to certain components of EI. For example, a study showed that the AB+ blood group had a higher score on empathy and emotional stability than the other blood groups (Gupta, 2017).

Therefore, this study aimed to explore the emotional Intelligence and styles of thinking of King Fahad Medical City (KFMC) residents and determine differences in gender, age, specialty, residency level, social status, marital status, smoking, time on social media, exercising habits, and GPA performance.

2. Method

2.1. Participants

A simple random sampling was used to recruit residents of all specialties at King

Fahad Medical City (KFMC), Riyadh, Kingdom of Saudi Arabia, during the period of 1st December 2022 - 5th January 2023. There were 698 Residents at the time of the study. The number of responses received was 568, making the response rate 81.4%. The completed responses were 245 out of the 568 total responses.

The final sample (N = 245) comprised one hundred twenty-two males (49.8%) and one hundred twenty-three females (50.2%). Age groups were: 24 - 26 years old (n = 70, 28.6%), 27 - 29 years old (n = 133, 54.3%), 30 - 35 years old (n = 39, 15.9%) and ≥36 years old (n = 3, 1.2%).

Demographic data collected were: gender, age, specialty, residency level, social status, marital status, smoking, time on social media, exercising habits, and GPA performance.

2.2. Design

A cross-sectional, self-administered online survey was conducted with residents through KFMC emailing system. Qualtrics survey tool was used for the survey construction and SPSS (version 28) were used for the analysis. Demographic data were first collected. The survey then presented participants with 40 questions to calculate the thinking styles, and 153 questions for the emotional intelligence calculation.

2.3. Procedure

Ethical approval was obtained from King Fahad Medical City Institutional Review Board—IRB (reference number: 22-552). Residents were asked to complete an online electronic survey to collect decision-making data. Clicking the link or copying the link into a web browser, participants were brought directly to the study via Qualtrics.

Participants were first presented with the participant information page, which provided a brief description of the study aims as well as participation requirements. Once participants had read the information page, they were then presented with the consent form. Participants were required to sign the consent form by ticking three boxes before continuing the study. It was clearly stated that participants could contact the researcher or supervisor should they require further information, in which case the researcher/supervisor would clarify any queries.

The survey comprised a questionnaire assessing residents' style of thinking using the Rational-Experiential Inventory-40 (REI-40) (Keaton, 2017). The REI-40 has been validated and has internal consistency scores (Cronbach's alpha) ranging from .74 to .91 (Hovencamp, 2014). Our data were validated for internal consistency where the Cronbach alpha of these items was .70 which is good. A 40-item questionnaire consisted of 4 subscales: Rational ability, Rational engagement, Experiential ability, and Experiential engagement (subscales were not used in the analyses; they were used to compute each style of thinking Rational and Experiential styles). Each subscale was measured by ten items that were scored on a five-point Likert scale from "Definitely False; score (1)" to "Defi-

nitely True; score (5)." The responses for negatively-worded questions were reversed. The total score for each subscale was computed by summing responses from each category and was divided by 10 for the average score for each participant for each subscale.

To collect data about emotional Intelligence, residents were asked to complete an online electronic survey. The survey was composed of the Trait Emotional Intelligence questionnaires to measure the trait EI and other variables (Petrides, 2009). The TEIQue comprised 153 questions to measure global trait EI on a 7-point Likert scale ranging from disagree to agree completely. Out of the EI global as one single measure, four factors stem from it: well-being, Self-Control, Emotionality, and Sociability. These four factors are further sub-divided: Well-being (facets: happiness, optimism, and self-esteem); Self-control (facets: emotion control, impulsivity, and stress management); Emotionality (facets: emotion-perception, empathy, emotion expression, and relationships); and Sociability (facets: emotion management, assertiveness, and social awareness) with internal consistency ranging α = .89 - .92 (Bru-Luna, Martí-Vilar, Merino-Soto, & Cervera-Santiago, 2021). Our data were validated for internal consistency where the Cronbach's alpha of these items was .90, which is very good. Scores were calculated by K.V. Petrides for all researchers who collect data using this measure, so no information is available on scoring procedures for this questionnaire. An Excel sheet with only the EI selection data numbers was submitted to their website https://psychometriclab.com/teique-manual-2/ for calculations of all factors and facets, which gave the results immediately as the process was automated.

2.4. Statistical Analysis

A descriptive analysis (frequency, percentages, mean ± standard deviation (SD)) will summarize the categorical and continuous variables. Appropriate tests will be used depending on the normality distribution of the data.

2.5. Ethical Consideration

King Fahad Medical City's Institutional review board (IRB Log Number: 22-552) approved the study. Participants' completion of the study questionnaires implied their consent to take part in the study.

3. Results

3.1. Descriptive Statistics

Preliminary analysis
Style of thinking data has a good internal reliability (Table 1), and the EI data has excellent internal reliability (Table 2).

3.2. Primary Analysis

Objective 1. Differences in thinking styles within groups for Males and Females Residents.

A Wilcoxon signed rank test for Males' thinking styles revealed that RS scores (Table 3) were significantly higher than their ES scores, $z = -8.118$, $p < .001$ with strong effect size, $r = .74$.

Similarly, a Wilcoxon signed rank test for Females' thinking styles revealed that RS scores (Table 4) were significantly higher than their ES scores, $z = -6.475$, $p < .001$ with strong effect size, $r = .58$.

Objective 2. Differences in thinking styles and some demographic data:

Objective 2.1. Blood Group

A Kruskal-Wallis H test for thinking style RS revealed no significant difference between Blood Group and RS styles of thinking: RS: $H(7) = 7.989$, $p = .334$

However, there was a significant finding for the ES style of thinking: ES: $H(5) = 14.328$, $p = .046$, where blood group AB+ ranked the highest score (Table 5).

Objective 2.2. Error Rate

A Mann-Whitney test was used to compare ES and error rate. There were no significant differences in the ES and error rate ($U = 6598.500$, $z = -1.621$, $p = .105$).

A Mann-Whitney U test revealed that RS scores were significantly higher in the No-erro group compared with the error group (Table 6), $U = 5969.500$, $z = -2.756$, $p = 0.006$, with a small effect size $r = .18$.

Table 1. Internal Reliability Statistics for Style of thinking data.

Cronbach's Alpha	N of Items
.70	40

Table 2. Internal Reliability Statistics for Emotional Intelligence (EI) data.

Cronbach's Alpha	N of Items
.90	153

Table 3. Male Residents' RS scores compared with their ES.

Thinking Style	*Md*	*N*
RS	3.65	122
ES	3.25	122

Table 4. Female Residents' RS scores compared with their ES.

Thinking Style	*Md*	*N*
RS	3.60	123
ES	3.28	123

Table 5. ES style of thinking Scores.

Blood Groups	*Md*	*N*
AB+	3.59	10
A−	3.50	5
O−	3.38	15
A+	3.30	55
B+	3.28	52
O+	3.18	105
B−	2.80	1
AB−	2.78	1

Table 6. RS style of thinking scores.

Error Rate	*Md*	*N*
No-error	3.85	119
Error	3.55	126

Objective 3. Association between thinking styles and Global Emotional Intelligence (EI)

Spearman's rank correlation was computed to assess the relationship between thinking style RS and Global EI. There was positive and significant correlation between the two variables, $r_s = .482$, $n = 245$, $p < .001$.

Similarly, spearman's rank correlation was computed to assess the relationship between thinking style ES and Global EI. There was a positive and significant correlation between the two variables, $r_s = .326$, $n = 245$, $p < .001$.

Objective 4. Emotional Intelligence (EI) Global and some of its Factors

Objective 4.1. Males vs. Females Residents' differences in Global EI

A Mann-Whitney test was used to compare Males' and Females' Global EI. There were no significant differences in the Global EI between Males Residents and Females ($U = 6813.500$, $z = −1.243$, $p = .214$).

Objective 4.2. Self-Control Factor

Objective 4.2.1. Males vs. Females Residents' differences in the Self-Control Factor

A Mann-Whitney test was used to compare Males' and Females' Self-Control. There were no significant differences in the Self-Control Factor between Males Residents and Females ($U = 6724.500$, $z = −1.404$, $p = .160$).

Objective 4.2.2. Males vs. Females Residents' differences in the stress management facet of the Self-Control Factor

A Mann-Whitney U test revealed that Stress Management Facet scores were significantly higher in the male residents group compared with the female resi-

dents (Table 7), $U = 6276.500$, $z = -2.213$, $p = 0.027$, with a small effect size $r = .14$.

Objective 4.3. Males vs. Females Residents' differences in the Emotionality Factor

A Mann-Whitney U test revealed that Emotionality Factor scores were significantly higher in the female residents' group compared with the male Residents (Table 8), $U = 5767.500$, $z = -3.129$, $p = 0.002$, with small effect size $r = .20$.

Objective 4.4. Marital Status

A Kruskal-Wallis H test revealed:

Objective 4.4.1. There was a significant finding for Marital Status Vs. Global EI:

$H (2) = 8.941$, $p = .011$, where Residents who were married had higher EI Global scores (Table 9), followed by singles and finally divorced ones.

Objective 4.4.2. There was a significant finding for Martial Status Vs. Well-Being Factor

$H (2) = 9.187$, $p = .010$, where Residents who were married had higher Well-Being scores (Table 10), followed by singles and finally divorced ones.

Objective 4.4.3. There was a significant finding for Martial Status Vs. Self-Control Factor

Table 7. Males' and females' stress management facet of the self-control factor scores.

Gender	Md	N
Males	4.50	122
Females	4.40	123

Table 8. Males' and females' emotionality factor scores.

Gender	Md	N
Males	4.49	122
Females	4.89	123

Table 9. Global EI scores.

Marital Status	Md	N
Single, never married	4.53	163
Married	4.88	74
Divorced	4.15	8

Table 10. Well-Being Factor scores.

Marital Status	Md	N
Single, never married	4.96	163
Married	5.45	74
Divorced	4.19	8

$H(2) = 8.776$, $p = .012$, where Residents who were married had higher Self-Control scores (Table 11), followed by singles and finally divorced ones.

Objective 4.4.4. There was a significant finding for Martial Status Vs Sociability Factor

$H(2) = 6.897$, $p = .032$ where Residents who were married had higher Sociability scores followed by singles and finally divorced ones (Table 12).

Objective 4.4.5. There was no significant finding for Martial Status Vs. Emotionality Factor

$H(2) = 3.450$, $p = .178$

Objective 4.4.6. There was a statistically significant difference between marital status groups as determined by one-way ANOVA ($F(2, 242) = 5.931$, $p = .003$). A Tukey post hoc test revealed that married residents significantly scored higher in the Self-Motivation facet ($4.73 \pm .72$, $p = .002$) compared with single residents ($4.36 \pm .81$). Divorced residents had the lowest score ($4.31 \pm .55$), but there were no significant differences compared to single residents ($p = .968$) or the married residents ($p = .166$).

Objective 4.5. Error Rate Vs. Global EI

Objective 4.5.1. A Mann-Whitney U test revealed that Global EI scores were significantly higher in the No-error residents compared with the Error Residents (Table 13), $U = 5619.000$, $z = -3.387$, $p < .001$, with small effect size $r = .22$.

Objective 4.5.2. A Mann-Whitney U test revealed that Well-Being Factor scores were significantly higher in the No-error residents compared with the Error Residents (Table 14), $U = 5926.500$, $z = -2.833$, $p = .005$, with small effect size $r = .18$.

Table 11. Self-control factor scores.

Marital Status	*Md*	*N*
Single, never married	4.33	163
Married	4.59	74
Divorced	3.86	8

Table 12. Sociability factor scores.

Marital Status	*Md*	*N*
Single, never married	4.38	163
Married	4.63	74
Divorced	4.10	8

Table 13. Residents' global EI scores.

Error Rate	*Md*	*N*
No-error	4.77	119
Error	4.51	126

Objective 4.5.3. A Mann-Whitney U test revealed that Self-Control factor scores were significantly higher in the No-error residents compared with the Error Residents (Table 15), $U = 5095.000$, $z = −4.333$, $p < .001$, with small to medium effect size $r = .28$.

Objective 4.5.4. A Mann-Whitney U test revealed that Emotionality factor scores were significantly higher in the No-error residents compared with the Error Residents (Table 16), $U = 6280.500$, $z = −2.194$, $p = .028$, with small effect size $r = .14$.

Objective 4.5.5. A Mann-Whitney U test revealed that Sociability factor scores were significantly higher in the No-error residents compared with the Error Residents (Table 17), $U = 5619.000$, $z = −3.280$, $p = .001$, with small effect size $r = .21$

Objective 4.6. Social Media usage

A Kruskal-Wallis H test revealed:

Objective 4.6.1. There was a significant finding for Social Media Vs. Self-Control Factor

$H(2) = 6.680$, $p = .035$, where residents who used social media least had the highest score of Self-Control Factor (Table 18).

Objective 4.7. Age Vs. Global EI

A Kruskal-Wallis H test revealed: there was no significant finding for Age Vs. Global EI: $H(3) = 6.251$, $p = .100$

Table 14. Residents' well-being factor scores.

Error Rate	Md	N
No-error	5.28	119
Error	4.95	126

Table 15. Residents' self-control factor scores.

Error Rate	Md	N
No-error	4.61	119
Error	4.22	126

Table 16. Residents' emotionality factor scores.

Error Rate	Md	N
No-error	4.84	119
Error	4.56	126

Table 17. Residents' sociability factor scores.

Error Rate	Md	N
No-error	4.77	119
Error	4.51	126

Table 18. Self-control factor scores.

Social Media usage	*Md*	*N*
Less than 2 hours	4.54	53
Between 2-5 hours	4.30	140
More than 5 hours	4.35	52

Objective 4.8. Smoking Vs. Global EI

Objective 4.8.1. A Mann-Whitney test was used to compare Smoking and Global EI. There were no significant differences ($U = 5544.500$, $z = -.508$, $p = .612$).

Objective 4.9. Residency Level Vs. Global EI

A Kruskal-Wallis H test revealed:

Objective 4.9.1. There was no significant finding for Residency Level Vs. Global EI: $H(5) = 7.888$, $p = .163$

Objective 4.9.2. There was no significant finding for Residency Level Vs. Well-Being Factor: $H(5) = 7.481$, $p = .187$

Objective 4.10. GPA

A Kruskal-Wallis H test revealed: There was no significant finding for GPA Vs. Global EI: $H(3) = 1.948$, $p = .583$

Objective 4.11. Blood Group

A Kruskal-Wallis H test revealed:

Objective 4.11.1. There was no significant finding for Blood Group Vs. Global EI: $H(7) = 5.687$, $p = .577$

Objective 4.11.2. There was no significant finding for Blood Group Vs. Sociability Factor: $H(7) = 6.290$, $p = .506$

4. Discussion

The present study aimed to explore and shed light on the thinking style and emotional Intelligence between and among Saudi residents, and how this is affected by specific characteristics of their demographic data and would impact them and patient safety.

EI and all its components were considered an essential part of all physicians' competency and evaluations and should be improved for better 21st-century physician care (Abe, Niwa, Fujisaki, & Suzuki, 2018; Mitra et al., 2018). The risk of burnout, stress, depression, anxiety, medical errors, drug abuse, self-harm, violent behavior, addiction, and even suicide is high among physicians, especially female physicians, and in general, both genders are at up to seven times higher risk of suicide than the general population (Mikolajczak, Petrides, & Hurry, 2009; Dutheil et al., 2019; Kalmoe et al., 2019; Nyarko et al., 2020; Henning, Crane, Taylor, & Parker, 2021; Hawton et al., 2001; Ventriglio, Watson, & Bhugra, 2020). In general, EI was found to have a significant inverse relationship with burnout, depression, personality disorder, and psychopathy and a significant positive relationship with better stress coping strategies and better academic perfor-

mance, leading studies to recommend that organizations measure residents' EI and train them on how to improve it (Weinstein, 2011; Montvilaitė & Antinienė, 2020; Jauk, Freudenthaler, & Neubauer, 2016; El-Khodary et al., 2021; Khesroh et al., 2022; Krajniak et al., 2018; Richards et al., 2021; Lin et al., 2016b; Cofer et al., 2018).

Burnout prevalence among residents in the United States is up to 74%, with higher levels in females (Kalmoe et al., 2019; Richards et al., 2021), and in Saudi plastic surgery, residents' burnout rates were found to be 38% (Bin Dahmash et al., 2019). Additionally, depression is another major issue among residents; where it was found that up to 50.8% of residents suffered from depression in the US (Lin et al., 2016a), and residents with depression were 6.2 times more likely to have medical errors (Kalmoe et al., 2019). One study on residents found that burnout is significantly associated with the Self-Control (SC) factor of EI, and this is linked to more medical errors and suicidal thoughts among residents; they concluded that program directors should make EI and its factors part of the residents' assessments (Cofer et al., 2018) and provide training to enhance EI, as it was found it can significantly improve EI in residents (Abe et al., 2013). Additionally, it was found that low SC scores were associated with risky behavior and worse mental and physical health (Fernández-Abascal & Martín-Díaz, 2015). Some studies recommended that EI assessment be mandatory even for accepting residents to their institution, as soft skills play a significant role in the residents themselves, patients, and the organization (Skokou et al., 2019; Lin, Kannappan, & Lau, 2013). In this study similar finding about error making was found, where residents who made medical errors had significantly lower scores in SC factor than residents who did not (objective 4.9.3). It was found that higher SC scores had better control over memory and attention during negative adverse events, giving them more ability to cope with the situation than lower SC scores (Mikolajczak Roy, Verstrynge, & Luminet, 2009), which could explain the lack of errors in high SC residents.

This study's findings were consolidated by looking at the thinking style where residents who spent less time were more rational than others (objective 2.9). Additionally, social media time usage significantly affected the SC factor (objective 4.11.3), where residents who spent less time on social media had significantly higher scores in the SC factor. This is in line with other studies in which people who spent more on social media had lower EI and had high scores of rumination about their past mistakes causing negative behavior. They would use social media as a coping mechanism to avoid these negative thoughts (Süral et al., 2019). Lower EI affected people by making them more impulsive, spending more time on social media, and impulsive and negative shopping behavior (Jie, Poulova, Haider, & Sham, 2022). Organizations should take this construct as a trigger to offer more help and support.

One of the EI components that has a positive effect on the patient-physician relationship is the Emotionality factor. It was found in this study that female residents had significantly higher scores than male residents in this factor (ob-

jective 4.3), which is in line with other studies conducted on residents (Abe, Niwa, Fujisaki, & Suzuki, 2018; Hojat & Gonnella, 2015; Bertram et al., 2016; Aithal et al., 2016). However, these results also have a downside, where higher emotionality is linked to a greater risk of stress from emotional fatigue (Abe, Niwa, Fujisaki, & Suzuki, 2018). In fact, in this study, males were found to score significantly higher in stress management facets than females (objective 4.2.2), which could cause more issues in coping with stress in females. As EI, in general, could be enhanced by training and education, this point should be addressed by the organization to ensure a balance in EI components and how they affect the residents and patient care (Abe, Niwa, Fujisaki, & Suzuki, 2018).

There are conflicting findings regarding gender differences in residents' Global EI, where some studies found no differences (Abe, Niwa, Fujisaki, & Suzuki, 2018; Lin, Kannappan, & Lau, 2013; Bin Dahmash et al., 2019; Mohamed, El Khouly, & Saad, 2012; McKinley et al., 2014), which is in line with this study (objective 4.1), while others found females to have higher scores (Null, 2020; Ventriglio, Watson, & Bhugra, 2020; Süral, Griffiths, Kircaburun, & Emirtekin, 2019; Mohamed, El Khouly, & Saad, 2012), and finally, some found males to have higher scores than females (McNulty et al., 2016; Mikolajczak, Luminet, Leroy, & Roy, 2007), which could be attributed to cultural differences. For example, Japanese residents had significantly lower Global EI scores than other Asian countries (Indonesian, Taiwanese, and Thai) and UK medical students (Abe et al., 2013). Additionally, Chinese medical students had lower empathy traits compared to students in Western countries (Shi & Du, 2020). Additionally, the Lebanese scored higher than the British on the Sociability factor and the emotion perception facet, while the British scored higher on stress management and optimism (Sánchez-Ruiz, Mavroveli, & Petrides, 2021).

Age (objective 4.11), smoking (objective 4.12), and Residency Level (objective 4.13) did not have any significant effect on Global EI or its four factors, which is in line with other studies (Lin, Kannappan, & Lau, 2013; Bin Dahmash et al., 2019; Serebrakian et al., 2021; McNulty et al., 2016). However, a study on Saudi plastic surgery residents found that exercising 1 d or more per week significantly affects Global EI (Bin Dahmash et al., 2019). In contrast, this study did not find any significance in the Global EI or its four factors for all residents who exercised one, two, or three more days per week (objective 4.13). Additionally, the same study did not find any significance between marital status and Global EI in the Saudi plastic surgery residents (Bin Dahmash et al., 2019), together with another study on plastic surgery residents (US-based) who also did not find any significance between marital status and Global EI (Serebrakian et al., 2021). However, this study found a significant effect between Global EI and marital status (objective 4.4) and with its three factors: Well-Being, Self-Control, and Sociability (objective 4.4.2, 4.4.3, and 4.4.4) and even with its independent facet of Self-Motivation (objective 4.4.6). This study is in line with a US study of residents, where it was found that married residents had lower scores on depression, better well-being, and sociability (Lin et al., 2016a), which was also confirmed by

another study showing married people had better EI than others (Khodarahimi, 2015). Additionally, it was found that with the US plastic surgery residents their Empathy level declined with residency level (Serebrakian et al., 2021), however this study did not find any significant finding on this factor (objective 4.13.2). Contrary to this and other studies on Age and Global EI for residents, one study found a statistically significant predictive relationship but with a small effect size (McKinley et al., 2015).

Creativity (Divergent Thinking and Creative Personality) was linked to specific components of EI as a strong predictor, mainly the sociability factor (Sánchez-Ruiz et al., 2011). In this study, sociability significantly affected the error rate (Objective 4.9.4), which is an opportunity for organizations to raise this factor through training.

One of the previous studies on EI found a positive association with academic achievement. It is also important to highlight that even though it was mentioned that EI is sensitive to cultural differences, it could also be different depending on the type of profession. For example, it was found that EI components: Self-Control, Well-Being, and Sociability positively impacted the GPA scores, and the Emotionality factor negatively impacted participants with management and business backgrounds (Ahmed, Asim, & Pellitteri, 2019). However, in this study of medical residents, there was no significant difference in all EI components and GPA scores (objective 4.14).

Another stable construct of individuals is their style of thinking (Bataweel, 2022). In this study, the error rate was significantly affected by the style of thinking, where higher RS scores indicated a lower error rate (objective 2.2). This could be expected because RS means more mindful and deliberate thinking, which is needed. After all, many tasks in healthcare are rules and knowledge bases that require system two thinking, which is mainly RS in nature (Bataweel, 2022). Additionally, to reinforce this finding, this study found a strong positive correlation between RS and EI (Objective 3). As shown above, more EI meant less stress, less burnout, and better self-control.

This study also examined the relationship between EI and thinking styles. A study by business managers found strong relationships between EI and style of thinking. This could be used to choose the appropriate and effective manager or salespeople for specific jobs (Hovencamp, 2014; Herbst & Maree, 2008; Billing, 2012). Another study compared EI with the style of thinking in criminals and found that there was a strong relationship between the two variables. One of the findings was that criminals had low scores in EI in general and in self-control in particular (Megreya, 2013). Another study on agricultural employees found a similarly strong relationship between EI and thinking style (Darvish & Ayagh, 2013). A study for undergraduate medical students examined the relationship between EI and critical thinking. It was found that there was a strong predictive relationship where higher EI scores were linked to higher scores in critical thinking (Li et al., 2021). A study conducted on college students also found that thinking style significantly affected EI, and both predicted academic performance

(Barreiro, 2014). A study used a similar psychometric assessment for EI and style of thinking, as this study was conducted with psychology students (Jokić & Puric, 2019). They found a significant relationship between EI and thinking styles. Similarly, another study for One hundred and fifty-four participants with different background including healthcare providers found a positive association between EI and both style of thinking (Schutte et al., 2010). This study is in line with all of these studies, in which there was a significant relationship between EI and thinking styles (Objective 3). RS and ES were shown to be independent and have their continuum scales, resulting in four quadrants: (high RS/high ES), (high RS/low ES), (low RS/high ES), and (low RS/low ES) (Lin et al., 2016a). It was found that both RS and ES need to be high to have high EI and less error (Darvish & Ayagh, 2013), which is in line with this study (Objective 3). This is also extremely important as both styles are needed for specific tasks, where ES is an efficient style for routine tasks that are less demanding on energy, but RS for skill and knowledge-based that require and demand RS for an effective outcome of complex situations but also demanding on energy and why it is used less compared with ES, and if ES used more or RS instead, errors will occur (Bataweel, 2022). This study confirms that both RS and ES need to be high to have an effect on EI and even on the error rate. For example, it was found that ES was similar for both groups that erred and those that did not, and both were high (objective 2.2); however, their RS differed significantly, where RS was higher in the no-error group, making them less susceptible to err (objective 2.2) and also to have higher EI (objective 4.9). Therefore, both RS and ES need to be high to have fewer errors, as an imbalance among one of them could lead to unsuitable behavior towards tasks, medical error, and even patients (Bataweel, 2022).

The thinking style also affected how healthcare, including physicians, coped with the pandemic COVID-19 where healthcare workers with higher scores in ES had better intrinsic motivation coping mechanisms than workers with high RS scores (Arslan, 2022). In general, nurses have more ES than RS compared with physicians (Bataweel, 2022), and this is also the case in this study, which found that residents were significantly more towards an RS style of thinking (objective 1). Even though in this study, residents had higher RS than ES, their ES scores were still high enough to give them these motivation skills as RS and ES are independent constructs on a continuum scale as mentioned above, which means that an individual could have different levels at them and switch between depending on the task at hand (Bataweel, 2022).

Blood groups were investigated in this study. There are very few studies on emotional Intelligence and blood groups, and to the best of our knowledge, no study has been found on the style of thinking and blood group. For thinking style, AB+ was found to have significantly higher ES scores than the others (objective 2.1). One study compared blood groups and EI, where they found significance but recommended larger-scale studies internationally (Shaikh et al., 2020). However, for this study, there was no significance between blood groups and EI (objective 4.15.1). Another study found group AB+ to be significant in the emo-

tionality of the EI (Gupta, 2017), which is contrary to this study, where there was no significance (objective 4.15.2).

5. Conclusion

Medical errors are the third leading cause of death in the US (Dutheil et al., 2019), costing approximately $20 billion annually. The prevalence of medical errors worldwide can be up to 16.6% of all admissions. The significant contribution is cognitive biases due to the effect of EI and thinking style on decision-making (Bataweel, 2022). Therefore, healthcare should not only focus on systemic and organizational factors but should also look at individuals as a source of errors in their own right, and ignoring this would not help in reducing medical errors worldwide, as shown by this study and many other studies (Lucchiari & Pravettoni, 2012; Gorini & Pravettoni, 2011; Stephens, 2020).

Finally, EI and the style of thinking directly improved the accuracy of clinical findings. Although some argued that EI is an innate ability or genetic construct (van der Linden et al., 2018), training was found to give awareness about weak points and strategic techniques for managing these weaknesses when they surface (Rupani, 2013; Miller, 2022). This is a vital paradigm shift for healthcare industry that should be treated as a complex environment that depends on human to human interactions and communications which would produce medical errors in its own right besides system factors (Seshia et al., 2018). There are many studies showing that humans as individuals were solely responsible for errors besides system and environmental factors (Kinnear & Wilson, 2017; Baziuk et al., 2014; Stanovich, Toplak, & West, 2008; Zarei et al., 2019; Ma et al., 2022; Palisoc & Norona, 2020) and once human factors is taken more seriously in healthcare, through their EIs, personality traits and thinking styles, medical errors will stand better chance of going down.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Abe, K., Evans, P., Austin, E. J., Suzuki, Y., Fujisaki, K., Niwa, M., & Aomatsu, M. (2013). Expressing One's Feelings and Listening to Others Increases Emotional Intelligence: A Pilot Study of Asian Medical Students. *BMC Medical Education, 13,* Article No. 82. https://doi.org/10.1186/1472-6920-13-82

Abe, K., Niwa, M., Fujisaki, K., & Suzuki, Y. (2018). Associations between Emotional Intelligence, Empathy and Personality in Japanese Medical Students. *BMC Medical Education, 18,* Article No. 47. https://doi.org/10.1186/s12909-018-1165-7

Ahmed, Z., Asim, M., & Pellitteri, J. (2019). Emotional Intelligence Predicts Academic Achievement in Pakistani Management Students. *The International Journal of Management Education, 17,* 286-293. https://doi.org/10.1016/j.ijme.2019.04.003

Aithal, A. P., Kumar, N., Gunasegeran, P., Sundaram, S. M., Rong, L. Z., & Prabhu, S. P.

(2016). A Survey-Based Study of Emotional Intelligence as It Relates to Gender and Academic Performance of Medical Students. *Education for Health, 29,* 255-258.

Aradilla-Herrero, A., Tomás-Sábado, J., & Gómez-Benito, J. (2014). Associations between Emotional Intelligence, Depression and Suicide Risk in Nursing Students. *Nurse Education Today, 34,* 520-525. https://doi.org/10.1016/j.nedt.2013.07.001

Arslan, I. K. (2022). Examining the Relationship between the Thinking Styles and the Motivation Aspects of the Individuals Working in the Health Sector in Turkey during the COVID-19 Pandemic: The Case of Hospital Staff. *Annales Médico-Psychologiques, revue psychiatrique.*

Badri, S. K. Z., Kong, M. Y., Wan Mohd Yunus, W. M. A., Nordin, N. A., & Yap, W. M. (2021). Trait Emotional Intelligence and Happiness of Young Adults: The Mediating Role of Perfectionism. *International Journal of Environmental Research and Public Health, 18,* Article 10800. https://doi.org/10.3390/ijerph182010800

Barreiro, O. M. (2014). *Cognitive Ability, Thinking Styles, Emotional Intelligence, and Their Impact on Academic Performance.* ProQuest Dissertations Publishing.

Bataweel, A. O. (2022). The Impact of Medical Profession Type, Gender, and Years of Experience on Thinking Styles: What Are the Implications for Patient Safety? *Journal of Behavioral and Brain Science, 12,* 569-588. https://doi.org/10.4236/jbbs.2022.1211034

Bavolar, J. (2017). Thinking Styles, Perceived Stress and Life Satisfaction. *Studia Psychologica, 59,* 233-242. https://doi.org/10.21909/sp.2017.04.743

Baziuk, P. A., Rivera, S. S., & McLeod, J. N. (2014). Towards Human Factor Taxonomy with Cognitive Generic Terms. In *Proceedings of the World Congress on Engineering* (Vol. 2).

Bertram, K., Randazzo, J., Alabi, N., Levenson, J., Doucette, J., & Barbosa, P. (2016). Strong Correlations between Empathy, Emotional Intelligence, and Personality Traits among Podiatric Medical Students: A Cross-Sectional Study. *Education for Health, 29,* 186-194.

Billing, P. (2012). *A Study of Emotional Intelligence, Thinking Styles, and Selling Effectiveness of Pharmaceutical Sales Representatives.* ProQuest Dissertations Publishing.

Bin Dahmash, A., Alhadlaq, A. S., Alhujayri, A. K., Alkholaiwi, F., & Alosaimi, N. A. (2019). Emotional Intelligence and Burnout in Plastic Surgery Residents: Is There a Relationship? Plastic and Reconstructive Surgery. *Global Open, 7,* e2057-e2057. https://doi.org/10.1097/GOX.0000000000002057

Bru-Luna, L. M., Martí-Vilar, M., Merino-Soto, C., & Cervera-Santiago, J. L. (2021). Emotional Intelligence Measures: A Systematic Review. *Healthcare (Basel), 9,* Article 1696. https://doi.org/10.3390/healthcare9121696

Bukhari, R., & Khanam, S. J. (2014). Relationship of Emotional Intelligence and Big Five Personality Dimensions among University Students. *Pakistan Journal of Psychology, 45.*

Cofer, K. D., Hollis, R. H., Goss, L., Morris, M. S., Porterfield, J. R., & Chu, D. I. (2018). Burnout Is Associated with Emotional Intelligence but Not Traditional Job Performance Measurements in Surgical Residents. *Journal of Surgical Education, 75,* 1171-1179. https://doi.org/10.1016/j.jsurg.2018.01.021

Darvish, H., & Ayagh, H. (2013). An Empirical Study to Investigate the Effects of Thinking Styles on Emotional Intelligence: A Case Study of Jihad Agriculture Organization of East Azerbaijan Province. *Management Science Letters, 3,* 1363-1368. https://doi.org/10.5267/j.msl.2013.04.014

Di Fabio, A., & Palazzeschi, L. (2015). Beyond Fluid Intelligence and Personality Traits in Scholastic Success: Trait Emotional Intelligence. *Learning and Individual Differences, 40,* 121-126. https://doi.org/10.1016/j.lindif.2015.04.001

Dutheil, F., Aubert, C., Pereira, B., Dambrun, M., Moustafa, F., Mermillod, M., Baker, J. S., Trousselard, M., Lesage, F. X., & Navel, V. (2019). Suicide among Physicians and Healthcare Workers: A Systematic Review and Meta-Analysis. *PLOS ONE, 14,* e0226361. https://doi.org/10.1371/journal.pone.0226361

El-Khodary, B., Alshawamreh, S., Salah, M. A., Hamada, A., Alhendawi, B., Alhabil, M., Alemour, Y., Zaqout, H., & Wadi, E. A. (2021). The Relationship between Stress, Trait Emotional Intelligence and Mental Health amongst Gaza's Basic-Year Medical Students during the COVID-19 Outbreak. *Middle East Current Psychiatry (Cairo), 28,* Article No. 65. https://doi.org/10.1186/s43045-021-00146-0

Fernández-Abascal, E. G., & Martín-Díaz, M. D. (2015). Dimensions of Emotional Intelligence Related to Physical and Mental Health and to Health Behaviors. *Frontiers in Psychology, 6,* Article 317. https://doi.org/10.3389/fpsyg.2015.00317

Fix, R. L., & Fix, S. T. (2015). Trait Psychopathy, Emotional Intelligence, and Criminal Thinking: Predicting Illegal Behavior among College Students. *International Journal of Law and Psychiatry, 42-43,* 183-188. https://doi.org/10.1016/j.ijlp.2015.08.024

Görgens-Ekermans, G., & Brand, T. (2012). Emotional Intelligence as a Moderator in the Stress-Burnout Relationship: A Questionnaire Study on Nurses. *Journal of Clinical Nursing, 21,* 2275-2285. https://doi.org/10.1111/j.1365-2702.2012.04171.x

Gorini, A., & Pravettoni, G. (2011). An Overview on Cognitive Aspects Implicated in Medical Decisions. *European Journal of Internal Medicine, 22,* 547-553. https://doi.org/10.1016/j.ejim.2011.06.008

Gupta, T. (2017). Blood Groups and Emotional Intelligence. *The International Journal of Indian Psychology, 4.* https://doi.org/10.25215/0404.030

Hawton, K., Clements, A., Sakarovitch, C., Simkin, S., & Deeks, J. J. (2001). Suicide in Doctors: A Study of Risk According to Gender, Seniority and Specialty in Medical Practitioners in England and Wales, 1979-1995. *Journal of Epidemiology & Community Health, 55,* 296-300. https://doi.org/10.1136/jech.55.5.296

Henning, C., Crane, A. G., Taylor, R. N., & Parker, J. D. A. (2021). Emotional Intelligence: Relevance and Implications for Addiction. *Current Addiction Reports, 8,* 28-34. https://doi.org/10.1007/s40429-021-00356-w

Herbst, T. H., & Maree, K. G. (2008). Thinking Style Preference, Emotional Intelligence and Leadership Effectiveness. *SA Journal of Industrial Psychology, 34,* 32-41. https://doi.org/10.4102/sajip.v34i1.422

Hojat, M., & Gonnella, J. S. (2015). Eleven Years of Data on the Jefferson Scale of Empathy-Medical Student Version (JSE-S): Proxy Norm Data and Tentative Cutoff Scores. *Medical Principles and Practice, 24,* 344-350. https://doi.org/10.1159/000381954

Hovencamp, S. A. (2014). *The Relationship between Thinking Styles and Emotional Intelligence: An Exploratory Study of Retail Managers.* ProQuest Dissertations Publishing.

Jauk, E., Freudenthaler, H. H., & Neubauer, A. C. (2016). The Dark Triad and Trait versus Ability Emotional Intelligence: Emotional Darkness Differs between Women and Men. *Journal of Individual Differences, 37,* 112-118. https://doi.org/10.1027/1614-0001/a000195

Jie, W., Poulova, P., Haider, S. A., & Sham, R. B. (2022). Impact of Internet Usage on Consumer Impulsive Buying Behavior of Agriculture Products: Moderating Role of Personality Traits and Emotional Intelligence. *Frontiers in Psychology, 13,* Article ID:

951103. https://doi.org/10.3389/fpsyg.2022.951103

Jokić, B., & Puric, D. (2019). Relating Rational and Experiential Thinking Styles with Trait Emotional Intelligence in Broader Personality Space. *Europe's Journal of Psychology, 15,* 140-158. https://doi.org/10.5964/ejop.v15i1.1692

Kalmoe, M. C., Chapman, M. B., Gold, J. A., & Giedinghagen, A. M. (2019). Physician Suicide: A Call to Action. *Missouri Medicine, 116,* 211-216.

Keaton, S. A. (2017). Rational-Experiential Inventory-40 (REI-40). (Pacini & Epstein, 1999). In D. L. Worthington, & G. D. Bodie (Eds.,), *The Sourcebook of Listening Research: Methodology and Measures* (pp. 530-536). John Wiley & Sons, Inc. https://doi.org/10.1002/9781119102991.ch59

Khesroh, E., Butt, M., Kalantari, A., Leslie, D. L., Bronson, S., Rigby, A., & Aumiller, B. (2022). The Use of Emotional Intelligence Skills in Combating Burnout among Residency and Fellowship Program Directors. *BMC Medical Education, 22,* Article No. 127. https://doi.org/10.1186/s12909-022-03187-z

Khodarahimi, S. (2015). The Role of Marital Status in Emotional Intelligence, Happiness, Optimism and Hope. *Journal of Comparative Family Studies, 46,* 351-371. https://doi.org/10.3138/jcfs.46.3.351

Kinnear, J., & Wilson, N. (2017). Assessing the Association between Thinking Dispositions and Clinical Error. *Postgraduate Medical Journal, 94,* 3-6. https://doi.org/10.1136/postgradmedj-2017-135088

Krajniak, M. I., Pievsky, M., Eisen, A. R., & McGrath, R. E. (2018). The Relationship between Personality Disorder Traits, Emotional Intelligence, and College Adjustment. *Journal of Clinical Psychology, 74,* 1160-1173. https://doi.org/10.1002/jclp.22572

Li, Y., Li, K., Wei, W., Dong, J., Wang, C., Fu, Y., Li, J., & Peng, X. (2021). Critical Thinking, Emotional Intelligence and Conflict Management Styles of Medical Students: A Cross-Sectional Study. *Thinking Skills and Creativity, 40,* Article ID: 100799. https://doi.org/10.1016/j.tsc.2021.100799

Lin, D. T., Kannappan, A., & Lau, J. N. (2013). The Assessment of Emotional Intelligence among Candidates Interviewing for General Surgery Residency. *Journal of Surgical Education, 70,* 514-521. https://doi.org/10.1016/j.jsurg.2013.03.010

Lin, D. T., Liebert, C. A., Esquivel, M. M., Tran, J., Lau, J. N., Greco, R. S., Mueller, C. M., & Salles, A. (2016a). Prevalence and Predictors of Depression among General Surgery Residents. *The American Journal of Surgery, 213,* 313-317. https://doi.org/10.1016/j.amjsurg.2016.10.017

Lin, D. T., Liebert, C. A., Tran, J., Lau, J. N., & Salles, A. (2016b). Emotional Intelligence as a Predictor of Resident Well-Being. *Journal of the American College of Surgeons, 223,* 352-358. https://doi.org/10.1016/j.jamcollsurg.2016.04.044

Lucchiari, C., & Pravettoni, G. (2012). Cognitive Balanced Model: A Conceptual Scheme of Diagnostic Decision Making. *Journal of Evaluation in Clinical Practice, 18,* 82-88. https://doi.org/10.1111/j.1365-2753.2011.01771.x

Ludolph, R., & Schulz, P. J. (2018). Debiasing Health-Related Judgments and Decision Making: A Systematic Review. *Medical Decision Making, 38,* 3-13. https://doi.org/10.1177/0272989X17716672

Ma, L., Ma, X., Xing, P., & Yu, F. (2022). A Hybrid Approach Based on the HFACS-FBN for Identifying and Analysing Human Factors for Fire and Explosion Accidents in the Laboratory. *Journal of Loss Prevention in the Process Industries, 75,* Article ID: 104675. https://doi.org/10.1016/j.jlp.2021.104675

McKinley, S. K., Petrusa, E. R., Fiedeldey-Van Dijk, C., Mullen, J. T., Smink, D. S., Scott-Vernaglia, S. E. et al. (2014). Are There Gender Differences in the Emotional In-

telligence of Resident Physicians? *Journal of Surgical Education, 71,* e33-e40. https://doi.org/10.1016/j.jsurg.2014.05.003

McKinley, S. K., Petrusa, E. R., Fiedeldey-Van Dijk, C., Mullen, J. T., Smink, D. S., Scott-Vernaglia, S. E. et al. (2015). A Multi-Institutional Study of the Emotional Intelligence of Resident Physicians. *The American Journal of Surgery, 209,* 26-33. https://doi.org/10.1016/j.amjsurg.2014.09.015

McNulty, J. P., Mackay, S. J., Lewis, S. J., Lane, S., & White, P. (2016). An International Study of Emotional Intelligence in First Year Radiography Students: The Relationship to Age, Gender and Culture. *Radiography, 22,* 171-176. https://doi.org/10.1016/j.radi.2015.10.008

Megreya, A. M. (2013). Criminal Thinking Styles and Emotional Intelligence in Egyptian Offenders: Criminal Thinking Styles. *Criminal Behaviour and Mental Health, 23,* 56-71. https://doi.org/10.1002/cbm.1854

Mikolajczak, M., Luminet, O., Leroy, C., & Roy, E. (2007). Psychometric Properties of the Trait Emotional Intelligence Questionnaire: Factor Structure, Reliability, Construct, and Incremental Validity in a French-Speaking Population. *Journal of Personality Assessment, 88,* 338-353. https://doi.org/10.1080/00223890701333431

Mikolajczak, M., Petrides, K. V., & Hurry, J. (2009). Adolescents Choosing Self-Harm as an Emotion Regulation Strategy: The Protective Role of Trait Emotional Intelligence. *British Journal of Clinical Psychology, 48,* 181-193. https://doi.org/10.1348/014466508X386027

Mikolajczak, M., Roy, E., Verstrynge, V., & Luminet, O. (2009). An Exploration of the Moderating Effect of Trait Emotional Intelligence on Memory and Attention in Neutral and Stressful Conditions. *British Journal of Psychology, 100,* 699-715. https://doi.org/10.1348/000712608X395522

Miller, E. (2022). *The Relationship between Emotional Intelligence and Student Success for the Radiologic Technology and Diagnostic Medical Sonography Students at a Community College.* Doctoral Dissertation, University of St. Francis.

Mitra, S., Sarkar, A. P., Haldar, D., Saren, A. B., Lo, S., & Sarkar, G. N. (2018). Correlation among Perceived Stress, Emotional Intelligence, and Burnout of Resident Doctors in a Medical College of West Bengal: A Mediation Analysis. *Indian Journal of Public Health, 62,* 27-31.

Mohamed, A. A., El Khouly, S., & Saad, M. (2012). Reliability and Factor Structure of a Trait Emotional Intelligence Measure in Four Arab Countries. *Education, Business and Society: Contemporary Middle Eastern Issues, 5,* 83-92. https://doi.org/10.1108/17537981211225871

Montvilaitė, G., & Antinienė, D. (2020). Emotional Intelligence and Stress Coping Strategies of Medical Residents. *Baltic Journal of Sport & Health Sciences, 4,* 13-19. https://doi.org/10.33607/bjshs.v4i115.818

Null (2020). Organizational Change and Uncertainty: The Mediating and Moderating Effects of Emotional Intelligence and Gender on Work Outcomes. *Human Resource Management International Digest, 28,* 15-17. https://doi.org/10.1108/HRMID-10-2019-0237

Nyarko, F., Peltonen, K., Kangaslampi, S., & Punamäki, R.-L. (2020). Emotional Intelligence and Cognitive Skills Protecting Mental Health from Stress and Violence among Ghanaian Youth. *Heliyon, 6,* e03878. https://doi.org/10.1016/j.heliyon.2020.e03878

Palisoc, J. I. L., & Norona, M. I. (2020). Mathematical Modeling and Analysis of Factors Affecting Medical Errors in Emergency Department of Government Hospitals in Province X. In *Proceedings of the 2020 2nd International Conference on Management*

Science and Industrial Engineering (pp. 39-43). Association for Computing Machinery. https://doi.org/10.1145/3396743.3396795

Petrides, K. V. (2009). *Technical Manual for the Trait Emotional Intelligence Questionnaires (TEIQue).* London Psychometric Laboratory. https://doi.org/10.1007/978-0-387-88370-0_5

Richards, A. E., Curley, K. L., Zhang, N., Bendok, B. R., Zimmerman, R. S., Patel, N. P. et al. (2021). Burnout and Emotional Intelligence in Neurosurgical Advanced Practice Providers across the United States: A Cross-Sectional Analysis. *World Neurosurgery, 155,* e335-e344. https://doi.org/10.1016/j.wneu.2021.08.066

Rupani, R. J. (2013). *Exploring the Emotional Intelligence of Obstetrics and Gynecology Medical Residents.* Doctoral Dissertation, The Chicago School of Professional Psychology.

Salehi, M., & Mohammadi, N. (2017). The Relationship between Emotional Intelligence, Thinking Style, and the Quality of Investors' Decisions Using the Log-Linear Method. *Qualitative Research in Financial Markets, 9,* 325-336. https://doi.org/10.1108/QRFM-04-2017-0025

Sanchez-Gomez, M., & Breso, E. (2020). In Pursuit of Work Performance: Testing the Contribution of Emotional Intelligence and Burnout. *International Journal of Environmental Research and Public Health, 17,* Article 5373. https://doi.org/10.3390/ijerph17155373

Sánchez-Ruiz, M. J., Hernández-Torrano, D., Pérez-González, J. C., Batey, M., & Petrides, K. V. (2011). The Relationship between Trait Emotional Intelligence and Creativity across Subject Domains. *Motivation and Emotion, 35,* 461-473. https://doi.org/10.1007/s11031-011-9227-8

Sánchez-Ruiz, M. J., Mavroveli, S., & Petrides, K. V. (2021). The Trait Emotional Intelligence Questionnaire in Lebanon and the UK: A Comparison of the Psychometric Properties in Each Country. *International Journal of Psychology: Journal International de Psychologie, 56,* 304-313. https://doi.org/10.1002/ijop.12711

Schutte, N. S., Thorsteinsson, E. B., Hine, D. W., Foster, R., Cauchi, A., & Binns, C. (2010). Experiential and Rational Processing Styles, Emotional Intelligence and Wellbeing. *Australian Journal of Psychology, 62,* 14-19. https://doi.org/10.1080/00049530903312865

Serebrakian, A. T., Petrusa, E. R., McKinley, S. K., Ortiz, R., Austen, W. G., & Phitayakorn, R. (2021). Evaluating and Comparing Emotional Intelligence and Improvement Mindset of Plastic Surgery Residents. *The Journal of Surgical Research, 268,* 750-756. https://doi.org/10.1016/j.jss.2021.06.061

Seshia, S. S., Bryan Young, G., Makhinson, M., Smith, P. A., Stobart, K., & Croskerry, P. (2018). Gating the Holes in the Swiss Cheese (Part I): Expanding Professor Reason's Model for Patient Safety. *Journal of Evaluation in Clinical Practice, 24,* 187-197. https://doi.org/10.1111/jep.12847

Shaikh, S., Mohyuddin, S., & Fahim, M. F. (2020). Emotional Intelligence May Have Association with Blood Groups. *Pakistan Journal of Medicine and Dentistry, 9,* 72-77. https://doi.org/10.36283/PJMD9-2/013

Shi, M., & Du, T. (2020). Associations of Emotional Intelligence and Gratitude with Empathy in Medical Students. *BMC Medical Education, 20,* Article No. 116. https://doi.org/10.1186/s12909-020-02041-4

Sinclair, H., & Feigenbaum, J. (2012). Trait Emotional Intelligence and Borderline Personality Disorder. *Personality and Individual Differences, 52,* 674-679. https://doi.org/10.1016/j.paid.2011.12.022

Skokou, M., Sakellaropoulos, G., Zairi, N.-A., Gourzis, P., & Andreopoulou, O. (2019). An Exploratory Study of Trait Emotional Intelligence and Mental Health in Freshmen Greek Medical Students. *Current Psychology (New Brunswick, N.J.), 40,* 6057-6066. https://doi.org/10.1007/s12144-019-00535-z

Stanovich, K., Toplak, M., & West, R. (2008). The Development of Rational Thought: A Taxonomy of Heuristics and Biases. *Advances in Child Development and Behavior, 36,* 251-285. https://doi.org/10.1016/S0065-2407(08)00006-2

Stephens, T. M. (2020). Cognitive Debiasing: Learning to "Change Your Mind". *Nurse Leader, 18,* 344-351. https://doi.org/10.1016/j.mnl.2019.03.013

Süral, I., Griffiths, M. D., Kircaburun, K., & Emirtekin, E. (2019). Trait Emotional Intelligence and Problematic Social Media Use among Adults: The Mediating Role of Social Media Use Motives. *International Journal of Mental Health and Addiction, 17,* 336-345. https://doi.org/10.1007/s11469-018-0022-6

Swider, B. W., & Zimmerman, R. D. (2010). Born to Burnout: A Meta-Analytic Path Model of Personality, Job Burnout, and Work Outcomes. *Journal of Vocational Behavior, 76,* 487-506. https://doi.org/10.1016/j.jvb.2010.01.003

Szabó, E., & Bereczkei, T. (2017). Different Paths to Different Strategies? Unique Associations among Facets of the Dark Triad, Empathy, and Trait Emotional Intelligence. *Advances in Cognitive Psychology, 13,* 306-313. https://doi.org/10.5709/acp-0230-7

van der Linden, D., Schermer, J. A., De Zeeuw, E., Dunkel, C., Pekaar, K., Bakker, A., Vernon, P., & Petridis, K. (2018). Overlap between the General Factor of Personality and Trait Emotional Intelligence: A Genetic Correlation Study. *Behavior Genetics, 48,* 147-154. https://doi.org/10.1007/s10519-017-9885-8

Ventriglio, A., Watson, C., & Bhugra, D. (2020). Suicide among Doctors: A Narrative Review. *Indian Journal of Psychiatry, 62,* 114-120. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_767_19

Waidler, K. A. (2021). *Relationships between Trait Emotional Intelligence and Gender in Healthcare Leaders.* ProQuest Dissertations Publishing.

Weinstein, M. (2011). *The Relationship between Emotional Intelligence and Burnout among Postgraduate University Students.* ProQuest Dissertations Publishing.

Zarei, E., Yazdi, M., Abbassi, R., & Khan, F. (2019). A Hybrid Model for Human Factor Analysis in Process Accidents: FBN-HFACS. *Journal of Loss Prevention in the Process Industries, 57,* 142-155. https://doi.org/10.1016/j.jlp.2018.11.015