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Medical Students' Empathy During the COVID-19 Pandemic: A cross-sectional study

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Several authors have underlined the negative consequences of the COVID-19 pandemic on mental health in several populations, including medical students, such as increases in anxiety, depression and burnout symptoms. Furthermore, previous studies showed that anxiety and depressive symptoms are positively associated with affective empathy and negatively associated with cognitive empathy. Given the adverse pandemic effects highlighted by several authors, the present study sought to determine whether medical students' empathy has been potentially impacted, with higher affective empathy and lower cognitive empathy score in the pandemic cohort compared to pre-pandemic cohorts. Medical students (n = 395) were recruited during the COVID-19 pandemic and completed the *Interpersonal Reactivity Index* (IRI) and the *Basic Empathy Scale* (BES). This cohort was then compared with two pre-pandemic cohorts (one used the BES [n = 1168], and the other used the IRI [n = 342]). Similar results were found on both scales: the pandemic cohort displayed significantly higher scores in affective empathy and personal distress (affective empathy domain) and, surprisingly, significant higher scores in cognitive empathy, fantasy, and perspective-taking (cognitive empathy domains). As stressed by previous studies, we posited that the higher scores in affective empathy, personal distress, and fantasy might indicate emotional difficulties. The paper concludes with the identification of empathy components that should be promoted in the curriculum of medical students.

Keywords: medical education; medical students; empathy; COVID-19, affective empathy, cognitive empathy

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Introduction

Empathy is "the ability to experience and understand what others feel without confusion between oneself and others" (Decety & Lamm, 2006, p. 1146). It is usually subdivided into two components: cognitive and affective empathy. Davis (1980) defined the cognitive component as the ability to understand the other's perspective, while other authors (Hogan, 1969) focused on the emotional aspects, i.e., the capacity to comprehend others' emotions). Affective empathy is described as a more visceral emotional reaction (Bryant, 1982) or the ability to experience another's emotions (Jolliffe & Farrington, 2006). Davis' approach (1980; 1983) subdivided affective and cognitive empathy into two other domains (two for each facet). Empathic concern (i.e., the respondents' tendency to experience feelings of concern or compassion for others) and personal distress (i.e., the tendency to experience distress or discomfort in response to others' emotional distress) are two domains of affective empathy. On the other hand, the two cognitive empathy domains are perspective-taking (i.e., the ability to adopt another's perspective or point of view) and fantasy (i.e., the people's propensity to get involved in fictional situations and to identify with fictional characters in books, movies, or plays).

Over the past decades, several authors stressed the importance of developing empathy skills among healthcare professionals. Quite naturally, scientific investigations have focused on student populations like nursing or medical students (Chen et al., 2007; Hojat et al., 2004; Nunes et al., 2011; Triffaux et al., 2019; Ward et al., 2012). Surprisingly, they observed similar results: empathy declined over their educational curriculum. Triffaux et al. (2019) performed an empathy study on a large sample of medical students (N = 1168) and found lower affective and cognitive empathy scores between higher education years (i.e., undergraduate students had higher affective and cognitive empathy scores than postgraduate students).

Several interpretations have been proposed to explain the empathy decline amongst future healthcare professionals, such as students' systematic desensitization to emotional distress (Triffaux et al., 2019), heavy workload (Hojat et al., 2009), competitive climate between students (Hojat et al., 2009), increase in cynicism during studies (Newton et al., 2008), lack of appropriate role models (Hojat et al., 2009), increased dependency on technology for diagnoses and treatments and shorter interactions with patients (Hojat et al., 2009), and the effect of the intergroup empathy bias (i.e., the tendency to display more empathy toward in-group members, like peers or medical colleagues, and less empathy toward out-group members, like patients) (Nasello et al., 2018).

Kilic et al. (2021) recently showed that empathy has a double-edged predictive effect on academic burnout. Indeed, two cognitive empathy domains were considered protective and risk factors of academic burnout respectively. Perspective-taking protected emotional exhaustion and academic effectiveness, while fantasy was a risk factor for cynicism. The authors concluded that academic burnout is a multifactorial process, while empathy is a significant predictive factor. This work highlighted the interest in studying medical students' empathy because it impacts mental health, patient care activities, and, consequently, public health (Kilic et al., 2021).

Impact of the COVID-19 pandemic on medical students

Several medical education studies showed that the COVID-19 pandemic negatively impacted mental health (Nishimura et al., 2021), including academic burnout (Zis et al., 2021), anxiety and PTSD symptoms (Lee et al., 2021), and depressive and anxiety symptoms (Halperin et al., 2021). However, to our knowledge, no study investigated whether the pandemic impacted the empathy of medical students. Given the adverse effects of the COVID-19 pandemic on several psychological factors, we sought to determine whether medical students' empathy has been potentially impacted. Following Hojat et al.'s (2009) interpretation of the medical students' empathy decline (i.e., that empathy decline is a result of heavy workloads and constantly dealing with stress, pain, and death), it is expected that COVID-19, as a distressful event, will negatively impact empathy scores.

Various researchers showed that medical students' cognitive empathy was negatively linked with depressive symptoms, anxiety, and burnout (Carrard et al., 2022), which is in line with a systematic review (Wolgast et al., 2020) showing that distress is negatively related to dispositional social perspective-taking (a cognitive empathy domain). Hence, as a result of being overwhelmed by medical care, being overexposed to death and pain, and given that the pandemic negatively impacted mental health and increased academic burnout, anxiety, and depressive symptoms (negatively linked to cognitive empathy), we expect that the pandemic cohort will present significant lower scores in cognitive empathy than the pre-pandemic cohorts.

Conversely, higher scores in affective empathy are expected in the pandemic cohort, a domain that is notably characterized by personal distress. Wolf et al. (2015) showed that stressful situations (such as the pandemic) caused negative affect increases and influenced significantly affective empathy. In addition, Carrard et al. (2022) also showed that medical students' affective empathy is positively related to anxiety, burnout, and depressive symptoms. In line with the findings that the pandemic provoked an overall increase in anxiety, depression, and PTSD symptoms, we expect to find higher levels of affective empathy in the COVID-19 cohort (because affective empathy is significantly related to these symptoms). Previous findings also showed significant differences between men and women (in both affective and cognitive domains): women tend to present higher empathy scores than men (Baron-Cohen & Wheelwright, 2004; Jolliffe & Farrington, 2006; Nasello & Triffaux, 2020; Triffaux et al., 2019). However, we sought to determine whether the COVID-19 pandemic has potentially accentuated or reduced these differences.

Method

Participants and Procedure

We recruited 395 participants (n_{women} = 276; M_{age} = 21.6; *SD* = 2.29; *Min* = 18; *Max* = 30) from six years of the medical training programme from January to June 2021. Medical students were recruited from the University of Liège (Belgium) and voluntarily participated in our online study. Like Triffaux et al. (2019) and Kilic et al. (2021), the inclusion criteria were being enrolled in a medical curriculum at the University of Liège; being between 18 and 35 years; and not having a psychiatric or neurological history. G*Power 3.1.9.7 (Faul

et al., 2007) determined that we would require at least 302 participants to achieve a power of 0.80 with an α-error settled at 0.05 and to detect moderate effect sizes (settled at 0.0625).

The present study used a cross-sectional design composed of three cohorts. We recruited two pre-pandemic cohorts [from Triffaux et al. (2019) and Kilic et al. (2021)]; one participated in the data collection in 2016-2017 completing the *Basic Empathy Scale* (BES) (Jolliffe & Farrington, 2006), and the other in 2018-2019 completing the *Interpersonal Reactivity Index* (IRI) (Davis, 1980; 1983). The data collection from the pandemic cohort is divided into two groups: Bachelor students (pre-clinical medical students: $N = 220$; $n_{women} = 152$) and Master students (clinical medical students: $N = 175$; $n_{women} = 124$), and all students completed the BES and IRI. The present study's participation rate was 33% for Bachelor's students and 30% for Master's students. Kilic et al. (2021) reported a participation rate of 25%, and Triffaux et al. (2019) obtained a rate of around 57% (80% for Bachelor's students and 27.5% for Master's students).

In summary, there are three cohorts: Triffaux et al.'s cohort (2019): 2016-2017 data collection (renamed *pre-pandemic cohort 1* "PPC1"; $N = 1168$; $N_{Bachelor} = 926$, $n_{women} = 612$; $N_{Master} = 242$, $n_{women} = 149$); Kilic et al.'s cohort (2021): 2018-2019 data collection (renamed *pre-pandemic cohort 2* "PPC2"; $N = 342$; $N_{Bachelor} = 179$, $n_{women} = 129$; $N_{Master} = 163$, $n_{women} = 124$); and the 2020-2021 data collection (renamed *pandemic cohort* "PC"). This study was approved by "*Hospitalo-Facultaire Universitaire de Liège*" ethical committee and informed consent was obtained online from all participants included in the study.

Instruments

Demographic information. The student participants were asked to provide their age, gender, and year of study.

Empathy. The Interpersonal Reactivity Index (IRI: Davis, 1980; 1983; French version: Gilet et al., 2013) is a self-report empathy measurement composed of twenty-eight items and uses a five-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). It assesses four domains exploring the affective and cognitive aspects of empathy. The *Empathic Concern* and *Personal Distress* domains explore the affective aspect, while cognitive empathy is evaluated through the *Perspective-Taking* and *Fantasy* domains. In the present study, the IRI domains displayed adequate and good internal consistency (Fantasy: $\alpha = .80$; Perspective-taking: $\alpha = .75$; Empathic concern: $\alpha = .69$; and Personal distress: $\alpha = .81$).

The *Basic Empathy Scale* (BES: Jolliffe & Farrington, 2006; French version: D'ambrosio et al., 2009) measures two empathy domains (i.e., affective and cognitive empathy) and four emotions (i.e., anger, fear, happiness, and sadness). The scale is a self-report measurement composed of twenty items and uses a 5-point Likert scale (from "strongly disagree" to "strongly agree"). Eleven questions compose the affective empathy domain, and nine items the cognitive empathy component. This scale was created to overcome the weaknesses of the IRI (see Jolliffe & Farrington, 2006 for a complete description). In the present study, the BES domains had adequate and good internal consistency (affective empathy: $\alpha = .79$; cognitive empathy: $\alpha = .68$).

Data analysis

To determine whether there are any significant empathy differences between the pre-pandemic and pandemic cohorts, we compared cohorts two by two: PPC1 vs. PC and PPC2 vs. PC. We performed two MANOVAs with gender and cohorts as independent variables, and the analyses were performed using Jamovi computer software, version 2.2.5 (The Jamovi Project, 2021).

Results

PPC1 vs PC (scale: BES)

The most expected result was to find a cohort main effect (see Tables I and II). Indeed, some main effects of the cohort were found for overall empathy (Λ = .773; $F_{(2,1558)}$ = 229; p < .001), affective empathy ($F_{(1,1559)}$ = 270; p < .001; η^2_p = .116), and cognitive empathy ($F_{(1,1559)}$ = 431; p < .001; η^2_p = .193), showing some moderate to large differences between PPC1 and PC. As shown in Figure 1, PC reported higher cognitive and affective empathy scores than PPC1. Furthermore, significant gender differences were found in empathy (Λ = .909; $F_{(2,1558)}$ = 77.8; p < .001), affective empathy ($F_{(1,1559)}$ = 125; p < .001; η^2_p = .063), and cognitive empathy ($F_{(1,1559)}$ = 77.2; p = .035; η^2_p = .002), showing (small to moderate) higher scores for females compared to males. No significant interaction was found between gender and cohort (Λ = .998; $F_{(2,1558)}$ = 1.93; p = .145).

Table I. Descriptive Statistics

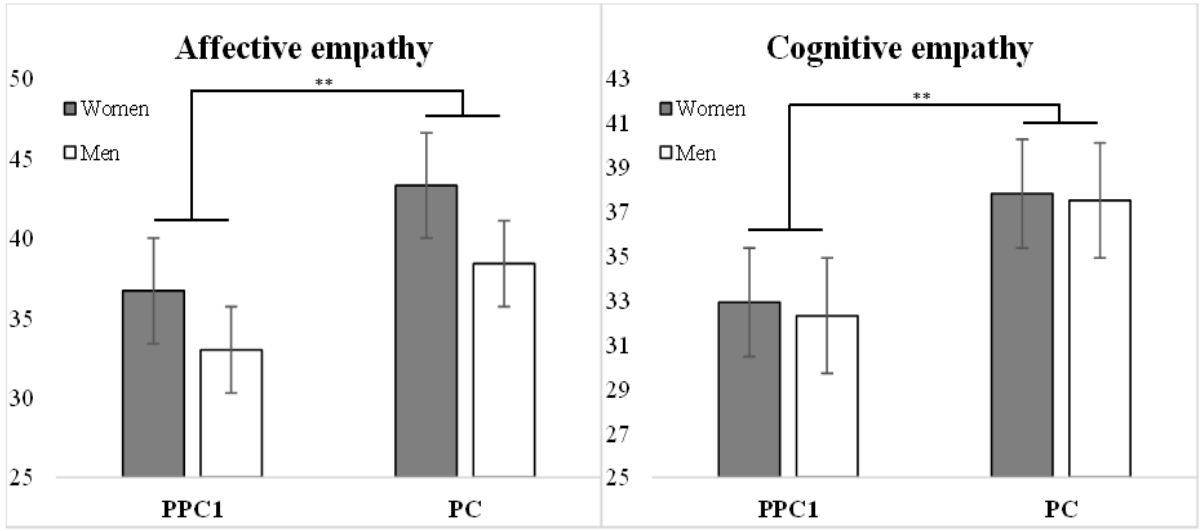
Variable	***N***		***M***		***SD***		***Min***		***Max***	
PPC1 vs. PC (*BES*)	**PPC1**	**PC**	**PPC1**	**PC**	**PPC1**	**PC**	**PPC1**	**PC**	**PPC1**	**PC**
Affective empathy	1168	395	35.4	41.8	7.12	6.52	19	17	55	55
Females	761	276	36.7	43.3	7.21	5.72	20	21	55	55
Males	407	119	33	38.4	6.24	7.01	19	17	51	52
Cognitive empathy	1168	395	32.7	37.7	4.14	4.26	17	20	45	45
Females	761	276	32.9	37.8	4.3	4.09	17	20	45	45
Males	407	119	32.3	37.5	4.09	4.64	23	25	43	45
PPC2 vs. PC (*IRI*)	**PPC2**	**PC**	**PPC2**	**PC**	**PPC2**	**PC**	**PPC2**	**PC**	**PPC2**	**PC**
EC	342	395	27.7	27.5	4.25	3.55	11	17	35	35
Females	253	276	27.9	27.9	4.25	3.49	15	17	35	35
Males	89	119	27	26.6	4.19	3.52	11	17	34	35
PD	342	395	17.9	19.1	5.09	4.4	7	8	35	33
Females	253	276	18.3	19.9	5.04	4.27	7	8	35	33
Males	89	119	16.6	17.1	5.06	4.08	7	8	30	28
FS	342	395	20.9	25.4	5.14	4.86	8	11	30	35
Females	253	276	20.8	26	5.18	4.82	8	11	30	35
Males	89	119	21	24.1	5.06	4.08	8	13	30	35
PT	342	395	25.3	26	4.72	3.79	8	15	35	35
Females	253	276	25.2	26	4.85	3.82	8	15	35	35
Males	89	119	25.6	26.1	4.35	3.75	15	17	34	35

Note: PPC1 = Pre-Pandemic Cohort 1 from Triffaux et al. (2019); PPC2 = Pre-Pandemic Cohort 2 from Kilic et al. (2021); PC = Pandemic Cohort, the present study's cohort; BES = Basic Empathy Scale (Jolliffe & Farrington, 2006); IRI = Interpersonal Reactivity Index (Davis, 1980; 1983); EC = Empathic Concern; PD = Personal Distress; FS = Fantasy; PT = Perspective Taking

Table II. MANOVA: PPC1 vs. PC, BES comparisons

Variables	Λ	F	Df	p	η^2_p
Empathy					
Gender	0.909	77.8	2,1558	< .001	-
Cohort	0.773	229	2,1558	< .001	-
Gender * Cohort	0.998	1.93	2,1558	.145	-
Affective empathy					
Gender	-	125	1,1559	< .001	.063
Cohort	-	270	1,1559	< .001	.116
Gender * Cohort	-	1.64	1,1559	.201	-
Cognitive empathy					
Gender	-	4.44	1,1559	.035	.002
Cohort	-	431	1,1559	< .001	.193
Gender * Cohort	-	.210	1,1559	.647	-

Note: PPC1 = Pre-Pandemic Cohort 1 from Triffaux et al. (2019); PC = Pandemic Cohort, the present study's cohort; BES = Basic Empathy Scale (Jolliffe & Farrington, 2006).



Note: BES = Basic Empathy Scale (Jolliffe & Farrington, 2006); PPC1 = Pre-Pandemic Cohort 1 from Triffaux et al. (2019); PC = Pandemic Cohort, the present study's cohort. **: $p < .001$

Figure I. BES comparison between PPC1 and PC

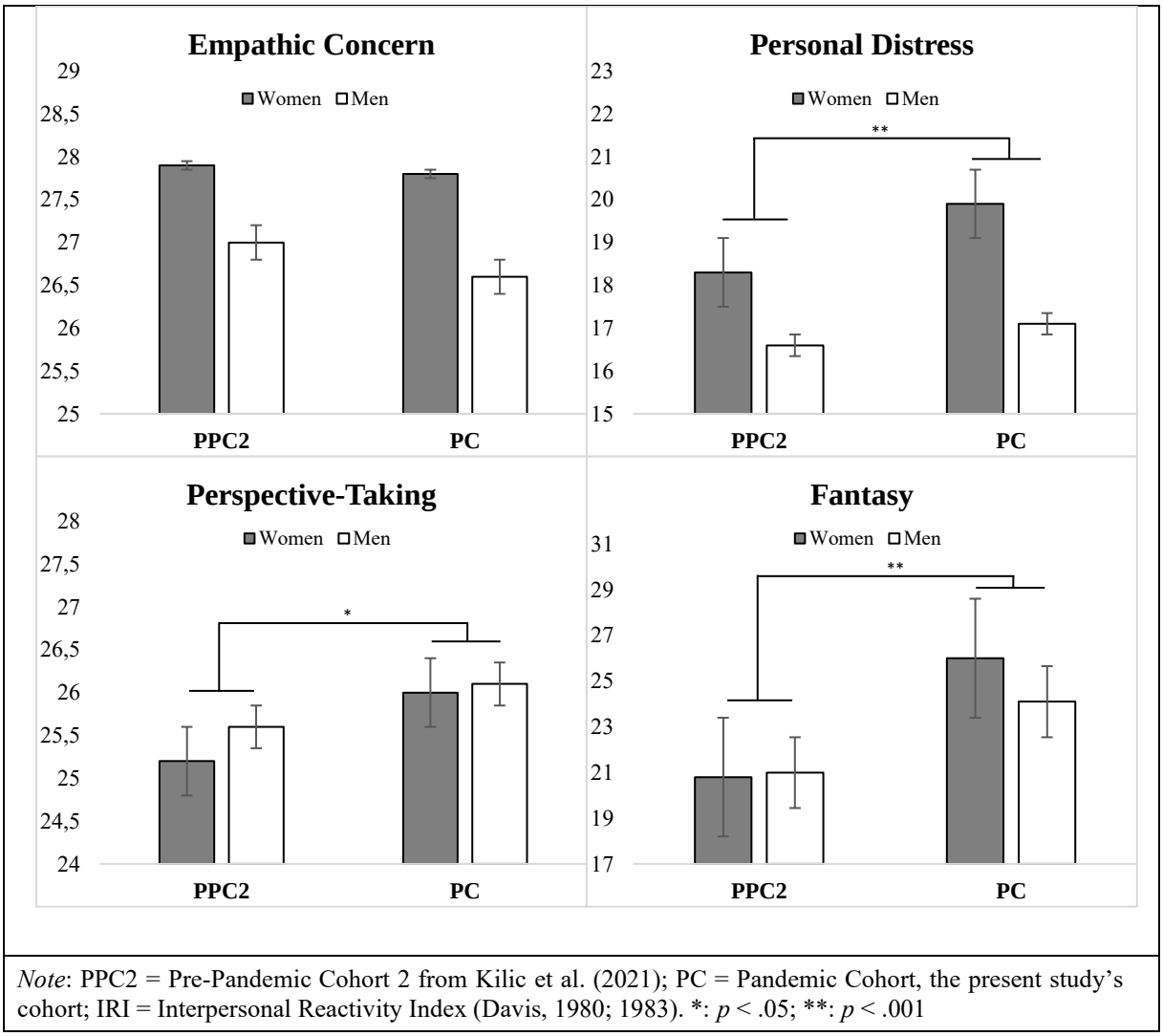
PPC2 vs. PC (scale: IRI).

We found a significant main effect of the cohort for overall empathy ($\Lambda = .801$; $F_{(4,730)} = 45.4$; $p < .001$), Fantasy ($F_{(1,733)} = 154$; $p < .001$; $\eta^2_p = .121$), Personal Distress ($F_{(1.733)} = 12.3$; $p < .001$; $\eta^2_p = .011$), and Perspective-Taking ($F_{(1,733)} = 5.08$; $p = .024$; $\eta^2_p = .005$) [ranging from moderate to small effect sizes] (see Tables 1 and 3). As shown in Figure 2, PC scored significantly higher in the mentioned empathy domains than PPC2. We also found small gender differences in empathy ($\Lambda = .937$; $F_{(4,730)} = 12.2$; $p < .001$), Empathic Concern ($F_{(1,733)} = 13.8$; $p < .001$; $\eta^2_p = .02$), Personal Distress ($F_{(1,733)} = 37.9$; $p < .001$; $\eta^2_p = .05$), and Fantasy ($F_{(1,733)} = 6.23$; $p = .013$; $\eta^2_p = .01$). No significant interaction was found between gender and cohort ($\Lambda = .989$; $F_{(4,730)} = 1.94$; $p = .102$), except for the Fantasy domain ($F_{(1,733)} = 6.64$; $p = .010$; $\eta^2_p = .01$).

Table III. MANOVA PPC2 vs. PC, IRI comparisons

Variables	***Λ***	***F***	***Df***	***p***	η^2_p
Empathy					
Gender	0.937	12.2	4,730	< .001	-
Cohort	0.801	45.4	4,730	< .001	-
Gender * Cohort	0.989	1.94	4,730	.102	-
Empathic Concern					
Gender	-	13.8	1,733	< .001	.018
Cohort	-	.389	1,733	.533	-
Gender * Cohort	-	.276	1,733	.599	-
Personal Distress					
Gender	-	37.9	1,733	< .001	.046
Cohort	-	12.3	1,733	< .001	.011
Gender * Cohort	-	1.82	1,733	.178	-
Fantasy					
Gender	-	6.23	1,733	.013	.006
Cohort	-	154	1,733	< .001	.121
Gender * Cohort	-	6.64	1,733	.010	.009
Perspective-Taking					
Gender	-	.325	1,733	.569	-
Cohort	-	5.08	1,733	.024	.005
Gender * Cohort	-	.245	1,733	.621	-

Note: PPC2 = Pre-Pandemic Cohort 2 from Kilic et al. (2021); PC = Pandemic Cohort, the present study's cohort; IRI = Interpersonal Reactivity Index (Davis, 1980; 1983 *Note*: PPC2 = Pre-Pandemic Cohort 2 from Kilic et al. (2021); PC = Pandemic Cohort, the present study's cohort; IRI = Interpersonal Reactivity Index (Davis, 1980; 1983



Note: PPC2 = Pre-Pandemic Cohort 2 from Kilic et al. (2021); PC = Pandemic Cohort, the present study's cohort; IRI = Interpersonal Reactivity Index (Davis, 1980; 1983). *: $p < .05$; **: $p < .001$

Figure II. IRI comparison between PPC2 and PC

Discussion

Affective empathy

Our results confirmed our expectations for affective empathy, namely higher affective empathy scores in the pandemic cohort than in the two pre-pandemic cohorts. We assume that experiencing the pandemic health crisis (e.g., lack of beds and materials, lack of healthcare staff, and seeing many patients die) substantially increased the affective empathy of medical students. Comparisons between PPC2 and PC show significant higher scores in personal distress in the pandemic cohort. These differences suggest that the pandemic might have fostered a general increase in medical students' affective empathy, especially in their personal distress. As previously mentioned, Wolf et al. (2015) showed a causal effect of stressful conditions on emotional responses and on the emotional aspects of empathy.

Cognitive empathy

Contrary to our expectations, the pandemic cohort displayed higher scores than the pre-pandemic cohorts, in cognitive empathy (when using the BES), fantasy, and perspective-taking (when using the IRI scale).Being involved in the pandemic crisis might have promoted medical students' ability to comprehend and take the perspective of what others feel. In parallel, medical students from the pandemic cohort scored higher in the fantasy domain than the pre-pandemic cohort. Although fantasy is not considered an essential disposition in patient care activities (Dores et al., 2021), a study showed similar empathy for fictional and real persons (Nomura & Akai, 2012). A probable explanation for the higher fantasy level is that the pandemic may have provoked an unrealistic situation in everyday clinical activities (e.g., overload of hospital services, seeing thousands of patients awaiting treatments, and seeing some of them die) and closer to fictional scenes like those we can see in some movies. This situation might have changed medical students' perceptions as some fictional scenarios became more plausible, making students more inclined to identify with fictional characters. Preston and de Waal (2002) showed that five cross-species factors increase empathy, i.e., familiarity, similarity, past experience, learning, and salience, and these might have played a significant role in the findings of the present study.

Gender differences

Previous findings showed that women display higher scores in almost all empathy domains than men (except for perspective-taking), but these gender differences are small (Baron-Cohen & Wheelwright, 2004; Jolliffe & Farrington, 2006; Nasello & Triffaux, 2020; Triffaux et al., 2019). In the present study, approximately the same order of gender differences was found in the pre-pandemic and pandemic cohorts.

Is more empathy beneficial?

Our findings showed that the pandemic cohort had higher scores in affective empathy (personal distress) and, surprisingly, in cognitive empathy (fantasy and perspective-taking) than the two pre-pandemic cohorts. Although specific higher empathy scores such as empathic concern or perspective-taking, may have several clinical advantages, higher scores in other domains are of concern. Higher scores in overall empathy or fantasy and personal distress are not beneficial at personal and interpersonal levels for several reasons.

A study conducted during the pandemic showed that empathy was associated with trauma severity, depression scores, and state and trait anxiety (Guadagni et al., 2020). The authors reported that personal distress was significantly related to sleep disturbance and insomnia symptoms, and sleep quality appeared to be the strongest predictor of depression symptoms in their study. In addition, they showed that people with higher overall empathy had higher mental health difficulties during the pandemic. In another study with young adults (as in our study), Contardi et al. (2016) showed that difficulties in emotion regulation were associated with personal distress and fantasy, and hostility was related to personal distress. The authors concluded that "in stressful interpersonal settings, people with higher fantasy may experience difficulties in emotion regulation

and use dysfunctional coping strategies, such as avoidance" and "individuals with high scores in this empathy dimension [personal distress], may use hostile behaviors as a dysfunctional coping strategy to escape from that unpleasant state and/or self-regulate emotions" (Contardi et al., 2016, p.5-6).

Another recent study on young adults showed that higher personal distress and fantasy were associated with an insecure-anxious profile, characterized by less access to emotion regulation strategies and more ruminations (Henschel et al., 2020). Moreover, similar results showed that fantasy was correlated with maladaptive emotion regulation strategies such as self-blame and rumination, and rumination was a positive predictor of fantasy, while positive reappraisal was a negative predictor (Arutyunyan, 2018).

Kilic et al. (2021) have also found that cognitive empathy had a double-edged effect in predicting academic burnout. While perspective-taking prevented emotional exhaustion and academic effectiveness, fantasy significantly increased cynicism (i.e., treating others as impersonal objects or diagnoses rather than people), another component of academic burnout.

Finally, Powell (2018) showed that higher affective empathy is associated with higher anxiety and stress levels and fewer emotion suppression strategies. On the other hand, more cognitive empathy (perspective-taking) was associated with fewer depression symptoms, more life satisfaction, and lower stress and threat appraisal (Lee et al., 2001; Powell, 2018), stressing the necessity to promote an adequate balance of medical students' empathy.

Optimal empathy levels for healthcare professionals require a balance between the various empathy components (Jackson et al., 2015). Several authors argue that this optimal empathy should be lower affective empathy and higher cognitive empathy (Hojat, 2016; Lee et al., 2003; Maslach, 1982; Van Winkle et al., 2018). However, if we construe empathy as relating to all mental states (feelings or thoughts, like the IRI) rather than just emotional states, then being less aroused and involved by others' feelings (i.e., presenting lower personal distress without presenting lower empathic concern) would positively impact psychological functioning. On the other hand, Hojat (2016) showed that cognitive empathy expression promotes patients' health and meaning in the work of healthcare professionals. Moreover, a higher cognitive empathy level associated with higher prosocial aspirations, gratitude, and life satisfaction amongst students (Oriol et al., 2020). Hojat's (2016) and Oriol et al.'s (2020) perspectives in this instance refer to perspective-taking and does not include fantasy. Thus, while more perspective-taking would be beneficial for mental health and patient care activities, more fantasy would not (e.g., Kilic et al., 2021). However, if we consider empathy in terms of feelings and emotional aspects, low ability to feel what others feel and higher ability to comprehend others' emotional perspectives would be beneficial for healthcare professionals.

What are the consequences of the pandemic situation for medical students?

We can speculate that the higher empathy scores in the pandemic cohort are either transient and represent a coping strategy to face the health crisis, or else they will remain permanent. If the overall higher scores in empathy are transient effects, the situation will probably return to a progressive decline in cognitive and

affective empathy amongst medical students, as shown by several studies for decades (Chen et al., 2007; Hojat et al., 2004; Nunes et al., 2012; Triffaux et al., 2019; Ward et al., 2012). If the effect is permanent, however, medical students will maintain higher affective (notably higher personal distress scores) and cognitive (notably higher fantasy and perspective-taking) empathy. As discussed in the previous section, there are numerous risks in medical students having higher affective and cognitive empathy, namely more vulnerability to emotional regulation problems, psychological difficulties like anxiety, depression, or burnout symptoms, and other-oriented features like hostility or cynicism. The slight increase in perspective-taking might alleviate some of these negative consequences, but we believe the higher perspective-taking scores are not high enough to present a consequent compensatory effect. Both scenarios lead to the same conclusion: failing to act within a reasonable time on medical students' empathy skills will probably lead to a cascade of negative effects on their mental health and patient care activities. This calls for medical schools to provide tailored interventions, particularly in empathy, for their students.

Conclusion

The COVID-19 pandemic has been a historical moment, and in the present study, we seized the opportunity to compare the medical students' empathy at pre and peri pandemic periods. Our study stressed some convergent findings, namely higher scores in affective and cognitive empathy for the pandemic cohort in contrast to the pre pandemic ones. These higher scores indicate unbalanced empathic abilities that, in some aspects, appear alarming, given that higher scores in affective empathy or personal distress and fantasy are linked with mental health or emotional disturbance (Contardi et al., 2016; Guadagni et al., 2020; Henschel et al., 2020). We also showed that the pandemic has not presumably impacted the empathy gender differences. However, female participants from the pandemic cohort still displayed higher empathy in almost all empathy domains than males, making them potentially more vulnerable to mental health or emotional difficulties.

As suggested by various researchers (Hojat, 2016; Kilic et al., 2021; Nasello & Triffaux, 2020; Triffaux et al., 2019), prevention and targeted intervention modules promoting adequate empathy skills (Zhu et al., 2021) should be at the top priority to avoid negative consequences for medical students, for patients taken care of by these students, and for public health in general. More specifically medical students' training programmes need to prvovide tailored interventions fostering empathic concern, perspective-taking, and emotion regulation skills.

Nasello and Triffaux (2023) recently developed a model explaining how the different facets of empathy are articulated and how the empathic process might lead to psychopathological symptoms. For example, they showed that when the empathizer (i.e., the person seeing someone experiencing an emotional state) does not appropriately regulate his/her personal emotional experience, an amplification might occur, leading to a too-intense feeling that will produce maladaptive responses. The reoccurrence of this process can lead to emotional exhaustion. This model demonstrates how to promote a proper balance of each facet of empathy, how to avoid certain characteristics that may result in maladaptive responses, and how medical

education can effectively teach empathy skills. Other authors, like Helen Riess and Kraft-Todd (2014), developed a tool to enhance clinicians' nonverbal communication with their patients. They proposed the acronym E.M.P.A.T.H.Y to help clinicians develop specific communication features, E: eye contact, M: muscles of facial expression, P: posture, A: affect, T: tone of voice, H: hearing the whole patient, Y: your response. Finally, proposing Balint groups' lessons (i.e., inviting students to alternatively enroll a patient, a clinician, or an observer) will also be useful in increasing specific facets of empathy, like perspective-taking and empathic concern (Zhu et al., 2021).

The main limitation of the present study is that the results do not provide causal inferences about the pandemic's impact on medical students' empathy. Only indirect effects which might be temporary or transient, are reported in our study. The findings of the present study should therefore be interpreted with caution, and further research is needed to investigate medical students' empathy after the pandemic.

Endnote

[1] We collected our data during COVID-19's third wave in Belgium (from March to June 2021).

Disclosure

The authors confirm that they do not have any conflict of interest concerning this paper.

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