



# Supporting students with empathy: the association between empathy and coping strategies in pre-clinical medical students

Stefano Ardenghi<sup>1,2</sup> · Selena Russo<sup>1</sup> · Marco Bani<sup>1</sup> · Giulia Rampoldi<sup>1</sup> · Maria Grazia Strepparava<sup>1,3</sup>

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## Abstract

How medical students cope with stress predicts their mental health and academic/clinical performances, making the promotion of functional coping strategies a relevant outcome for medical educators. Empathy has been reported to be connected with coping. This study wanted to explore the most used coping strategies and whether gender differences existed, and to investigate whether and to what extent empathy affected coping in a sample of pre-clinical medical students. In a cross-sectional study design, the Interpersonal Reactivity Index (IRI) and the Coping Orientations to the Problems Experienced - New Italian Version (COPE-NIV) were administered to 398 (53% females) Italian second-year medical students. T-tests and multiple regression analyses were used to explore gender differences and the association between IRI and COPE-NIV scores, respectively. Problem Orientation obtained the highest mean score, whereas Avoidance the lowest one. Females outscored males on Social Support ( $t=4.95$ ,  $p < .001$ ) and Transcendent Orientation ( $t=4.04$ ,  $p < .001$ ). After controlling for gender, Empathic Concern was positively associated with Social Support ( $\beta=0.223$ ,  $p = .001$ ) and Transcendent Orientation ( $\beta=0.234$ ,  $p = .001$ ). Perspective Taking was positively and negatively associated with Positive Attitude ( $\beta=0.248$ ,  $p < .001$ ) and Transcendent Orientation ( $\beta = -0.180$ ,  $p = .008$ ), respectively. Personal Distress was negatively related to Problem Orientation ( $\beta = -0.250$ ,  $p < .001$ ). Educational and psychological counselling interventions targeting empathy should be implemented in the pre-clinical years to equip medical students to cope functionally with the emotional distress linked to medical school.

**Keywords** Medical education · Medical students · Undergraduate · Empathy · Coping strategies

## Introduction

There is significant evidence that medical students' mental well-being is often challenged during the academic journey (Rotenstein et al., 2016). Pressing workloads, onerous curricula, challenging learning environments, personal life events, and psychological pressures are amongst the main

stressors that medical students need to cope with (Dyrbye et al., 2006, 2009; Santen et al., 2010; Shaikh et al., 2004). A particularly challenging aspect for medical students is the transition from the classroom to clinical environments. Undergoing clinical training can be demanding (Alsaggaf et al., 2016; Houpy et al., 2017; Lin & Lin, 2016), trigger several physical and mental health conditions, and induce emotional exhaustion (Dunn et al., 2008). In a recent study exploring medical students' abilities to cope with stressful experiences, almost half of participants met the criteria for burnout diagnosis, and 17% described moderate to severe depression, with 23% reporting depression onset linked to difficulties in managing stressful events (Thompson et al., 2016).

To respond effectively to stressful circumstances, functional and healthy coping behaviors are of paramount importance for medical students (Fares et al., 2016; Rahimi et al., 2014). Coping can be defined as a conscious volitional effort to regulate one's emotions, thoughts, and behaviors,

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✉ Maria Grazia Strepparava  
mariagrazia.strepparava@unimib.it

<sup>1</sup> School of Medicine and Surgery, University of Milano-Bicocca, Monza (MB), Italy

<sup>2</sup> Complex Structure of Specialized Rehabilitation, Fondazione IRCCS San Gerardo dei Tintori, ASST-Monza, Monza, MB, Italy

<sup>3</sup> Clinical Psychology Unit, Department of Mental Health and Addiction, Fondazione IRCCS San Gerardo dei Tintori, ASST-Monza, Via Cadore 48, 20900, +39 02, 64488175 Monza, MB, Italy

in response to stress (Compas et al., 2001). Coping is usually type casted into three main categories, namely problem-focused, emotion-focused, and avoidance-focused strategies (Folkman, 1984). Problem-focused coping strategies are directed at solving a threatening or harmful situation (e.g., planning actions, seeking instrumental support, etc.); emotion-focused coping strategies attempt to mitigate emotional responses to a difficult situation (e.g., acceptance, humor, venting, turning to religion, emotional support, positive reframing, and self-blame); avoidance-focused coping strategies aim to remove oneself mentally or physically from a situation perceived as threatening or damaging (e.g., denial, self-distraction, behavioral disengagement, substance use, etc.) (Madhyastha et al., 2014). There is also a second-order classification of coping, namely, adaptive and maladaptive (Carver, 1997; Meyer, 2001). Adaptive coping entails flexible approaches to dealing with problems and managing stressors-related emotions (García et al., 2018), whereas maladaptive coping involves less constructive and fruitful behaviors (Carver & Connor-Smith, 2010; Connor-Smith & Flachsbart, 2007). Problem-focused coping strategies have been proven to be the most adaptive (Crockett et al., 2007; Kohn & Frazer, 1986; Wijndaele et al., 2007), while avoidant-focused coping strategies the least adaptive (Crockett et al., 2007; Dunkley et al., 2000; Dwyer & Cummings, 2007; Wijndaele et al., 2007). Emotion-focused coping strategies could be adaptive as well as maladaptive (Billings & Moos, 1984; Crockett et al., 2007; Penland et al., 2000; Wijndaele et al., 2007). Studies in medical education settings showed that medical students in later vs. earlier years of their educational path use more avoidant maladaptive coping strategies, which tend to emerge when stressors are perceived as unmanageable and difficult to control (Erschens et al., 2018; Hojat et al., 2009; Singh et al., 2016). Hence, how students cope depends on the unique environments and stressors they face and their subjective experiences of these aspects. With regard to gender differences in coping strategies among medical students, existing data are not clear-cut. Findings on the general population show significant gender differences in coping behaviors (Carver et al., 1989; Eschenbeck et al., 2007; Matud, 2004; Ptacek et al., 1992) with females expressing more emotions and tending more to rely on social support to cope with stress (Shaikh et al., 2004). Nevertheless, although some studies found that coping strategies do not differ amongst male and female medical students (Moffat et al., 2004; Rahimi et al., 2014; Salam et al., 2019), others highlighted significant gender differences with females preferring seeking instrumental support (problem-focused coping strategy) and emotional support (emotion-focused coping strategy) (Madhyastha et al., 2014). Data also show that, when compared to females, third-year male medical students reported greater use of humor which is a positive

emotion-focused strategy to cope with stress (Madhyastha et al., 2014).

How medical students cope with stress not only predicts their mental health (Maslach et al., 2001) and academic performance (Ramkumar et al., 2011), but also the quality of care patients receive (Shanafelt et al., 2010; West et al., 2006) making the promotion of functional copy strategies relevant for clinical and healthcare outcomes. A thorough understanding of the factors promoting the adoption of functional and effective coping strategies is crucial for medical educators and administrators who aim at preserving and fostering well-being amongst their students and the quality of care they deliver. While the prevalence of distress has been established amongst medical students (Fares et al., 2016; Hope & Henderson, 2014; Rotenstein et al., 2016), less is known about the types of coping behaviors they engage in to lessen distress throughout their medical education (Dodek et al., 2019). Several factors have been detected to be likely to influence coping strategies in the general population, including sociodemographic factors (Pearlin & Schooler, 1978), self-confidence levels (Kobasa et al., 1982), negative life events (Dohrenwend et al., 1987; Norman & Malla, 1993), and social and family support (Billings & Moos, 1984). One factor that has yet to receive much attention, however, is empathy.

Empathy refers to the ability to understand and respond to another person's thoughts and emotions (Decety & Jackson, 2006). There is a wide consensus that empathy is a complex and multifaceted socio-emotional competency encompassing different interacting components (Decety, 2010; Decety & Jackson, 2004). At least two dimensions of empathy have been indicated: an automatic emotional response, which often includes sharing another person's feelings; and a cognitive ability to understand and take the perspective of others (i.e. perspective taking) (Shamay-Tsoory et al., 2009; Smith, 2006). The emotional dimension of empathy can be further differentiated into empathic concern and personal distress. The former is an other-focused emotional response of concern or sorrow resulting from the understanding of the other person's emotional state (Eisenberg et al., 2014; Preston & Hofelich, 2012; Singer & Lamm, 2009); the latter is a self-focused response of anxiety, worry or discomfort resulting from the apprehension of another person's distress (Batson et al., 1987; Singer & Lamm, 2009). Unlike empathic concern, personal distress does not have to be congruent with the other person's emotional state and often leads to a self-oriented reaction to reduce the unpleasant emotions including withdrawing from the stressor.

Both emotional and cognitive dimensions of empathy seem to be connected with coping. It has been advanced that empathic concern and perspective taking (other-focused empathy dimensions) trigger altruistic motivations and

helping behaviors aiming at reducing the other's suffering, while personal distress (self-focused empathy dimension) triggers more egoistic motivations aiming at reducing one's own unpleasant feelings (Batson et al., 1983; Decety, 2010). Thus, empathic concern and perspective taking might lead to approach behavior (e.g., care, helping), whereas personal distress might ignite avoidance behavior (e.g., withdrawal). Other-focused empathic responses (i.e., empathic concern and perspective-taking) are naturally connected to coping processes requiring engaging others in constructive interactions (Di Giunta et al., 2010; Kramer, 1993; O'Brien et al., 2009; O'Brien & DeLongis, 1996). Individuals with greater other-focused empathy are more likely to help others thus building and maintaining stronger social networks and receiving greater social support, which was found to be a chief ally in coping with stress (Batson et al., 1983).

Although the development of empathic skills are strongly related to the educational environment (Batt-Rawden et al., 2013), empathy has been linked to individual dispositions such as attachment styles (Ardenghi et al., 2020), emotional intelligence (Ardenghi et al., 2022; Donisi et al., 2022), personal values (Ardenghi, Luciani, Ardenghi et al. 2021a, b, c), personality traits (Barbaranelli et al., 2021), dispositional mindfulness (Ardenghi et al., 2022; Ardenghi, Rampoldi, Ardenghi et al. 2021a, b, c), patient-centered orientation (Ardenghi et al., 2019), emotional regulation (Ardenghi, Russo, Ardenghi et al. 2021a, b, c), and well-being (Salvarani et al., 2019, 2020). To the best of our knowledge, no study has directly examined the association between empathy and coping strategies in medical students and whether and to what extent gender influences this relationship. According to this literature gap, this study aimed to answer the following research questions:

1. Which are the most used coping strategies in a sample of Italian medical students? Do gender differences exist in coping strategies?
2. Do the other- and self-focused components of empathy influence coping strategies?

This research has the potential to inform educators about what empathic competencies should be sustained to provide medical students with functional coping strategies to face the emotionally demanding setting of the medical profession. The data from the present study can be particularly valuable to plan and implement interventions to support medical students transiting from the pre-clinical to the clinical years.

## Methods

### Participants and procedure

Three consecutive cohorts of second-year students of the medical school at the University of Milano-Bicocca, Italy took part in the study. The medical degree program is six years in length; the first two years are considered pre-clinical with minimal interaction with patients, while the remaining four provided students with clinical clerkship experiences. Inclusion criteria for participating in the study were to be enrolled at the second year of the medical school program and to read and write Italian sufficiently to complete the questionnaire. Participants were approached and invited to participate in the study after a mandatory lesson at the university facilities by a researcher with no teaching duties. Paper-and-pencil questionnaires were completed anonymously. The researcher was available for any doubts or questions while participants were filling in the questionnaire. All participants provided their written informed consent to participate. Participants did not receive any compensation for participating. Ethical approval was obtained from the Ethical Committee of the University of Milano-Bicocca (Prot. 0039927).

### Measures

The questionnaire gathered socio-demographic information and included the Italian validated version of the Interpersonal Reactivity Index (IRI) (Albiero et al., 2006; Davis, 1983) and the Coping Orientations to the Problems Experienced - New Italian Version (COPE-NIV) (Carver et al., 1989; Sica et al., 2008).

### Empathy: the interpersonal reactivity index

The 28-item IRI measured four dimensions of dispositional empathy: (1) *Empathic Concern* (IRI-EC), which refers to the tendency to experience feelings of compassion for unfortunate others and represents the other-focused emotional facet of empathy; (2) *Perspective Taking* (IRI-PT), which is the tendency to spontaneously adopt the point of view of others and is the other-focused cognitive facet of empathy; (3) *Personal Distress* (IRI-PD), that is the tendency to undergo emotional discomfort and present behavioral disorganization in response to others' suffering during stressful interpersonal situations; (4) *Fantasy* (IRI-F), which is the tendency to imaginatively transpose oneself into fictional situations and is the self-focused cognitive dimension of empathy. Participants are asked to rate to what extent each item describes them on a 5-point Likert scale, ranging from 0 ("Does not describe me well") to 4 ("Describes me

very well”), with greater scores indicating higher levels of empathy. We excluded from the analyses the IRI-F because it does not assess a core part of empathy in medical contexts (Gu et al., 2020; Neff & Pommier, 2013). In this study, the Cronbach’s alphas of the three dimensions of the IRI were 0.78 for IRI-EC, 0.79 for IRI-PT, and 0.73 for IRI-PD.

### Coping strategies: coping orientations to the problems experienced - new Italian version

Coping strategies were assessed with the COPE-NIV which is a multi-dimensional inventory comprising 60 items evaluating how often the subject uses a set of particular coping processes in difficult or stressful situations and rated on a 4-point scale ranging from 1 (“I usually don’t do this at all”) to 4 (“I usually do this a lot”). The instrument includes five subscales corresponding to five different coping strategies: (1) *Social Support* (COPE-SS), coping strategy which refers to understanding- and information-seeking behaviors and emotional assistance; (2) *Positive Attitude* (COPE-PA), a coping strategy which refers to acceptance and positive reframing; (3) *Problem Orientation* (COPE-PO), coping strategy which refers to planning and active strategies; (4) *Transcendent Orientation* (COPE-TO), a coping strategy which refers to turning to religion and low use of humor; (5) *Avoidance Strategies* (COPE-A), a coping strategy which refers to denial, substance use, behavioral and emotional detachment. A higher score on a particular subscale indicates greater use of that specific coping strategy. In line with other scholars (Sun et al., 2019), COPE-A was considered a maladaptive coping strategy. In our study, Cronbach’s alpha for the five subscales was 0.87 for the COPE-SS, 0.74 for COPE-PA, 0.81 for COPE-PO, 0.84 for COPE-TO, and 0.69 for COPE-A.

### Statistical analysis

Chi-square tests and three-way between-subjects analyses of variance (ANOVA) explored differences in gender, age, and study variables between the three cohorts of students. A set of t-tests was performed to explore gender differences in COPE-NIV and IRI scoring. Pearson’s correlations between COPE-NIV and IRI scales were calculated. A set of multiple regression analyses with IRI dimensions as independent variables and COPE-NIV subscales as dependent variables were run to explore whether and to what extent empathy predicted coping strategies. Gender and academic cohorts were introduced as covariate factors if statistically significant associations with either independent or dependent variables emerged. Bonferroni’s correction was used ( $p < .01$ ). Effect sizes were computed as eta-squared ( $\eta^2$ ) for ANOVA, Cohen’s  $d$  for t-tests, and  $R^2$  for regressions.

**Table 1** Means and standard deviations of study variables by gender

	Variable	Total sample (M ± SD)	Female (M ± SD)	Male (M ± SD)
Other-focused empathy	IRI-EC	18.56 ± 4.15	19.66 ± 3.79	17.37 ± 4.50
	IRI-PT	17.81 ± 4.63	18.33 ± 4.53	17.29 ± 4.73
Self-focused empathy	IRI-PD	9.38 ± 4.55	10.22 ± 4.66	8.54 ± 4.39
Adaptive coping strategy	COPE-SS	2.55 ± 0.62	2.74 ± 0.67	2.36 ± 0.56
	COPE-PA	2.67 ± 0.42	2.69 ± 0.44	2.68 ± 0.39
	COPE-PO	2.77 ± 0.45	2.78 ± 0.48	2.76 ± 0.42
	COPE-TO	2.38 ± 0.58	2.54 ± 0.59	2.22 ± 0.56
Maladaptive coping strategy	COPE-A	1.47 ± 0.31	1.45 ± 0.31	1.48 ± 0.30

Note. IRI-EC Empathic Concern, IRI-PT Perspective Taking, IRI-PD Personal Distress, COPE-SS Social Support, COPE-PA Positive Attitude, COPE-PO Problem Orientation, COPE-TO Transcendent Orientation, COPE-A Avoidance

## Results

### Sample demographics, cohorts’ features and gender differences in study variables

Out of 450 students invited, three hundred and ninety-eight (88.4%) entered the study and completed the questionnaire. 53% of participants ( $N=211$ ) were female. The mean age of participants was 19.65 years ( $\pm 1.34$ ). No differences emerged for gender distribution ( $\chi^2(2)=2.256$ ,  $p=.324$ ), age ( $F(2,395)=3.504$ ,  $p=.031$ ), and the scores of the study variables ( $F_s(2,395) < 2.403$ ,  $p_s > 0.129$ ) amongst the three student cohorts.

Table 1 reports the study variables scoring for all participants and by gender. COPE-PO obtained the highest mean score, whereas COPE-A mean score was the lowest ones. Female students outscored males on COPE-SS ( $t(396)=4.95$ ,  $p < .001$ ,  $d=0.62$ ), COPE-TO ( $t(396)=4.04$ ,  $p < .001$ ,  $d=0.57$ ), IRI-EC ( $t(396)=7.17$ ,  $p < .001$ ,  $d=0.55$ ), IRI-PD ( $t(396)=4.82$ ,  $p < .001$ ,  $d=0.37$ ), and IRI-PT ( $t(396)=2.93$ ,  $p=.004$ ,  $d=0.22$ ).

### Association of empathy dimensions with coping strategies

In Table 2 are reported Pearson’s correlation coefficients among the study variables. IRI-EC had a significant positive correlation with COPE-SS and COPE-TO; IRI-PT was positively related to COPE-PA; IRI-PD positively and negatively correlated to COPE-SS and COPE-PO, respectively.

All multiple regression models were statistically significant except for that of COPE-A ( $F(4,394)=0.969$ ;  $R^2=0.02$ ;  $p=.425$ ) (not reported in Table 3). After controlling for

**Table 2** Zero-order correlations between empathy dimensions and coping strategies

Variables	1	2	3	4	5	6	7	8
1. IRI-EC	1							
2. IRI-PT	0.398***	1						
3. IRI-PD	0.171**	−0.056	1					
4. COPE-SS	0.317***	0.135	0.194**	1				
5. COPE-PA	0.137	0.270***	−0.051	0.157	1			
6. COPE-PO	0.071	0.082	−0.227***	0.094	0.435***	1		
7. COPE-TO	0.226**	−0.079	0.128	0.262***	−0.211**	−0.018	1	
8. COPE-A	−0.072	−0.008	0.085	0.040	0.050	−0.177**	−0.176**	1

Note. IRI-EC Empathic Concern, IRI-PT Perspective Taking, IRI-PD Personal Distress, COPE-SS Social Support, COPE-PA Positive Attitude, COPE-PO Problem Orientation, COPE-TO Transcendent Orientation, COPE-A Avoidance; \*\*  $p < .01$ , \*\*\*  $p < .001$

**Table 3** Multiple regressions exploring the effects of empathy dimensions on coping strategies

Variables	COPE-SS		COPE-PA		COPE-PO		COPE-TO	
	$\beta$	p	$\beta$	p	$\beta$	p	$\beta$	p
Gender	0.231	<0.001	−0.011	0.866	0.029	0.660	0.205	0.002
IRI-EC	0.223	0.001	0.056	0.436	0.100	0.172	0.234	0.001
IRI-PT	0.039	0.555	0.248	<0.001	0.038	0.587	−0.180	0.008
IRI-PD	0.124	0.047	−0.056	0.395	−0.250	<0.001	0.054	0.397
F	11.646	<0.001	4.767	0.001	4.143	0.003	8.269	<0.001
R <sup>2</sup>	0.17		0.08		0.07		0.13	

Note. IRI-EC Empathic Concern, IRI-PT Perspective Taking, IRI-PD Personal Distress, COPE-SS Social Support, COPE-PA Positive Attitude, COPE-PO Problem Orientation, COPE-TO Transcendent Orientation

gender, IRI-EC was positively associated with COPE-SS and COPE-TO; IRI-PT was positively and negatively associated with COPE-PA and COPE-TO, respectively; and IRI-PD negatively correlated to COPE-PO. Gender was a significant predictor of COPE-SS and COPE-TO beyond the effect of the IRI dimensions (Table 3) with females scoring higher on COPE-SS and COPE-TO than males.

## Discussion

In the present research, we aimed to describe the most used coping strategies in pre-clinical medical students, to assess whether gender differences in coping exist, and explore the relationship between empathy dimensions and coping strategies.

### Coping strategies usage and gender differences

Medical students in our study reported to use more frequently adaptive and problem-focused (COPE-PO) coping strategies, while less frequently adopted maladaptive avoidant coping strategies (COPE-A). Our findings echo those of Neufeld and Malin (Neufeld & Malin, 2021) suggesting that the coping strategies adopted by pre-clinical medical students were primarily healthy, rather than dysfunctional. As literature showed that medical students in later vs. earlier years of training tend to use more avoidant-based and maladaptive coping strategies (Erschens et al., 2018; Hojat et

al., 2009; Singh et al., 2016), data from longitudinal studies are needed to further explore changes in coping strategies throughout the academic journey, and the effect of the learning environment.

As for gender differences, when compared to their male counterparts, female medical students in our study showed greater tendency to seek information, understanding, and emotional support (COPE-SS), and to turn to religion while presenting lower use of humor (COPE-TO) as a form of coping. The latter data mirror studies showing that men use and appreciate humor more than women as a strategy to face stressful situations (Rawlings & Findlay, 2016). Furthermore, literature data indicate that gender differences in coping exist, and are most likely due to social norms and socialized gender roles (Bem, 1981; Prentice & Carranza, 2002). Studies suggest that females vent more emotions, and rely on more social support to cope with stress since adolescence (Carver et al., 1989; Eschenbeck et al., 2007). Thus, our findings that female medical students used more social support (COPE-SS) and transcendent orientation (COPE-TO) to deal with stress may reflect gender stereotypes and cultural norms.

Historically, in many cultures due to differential socialization, females are taught to be more submissive, passive, and nurturing than males, and often these traits are associated with higher levels of religiosity (Roth & Kroll, 2007; Suziedelis & Potvin, 1981). When compared to other European countries, Italy is characterized by a patriarchal family model (Bertocchi & Bozzano, 2019) which may promote

this genderized tendency to rely on social network and religiosity when facing hardship. These considerations on cultural and social factors are in line with existing literature on gender differences in personal values (with females showing higher levels of self-transcendent values than males) (Ardenghi, Luciani, et al., 2021; Luciani et al., 2020), and with the higher levels of compassion and emotional concern for unfortunate others (IRI-EC) in female students in our study. Hence, workplace climates can lessen or strengthen gender differences in coping behaviors, based on how accepted and reinforced “masculine” (i.e., agentic and instrumental) or “feminine” (i.e., communal and emotional) coping strategies tend to be (Colley et al., 2009) and how the organizational culture mirrors gender stereotypes and beliefs from the society.

### Relationship between empathy dimensions and coping strategies

After controlling for gender, medical students who are more concerned for the hardship of other people (high levels of IRI-EC) showed higher scores on social- and transcendent-oriented coping strategies (COPE-SS and COPE-TO); the capability to adopt other people’s viewpoints (high levels of IRI-PT) was positively associated with the ability to positive reframing in stressful situations (COPE-PA) and negatively with turning to religion as a way of coping (COPE-TO); and students who tend to lose control in emotionally tense interpersonal situations (high levels of IRI-PD) showed lower levels of problem-focused coping strategies (COPE-PO).

Our findings suggest that other-focused empathic responses (i.e., empathic concern and perspective taking) are naturally involved in those coping processes that require an individual to engage others in interactions (COPE-SS) and to consider a situation from other and more positive perspectives (COPE-PA). As for the association between Empathic Concern (IRI-EC) and using social support as coping strategy (COPE-SS), Zheng (Zheng et al., 2021) found that people with lower Empathic Concern were more reluctant to reach for social support during stressful situations. When considering the relationship between Perspective Taking (IRI-PT) and the tendency to positively reframing stressful situations (COPE-PA), the ability to be attentive to the mental states of others – skill at the basis of the perspective taking dimensions of empathy – has been considered to bolster the ability to mentally simulate alternative perspectives (i.e., positive reframing) through a common neural network and neurocognitive resources (Powers et al., 2022).

In our study, Empathic Concern (IRI-EC) and Perspective Taking (IRI-PT) had a positive and negative relationship with the tendency to use religion and not to

use humor to cope with the stress (COPE-TO), respectively. A previous study with counselling students found that Empathic Concern was associated with spirituality defined as one’s engagement in relationships or activities that promote self-worth and enhance meaning to one’s life, whereas Perspective Taking positively correlated to spirituality seen as a sense of attachment to others and oneness with the universe (Giordano et al., 2014). The latter description of spirituality can be considered a more relational facet of the construct. Nevertheless, it is not surprising that in our study Perspective Taking correlates negatively with Transcendent Orientation (COPE-TO) as IRI-PT entails a propensity for immanent relationality while COPE-TO, as designed in the COPE-NIV, is a private use of religion and the lack of humor (a register that is typically interpersonal).

Our results also suggest that Personal Distress (IRI-PD) – which is related to discomfort in tense interpersonal situations – might impair adaptive problem-oriented coping strategies (COPE-PO). In previous research (Grynbeg & López-Pérez, 2018), Personal Distress was positively related to maladaptive coping strategies and the association between maladaptive strategies and the willingness to avoid the person in distress was mediated by the magnitude of Personal Distress. Our findings on the negative relationship between the Personal Distress dimension of the IRI and the Problem Orientation subscale of the COPE-NIV mirror those of Flett et al. (Flett et al., 1996) that found a strong negative association between measures of interpersonal maladjustment (including symptoms of depression and anxiety) and problem-solving orientation. Moreover, our results confirm those of Deasy et al.’s study (Deasy et al., 2014) that showed a positive relationship between elevated psychological distress and escape avoidance behavior – which is a coping strategy opposite to problem orientation – in a sample of undergraduate healthcare students.

### Strengths and limitations

Although the present findings are promising, some limitations hampering the generalizability of results needed to be considered. Participants were only second-year students and were recruited from a single university missing to assess coping strategies and empathy in more senior students. Furthermore, more details regarding the participants’ psycho-social characteristics could have improved the impact of the investigations. Contrasting medical students and healthcare professionals could shed light on the role of empathy in promoting adaptive coping strategies throughout healthcare workers’ education and professional life. Furthermore, the cross-sectional and correlational design does not allow to establish a causal direction

of the relationship between empathy and coping. Longitudinal studies are needed to assess changes over time. Although we have measured the study variables by validated instruments, the nature of these self-reported tools hindered an in-depth investigation of participants' attitudes and beliefs. We suggest future research to include multiple measures, such as peer-evaluation or a narrative of relevant experiences carried out in the medical education context analyzed with qualitative methods.

## Conclusion

An important aspect for fostering adaptive coping strategies is empathy. The present study expands the existing evidence on the role of empathy dimensions in predicting coping strategies in pre-clinical medical students. Our results suggest that empathy dimensions are differently associated with coping strategies highlighting the importance of tailored educational approaches and psychological counselling interventions (Bani et al., 2022; Strepparava et al., 2017a, b) to foster other-focused empathy facets (i.e., empathic concern and perspective-taking) and reduce self-focused empathy dimension (i.e., personal distress) to equip medical students with adaptive problem- and emotion-focused coping strategies.

Strengthening other-oriented empathic attitudes in medical students can be pursued through different avenues such as extracurricular practical activities, clinical practice, improving teaching methods, and counselling interventions. As for the extracurricular activities, interventions promoting self-awareness, self-reflection, communication and relationship-centeredness, can be educational models that indirectly address professional formation and empathy (Ekman & Krasner, 2017). When considering clinical practice, clinical tutors have a paramount importance in developing empathic clinicians thorough modelling. Equipping clinical tutors with the adequate competences and skills to act according to and promote nonjudgmental regard and listening skills is essential (Burgess et al., 2015). As for teaching methods and intervention, it could be useful to integrate the current didactic tools with methods that have been proven to nurture empathy in medicine including group discussions, simulated/virtual/real patients, role-play, and arts and humanities (Zhou et al., 2021). As for psychological counselling interventions, they should target self-focused empathy (i.e., personal distress) to equip pre-clinical medical students to cope functionally with the emotional burden linked to clinical clerkship and the other challenges that the medical school entails (Powell, 2018). Gender differences and gender-related cultural issues should be considered and addressed thoroughly.

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**Data availability** The data that support the findings of this study are available from the corresponding author upon reasonable request.

## Declarations

**Ethical approval** Ethical approval was obtained from the Ethical Committee of the University of Milano-Bicocca (Prot. 0039927).

**Conflict of interest** All authors declare that they have no conflicts of interest.

**Informed consent** All participants provided their written informed consent to participate.

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