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THE CONTRIBUTION OF PERSONALITY TRAITS AND SELF-EFFICACY BELIEFS TO MEDICAL STUDENTS' EMPATHY

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Academic learning and professional internship are the paramount pillars of medical students' education. Modern healthcare organizational settings have become increasingly aware of the importance of nontechnical individual differences (e.g., personality dispositions and personal resources) in shaping optimal job profiles that may satisfy high-level clinical standards. In this vein, one of the most important challenges for medical academic institutions is the development of emotional and cognitive aspects of empathy that may support and sustain future professionals in achieving the goals of their clinical practice. Capitalizing on a large sample of Italian first-year undergraduate students, the present

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study sought to disentangle the independent contribution of Big-Five personality traits and Self-Efficacy beliefs in multiple academic and life spheres in explaining cognitive and emotional components of empathy. Results showed that both sets of variables play a significant role in shaping empathy, albeit with relevant differences on specific dimensions of empathy. Implications for academic learning and clinical practice are discussed.

Keywords: Empathy; Personality traits; Big Five; Self-efficacy; Medical students.

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Medical educators extensively recognize empathy as a crucial factor for clinical practice. Empathic management of the clinical encounter promotes functional patient-physician communication (Derksen et al., 2013). Empathic physicians reduce emotional distress and foster satisfaction, well-being, adherence to treatment, and self-efficacy in their patients, as well as typically making a more accurate diagnosis and engaging in more shared decision-making behaviors (Zachariae et al., 2003). Furthermore, empathy is considered a protective factor against psychological distress and burnout among healthcare students and professionals (Salvarani et al., 2019, 2020). It comprises a complex multidimensional construct encompassing emotional and cognitive components (Mooradian et al., 2011). In healthcare contexts, the emotional dimension of empathy, frequently labeled as "empathic concern," represents the physician's propensity to emotionally respond to patients' feelings while retaining his/her professionalism. The cognitive component of empathy involves the physician's tendency to consider the patient's perspective and the capability to determine treatment plans considering the patient's viewpoint, needs, and desires (Hojat, 2007).

The growing importance of both emotional and cognitive components of empathy in clinical practice has given rise to the need for educational interventions to foster and sustain empathy in medical students during their educational path (Toto et al., 2015). Furthermore, several studies examining empathy in undergraduate medical students called for programs fostering empathy in this population. Most of these studies have explored gender differences and changes in empathy throughout medical school. While the debate on the developmental trajectories of students' levels of empathy through their medical training is still ongoing (Andersen et al., 2020), gender is commonly recognized as a predictor of empathy, with female healthcare students displaying higher levels of self-transcending values (Ardenghi, Luciani, et al., 2021; Luciani et al., 2020) and higher scores on self-reported empathy measures than their male counterparts (Andersen et al., 2020). Lately, researchers have focused on the identification of dispositional variables that could be nurtured during medical school to develop and foster empathy in future healthcare professionals. A secure attachment style (Ardenghi et al., 2020), higher levels of dispositional mindfulness (Ardenghi, Rampoldi, Pepe, et al., 2021), a higher patient-centered orientation (Ardenghi et al., 2019), and higher levels of self-transcending personal values (Ardenghi, Rampoldi, Bani, & Strepparava, 2021) showed to be positively correlated to empathy. Nevertheless, investigations on the relationship between empathy and personality traits (Song & Shi, 2017) as well as between empathy and self-efficacy in medical education are still scanty (Klassen & Klassen, 2018).

According to the five-factor model (FFM or the Big Five), the five broad domains of personality traits are Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience (Markon et al., 2005). Previous cross-cultural studies found several associations between Big Five traits and interpersonal behaviors and attitudes across the lifespan (McCrae, 2009). Existing studies suggest that Agreeableness is the personality trait more strongly associated with prosocial and altruistic behaviors (Hogan et al., 1997). In both college students and adult samples, Agreeableness has been typically conceptual-

ized as the propensity to be kind, supportive, and sympathetic, representing an important predictor of empathy (Costa et al., 2001; Melchers et al., 2016). Agreeableness and Openness to Experiences showed a positive association with empathy among medical students in Portugal (Costa et al., 2014; Magalhães et al., 2012). Furthermore, empathy was found positively associated with affability and negatively associated with aggressiveness in social interactions among first-year undergraduate students (Hojat, Zuckerman, et al., 2005). Agreeableness also showed a strong positive association with empathic concern, which refers to feelings of preoccupation and protection toward unfortunate others (Mooradian et al., 2011). Neuroticism, which indicates excessive levels of emotional arousal and the tendency to experience negative emotions such as anxiety and depression (Lewis et al., 2001), is typically associated with personal distress, which refers to the difficulty to remain calm and effective in dealing with tense and emergency situations (Davis, 1983). Openness to Experience (and especially its facet reflecting attentiveness to one's own feelings) was found to be positively associated with the capability to take others' perspectives, such as thoughts, feelings, and intentions (Magalhães et al., 2012). Moreover, also Conscientiousness (including carefulness, diligence, and obligations to others) and Extraversion (including energy, assertiveness, and pleasure in interacting with people) were found associated with empathy (Guilera et al., 2019; Melchers et al., 2016).

Differently from personality traits, self-efficacy beliefs are defined as a person's perceptions about his/her capability to effectively deal with challenging situations or to achieve goals in specific life domains (Bandura et al., 1999; Williams & Rhodes, 2016). Although self-efficacy does not refer to an individual's actual capacities to manage problematic situations, it affects that individual's performance when facing a task by regulating resources to reach a specific goal (Bandura et al., 1999). Self-efficacy represents a dynamic self-perception, which can change through specific learning experiences and by interacting with the surrounding environment (Bandura, 2002). Because self-efficacy beliefs are forged in specific settings, they can be considered contextualized perceptions associated with specific spheres of individual functioning, such as the domains of emotional understanding and interpersonal relationships (Bandura et al., 2003). In medical education, students' self-efficacy is typically associated with academic performance and achievement, self-regulated learning skills and motivation, problem-solving abilities, and less uncertainty in career choices (Turan et al., 2013).

The few existing studies exploring the relationship between self-efficacy and empathy have been conducted in educational settings. They highlighted significant and positive associations of self-efficacy beliefs with the cognitive component of empathy among early childhood educators (Pu & Kim, 2012), and a significant positive relationship between both emotional and professional self-efficacy beliefs with empathy in a sample of teachers (Goroshit & Hen, 2016). Self-efficacy beliefs in recognizing others' feelings and responding empathically to others in need (i.e., empathic self-efficacy) were positively associated with other-oriented and prosocial behaviors (Caprara & Steca, 2005). Additionally, Işik (2012) reported that trait anxiety and negative affectivity were negatively associated with career decision self-efficacy in a sample of first-year undergraduate students. A negative relationship between self-efficacy and depression, anxiety, worry, and social avoidance was found in a high school sample in Iran (Muris, 2002).

Overview of the Study

The principal aim of the present study was to evaluate the explanatory role of the five-factor personality traits and self-efficacy beliefs on both cognitive and emotional dimensions of empathy in a large sample of undergraduate Italian students from different medical schools. This study is rooted in a broader

ongoing longitudinal research project promoted by the Permanent Italian Conference of the Directors of Undergraduate Medical Schools (UMS) aimed to investigate students' wellbeing trajectories across the six years of their academic and training career (see Barbaranelli et al., 2016, 2019).

Specifically, we assessed the FFM using a reduced form of a well-validated measure (Big Five Questionnaire; BFQ, Caprara et al., 1993). Moreover, capitalizing on the aforementioned previous studies, we assessed self-efficacy beliefs in the following domains: self-regulating the experience and the expression of negative emotions ("emotional efficacy"), self-regulating the expression of empathic behaviors ("empathic efficacy"), establishing friendships ("social efficacy"), regulating studying and academic learning ("academic efficacy"), performing effectively in social groups ("assertive efficacy"), expressing problem-solving behaviors ("problem-solving efficacy"), self-regulating one's behavior when faced with peer pressure for antisocial conduct ("regulatory efficacy"). Finally, we assessed the key dimensions of both cognitive and emotional components of empathy, namely Empathic Concern (preoccupation for others in need), Personal Distress (discomfort in tense interpersonal settings), Perspective Taking (adoption of others' point of view), and Fantasy (imaginative transposition to fictitious situations).

In light of the aforementioned literature, we expected that: (a) among the five personality traits, Agreeableness would be the most important predictor of Empathic Concern and Perspective Taking, Emotional Stability would be the most important predictor of Personal Distress, Openness would be the most important predictor of Fantasy; (b) medical students with higher levels of self-efficacy beliefs in the emotional and empathic domains would show a greater empathic attitude and lower levels of Personal Distress in emotionally-charged interpersonal situations.

Finally, because of possible gender differences in the assessed variables, potential gender differences in medical students were explored, and gender was considered among the predictors in the regression analyses described below. Our analyses, then, addressed the possibility that the two sets of personality variables ("personality traits" and "self-efficacy beliefs") would differentially contribute to both emotional and cognitive components of empathy of medical students. Study results may inform medical educators on which psycho-attitudinal characteristics to target when designing educational interventions to promote empathy in medical students.

Method

Procedure and Participants

Data used for the study were collected as the first point of assessment (T1) of the broader longitudinal research project described above. Participants completed a self-administered paper-and-pencil questionnaire during the first semester of their first academic year of attendance at their medical schools. A research assistant explained the general purpose of the research project to the students, and s/he retrieved the completed questionnaires from participants. Before completing the questionnaire, participants signed an informed consent developed by the members of the Permanent Conference of Italian UMS Directors and previously approved by the Ethics Committee of each referent academic institution. Specifically, given the longitudinal nature of the research project, data were not anonymous, and they were treated in accordance with principles of local (Legislative Decree No. 196 of 30 June 2003) and international legislation (General Data Protection Regulation - GDPR (EU), No. 2016/67). Participation was completely voluntary, and no specific rewards were provided.

The final sample of the present study included 822 students (60.5% females) from eight different Italian UMS schools. Their age ranged between 18 and 30 years old (M_{age} = 19.73, SD_{age} = 1.04). Most participants had received a high school degree in humanities (27.1%) or sciences (67.8%). The grade point average (GPA) of the high school degree was 91.23/100 (SD_{GPA} = 9.83). Most of the sample was composed of full-time (90.9%) unmarried (99.3%) students.

Measures

Big Five Personality Traits

The Big Five interindividual-difference dimensions were assessed via a reduced version of the Big Five Questionnaire (BFQ; Caprara et al., 1993). This questionnaire was devised to be included in the online orienting program of Sapienza University of Rome (http://www.conosci-te-stesso.it/). The reduced BFQ comprises 8 items for each of the factors. Respondents rate the occurrence of the behavior reported in the item on a 5-point agreement scale. Energy/Extraversion (E) items assess characteristics such as activity, enthusiasm, assertiveness, and self-confidence. Agreeableness (A) taps concern and sensitivity toward others and their needs. Conscientiousness (C) items assess dependability, orderliness, precision, and the fulfilling of commitments. Emotional Stability (S) refers to the absence of feelings of anxiety, depression, discontent, and anger. Finally, Openness (O) items tap both self-reported intellect (especially in the school domain and broadness or narrowness of cultural interests) and self-reported fantasy/creativity. An exploratory factor analysis (alpha factoring with Promax rotation) conducted on the sample of this study revealed a clear five-factor structure. The correspondence between the posited five factors and the factors empirically found in the EFA was confirmed by correlations .92 (E), .95 (A), .94 (C), .97 (S), and .92 (O) between the computed scores and the factor scores derived from EFA (this correlation is called *scale validity coefficient*, see Cattell & Tsujoka, 1964). Correlations among factors ranged from .14 (A with S) to .33 (A with C), with a mean correlation of .23. Cronbach's alpha internal consistency coefficients were .71 (E), .79 (A), .76 (C) .80 (S), and .70 (O). Reliability of factor scores was estimated via the "ORION" coefficient ("Overall Reliability of fully-Informative prior Oblique N-EAP scores", see Ferrando & Lorenzo-Seva, 2016) and was .73 (E), .83 (A), .80 (C) .84 (S), and .77 (O).

Self-Efficacy Beliefs

Perceived self-efficacy (SE) was assessed via 41 items tapping multiple domains of functioning that are relevant to students' daily lives (Bandura et al., 1996). For each item, participants rated their beliefs in their capability to perform a given action. Ratings were made on a 5-point scale. An exploratory factor analysis (EFA; principal axis factoring with Promax rotation) conducted on the sample of this study revealed a clear six-factor structure. The first factor was identified as Emotional Efficacy (EE, 13 items), the second factor collapsed the Empathic and Social efficacy factor (ESE, 10 items), the third factor was loaded by Academic efficacy (AE, five items) items, the fourth factor consisted of Assertive efficacy (ASE, five items) items, the fifth factor was loaded by Problem-Solving efficacy (PSE, four items) items, and the sixth factor was identified as Regulatory efficacy (RE, four items) in facing peer pressure. The correspondence between the posited five factors and the factors empirically found in the EFA was confirmed by corre-

lations .99 (EE), .98 (ESE), .98 (AE), .99 (ASE), .97 (RE), and .93 (PSE) between the computed scores and the factor scores derived from EFA (Cattell & Tsujoka, 1964). Correlations between the EFA factors ranged from .02 (AE with RE) to .45 (EE with AE), with a mean correlation of .29. Cronbach's alpha internal consistency coefficients were .87 (EE), .86 (ESE), .81 (AE), .80 (ASE), .75 (RE), and .79 (PSE). Reliability of factor scores (estimated via the "ORION" coefficient) was .90 (EE), .88 (ESE), .87 (AE), .86 (ASE), .82 (PSE), and .87 (RE).

Cognitive and Emotional Components of Empathy

Empathy was evaluated through the Italian version of the Interpersonal Reactivity Index (IRI; Albiero et al., 2006; Davis, 1983), one of the most widely used self-report empathy measures in medical education (Hojat, Mangione, et al., 2005). The IRI is a 28-item multidimensional questionnaire that comprises four 7-item subscales: (1) Empathic Concern (EC) evaluates the respondents' tendency to concerned feelings when witnessing the misfortunes of others (e.g., "I often have tender, concerned feelings for people less fortunate than me"); (2) Personal Distress (PD) assesses respondents' tendency to feel anxiety and uneasiness in emergency situations (e.g., "In emergency situations, I feel apprehensive and ill-at-ease"); (3) Perspective Taking (PT) assesses respondents' tendency to take others' viewpoints during a discussion (e.g., "I try to look at everybody's side of a disagreement before I make a decision"); (4) Fantasy (F) assesses respondents' tendency to get involved with the feelings of the fictional characters in novels, movies, or plays (e.g., "I really get involved with the feelings of the characters in a novel"). Respondents are asked to rate the items using a 5-point scale (ranging from 1 = *does not describe me well* to 5 = *describes me very well*). Each subscale scoring is obtained by summing the corresponding items. Higher scores on each subscale indicate higher levels of empathy.

An EFA (principal axis factoring with Promax rotation) conducted on the study sample revealed a clear four-factor structure. The first factor was identified as Fantasy (F), the second factor was loaded by items referring to Perspective Taking (PT), the third factor was loaded by Personal Distress (PD) items, the fourth factor consisted of Empathic Concern (EC) items. The correspondence between the posited four factors and the factors empirically found in the EFA was confirmed by correlations .97 (F), .96 (PT), .98 (PD), and .93 (EC) among the computed scores and the factor scores derived from EFA (Cattell & Tsujoka, 1964). Correlations between the EFA factors ranged from .02 (PT with PD) to .37 (PT with EC), with a mean correlation of .21. Cronbach's alpha internal consistency coefficients were .97 (F), .96 (PT), .98 (PD), and .93 (EC). Reliability of factor scores (estimated via the "ORION" coefficient) was .97 (F), .96 (PT), .98 (PD), and .93 (EC).

RESULTS

Zero-Order Correlations

Zero-order correlations among the study variables are presented in Table 1. As can be noted, correlations among self-efficacy dimensions were all positive and significant (excepting the relationship between Assertive and Regulatory SE). The magnitude of these coefficients ranged from low to moderate.

TABLE 1
Zero-order correlations among the study variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Emotional SE	1														
2. Empathic and Social SE	.39**	1													
3. Academic SE	.35**	.44**	1												
4. Assertive SE	.50**	.47**	.20**	1											
5. Problem-Solving SE	.50**	.43**	.37**	.48**	1										
6. Regulatory SE	.11**	.28**	.38**	.03	.11**	1									
7. Energy/Extraversion	.42**	.37**	.40**	.51**	.42**	.12**	1								
8. Agreeableness	.08*	.49**	.26**	.05	.13**	.29**	.20**	1							
9. Conscientiousness	.07*	.28**	.47**	.05	.13**	.43**	.33**	.39**	1						
10. Emotional Stability	.71**	.24**	.23**	.27**	.31**	.05	.31**	.17**	.17**	1					
11. Openness	.42**	.28**	.21**	.35**	.49**	.17**	.32**	.36**	.22**	.41**	1				
12. Empathic Concern	–.16**	.31**	.16**	–.03	–.01	.24**	.05	.60**	.25**	–.14**	.09*	1			
13. Personal Distress	–.55**	–.27**	–.25**	–.41**	–.40**	–.06	–.39**	–.08*	–.07	–.438**	–.28**	.06	1		
14. Perspective Taking	.10**	.31**	.15**	.09**	.18**	.26**	.07*	.57**	.27**	.19**	.50**	.44**	–.03	1	
15. Fantasy	–.21**	.07*	–.04	–.08*	.03	–.01	.00	.20**	.05	–.25**	.19**	.38**	.34**	.20**	1

Note. Variables were computed as factor scores estimated from previous EFA models. SE = Self-Efficacy.
*p < .05. **p < .01. ***p < .001.

Also, the correlation among Big Five personality traits were all positive and statistically significant, ranging from low to moderate in terms of magnitude. Cognitive and emotional dimensions of empathy were all positively and moderately related, except for the zero associations of Personal Distress with both Perspective Taking and Empathic Concern.

With regards to the association among empathy components and personality variables, Empathic Concern was positively related with Empathic and Social SE, Academic SE, and Regulatory SE, while on the Big Five side the strongest relationship was displayed by the relationship with Agreeableness (but also, with a weaker effect, with Conscientiousness). Furthermore, Empathic Concern displayed weak negative but significant correlations with Emotional SE and Emotional Stability. Personal Distress was negatively associated especially with some SE dimensions (Emotional, Assertive, and Problem-Solving SE) and with Energy/Extraversion, Emotional Stability, and Openness. Perspective Taking was positively and moderately associated with both Agreeableness and Openness, while lower but significant positive relationships were found with all SE dimensions (especially Emphatic and Social SE and Regulatory SE). Finally, Fantasy showed a weak negative significant association with Emotional SE and Emotional Stability, and a weak positive relationship with both Agreeableness and Openness.

Gender Differences in the Study Variables

As anticipated, we also examined potential gender differences in the study variables. Gender differences were examined via a series of one-way analyses of variance (ANOVAs), with Bonferroni correction to avoid capitalizing on chance results. The actual probability level of minimum nontrivial difference was set to .0033, which corresponds to a real probability level of .05, according to the equation .05/15, where .05 is the nominal level of alpha and 15 is the number of planned comparisons (see Stevens, 1990). Only differences with an associated probability level equal to or lower than .0033 were considered statistically significant. After the Bonferroni correction, females showed higher scores in IRI Empathic Concern and Fantasy, BFQ Agreeableness and Conscientiousness, Academic and Regulatory SE. Males showed higher scores in BFQ Openness and Emotional Stability, and in Assertive, Emotional, and Problem-Solving SE. Effect sizes of significant differences ranged from partial η^2 = .013 (Problem-Solving SE) to partial η^2 = .14 (IRI Empathy), with an average partial η^2 of = .051 (*SD* = .038).

Impact of Big Five Personality and Self-Efficacy Variables on Empathy Dimensions

Regression analyses were used to determine the unique explicative value of each personality measure and to determine whether self-efficacy measures predicted beyond the effects of Big Five scores (and vice-versa). Four sets of hierarchical multiple regression analyses were conducted, with each of the four scales measured by the IRI being regressed, in turn, on the Big Five traits and the self-efficacy measures. In all analyses factor scores derived from the EFA described above were used. Following Cohen et al. (2003), sets of independent variables were defined to test hierarchically the impact of efficacy variables versus Big Five dimensions on the IRI dimensions. We defined two "functional" sets of variables (see Cohen et al., 2003, pp. 163-164); a first set comprised the six-factor scores derived from the previous EFA model tested on perceived self-efficacy scales (the "Perceived Self-Efficacy set"), while a second set comprised the five scores obtained from the EFA model tested on the reduced version of the BFQ (the "Big Five set"). The aim was to examine the relative importance of SE beliefs and of Big Five dimensions in accounting for variance in our outcome variables. In a first hierarchical model, the "Self-Efficacy set" was

entered first in the regression equation; next, the "Big-Five set" was entered to examine if the inclusion of this set would explain any residual variance of the dependent variable. This procedure was applied to all outcome variables constituted by the factor scores derived from the IRI (i.e., Empathic Concern, Personal Distress, Perspective Taking, and Fantasy). With the first model, we wanted to examine if the Big Five set add any value once the variance explained by Self-Efficacy dimensions was partialled out from dependent variables; with the second model, we wanted to examine if Self-Efficacy dimensions, in turn, add any value once the variance explained by the Big Five set is partialled out from dependent variables. In other terms, the entrance of these set of variables was inverted in the last two steps of the hierarchical regression models (in the first model, Self-Efficacy beliefs were entered in the second step, while the Big Five set was added in the third step; in the second model, the Big Five set was entered in the second step, while Self-Efficacy dimensions were added in the third step). Due to significant gender differences, in all analyses gender was controlled by being entered in the first step (gender was coded 0 = *males*, 1 = *females*). Table 2 presents the results from the tested hierarchical regression models. We consider the four outcome variables in turn.

With regards to Empathic Concern, students who showed higher levels in this variable also displayed higher levels of Empathic and Social SE and Agreeableness, and lower levels of Emotional SE and Emotional Stability. Moreover, females reported significantly higher scores in Empathic Concern than males. Turning to the comparison between the two hierarchical models, after controlling for gender, the "Perceived Self-Efficacy set" added a low, albeit significant, 1.1% of variance after the "Big Five set" was partialled out; conversely, the "Big Five set" explained a consistently higher proportion of variance (18.3%) once gender and the "Perceived Self-Efficacy set" were partialled out.

With regards to Personal Distress, students who showed higher levels in this variable also displayed lower levels of Emotional, Assertive, and Problem-Solving SE, and Energy/Extraversion and Emotional Stability. Gender effect should not be interpreted because it is due to suppression effects among predictors. Turning to the comparison between the two hierarchical models, after controlling for gender, the "Perceived Self-Efficacy set" added a significant 8.8% of variance after the "Big Five set" was partialled out; conversely, the "Big Five set" explained a consistently lower percentage of variance (2.1%) once gender and the "Perceived Self Efficacy set" were partialled out.

With regards to Perspective Taking, students who showed higher levels of Perspective Taking also displayed higher levels of Agreeableness and Openness and Regulatory SE, and lower levels of Energy/Extraversion. The effect of Emotional SE should not be interpreted because it is due to suppression effects among predictors. Turning to the comparison between the two hierarchical models, after controlling for gender, the "Perceived Self-Efficacy set" added a low, albeit significant, 1.1% of variance after the "Big Five set" was partialled out; conversely, the "Big Five set" explained a consistently higher percentage of variance (32.2%) once gender and the "Perceived Self-Efficacy set" were partialled out.

With regards to Fantasy, students who showed higher levels in this variable also displayed higher levels of Empathic and Social SE, Agreeableness and Openness, and lower levels of Assertive, Academic, and Regulative SE, and Emotional Stability. Although the effect of Regulatory SE was significant, this effect should not be interpreted because it is due to suppression effects among predictors. Moreover, females reported significantly higher scores in Fantasy than males. Turning to the comparison among the two hierarchical models, after controlling for gender, the "Perceived Self Efficacy set" added a low, albeit significant, 2.5% of variance after the "Big Five set" was partialled out; conversely, the "Big Five set" explained a much higher proportion of variance (8%) once gender and the "Perceived Self- Efficacy set" were partialled out.

TABLE 2
Results from the empirical hierarchical regression models

	Empathic Concern	Personal Distress	Perspective Taking	Fantasy
Standardized regression coefficients				
Gender (0 = *male*, 1 = *female*)	.153***	–.102***†	–.021	.102**
Emotional SE	–.117*	–.323***	–.121**†	–.102*
Empathic and Social SE	.093*	.029	.043	.100*
Academic EFF	.040	–.124**	.039	–.104*
Assertive EFF	.011	-.019	–.015	–.088*
Problem-Solving SE	–.012	–.113**	–.001	.056
Regulatory SE	.048	.019	.094**	–.082*†
Energy/Extraversion	–.019	–.144***	–.152***	.052
Agreeableness	.545***	–.001	.417***	.107*
Conscientiousness	.002	.056	.032	.027
Emotional Stability	–.121**	–.142***	.072	–.28***
Openness	–.036	.026	.370***	.24***
Step 1				
R^2	.141	.005	.006	.037
Step 2				
Self-Efficacy set (1)				
R^2	.275	.352	.138	.105
R^2 Change	.134***	.347***	.132***	.068***
Big five set (2)				
R^2	.448	.285	.448	.160
R^2 Change	.307***	.280***	.443***	.123***
Step 3				
Big five set (1)				
R^2	.458	.374	.460	.185
R^2 Change	.183***	.021***	.322***	.080***
Self-Efficacy set (2)				
R^2	.448	.373	.460	.185
R^2 Change	.011*	.088***	.011*	.025**

Note. SE = Self-Efficacy. Regression coefficients are presented in a completely standardized metric (β coefficients). (1) = First hierarchical regression model; (2) = Second hierarchical regression model. † Spurious coefficients due to suppression effects between the regression predictors. *p < .05. **p < .01. ***p < .001.

DISCUSSION

A primary aim of the present study was to determine whether personality dimensions such as self-efficacy perceptions and the Big Five traits contribute to the empathy of Italian medical school students. Findings substantially confirm the hypothesized impact of both sets of variables. A related aim of the study was to determine whether self-reported efficacy beliefs contribute to an empathy beyond the predictive

value of self-reported dispositional tendencies, as assessed by a measure of the five primary dimensions of phenotypic interindividual-differences, and vice-versa.

Self-Efficacy beliefs related to coping with negative emotions were significantly associated with Empathic Concern, Personal Distress, and Fantasy facets of the IRI. While this association was expected for Personal Distress, it was not hypothesized for the other facets of the IRI. These results evidence how the tendency to have more empathic concerns and of assuming the perspective of others is contingent upon a lower perceived capability to cope with negative emotions. Empathic and Social SE was, as expected, associated with both Empathic Concerns and Fantasy, while its association with Perspective Taking was positive but not significant.

Agreeableness was the main predictor of both Perspective Taking and Empathic concern. These results confirm our expectations, and they show how this stable personality trait outperforms any other dimension in the explanation of these key dimensions of Empathy. Openness explained Perspective Taking above and beyond what was explained by Agreeableness, and by the few Self-Efficacy beliefs which have an impact on this facet of Empathy. Moreover, this trait was significantly related to Fantasy (as expected). To further confirm the tendency to emotional lability of students who have a higher propensity to empathy, Emotional Stability was negatively related to Fantasy, Personal Distress (as expected), and Empathic Concerns (see also Lee, 2009). Finally, Energy/Extroversion was negatively associated with both Perspective Taking and Personal Distress: students who perceived themselves as more energetic and assertive are less prone to assume the perspective of others and more capable to cope with personal distress.

It is clear from the results of the hierarchic regression analyses that the Big Five personality traits have a stronger impact in explaining empathy. This is true for all IRI scales except for Personal Distress, where the Self-Efficacy functional set outperformed the Big Five functional set. While this data analytic approach seems to suggest a "competition" between these two sets of constructs, we believe that they are complementary, so that we are not in the presence of two rival theories which explain behaviors. On one hand, as personality traits are sedimented in the language, similarly habitual behaviors sediment across time giving origin to those stable organizations of affects and cognitions associated with the habitual behavioral tendencies we call "personality traits." In this view, traits are phenomenological indicators of habitual ways of being, they are stable dimensions summarizing habitual behavioral tendencies. Self-regulation mechanisms, instead, are part of a cognitive-affective system that gradually takes form from development mostly under the guidance of experience, which motivates and directs human action. Personality is thus a coherent system where sedimented habitual behavior tendencies interact with self-regulation mechanisms. Self-regulatory mechanisms not only influence behavior above and beyond these habitual tendencies, but also moderate the "drifting" action of habitual behaviors on future behaviors. This interplay can be better appreciated assuming the Bandurian perspective of mutual triadic determinism: as "synthesis" of behaviors, personality traits may act as "causes" both of personal variables (e.g., self-efficacy) and of environmental/situational variables. Being the system of influence "reciprocal," traits can be influenced/changed, in turn, by personal self-regulation mechanisms and by the environment. This process of interplay could be better studied in a longitudinal perspective, where their reciprocal influence appears. For example, while mastering experience increases self-beliefs, in turn self-beliefs change the awareness people have of themselves and the expression of traits both when they are assessed through self-reports (which are an expression of self-reflection) and when they are displayed in behavior.

In addition to the need of overcoming the cross-sectional approach, we acknowledge further limits that future studies should address to strengthen current results. First, most of the measures were self-reported, thus social desirability bias cannot be excluded. A multi-informant approach would be an im-

portant added value. Notwithstanding these elements requiring additional investigation, the theoretical contribution of the present study highlights potential elements of practical relevance. Indeed, many studies provide evidence for the importance of considering individual resources when designing and planning interventions aimed to promote well-being, as well as hinder stress, depression, and other undesirable outcomes. Specifically, findings from the present contribution suggest monitoring traits and SE beliefs to promote success and positive behavior in the academic context. To this end, lecturers and supervisors in the academic context may play a key role in promoting and supporting individuals' SE through empowering leadership (Srivastava et al., 2006). From a practical perspective, this research suggests the importance of assessing and monitoring not only personal inclinations and attitudes but also individuals' self-regulatory beliefs related to their capabilities of setting challenging goals, planning the series of actions to achieve them, and modulating their own behavior on the basis of events and contextual characteristics and circumstances. In doing this, it is central to consider a range of specific SEs, including task-oriented, interpersonal, and emotional domains that may have different impacts on individuals' behavior and adjustment (Paciello et al., 2016). Overall, an assessment providing information on individuals' self-regulatory strengths and weaknesses may, in turn, inform the design of tailored intervention and training allowing individuals to adequately respond to the different demands and achieve successful outcomes.

Implications for Practice

The study findings have important implications for designing educational programs and courses aimed to foster students' empathy throughout medical school. Empathy can be enhanced in medical students by training and educational programs to increase their awareness of how specific personality traits may affect empathy and communication skills in the doctor-patient interaction (Tamayo et al., 2016). Students' personality characteristics could be assessed at admission to medical schools and included, alongside others (e.g., tests of scientific knowledge, attitude tests, etc.), as selection criteria (Magalhães et al., 2012). When it comes to perceived self-efficacy, it can be sustained through vicarious experiences and experiences of mastery during clinical internship and setting-specific communication skills training (Bandura et al., 1999; Leal-Costa et al., 2020). Faculty development should consider training courses for medical tutors and teachers to provide them with skills and competences on how to become sources of self-efficacy for their students. Medical educators can strengthen perceived self-efficacy in students by being positive role models which bridge clinical attributes, teaching skills, and personal qualities (Burgess et al., 2015). Moreover, debriefing activities after simulation training (e.g., standardized patients) can promote reflection on students' communication and empathic behaviors fostering their perceived interpersonal self-efficacy (Ha & Song, 2015).

References

Albiero, P., Ingoglia, S., & Lo Coco, A. (2006). Contributo all'adattamento italiano dell'Interpersonal Reactivity Index [A contribution to the Italian validation of the dell'Interpersonal Reactivity Index]. *TPM – Testing, Psychometrics, Methodology in Applied Psychology*, *13*(2), 107-125.

Andersen, F. A., Johansen, A.-S. B., Søndergaard, J., Andersen, C. M., & Assing Hvidt, E. (2020). Revisiting the trajectory of medical students' empathy, and impact of gender, specialty preferences and nationality: A systematic review. *BMC Medical Education*, *20*(1), Article 52. https://doi.org/10.1186/s12909-020-1964-5

Ardenghi, S., Luciani, M., Rampoldi, G., Ausili, D., Bani, M., Di Mauro, S., & Strepparava, M. G. (2021). Personal values among first-year medical and nursing students: A cross-sectional comparative study. *Nurse Education Today*, *100*, Article 104827. https://doi.org/10.1016/j.nedt.2021.104827

Ardenghi, S., Rampoldi, G., Bani, M., & Strepparava, M. G. (2020). Attachment styles as predictors of self-reported empathy in medical students during pre-clinical years. *Patient Education and Counseling*, *103*(5), 965-970. https://doi.org/10.1016/j.pec.2019.11.004

Ardenghi, S., Rampoldi, G., Bani, M., & Strepparava, M. G. (2021). Personal values as early predictors of emotional and cognitive empathy among medical students. *Current Psychology*. Advance online publication. https://doi.org/10.1007/s12144-021-01373-8

Ardenghi, S., Rampoldi, G., Pepe, A., Bani, M., Gritti, P., & Strepparava, M. G. (2019). Assessing patient-centeredness among medical students: The Italian translation and validation of the Patient-Practitioner Orientation Scale. *BPA Applied Psychology Bulletin*, *67*(285), 51-61. https://doi.org/10.26387/bpa.285.5

Ardenghi, S., Rampoldi, G., Pepe, A., Bani, M., Salvarani, V., & Strepparava, M. G. (2021). An exploratory cross-sectional study on the relationship between dispositional mindfulness and empathy in undergraduate medical students. *Teaching and Learning in Medicine*, *33*(2), 154-163. https://doi.org/10.1080/10401334.2020.1813582

Bandura, A. (2002). Social cognitive theory in cultural context. *Applied Psychology*, *51*(2), 269-290. https://doi.org/10.1111/1464-0597.00092

Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (1996). Multifaceted impact of self-efficacy beliefs on academic functioning. *Child Development*, *67*(3), 1206-1222. https://doi.org/10.2307/1131888

Bandura, A., Caprara, G. V., Barbaranelli, C., Gerbino, M., & Pastorelli, C. (2003). Role of affective self-regulatory efficacy in diverse spheres of psychosocial functioning. *Child Development*, *74*(3), 769-782. https://doi.org/10.1111/1467-8624.00567

Bandura, A., Freeman, W. H., & Lightsey, R. (1999). Self-efficacy: The exercise of control. *Journal of Cognitive Psychotherapy*, *13*(2), 158-166. https://doi.org/10.1891/0889-8391.13.2.158

Barbaranelli, C., Familiari, G., Ghezzi, V., Valli, M., De Placido, S., Murano, R., Bandello, F. M., Locatelli, V., Bozzaro, S., Di Liegro, I., Caiaffa, M. F., Morini, S., Strepparava, M. G., & Cavaggioni, G. (2016). Studio longitudinale sul benessere e le attitudini degli Studenti di Medicina e Chirurgia. Primi risultati della fase 1 - Le caratteristiche degli studenti selezionati. [Longitudinal study on the wellbeing and attitudes of students in Medicine and Surgery. First results of Phase 1 – Features of the students selected.] *Medicina e Chirurgia*, *70*, 3176-3180. https://doi.org/10.4487/medchir2016-70-4

Barbaranelli, C., Ghezzi, V., Cavaggioni, G., Caiaffa, M. F., Valli, M., Muraro, R., Locatelli, V., Strepparava, M. G., & Familiari, G. (2019). Studio longitudinale sul benessere e le attitudini degli studenti di medicina e chirurgia: focus su alcuni risultati dei primi due tempi della ricerca. [Longitudinal study on the wellbeing and attitudes of students in medicine and surgery: Focus on some results of the first two phases of the research.] *Medicina e Chirurgia*, *81*, 3601-3607. https://doi.org/10.4487/medchir2018-81-2

Burgess, A., Goulston, K., & Oates, K. (2015). Role modelling of clinical tutors: A focus group study among medical students. *BMC Medical Education*, *15*(1), Article 17. https://doi.org/10.1186/s12909-015-0303-8

Caprara, G. V., & Steca, P. (2005). Self-efficacy beliefs as determinants of prosocial behavior conducive to life satisfaction across ages. *Journal of Social and Clinical Psychology*, *24*(2), 191-217. https://doi.org/10.1521/jscp.24.2.191.62271

Caprara, G. V., Barbaranelli, C., Borgogni, L., & Perugini, M. (1993). The "Big Five Questionnaire": A new questionnaire to assess the five factor model. *Personality and Individual Differences*, *15*(3), 281-288. https://doi.org/10.1016/0191-8869(93)90218-R

Cattell, R. B., & Tsujoka, B. (1964). The importance of factor-trueness and validity, versus homogeneity and orthogonality, in test scales. *Educational and Psychological Measurement*, *24*(1), 3-30. https://doi.org/10.1177/001316446402400101

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Lawrence Erlbaum Associates Publishers.

Costa, P., Alves, R., Neto, I., Marvão, P., Portela, M., & Costa, M. J. (2014). Associations between medical student empathy and personality: A multi-institutional study. *PLoS ONE*, *9*(3), Article e89254. https://doi.org/10.1371/journal.pone.0089254

Costa, P. T., Terracciano, A., & McCrae, R. R. (2001). Gender differences in personality traits across cultures: Robust and surprising findings. *Journal of Personality and Social Psychology*, *81*(2), 322-331. https://doi.org/10.1037/0022-3514.81.2.322

Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, *44*(1), 113-126. https://doi.org/10.1037/0022-3514.44.1.113

Derksen, F., Bensing, J., & Lagro-Janssen, A. (2013). Effectiveness of empathy in general practice: A systematic review. *British Journal of General Practice*, *63*(606), e76–e84. https://doi.org/10.3399/bjgp13X660814

Ferrando, P. J., & Lorenzo-Seva U. (2016). A note on improving EAP trait estimation in oblique factor-analytic and item response theory models. *Psicologica*, *37*, 235-247.
Goroshit, M., & Hen, M. (2016). Teachers' empathy: Can it be predicted by self-efficacy? *Teachers and Teaching*, *22*(7), 805-818. https://doi.org/10.1080/13540602.2016.1185818
Guilera, T., Batalla, I., Forné, C., & Soler-González, J. (2019). Empathy and big five personality model in medical students and its relationship to gender and specialty preference: A cross-sectional study. *BMC Medical Education*, *19*(1), Article 57. https://doi.org/10.1186/s12909-019-1485-2
Ha, E.-H., & Song, H.-S. (2015). The effects of structured self-debriefing using on the clinical competency, self-efficacy, and educational satisfaction in nursing students after simulation. *The Journal of Korean Academic Society of Nursing Education*, *21*(4), 445-454. https://doi.org/10.5977/jkasne.2015.21.4.445
Hogan, R., Johnson, J., & Briggs, S. R. (Ed.) (1997). *Handbook of personality psychology.* Academic Press.
Hojat, M. (2007). *Empathy in patient care: Antecedents, development, measurement, and outcomes*. Springer.
Hojat, M., Mangione, S., Kane, G. C., & Gonnella, J. S. (2005). Relationships between scores of the Jefferson Scale of Physician Empathy (JSPE) and the Interpersonal Reactivity Index (IRI). *Medical Teacher*, *27*(7), 625-628. https://doi.org/10.1080/01421590500069744
Hojat, M., Zuckerman, M., Magee, M., Mangione, S., Nasca, T., Vergare, M., & Gonnella, J. S. (2005). Empathy in medical students as related to specialty interest, personality, and perceptions of mother and father. *Personality and Individual Differences*, *39*(7), 1205-1215. https://doi.org/10.1016/j.paid.2005.04.007
Işik, E. (2012). The relationship of career decision self-efficacy, trait anxiety, and affectivity among undergraduate students. *Psychological Reports*, *111*(3), 805-813. https://doi.org/10.2466/01.09.10.PR0.111.6.805-813
Klassen, R. M., & Klassen, J. R. L. (2018). Self-efficacy beliefs of medical students: A critical review. *Perspectives on Medical Education*, *7*(2), 76-82. https://doi.org/10.1007/s40037-018-0411-3
Leal-Costa, C., Tirado González, S., Ramos-Morcillo, A. J., Ruzafa-Martínez, M., Díaz Agea, J. L., & van-der Hofstadt Román, C. J. (2020). Communication skills and professional practice: Does it increase self-efficacy in nurses? *Frontiers in Psychology*, *11*, Article 1169. https://doi.org/10.3389/fpsyg.2020.01169
Lee, S. A. (2009). Does empathy mediate the relationship between neuroticism and depressive symptomatology among college students? *Personality and Individual Differences*, *47*(5), 429-433. https://doi.org/10.1016/j.paid.2009.04.020
Lewis, M., Haviland-Jones, J. M., Sloan, D. M., & Fresco, D. M. (2001). Handbook of emotions (2nd. edition). *Journal of Cognitive Psychotherapy*, *15*(3), 281-283. https://doi.org/10.1891/0889-8391.15.3.281
Luciani, M., Rampoldi, G., Ardenghi, S., Bani, M., Merati, S., Ausili, D., Strepparava, M. G., & Di Mauro, S. (2020). Personal values among undergraduate nursing students: A cross-sectional study. *Nursing Ethics*, *27*(6), 1461-1471. https://doi.org/10.1177/0969733020914350
Magalhães, E., Costa, P., & Costa, M. J. (2012). Empathy of medical students and personality: Evidence from the Five-Factor Model. *Medical Teacher*, *34*(10), 807-812. https://doi.org/10.3109/0142159X.2012.702248
Markon, K. E., Krueger, R. F., & Watson, D. (2005). Delineating the structure of normal and abnormal personality: An integrative hierarchical approach. *Journal of Personality and Social Psychology*, *88*(1), 139-157. https://doi.org/10.1037/0022-3514.88.1.139
McCrae, R. R. (2009). The Five-Factor Model of personality traits: Consensus and controversy. In P. J. Corr & G. Matthews (Eds.), *The Cambridge Handbook of Personality Psychology* (pp. 148-161). Cambridge University Press. https://doi.org/10.1017/CBO9780511596544.012
Melchers, M. C., Li, M., Haas, B. W., Reuter, M., Bischoff, L., & Montag, C. (2016). Similar personality patterns are associated with empathy in four different countries. *Frontiers in Psychology*, Article *7*. https://doi.org/10.3389/fpsyg.2016.00290
Mooradian, T.A., Davis, M., & Matzler, K. (2011). Dispositional empathy and the hierarchical structure of personality. *The American Journal of Psychology*, *124*(1), 99-109. https://doi.org/10.5406/amerjpsyc.124.1.0099
Muris, P. (2002). Relationships between self-efficacy and symptoms of anxiety disorders and depression in a normal adolescent sample. *Personality and Individual Differences*, *32*(2), 337-348. https://doi.org/10.1016/S0191-8869(01)00027-7
Paciello, M., Ghezzi, V., Tramontano, C., Barbaranelli, C., & Fida, R. (2016). Self-efficacy configurations and wellbeing in the academic context: A person-centred approach. *Personality and Individual Differences*, *99*, 16-21. https://doi.org/10.1016/j.paid.2016.04.083
Pu, S. S., & Kim, B. J. (2012). Impact of emotional intelligence on self-concept and self-efficacy among preservice early childhood teachers. *Korean Journal of Human Ecology*, *21*(4), 649-664. https://doi.org/10.5934/KJHE.2012.21.4.649
Salvarani, V., Ardenghi, S., Rampoldi, G., Bani, M., Cannata, P., Ausili, D., Di Mauro, S., & Strepparava, M. G. (2020). Predictors of psychological distress amongst nursing students: A multicenter cross-sectional study. *Nurse Education in Practice*, *44*, Article 102758. https://doi.org/10.1016/j.nepr.2020.102758

Salvarani, V., Rampoldi, G., Ardenghi, S., Bani, M., Blasi, P., Ausili, D., Di Mauro, S., & Strepparava, M. G. (2019). Protecting emergency room nurses from burnout: The role of dispositional mindfulness, emotion regulation and empathy. *Journal of Nursing Management*, *27*(4), 765-774. https://doi.org/10.1111/jonm.12771

Song, Y., & Shi, M. (2017). Associations between empathy and big five personality traits among Chinese undergraduate medical students. *PLOS ONE*, *12*(2), Article e0171665. https://doi.org/10.1371/journal.pone.0171665

Srivastava, A., Bartol, K. M., & Locke, E. A. (2006). Empowering leadership in management teams: Effects on knowledge sharing, efficacy, and performance. *Academy of Management Journal*, *49*(6), 1239-1251. https://doi.org/10.5465/amj.2006.23478718

Stevens, J. P. (1990). *Intermediate statistics: A modern approach.* Lawrence Erlbaum Associates, Inc.

Tamayo, C. A., Rizkalla, M. N., & Henderson, K. K. (2016). Cognitive, behavioral and emotional empathy in pharmacy students: Targeting programs for curriculum modification. *Frontiers in Pharmacology*, article *7*. https://doi.org/10.3389/fphar.2016.00096

Toto, R. L., Man, L., Blatt, B., Simmens, S. J., & Greenberg, L. (2015). Do empathy, perspective-taking, sense of power and personality differ across undergraduate education and are they inter-related? *Advances in Health Sciences Education*, *20*(1), 23-31. https://doi.org/10.1007/s10459-014-9502-z

Turan, S., Valcke, M., Aper, L., Koole, S., & Derese, A. (2013). Studying self-efficacy beliefs in medical education. *Procedia - Social and Behavioral Sciences*, *93*, 1311-1314. https://doi.org/10.1016/j.sbspro.2013.10.034

Williams, D. M., & Rhodes, R. E. (2016). The confounded self-efficacy construct: Conceptual analysis and recommendations for future research. *Health Psychology Review*, *10*(2), 113-128. https://doi.org/10.1080/17437199.2014.941998

Zachariae, R., Pedersen, C. G., Jensen, A. B., Ehrnrooth, E., Rossen, P. B., & von der Maase, H. (2003). Association of perceived physician communication style with patient satisfaction, distress, cancer-related self-efficacy, and perceived control over the disease. *British Journal of Cancer*, *88*(5), 658-665. https://doi.org/10.1038/sj.bjc.6600798