Understanding the links between inferring mental states, empathy and burnout in medical contexts.

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Abstract: It is generally accepted that empathy should be the basis of patient care. However, this ideal may be unrealistic if healthcare professionals suffer adverse effects when engaging empathy. The aim of this study is to explore the effect of inferring mental states and different components of empathy (perspective-taking; empathic concern; personal distress) in burnout dimensions (emotional exhaustion; depersonalization; personal accomplishment). 184 healthcare professionals participated in the study (23% male, Mage = 44.60; SD = 10.46). We measured participants' empathy, the inference of mental states of patients, and burnout. Correlation analyses showed that inferring mental states was positively associated with perspective-taking and with empathic concern, but uncorrelated with personal distress. Furthermore, emotional exhaustion was related to greater levels of personal distress and greater levels of inferences of mental states. Depersonalization was associated with greater levels of personal distress and lower levels of empathic concern. Personal accomplishment was associated with the inference of mental states in patients, lower levels of personal distress, and perspective-taking. These results provide a better understanding of how different components of empathy and mental states inferences may preserve or promote healthcare professionals' burnout.

Keywords: empathy; mental states inferences; burnout; healthcare professionals

1. Introduction

The Covid-19 pandemic has brought an extraordinary pressure on hospitals, with specialists at the frontline being the most seriously affected. Undoubtedly, the pandemic has accentuated the need to deal with the emotional wellbeing and stress-related problems of healthcare professionals [1]. But even before this critical period, there were unacceptable health problems among healthcare professionals, who are coping with emotionally distressing situations day after day: illness, dying, suffering in every form. This painful reality can lead to compassion fatigue, burnout, professional distress, and result in a low sense of accomplishment and severe emotional exhaustion [2-4].

Previous literature has explored the impact of empathy in emotional exhaustion [5], establishing links between empathy and burnout [6-7]. However, empirical evidence has shown both negative and positive links between high burnout scores and empathy [8-9]. These inconsistencies make it quite difficult to establish the direction and nature of the relationship between empathy and burnout [10]. Despite its interest for both healthcare professionals and patients, little is known about the role of empathy and related processes in burnout [11]. The main objective of this research is to clarify the effect of different empathic components and the inference of patients' mental states in healthcare professionals and their link with burnout dimensions. Specifically, we propose that the relationship between empathy and burnout depends on whether the dimensions of empathy are self-oriented (personal distress) or other-oriented (perspective- taking and empathic concern). The general hypothesis is that the self-oriented components of empathy will be positively related to burnout dimensions, whereas the other-oriented components will be negatively associated with them.

There is a strong scientific consensus on the multidimensionality of burnout [12]. A central component of burnout is emotional exhaustion, a felt depletion of emotional energy and resources [13-14]. The second component of burnout is the development of depersonalization that could lead to the view that patients deserve what they suffer. Finally, the lack of personal accomplishment is conceived as the tendency to evaluate oneself negatively, with feelings of unhappiness at work [15]. Most research has indicated high prevalence of burnout, estimated as even more than 80% of physicians and nurses [16-17].

Like burnout, empathy is also considered a multidimensional construct, though there is no single classification of their dimensions. Davis [18] developed an individual difference measure of empathy (the Interpersonal Reactivity Index, IRI) based on the idea that empathy can be considered as a set of related constructs. Perspective-taking is the tendency to adopt others' point of view, or knowing another person's internal states. Fantasy is the ability to transpose oneself imaginatively into the feelings and actions of fictitious characters. Empathic concern is the tendency to experience feelings of warmth, compassion, and concern for other people, assessing the other-oriented approach of empathy, whereas Personal distress refers to self-oriented approach to empathy, including feelings of distress and unease when observing others' suffering. Interestingly, all of these constructs imply a reaction towards others, but they are also specific and distinguishable from each other, capturing different components of our relational orientation towards others related to empathy. In the same line, other researchers have established the multidimensionality of empathy [19-23].

The effort to differentiate the multiple components of empathy is supported by social neuroscience. Several studies have begun to disentangle some of the neural substrates of empathy, supporting the idea that there are different underlying mechanisms involved [24-26]. Research on social cognition processes has indicated that although empathy and theory of mind processes activate different brain regions [27], both rely on networks associated with inferring mental states of others [28]. The inference of mental states refers to the assumption that others with whom we interact have minds, which means that they have intentions, plans, and goals [29-30], as well as experiences of pleasure, pain, and emotions [31]. Such inferences occur without cognitive effort and may serve to distinguish people from all other agents and to predict their actions toward us [32-33]. However, existing evidence also suggests that perceiving another mental state in its full humanity is not an automatic tendency but rather requires cognitive effort. Despite having an impressive unique capacity to reason about the minds of others [34-36], people may routinely fail to use this capacity by denying others mental states [37-42]. This tendency to perceive lesser minds in others can be conceived as a form of passive dehumanization [36]. The scarce literature that analyzes the relationship between empathy and the inference of mental states has indicated that the cognitive component of empathy (particularly other-focused empathy) is linked to mental state inferences, while the emotional component of empathy (self-focused affect) is unrelated to inferring mental states [24, 43]. A novel line of research suggests that empathy is less due to self–other merging (or a

blurring difference between the two), but rather that it is motivated by the recognition that the self is distinct from the other, and that one's experience is distinct from the experience of others [44].

Finally, previous literature has shown that the role of mental state inferences and empathy is very controversial in medical performance. On the one hand, some studies have shown that being empathic and inferring mental states of patients has a positive impact upon healthcare professionals, who can be more effective providing better care, experience more wellbeing and less distress, and suffer burnout to a lesser extent [45-47]. On the other hand, other studies suggest that healthcare professionals reduce their empathy and the inference of mental states in patients to regulate their personal emotions toward suffering, death, and pain, as well as to improve their performance [48-50]. Therefore, patient dehumanization may attenuate the stress and burnout derived from perceiving patients' physical and psychological pain. For example, nurses who humanize their patients report higher levels of emotional exhaustion [50]. In this same vein, it has been argued that depersonalization as a dimension of burnout is linked to objectifying and dehumanization of patients, as a defense and protection mechanism, altering empathy [51]. In the same vein, Haque et al. [52] pointed out that dehumanization can result from functional psychological demands of caregivers and it is assumed that it helps to deliver effective and efficient medical care. However, there is a lack of empirical evidence showing whether this mechanism of passive dehumanization is a useful strategy in the medical context or, on the contrary, whether it has severe negative consequences, not only for patients [48] but also for healthcare professionals.

One of the reasons that may explain these inconsistent results is the breadth of the term empathy. In this sense, those studies that consider empathy as a multidimensional factor have shown that each component of empathy is differently related to the dimensions of burnout (namely, emotional exhaustion, depersonalization, and low personal accomplishment). For example, Duarte et al. [53] found that negative self-oriented emotions elicited by others' distress were associated with burnout and compassion fatigue. Similarly, research with clinical social workers found that emotional exhaustion was negatively linked to perspective-taking, while personal distress predicted high emotional exhaustion and depersonalization, but low personal accomplishment; while empathic concern was unrelated to any dimension of burnout [54]. Another study also indicated that personal distress increased emotional exhaustion and depersonalization and decreased personal accomplishment in medical students. However, in this case, emotional concern predicted low emotional exhaustion and depersonalization, whereas it predicted high personal accomplishment [55]. As a whole, these results emphasize the need to further analyze the links between self- and other- oriented components of empathy and the dimensions of burnout in medical contexts.

Despite the relevance of empathy and inference of mental states in the wellbeing and professional performance in healthcare contexts, most published articles are theoretical [48, 45]; empirical studies on this topic are scarce and they are based on students of healthcare fields samples [55]. The current study was aimed at addressing the gaps in the literature by analyzing the relationship between different components of empathy, the inference of mental states, and the dimensions of burnout. Specifically, we hypothesized that perspective-taking (other-oriented component) will be negative and directly related to emotional exhaustion and depersonalization, but positively linked to personal accomplishment (Hypothesis 1). By contrast, the more personal distress participants show (self-oriented component), the more emotional exhaustion and depersonalization they would display, and the less personal accomplishment they would exhibit (Hypothesis 2). In accordance with previous literature, our analysis focuses on the indirect paths from components of empathy to dimensions of burnout through the inference of mental states in patients. In particular, we predicted that participants that exhibit more personal distress (Hypothesis 3a), but less perspective-taking (Hypothesis 3b) would show higher levels of emotional exhaustion because they infer their patients' mental states less. On the contrary, those healthcare professionals that exhibit lower levels of personal distress (Hypothesis 4a), but higher levels of perspective-taking (Hypothesis 4b) would display more personal accomplishment because of the inference of their patients' mental states. The direct and indirect links between empathic concern

and burnout were also examined. However, no specific hypotheses were put forward because of the inconsistency and scarcity of previous research.

2. Materials and Methods

2.1. Participants

One hundred eighty-four participants (77% women) with ages ranging from 23 to 65 years (*M* = 44.6; *SD* = 10.46) fully completed an online survey, hosted by Qualtrics (Qualtrics Labs Inc., Provo, UT). Most participants identified as Spanish (97%) and only 5 individuals indicated being from other countries. All participants were healthcare professionals (57% nurses, 30% doctors, 8% nursing assistants, and 5% other categories) with a mean of 19.38 years of professional experience (*SD* = 10.74). The survey link was sent to several Spanish Colleges of Nursing and Physicians, indicating that the main purpose of the study was to increase the knowledge about how they deal with the task of caring for and supporting their patients.

2.2. Ethical Approval

Once participants clicked on the survey link, they received detailed information about the study: the research team, contact details, and general goals. Anonymity of the responses and confidentiality of data was assured, and all participants were treated in accordance with APA ethical guidelines and informed consent was obtained from all volunteers prior to their participation. Moreover, prior to conducting this study, approval was obtained from the Animal Welfare and Research Ethics Committee of the first author's university.

2.3. Instruments

Empathy. Participants completed the Spanish adaptation [56] of the Interpersonal Reactivity Index (IRI) [18]. As in previous studies, three of the four dimensions of empathy were selected [3, 57], excluding the dimension of fantasy given that it consists of the tendency of identifying with fictional characters [56]. Moreover, targets of empathy in the original items (e.g. people, someone) were replaced with the word *patients* to assess empathy in healthcare situations. This 21-item instrument comprises three specific aspects of empathy: *Empathic concern* (EC; e.g., "When I see a patient being treated unfairly, I sometimes don't feel very much pity for them"), *Personal distress* (PD; e.g., "I sometimes feel helpless when I am in the middle of a very emotional situation"), and *Perspective-taking* (PT; e.g., "When I'm upset at a patient, I usually try to "put myself in his shoes" for a while"). The response scale ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). The internal consistency omega hierarchical was adequate for each of its subscales (EC = .65; PD = .75; PT = .76).

Burnout. The Spanish version of Maslach Burnout Inventory (MBI) [58] was used to measure professional burnout. The MBI includes three scales: *Emotional exhaustion* (EE; nine items, e.g., "Feel emotionally drained from work"), *Depersonalization* (D; five items, e.g., "Don't really care what happens to patients"), and *Personal accomplishment* (PA; eight items, e.g., "Deal with emotional problems calmly"). This 22-item self-report scale assessed the frequency with which respondents experienced burnout-related feelings or emotions on a 7-point scale (0 = *never*; 6 = *daily*). Coefficient omega hierarchical was .93 for the entire sample, and .90 for EE, .73 for D, and .83 for PA subscales.

Mental state inferences. After consulting empirical research on mental state inferences and previous scales related to the topic, we generated an item pool. Two of the authors, both experts in dehumanization, reviewed these items independently, deleting redundant ones and selecting those that fit with inferring mental states. Then, the items were edited for clarity and content by the second author. The final instrument, the Mental State Inferences Scale (MSIS), was composed of eight items that explained 51% of variance. Participants indicated how frequently (1 = *never*; 5 = *always*), while talking and interacting with patients, they tend to think about different aspects related to their patients' mental states. Higher scores indicated higher attribution of mental states to patients. Examples of the items are "The patient has projects and plans" or "The patient needs to

give meaning to their life". A confirmatory factor analysis (CFA) of the MSIS shown a clear one-factor structure (χ^2/df = 31.221, root mean square error of approximation [*RMSEA*] = .061, comparative fit index [*CFI*] = .98), the loadings of the items on the factor ranged from .32 to .57. Coefficient omega for the present sample was .86.

Background information. Participants reported their sex, age, nationality, occupation, and time of professional experience.

3. Results

3.1. Descriptive statistics and Zero-Order Correlations

Data analyses were conducted using R (R Core Team, 2020) through ULLRToolbox [59]. Means and standard deviations of all study variables, as well as Pearson's correlations among all study variables are shown in Table 1. Results showed that those healthcare professionals that reported more perspective-taking tended to display lower levels of depersonalization, but higher levels of personal accomplishment. However, perspective-taking was not significantly related to emotional exhaustion. By contrast, personal distress was positively linked to emotional exhaustion, while had a negative relationship with personal accomplishment. Moreover, personal distress was unrelated to depersonalization. These results partially support Hypothesis 1 and Hypothesis 2. Our findings also revealed that those participants that inferred mental states to their patients also showed higher levels of perspective-taking, emotional concern, and personal accomplishment. Furthermore, inferring mental states was uncorrelated with personal distress.

Table 1. Means, standard deviations, and correlations between variables of study.

	Mean	SD	MenSta	PerTak	EmoCon	PerDis	EmoExh	Dep	PerAcc
MenSta	3.88	.66	-						
PerTak	3.73	.77	.41***	-					
EmoCon	4.00	.74	.40***	.30***	-				
PerDis	1.99	.70	-.13	-.23***	-.08	-			
EmoExh	3.40	1.68	.14	.01	.11	.27***	-		
Dep	2.46	1.52	-.14	-.29***	-.19**	.14	.47***	-	
PerAcc	6.14	.99	.38***	.42**	.27***	-.35***	-.29***	-.41***	-

Note. MenSta = Mental State inference; PerTak = Perspective-Taking; EmoCon = Emotional Concern; PerDis = Personal Distress; EmoExh = Emotional Exhaustion; Dep = Depersonalization; PerAcc = Personal Accomplishment.
* $p < .05$; ** $p < .01$; *** $p < 0.001$

3.2. Paths from Empathy to Burnout

To examine the indirect effects from subscales of empathy to dimensions of burnout through the inference of mental states, several multiple mediation analyses were conducted using the Lavaan package in R [60]. Following recommended procedures, maximum likelihood estimator and standard error were calculated using 1,000 bootstrapped samples. Indirect effects were considered statistically significant inspecting p-values and if the 95% confidence interval did not include zero [61]. Three mediation models were examined, one for each dimension of burnout as dependent variables.

Regarding the model examining emotion exhaustion as the dependent variable (see Appendix 1), a direct path from personal distress to emotion exhaustion was found (β = .30, $p < .001$, 95%CI = [.150, .454]). However, and contrary to our predictions, the inference of mental states did not

mediate this link (see table 2). Likewise, no direct or indirect effects were found between perspective-taking and emotional exhaustion. Therefore, neither Hypothesis 3a nor Hypothesis 3b were supported.

In model testing mediation from empathy dimensions on personal accomplishment it was found a negative and direct path between personal distress and personal accomplishment (Figure 1; see Appendix 2). Contrary to Hypothesis 4a, this link was not mediated by the inference of mental states. However, and upholding Hypothesis 4b, we found that healthcare professionals that displayed high levels of perspective-taking and emotional concern also indicated high personal accomplishment when they inferred mental states to their patients (see table 2). Furthermore, both perspective-taking and empathic concern were positively related to mental states in the three mediation models. Moreover, we examined the relationship between emotional concern and burnout. Neither direct nor indirect effects were found (see appendices 1-3).
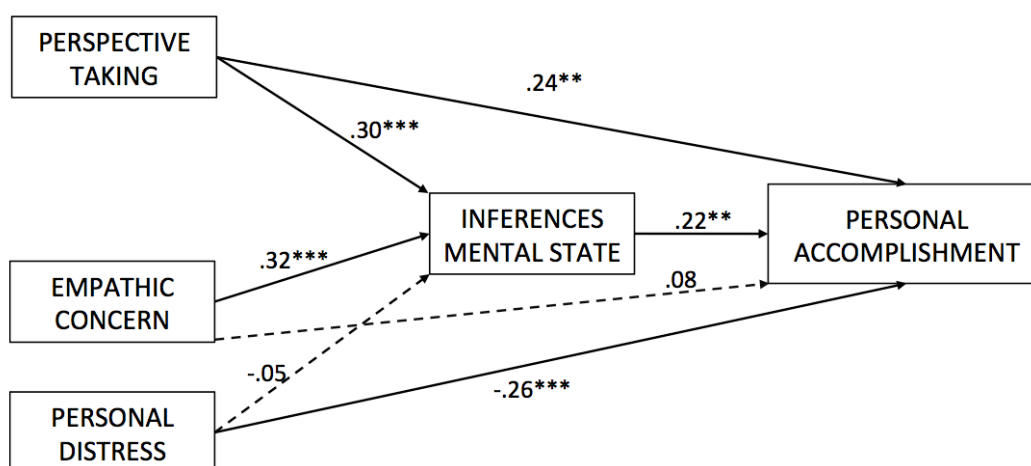

Figure 1. Direct paths from dimensions of empathy personal accomplishment through the mental state inferences.
**p < .01, ***p < .001.

Although there were no predictions for the depersonalization, it was tested whether the components of empathy were directly and indirectly related to this dimension of burnout (see Appendix 3). Only perspective-taking was negatively linked to depersonalization (β = -.22, *p* < .05, 95%CI = [-.399, -.049]). Moreover, indirect effects through the inference of mental states were not found.

Table 2. Indirect Paths from Dimensions of Empathy to Burnout Dimensions through the Inference of Mental States for the Models of Multiple Mediation Analyses.

	Estimate	z-value	P(>|z|)	Std	95% CI
Paths for Emotional Exhaustation					
PerTak → InfMen → EmoExh	.047	1.334		.036	[-.022, .117]
EmoCon → InfMen → EmoExh	.045	1.403		.032	[-.018, .108]
PerDis → InfMen → EmoExh	-.006	-.459		.012	[-.029, .018]
Paths for Personal Accomplishment					
PerTak → InfMen → PerAcc	.067	2.221	*	.030	[.008, .127]
EmoCon → InfMen → PerAcc	.072	2.338	*	.031	[.012, .132]
PerDis → InfMen → PerAcc	-.010	-.574		.018	[-.045, .024]
Paths for Depersonalization					
PerTak → InfMen → Dep	.007	.208		.032	[-.056, .070]
EmoCon → InfMen → Dep	.007	.209		.032	[-.056, .069]
PerDis → InfMen → Dep	-.001	-.196		.005	[-.010, .008]

Note. EmoCon = Emotional Concern; PerTak = Perspective-Taking; PerDis = Personal Distress; EmoExh = Emotional Exhaustion; PerAcc = Personal Accomplishment; Dep = Depersonalization; InfMen = Inference of Mental States
* *p* < .05; ** *p* < .01; *** *p* <.001

4. Discussion

Empathy in healthcare and the role it plays in the development of personal costs is a complex phenomenon. The purpose of this study was to analyze the relationship between three empathic components, mental state inferences, and burnout dimensions. The general hypothesis was that inferring mental states generate different consequences for professionals' wellbeing, depending on the type of empathic component that healthcare professionals display.

Our study showed that mental state inferences lead to positive effects for healthcare professionals. These results suggest that being conscious of patients' mental state, thoughts, and feelings doesn't imply personal costs. On the contrary, it increases the likelihood of finding the work significant and gratifying. This result is consistent with theoretical literature that suggests that mentalizing patients is a functional coping strategy with positive consequences for the doctor-patient relationship. In this sense, thinking about patients as agents without mind is not an effective strategy to reduce burnout of healthcare workers [45, 52].

The results also highlight the importance of studying the effects of different empathic components. Specifically, more personal distress is related to less inference of patients' mental states, and subsequently negative consequences for healthcare professionals, increasing their levels of emotional exhaustion. On the contrary, perspective-taking seems to increase mental state inferences of patients, resulting in positive effects such as higher levels of personal accomplishment.

Our results remark that negative consequences of empathy in healthcare are circumscribed to a particular component of empathy: personal distress. This component is an aversive self-focused emotional reaction unrelated to what the other feels and thinks since it is the expression of what the self is suffering in a particular situation. This empathic component is generally negatively related to social functioning [62]. An important question that remains unexplored is whether the capacity to be affected by the observable or inferred affective experiences of others is necessary to calibrate an appropriate caring response [63]. These findings are consistent with theoretical approaches that define empathy in patient care as an overriding cognitive attribute that presumes an understanding (rather than feeling) of the patient's suffering, combined with the ability to communicate this understanding, and the disposition to help [64-65]. From this perspective, personal distress should remain apart from the definition of empathy in healthcare, since it is a distinguishable concept with extremely negative consequences. Moreover, given that our results indicate that what is important to reduce is personal distress while helping others that should not be considered in training programs or interventions oriented to improve empathic skills.

One of the novelties of this study is that it incorporates mental state inferences in the relationship between empathy and burnout. The finding that emotional concern and perspective-taking increase personal accomplishment in healthcare professionals when they infer mental state of patients is remarkable. It suggests that paying attention to the feelings of others while thinking about patients' minds increases the levels of professional wellbeing and satisfaction at work. Importantly, our results make compatible patients' needs and healthcare professionals' needs: the empathetic relationships reinforce involvement and satisfaction of the patients from the therapeutic process, increase quality of care and decrease medical errors [66].

To our view, these results invite us to cautiously reconsider previous conclusions about the relationship between dehumanization and burnout [52, 50]. In line with our results, it is important to note that mentalizing the patients is not necessarily the cause of higher levels of burnout. Instead, our findings seem to indicate that perspective-taking, mental state inferences, and empathic concern play a positive role protecting healthcare workers of burnout. Sadly, healthcare professionals assume that taking personal distance is a necessary response to avoiding emotional exhaustion in healthcare. However, empirical evidence reveals that inferring mental states and perspective-taking could be a way to reduce personal distress, probably because the attentional resources are allocated to the patient rather than the self. Advances in neurocognitive science are an extraordinary opportunity to improve our knowledge on the different components of empathy and their neural correlates [25, 67]. Further empirical research in this field could help to understand the role of different components of empathy in specific psychosocial risks at work. Besides, future studies should explore other personal costs in healthcare professionals that cause severe problems that remain underexplored (i.e., turnover intentions, abuse of addictive substances, etc.). Finally, more meta-analyses are required to differentiate the specific role of each of the components of empathy in wellbeing beyond the negative consequences of healthcare.

In addition, the present research can help to design more efficient empathy-based intervention programs aimed at minimizing potentially negative consequences of the health-care activity. Specifically, training and education for clinicians and nurses should be oriented to the development of perspective-taking and empathic concern. It is highly important that the design of these programs is derived from empirical research in this field, and leads to a deep change in the culture of empathy in medicine [68]. Differences across empathic components and their consequences should lead to developing specific tasks for training perspective-taking, empathic concern, and preventing personal distress.

The current study also had some limitations that should be considered when interpreting the results. First, the sample size has not allowed us to make comparisons by specialty, time of experience, and other organizational dimensions that undoubtedly play a relevant role. Second, the selection of additional instruments and measurements is necessary to improve the conclusion obtained. Particularly interesting is the inclusion of physiological measures [24]. Finally, this is a correlational study, and interpretation of causal links between variables goes beyond its purpose.

Although the current study has several limitations, it also provides rising research directions. After COVID-19 pandemic, society has become more conscious of the imperative of caring for healthcare professionals. Emotional costs for help need to be reduced, and research on empathy and their consequences plays a relevant role in implementing this goal. Healthcare professionals are constantly trying to deal with their own personal emotions towards suffering, pain, and death, while at the same time they try to provide the best care to their patients. They must face an important challenge, and research on this topic could help to clarify and deeply understand how they can leverage empathy to achieve positive professional outcomes, and at the same time, maintain personal wellbeing.

5. Conclusions

This study provides unique empirical evidence of the variables related to burnout in healthcare professionals. It demonstrates how dimensions of empathy are differently related to types of burnout, and that these links may be mediated when inferring mental states to patients. In particular, our results emphasize the positive role that other-oriented empathy plays, as well as the inference of patients' minds on the appraisal of the personal achievement of healthcare professionals. Training on how to manage empathy more focused on others and less focused on the self can lead to a more effective health assistance, impacting patients and healthcare professionals' quality of life.

Appendices

Table A1. Multiple mediation analyses model for direct effects from dimensions of empathy to emotional exhaustion through the inference of mental states.

Paths	Estimate	z-value	P(> |z|)	Std	95% CI
EmoCon → EmoExh	.085	.991		.085	[-.083, .252]
PerTak → EmoExh	.085	-.397		-.034	[-.201, .134]
PerDis → EmoExh	.077	3.905	***	.302	[.150, .454]
EmoCon → InfMen	.072	4.292	***	.307	[.167, .447]
PerTak → InfMen	.074	4.371	***	.323	[.178, .467]
PerDis → InfMen	.079	-.478		-.038	[-.192, .116]
EmoExh → InfMen	.094	1.565		.147	[-.037, .331]

Note. EmoCon = Emotional Concern; PerTak = Perspective-Taking; PerDis = Personal Distress; EmoExh = Emotional Exhaustion; InfMen = Inference of Mental States
* $p < .05$; ** $p < .01$; *** $p < .001$

Table A2. Multiple mediation analyses for direct effects from dimensions of empathy to personal accomplishment through the inference of mental states.

Paths	Estimate	z-value	P(>|z|)	Std	95% CI
EmoCon → PerAcc	.070	1.195		.084	[-.054, .022]
PerTak → PerAcc	.069	3.442	**	.237	[.102, .372]
PerDis→PerAcc	.071	-3.710	***	-.263	[-.401, -.124]
EmoCon → InfMen	.070	4.563	***	.322	[.183, .460]
PerTak → InfMen	.077	3.917	***	.302	[.151, .453]
PerDis → InfMen	.073	-.626		-.045	[-.188, .097]
PerAcc → InfMen	.085	2.616	**	.223	[.056, .390]

Note. EmoCon = Emotional Concern; PerTak = Perspective-Taking; PerDis = Personal Distress; PerAcc = Personal Accomplishment; InfMen = Inference of Mental States
* $p < .05$; ** $p < .01$; *** $p < .001$

Table A3. Multiple mediation analyses for direct effect from dimensions of empathy to depersonalization through the inference of mental states.

Paths	Estimate	z-value	P(>|z|)	Std	95% CI
EmoCon → Dep	.102	-1.451		-.148	[-.347, .052]
PerTak → Dep	.089	-2.510	*	-.224	[-.399, -.049]
PerDis → Dep	.078	1.049		.082	[-.071, .234]
EmoCon → InfMen	.067	4.727	***	.315	[.185, .446]
PerTak → InfMen	.073	4.334	***	.317	[.173, .460]
PerDis → InfMen	.075	-.575		-.043	[-.191, .105]
Dep → InfMen	.101	0.209		.021	[-.177, .220]

Note. EmoCon = Emotional Concern; PerTak = Perspective-Taking; PerDis = Personal Distress; Dep = Depersonalization; InfMen = Inference of Mental States
* *p* < .05; ** *p* < .01; *** *p* <.001

References

1. Shapiro, J.; McDonald, T.B. Supporting Clinicians during Covid-19 and Beyond-Learning from Past Failures and Envisioning New Strategies. *N. Engl. J. Med*. **2020**, 1-3.
2. Gleichgerrcht, E.; Decety, J. The costs of empathy among health professionals. In *Empathy: From Bench to Bedside*; Decety, J., Ed.; MIT Press: Cambridge, MA, USA, 2012; pp. 245–261.
3. Gleichgerrcht, E.; Decety, J. Empathy in clinical practice: how individual dispositions, gender and experience moderate empathic concern, burnout and emotional distress in physicians. *PLoS One* **2013**, *8*, e61526. doi: 10.1371/journal.pone.0061526
4. Halpern, J. Clinical empathy in medical care. In *Empathy: From Bench to Bedside*; Decety, J., Ed.; MIT Press: Cambridge, MA, USA, 2012; pp. 229–244.
5. Rothschild, B. *Help for the helper: The psychophysiology of compassion fatigue and vicarious trauma*; WW Norton & Company: New York, USA, 2006.
6. Åström, S.; Norberg, A.; Nilsson, M.; Winblad, B. Tedium among personnel working with geriatric patients. *Scand. J. Caring Sc.* **1987**, *1*, 125-132.
7. Ferri, P.; Guerra, E.; Marcheselli, L.; Cunico, L.; Di Lorenzo, R. Empathy and burnout: An analytic cross-sectional study among nurses and nursing students. *Acta Biomed.* **2015**, *86*, 104-115.
8. Hoffman, M.I. *Empathy and moral devolpment: Implications for caring and justice*; Cambridge University Pres: New York, USA, 2000.
9. Mercer, S.W.; Reynolds, W.J. Empathy and quality of care. *Br. J. Gen. Pract.* **2002,** *52* (Suppl), S9-12.
10. Picard, J.; Catu-Pinault, A.; Boujut, E.; Botella, M.; Jaury, P.; Zenasni, F. Burnout, empathy and their relationships: A qualitative study with residents in general medicine. *Psychol. Health Med.* **2016**, *21*, 354-361. doi: 10.1080/13548506.2015.1054407
11. Wilkinson, H.; Whittington, R.; Perry, L.; Eames, C. Examining the relationship between burnout and empathy in healthcare professionals: A systematic review. *Burn. Res.* **2017**, *6*, 18-29. doi: 10.1016/j.burn.2017.06.003
12. Maslach, C. A multidimensional theory of burnout. In *Theories of Organizational Stress*; Cooper, C.L., Ed.; Oxford Univ. Press: Oxford, UK, 1998; pp. 68-85.

13. Figley, C.R. Compassion fatigue: Toward a new understanding of the costs of caring. In *Secondary traumatic stress: Self care issues for clinicians, researchers, and educators*; Stamm, B.H., Ed.; Sidran Press: Lutherville, MD, USA, 1995; pp. 3-28.

14. Maslach, C. *Burnout: The cost of Caring*; Prentice-Hall: New York, USA, 1982.

15. Maslach, C., Jackson, S.E.; Leiter, M.P. Maslach Burnout Inventory: 3rd edition. In *Evaluating stress: A book of resources*; Zalaquett, C.P., Wood, R.J., Eds.; Scarecrow Press Inc.: Lanham, MD, USA, 1997; pp. 191-218.

16. Rotenstein, L.S.; Torre, M.; Ramos, M.A.; Rosales, R.C.; Guille, C.; Sen, S.; Mata, D.A. Prevalence of burnout among physicians: A systematic review. *JAMA* **2018**, *320*, 1131-1150.

17. Vinueza-Veloz, A.F.; Aldaz-Pachacama, N.R.; Mera-Segovia, C.M.; Pino-Vaca, D.P.; Tapia-Veloz, E.C.; Vinueza-Veloz, M.F. Síndrome de Burnout en médicos/as y enfermeros/as ecuatorianos durante la pandemia de COVID-19 **2020**, doi.org/10.1590/SciELOPreprints.708

18. Davis, M.H. A multidimensional approach to individual differences in empathy. *JSAS* **1980**, *10*, 1-17.

19. Batson, C.D. These things called empathy. In *The Social Neuroscience of Empathy*; Decety, J., Ickes, W., Eds.; MIT Press: Cambridge, MA, USA, 2009; pp. 3-15.

20. Decety J. The neuroevolution of empathy. *Ann. N. Y. Acad. Sci.* **2011**, *1231*, 3-45.

21. Decety, J.; Cowell, J.M. The complex relation between morality and empathy. *Trends Cogn. Sci.* **2014**, *18*, 337-339.

22. Decety, J.; Smith, K.E.; Norman, G.J.; Halpern, J. A social neuroscience perspective on clinical empathy. *World Psychiatry* **2014**, *13*, 233.

23. Singer, T.; Lamm, C. The social neuroscience of empathy. *Ann. N. Y. Acad. Sci.* **2009**, *1156*, 81-96.

24. Buffone, A.E.; Poulin, M.; DeLury, S.; Ministero, L.; Morrisson, C.; Scalco, M. Don't walk in her shoes! Different forms of perspective taking affect stress physiology. *J. Exp. Soc. Psychol.* **2017**, *72*, 161-168.

25. Lamm, C.; Batson, C.D.; Decety, J. The neural substrate of human empathy: Effects of perspective-taking and cognitive appraisal. *J. Cogn. Neurosci.* **2007**, *19*, 42-58.

26. Thirioux, B.; Birault, F.; Jaafari, N. Empathy is a protective factor of burnout in physicians: new neuro-phenomenological hypotheses regarding empathy and sympathy in care relationship. *Front. Psychol.* **2016**, *7*, 763. doi: 10.3389/fpsyg.2016.00763.

27. Kanske, P.; Böckler, A.; Trautwein, F.M.; Singer, T. Dissecting the social brain: Introducing the EmpaToM to reveal distinct neural networks and brain–behavior relations for empathy and Theory of Mind. *NeuroImage* **2015**, *122*, 6-19.

28. Völlm, B.A.; Taylor, A.N.; Richardson, P.; Corcoran, R.; Stirling, J.; McKie, S.; Deakin, J.F; Elliott, R. Neuronal correlates of theory of mind and empathy: a functional magnetic resonance imaging study in a nonverbal task. *NeuroImage* **2006**, *29*, 90-98.

29. Epley, N.; Waytz, A. Mind perception. In *The handbook of social psychology*; Fiske, S.T., Gilbert, D.T., Lindzey, G., Eds.; Wiley: New York, USA, 2009; pp. 498–541.

30. Harris, L.T.; Fiske, S.T. Social neuroscience evidence for dehumanised perception. *Eur. Rev. Soc. Psychol.* **2009**, *20*, 192-231.

31. Gray, H.M.; Gray, K.; Wegner, D.M. Dimensions of mind perception. *Science* **2007**, *315*, 619-619.

32. Fiske, S.T.; Taylor, S.E. *Social cognition*, 2nd ed.; Mcgraw-Hill: New York, USA, 1991.

33. Fiske, S.T.; Taylor S.E. Attention and encoding. In *Social Cognition: From Brains to Culture*; Fiske, S.T., Taylor, S.E., Eds.; McGraw-Hill: New York, USA, 2008; pp. 51-74.

34. Herrmann, E.; Call, J.; Hernández-Lloreda, M.V.; Hare, B.; Tomasello, M. Humans have evolved specialized skills of social cognition: The cultural intelligence hypothesis. *Science* **2007**, *317*, 1360-1366.

35. Saxe, R. Uniquely human social cognition. *Curr. Opin. Neurobiol.* **2006**, *16*, 235-239.

36. Waytz, A.; Schroeder, J.; Epley, N. The lesser minds problem. In *Humanness and dehumanization*; Bain P.G., Vaes, J., Leyens, J.-P., Eds.; Psychology Press: New York, USA, 2014; pp. 49-67.

37. Fiske, S. T. Varieties of (de) humanization: Divided by competition and status. In *Objectification and (de) humanization*; Gervais, S.J., Ed.; Springer: New York, USA, 2013; pp. 53-71.

38. Harris, L.T.; Fiske, S.T. Dehumanizing the lowest of the low: Neuroimaging responses to extreme out-groups. *Psychol. Sci.* **2006**, *17*, 847-853.

39. Harris, L.T.; Fiske, S.T. Perceiving humanity or not: A social neuroscience approach to dehumanized perception. In *Social neuroscience: Toward understanding the underpinnings of the social mind*; Todorov, A., Fiske, S., Eds.; Oxford Univ. Press: Oxford, UK, 2011; pp. 123-134.

40. Haslam, N. Dehumanization: An integrative review. *Pers. Soc. Psychol. Rev.* **2006**, *10*, 252-264.

41. Haslam, N.; Loughnan S. Dehumanization and infrahumanization. *Annu. Rev. Psychol.* **2014**, *65*, 399-423.

42. Leyens, J.; Rodriguez-Torres, A.; Rodriguez-Perez, A.; Gaunt, R.; Paladino, M. Psychological essentialism and the differential attribution of uniquely human emotions to ingroups and outgroups. *Eur. J. Soc. Psychol.* **2001**, *81*, 395-411.

43. Dvash, J.; Shamay-Tsoory, S.G. Theory of Mind and empathy as multidimensional constructs: Neurological foundations. *Top. Lang. Disord.* **2014**, *34*, 282-295.

44. Abu-Akel, A.; Palgi, S.; Klein, E.; Decety, J.; Shamay-Tsoory, S. Oxytocin increases empathy to pain when adopting the other-but not the self-perspective. *Soc. Neurosci.* **2015**, *10*, 7-15.

45. Christoff, K. Dehumanization in organizational settings: Some scientific and ethical considerations. *Front. Hum. Neurosci.* **2014**, *8*, 748. doi: 10.3389/fnhum.2014.00748

46. Halpern, J. What is clinical empathy? *J. Gen. Intern. Med.* **2003**, *18*, 670-674.

47. Lamothe, M.; Boujut, E.; Zenasni, F.; Sultan, S. To be or not to be empathic: The combined role of empathic concern and perspective taking in understanding burnout in general practice. *BMC Fam. Pract.* **2014**, *15*, 1-7.

48. Capozza, D.; Falvo, R.; Boin, J.; Colledani, D. Dehumanization in medical contexts: An expanding research field. *Test. Psychom. Methodol. Appl. Psychol.* **2016**, *23*, 545-559.

49. Decety, J.; Yang, C.Y.; Cheng, Y. Physicians down-regulate their pain empathy response: An event-related brain potential study. *NeuroImage* **2010**, *50*, 1676-1682.

50. Vaes, J.; Muratore, M. Defensive dehumanization in the medical practice: A cross-sectional study from a health care worker's perspective. *Br. J. Soc. Psychol.* **2013**, *52*, 180-190.

51. Fitzgerald-Yau, N.; Egan, J. Defense styles mediate the association between empathy and burnout among nurses. *J. Nerv. Ment. Dis.* **2018**, *206*, 555-561.

52. Haque, O.S.; Waytz, A. Dehumanization in medicine: Causes, solutions, and functions. *Perspect. Psychol. Sci.* **2012**, 7, 176-186.

53. Duarte, J.; Pinto-Gouveia, J. The role of psychological factors in oncology nurses' burnout and compassion fatigue symptoms. *Eur. J. Oncol. Nurs.* **2017**, *28*, 114-121.

54. Thomas, J. Association of personal distress with burnout, compassion fatigue, and compassion satisfaction among clinical social workers. *J. Soc. Serv. Res.* **2013**, *39*, 365-379.

55. von Harscher, H.; Desmarais, N.; Dollinger, R.; Grossman, S.; Aldana, S. The impact of empathy on burnout in medical students: new findings. *Psychol. Health Med.* **2018**, *23*, 295-303.

56. Pérez-Albéniz, A.; De Paúl, J.; Etxeberría, J.; Montes, M.P.; Torres, E. Adaptación de interpersonal reactivity index (IRI) al español. *Psicothema* **2003**, *15*, 267-272.

57. Gleichgerrcht, E.; Decety, J. The relationship between different facets of empathy, pain perception and compassion fatigue among physicians. *Front. Behav. Neurosci.* **2014**, *8*, 243. doi: 10.3389/fnbeh.2014.00243

58. Maslach, C.; Jackson, S.E. *Inventario Burnout de Maslach (MBI): Síndrome del quemado por estrés laboral asistencial*; TEA Ediciones: Madrid, Spain, 1997.

59. Hernández, J., & Betancort, M. *ULLRToolbox*, 2016. https://sites.google.com/site/ullrtoolbox/

60. Rosseel, Y. Lavaan: An R package for structural equation modeling and more. Version 0.5-12 (BETA). *J. Stat. Softw.* **2012**, *48*, 1-36.

61. Hayes, A. F. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*; The Guilford Press: New York, USA, 2013.

62. Davis, M.H. The effects of dispositional empathy on emotional reactions and helping: A multidimensional approach. *J. Pers.* **1983**, *51*, 167-184.

63. Decety, J. Empathy in Medicine: What It Is, and How Much We Really Need It. *Am. J. Med.* **2020**, *133*, 561-566.

64. Hojat, M. *Empathy in Health Professions Education and Patient Care*; Springer International: New York, USA, 2016.

65. Hojat, M.; DeSantis, J.; Shannon, S.C.; Mortensen, L.H.; Speicher, M.R.; Bragan, L.; LaNoue, M.; Calabrese, L.H. The Jefferson Scale of Empathy: a nationwide study of measurement properties, underlying components, latent variable structure, and national norms in medical students. *Adv. Health Sci. Educ.* **2018**, *23*, 899-920.

66. Moudatsou, M.; Stavropoulou, A.; Philalithis, A.; Koukouli, S. The role of empathy in health and social care professionals. *Healthcare* **2020**, *8*, 26.

67. Preusche, I.; Lamm, C. Reflections on empathy in medical education: What can we learn from social neurosciences? *Adv. Health. Sci. Educ.* **2016**, *21*, 235-249.

68. Shapiro J. The paradox of teaching empathy in medical education. In *Empathy: From Bench to Bedside*; Decety, J., Ed.; MIT Press: Cambridge, MA, USA, 2012; pp. 275–300.