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Compassion vs. empathy. Necessary distinctions in approaching medical care

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ABSTRACT

The incidence of the fatigue caused by medical care brings to attention the emotional reactions to suffering and their possible effects on caregivers. In this study, we shall discuss empathy and compassion. Linguistic analyses and psychological evaluations fail to differentiate between empathy and compassion. We shall therefore make an inventory of the contribution of neuroscientific studies that we consider important.

We shall present some research and clinical studies that support the discrimination between compassion and empathy, at the psycho-behavioural level, in terms of vagal and cerebral patterns and in terms of the effects that these emotional states have at the psycho-emotional level. Unlike the interventions aimed at empathic training, cultivating compassion among caregivers produces beneficial effects, decreasing fatigue and increasing resilience.

We believe that the differences found between compassion and empathy support the replacement of the phrase "compassion fatigue", widely used today, with "empathic distress".

We consider the prophylactic and therapeutic capitalization of compassion in health care, by developing training programs to cultivate compassion for specialized staff for patients, to avoid fatigue (empathic distress) and to improve the emotional, humanistic dimension of the doctor-patient relationship, both urgent and necessary.

Keywords: compassion, empathy, compassion fatigue, empathic distress, compassionate neurolocation, compassionate neurophysiology

COMPASSION AND EMPATHY: A SHORT ETYMOLOGICAL INVENTORY

Empathy

A brief analysis of the word empathy brings up two perspectives. One of them refers to the Greek root of the word, ἐμπάθεια, a compound of ἐν (en, "in, at") and πάθος (pathos, "passion" or "suffering") [1]. The word *empathy* (ἐμπάθεια) appears late in Greek literature, being used by philosopher Ptolemy, but also by the last of the great physicians of the Antiquity, Aelius Galen (b. 129 AD) [2]. *Pathos*, *paschein* and *pathe* appear in the Greek philosophical texts from the classical and Hellenistic periods, in various anthropological models [3], having meanings relevant to this discussion. Originally, in its most general sense, the word *pathos* means "something that happens", referring to an event that produces effects or to an affected person [4]. The old philosophical reflection also analyzes *paschein* (understood as a general state that leads to pathos, having the meaning of "suffering", "being affected"), Aristotle considering here one of the ten categories. The adjective *empathes* (εμπαθής) appears in Aristotle's writings, meaning "to be in a certain state (emotion)", without referring to another person's feelings, which shows the difference between the current meaning of the term empathy and the original one [5]. For the Stoics, *pathe* meant personal "experience", with specific reference to pain, fear, lust and pleasure [6], *paschon* being used to distin-

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guish, in nature, the active elements (which have an agent character) from those that are passive (having the "patient" character), more specifically, those who suffer (paschein) the action [7]. The latter term (*paschein*) is also related to the Latin *patior*, from which the English word patient was later coined [8], meaning "able to accept or tolerate delays, problems, or suffering without becoming annoyed or anxious"/ "able to accept or tolerate delays, problems or sufferings without becoming angry or anxious" [9]. Although it had been used since ancient times, in the philosophical writings of Greek antiquity, the word "empathy" officially enters the English language via German. This happened in 1909, with the translation of *Einfühlung* by psychologists James Ward and Edward B. Titchener [10,11]. This would be the second perspective on the word *empathy*, which calls into question the term *Einfühlung*. According to some analyses, the word *Einfühlung* is introduced in German in 1873 by Robert Vischer [12] to express man's ability to "symbolize the inanimate objects of nature and art" [13]. Some claim that this idea was taken over by Vischer from philosopher Herman Lotze (b. 1817), who, in 1858, argued that man could get a glimpse of other species' perspective of the world because he could imagine himself in their condition. [14]. The term *Einfühlung* quickly penetrates the philosophical reflection of the time, being used by philosopher and psychologist Theodor Lipps (b. 1851), to designate the processes of empathic nature in intersubjective interaction, related to one's ability to feel the inside of the interlocutor ("inner" imitation, as Lipps puts it), which offers the possibility of understanding him [15]. In another philosophical approach, specific to the late eighteenth-century German Romanticism, Johann Gottfried Herder wrote that man can understand nature and culture through *Einfühlung* [16], meaning a union of the subject with the contemplated object, an issue that was often analyzed at the time, from psychological and aesthetic perspectives [17,18], by well-known authors in the field of natural philosophy, such as Friedrich Schelling, Novalis or the Schlegel brothers [19]. Herder's idea that *Einfühlung* allows the understanding of culture, texts and history [20] will be taken up and developed extensively in the hermeneutic reflection of Friedrich Schleiermacher and Wilhelm Dilthey, but also in phenomenology, by Husserl [21]. As with the word "empathy", *Einfühlung* is a compound word consisting of the particle "ein", which means "in", and "fühlen", which means "to feel for the other" [22]. The English translators of *Einfühlung*, psychologists Ward and Titchener, used the Greek word *empathy* (Greek: empatheia, ἐμπάθεια, referring to the meaning of "physical affection or passion" [23], "feeling into" [24, 25]. Nowadays, in English, empathy usually means "the ability to understand and share the feelings of another" [26], (using here the Greek empathia with the meaning of "physical affection" but also "passion" [27]). In Romanian, empathy is defined as "the intuition of reality through affective identification" and "the tendency of the recipient to emotionally experience" [28] the situation of another person.

Compassion

In Latin, the word *passio* is connected to the term *pathos*, a word that, in addition to the equivalents of the modern languages *passion* (French), *passion* (English), *passione* (Italian) [29], also led to the compound *compassion*. This is the Latin term *compassionem* (nominative compassion), consisting of the particle "com" (lat. "cum") which means "together") and *pati* (the Latin equivalent of the Greek paschein), which means "to suffer" [30]. Together, the two form the word *compassion*, which today, in Romanian, means "a feeling of understanding and compassion for one's sufferings and misfortunes; mercy; pity; almsgiving"[31]. In this regard, one should mention that, for the term *compassion* (meaning pity, gratitude), the Greek language has another ancient equivalent, which is unrelated to pathos: *eleos* (ἔλεος), which means mercy ("mercy", "pity"), a concept considered to be central in the religion of the Greek antiquity [32]. Here we could identify a small suggestion, of linguistic and etymological nature, regarding the difference between empathy and compassion, which we shall further discuss. Compared to empathy, compassion, a common topic in theological, religious or spiritual reflections in Judaism and Christianity [33,34], Buddhism [35] and the Islamic tradition [36], came to the attention of scientific research much later, being present in studies of moral philosophy (the 1980s) and psychological analyses of prosocial behaviour (the 1990s) [37]. Subsequently, the experience of compassion penetrated the sphere of experimental research even more, along with the increased interest in prosocial behaviors and the possible medical effects of spiritual experiences [38].

COMPASSION AND EMPATHY - UNDIFFERENTIATED USES

Compassion and empathy in subjective evaluation

Etymological observations show that "empathy" and "compassion" are close in meaning, the delimitations being difficult in the lexical analysis. At the same time, there is a certain difference between empathy (which refers to receiving any emotional state of another person) and compassion (which re-

fers only to someone's suffering). However, the two words present much more important differences, which prove useful in the field of health care services, but they are difficult to pinpoint. For example, the subjective perception of these two words does not necessarily reveal the distinction between them. On the one hand, some older psychological studies assessed the subjective perception of terms in English [39,40]; Chinese and Italian [41], but also in Indonesian [42], finding that terms such as compassion, sympathy or pity (with their equivalents in the languages mentioned) are, subjectively, perceived as having similar meanings. On the other hand, an analysis of the subjective perception of terms designating emotions highlighted the dual position of compassion, both among positive feelings, along with *sympathy* (another word in the family of pathos) and *pity*, and among negative ones, along with terms such as *sadness* [43]. Situations of this kind highlight the difficulties in classifying and discriminating between the two emotional reactions, due to lexical clarifications and subjective experience. Some studies on health care emphasize the need to cultivate empathy [44,45] or compassion [46,47] to emphasize a humanistic dimension [48-51], even a spiritual one [52,53], in an integrative approach to the medical act [54, 55], in which virtues play an important role [56,57]. The occurrence of the terms *empathy* and *compassion* has increased steadily, reaching more than 56,000 articles in the US National Library of Medicine [58]. Between 1945-1965, PubMed recorded 119 articles mentioning empathy, between 1965-1985, their number reached 1531, whereas between 1986 and 2005, there were as many as 6707 texts, and then between 2006-2021 - 18,970 [59]. Between 1966 and 2021, 28,837 articles containing the term compassion were identified. The number of studies containing the concept of compassion has grown steadily between 2004 and 2009, as well as from 2011 up to last year, with 2901 separate articles registered in 2020 [60]. There are situations when the two words are used without specifying any difference between them [61,62], as if both had the same meaning [63]. The PubMed search engine, for example, lists the texts that contain the term "compassion" together with articles that refer to empathy (resulting in 30,836 entries), while the search for the term "empathy" reveals only 27,269 articles (number registered on July 21, 2021).

Compassion fatigue and empathic distress

Another source, which fuels the confusion between empathy and compassion, is the phrase *compassion fatigue* (CF), a concept used to refer to the exhaustion of medical staff from care activities [64]. Regarding the negative effects of care work (mentally, emotionally and behaviorally), several concepts are used, such as burnout, secondary traumatic stress (STS) or vicarious trauma, and there are studies that look at the differences between these concepts [65- 67]. In this study, we shall argue that the phrase "compassion fatigue", defined as "the caregivers' emotional disengagement from their patients" [68], is not justified. The use of the phrase "compassion fatigue" could be explained by the classic healthcare reference model frame in which it was formulated. For a considerable period of time, the philosophy of health care has emphasized the idea that medical staff should avoid emotional involvement in the relationship with the patient [69]. In this context, CF would appear precisely because of non-compliance with this principle, emotional involvement causing, in advanced stages, "the diminishing or inability of the caregivers to feel empathy and compassion for patients" [70]. Studies that discuss CF are frequently present in literature (PubMed indicates over 1000 studies on "compassion fatigue", 289 of which were published last year [71]). For the CF there are currently four distinct explanatory models. The first of these, the theory of compassion fatigue, [72] argues that CF occurs as a result of poor management - by the medical staff - of enhanced empathic skills, when caring for suffering patients who require a lot of involvement, which prolongs the state of concern of the medical staff [73]. Another model proposes, as an explanation for CF, the theory of emotional dissonance [74]. According to this model, exhaustion occurs as a result of decreased empathy [75], weakened emotional recognition (alexithymia), which would correspond to a diminishing brain activity corresponding to empathy, accompanied by the difficulty of recognizing one's emotional states [76].

A third model considers CF a manifestation of fatigue. In this case, CF would mean a decrease in empathic abilities and the triggering of defense mechanisms, such as the distancing (both moral and psychological) of the medical staff from patients and reduced willingness to assume the (psychological) perspective of the patients [77]. A fourth model identifies a specific form of empathy that can protect medical staff from fatigue and that can lead to the satisfaction of caring. This protective form of empathy [78] is sometimes called clinical empathy [79]. The confusion between empathy and compassion is exacerbated, as the empathy that protects the medical staff from CF is sometimes called compassion, signaling that empathic distress (ED) [80] should be used to refer to the state of fatigue that occurs in health care [81].

EMPATHY AND COMPASSION - COGNITIVE EVALUATIONS

To outline some differences between compassion and empathy and to support the need for these distinctions, we shall briefly make a few remarks about each of the two emotional reactions.

Empathy

In cognitive approaches, empathy means "the ability to enter the state of another person", the "accurate perception of one's moods, emotions and feelings, together with their meanings" [82]. Empathy therefore corresponds to the action by which one places one's self in the situation of another person or to understand what the other feels, that is, to be in the mind of the other [83]. In the E approach, two components are discussed [84]. The first of these is the cognitive empathy (Ce), which aims at the perception of the other's state through the theory of the mind (including understanding of the other's affective state), emphasizing the connection of empathy with deliberate, conscious imitation of one's expressions or assuming the other's perspective [85]. The other component is the affective empathy (Ae), which consists of the ability to emotionally resonate with the other [86]. In this case, Ae ensures an adequate emotional response to the situation, to the emotional condition of the other subject [87]. Some clinical trials of psychiatric disorders support this Ae-Ce distinction. For example, patients with autism spectrum disorders present Ae abilities [88], but have a weaker Ce [89]. In contrast, psychopaths have an Ae deficiency, without major Ce impairments [90]. Other approaches to E, however, go beyond, the distinction of Ae - Ce. Daniel Batson, for example, proposes no less than eight aspects concerning E [91]: knowledge of one's inner disposition, including thoughts and feelings; adopting the other's state, a matching of the neural responses in relation to the observed subject; to catch, to capture the emotional state of the other (often used in philosophical writings); the ability to guess the situation of the other, to place ourselves in the situation of the other; the ability to imagine what the other person is thinking or feeling; the possibility to imagine what someone might think and feel in a situation of a third person; to feel distress in relation to a person's account of someone's suffering; feeling the pain of a suffering person. Here we see aspects related to Ce or Ae, but also certain interoceptive components of empathy (sometimes included in a third component of empathy, called somatic empathy), which contain both cognitive and emotional components.

Compassion

Compassion is defined as "a state of concern for the suffering or unmet need of another person", accompanied by a desire to alleviate this suffering [92]. Various components are also proposed for this concept, some of them being related to the virtue of compassion present in various traditional spiritualities, especially Christian and recent Buddhist spirituality. Compassion comprises several distinct components [93]: becoming aware of the suffering or need that another person has; the subjective experience of those needs that the other has, a certain emotional affectation, whose imprint can be found in the activity of the nervous system; the possibility of assessing the emotional landscape and physical condition of the sufferer; an important cognitive component, which consists of judgments about the suffering person and his situational context; the activation of the neural systems corresponding to the social affiliation and care and the motivation for helping. These descriptions of compassion and empathy highlight a significant difference: the practical, self-help component, the concrete intention to intervene to alleviate the other's suffering, present in compassion, is missing in the empathic approach.

ELEMENTS OF THE PHYSIOLOGY OF COMPASSION. THE PERSPECTIVE OF PROSOCIAL BEHAVIORS

Compassion has several characteristics in terms of experience, behaviour and physiology [94], but also in nervous activity patterns [95]. If empathy, in relation to a suffering person (also called empathic suffering), is felt as negative, being accompanied by a tendency to distance one's self, to avoid the situation, compassion is felt as a positive feeling. It is characterized by subjective perceptions of affiliation and the intention to intervene, to reduce the patient's suffering, through prosocial behaviors that have specific physiological imprints. Dacher Keltner identifies, for example, three adaptive physiological responses, which correspond to compassion and prosocial behaviors, in the serotonergic system, in the oxytocin network, and in the dopaminergic reward system [96]. One study shows that, in situations that require mutual help, subjects trained for compassion show such patterns in the form of more intense dopaminergic activities, in the reward circuit [97]. Compassion, manifested by the favorable disposition of mutual help, is also noticed in the polyvagal theory (PT). The model, developed in 1994 by Steve Porges, finds three patterns in the neurophysiological area [98]: the willingness to engage in cooperative relationships with others (a disposition that corresponds to safe contexts, fueled by a state of safety); defensive behavior, withdrawal when facing threats (which appears in a context

perceived as insecure, fueled by a state of insecurity); the tendency of social self-camouflage, of self-isolation (which appears in a context perceived as threatening, a tendency fueled by a state of insecurity). PT claims that specific vagal physiological patterns correspond to the three adaptive responses – social availability (in which we could also include compassion), defense reaction (fight or flight) or self-isolation tendency (social disconnection) [99]. According to this theory, like other mammals, humans possess two functionally distinct vagal circuits that originate in the brainstem. The first of them, phylogenetically older, is unmyelinated, originating in the dorsal motor nucleus of the vagus nerve, while the other, phylogenetically newer, is myelinated, being connected with the ambiguus nucleus [100]. According to PT, the unmyelinated circuit functions in a sanogenic role, controlling growth and restorative mechanisms by regulating neuronal signals destined for subdiaphragmatic organs, while myelinated vagal motor pathways regulate the activity of supradiaphragmatic organs (e.g. heart and lungs) [101]. Compassion, characterized by the intention to help, represents a behaviour of social adaptation, which corresponds to the stimulation of the myelinated vagal circuit, which causes the slowing of the heart rate, with the improvement of heart rate variability [102], with important positive effects at the emotional level [103].

COMPASSION AS A DISTINCT EMOTION: NEUROLOCALIZATION

In recent years, imaging and molecular biological approaches have analyzed possible differences between empathy and compassion. The measurement of the nerve activity (brain imaging, pupil size), in conditions of evoked potential (reception of a sound or visual signal that expresses a person's suffering), in the case of subjects who are experts in meditation for compassion, revealed some particularities in brain activity [104]. In the experience of compassion, the anterior insular cortex - aIC (which explains the intense visceral response) [105-107] and the dorsolateral prefrontal cortex - dlPFC (involved in emotional self-regulation processes) [108] are active, the latter being considered by some authors as a moderator of compassion [109]. In addition to these, the experience of compassion activates median cortical structures (midline cortex) – involved in self-referential and evaluative social thinking processes [110], but also the temporo-parietal junction (TPJ) – an important region in the processes of acquiring the other's perspective [111], the latter being considered a key structure in the experience of compassion. For example, one study found that more generous individuals who currently participate in charitable activities display this distinct neurobiological profile, having a higher density of nerve cells in the TPJ [112]. Other studies have shown that the experience of compassion corresponds to a more pronounced autonomic activation, an intensification of the activity of the autonomic nervous system (ANS), an improvement in the variability of the heart rhythm (respiratory sinus arrhythmia - RSA), a decrease in skin conductance and a deceleration of the heart rate [113].

Compassion training vs. empathy training

Differences between compassion and empathy are also highlighted in studies looking at the effects of emotional regulation interventions to improve patient care behavior. One study tracked these changes in a comparative approach, comparing training programs aimed at cultivating compassion with those aimed at empathy. Cultivating compassion has shown beneficial effects among practitioners, such as improving brain activity (downregulated) in regions corresponding to social cognition and emotional regulation processes (inferior parietal cortex - iPC, dorsolateral prefrontal cortex - dlPFC, and the connection of dlPFC with the nucleus accumbens – NA) [114]. Another study revealed that compassion training resulted in increased activity in the amygdala (A), under evoked potential conditions, in response to viewing images with specific emotional valences [115]. On the other hand, empathy training correlates with an increase in anterior insular cortex (aIC) and medial anterior cingulate cortex activity (amCC), as well as an intensification of self-reported negative affect. Compassion training reverses this process, decreasing negative affect and increasing self-reported positive affect, producing increased activity in brain networks corresponding to compassion, effects not present in empathy. These are the median orbito-frontal cortex (COFm), the ventral striatum (SV) [116], the subgenual anterior cingulate cortex (sgACC) and the nucleus accumbens (NAcc) [117]. In addition, compassion training revealed the activity of a neural network, considered by some authors as the compassion network, which connects the tegmental-ventral area (TVA) and the substantia nigra (SN) to the medial-orbital frontal cortex (mOFC) [118].

COMPASSION VS. EMPATHY –DIFFERENCES IN CONTENT AND EFFECTS

Compassion and empathy differ in content and in the effects they produce. One study succinctly states some differences between empathy and compassion, as shown in Table 1.

TABLE 1. Difference between compassion and empathy (according to Singer and Klimecki) [119]

compassion (care with compassion)	empathy (empathic suffering)
Feeling related to other people Positive feelings, for example, love, desire for care Beneficial impact on health, through the vagus nerve Motivation and availability for a prosocial approach	Feeling related to one's self Negative feelings, for example, stress, anxiety Negative impact on health, causes exhaustion The tendency to withdraw and adopting some antisocial behaviors

Another study, based on an inventory of empirical evidence, underlines the fact that, unlike empathy, which can only mean the simple feeling of a person's negative emotions, compassion depends on cognitive aspects that are decisive in prosocial behavior. This is the quick orientation towards the one in pain, with the intention of comforting him, by virtue of a felt responsibility for the suffering one, to which trust and sympathy, but also the ability to understand the mental state of the other (a process called mentalization or the theory minds) are added [120]. The idea is also present in another study which points out that while empathy is "an affective response that acknowledges and attempts to understand a person's suffering through emotional resonance", compassion contains a strong motivation to help, being fueled by love, the intention of an altruistic response to the needs of others, kindness, willingness to act to help the suffering [121]. One of the causes of the negative impact of empathy on health and mood is that, related to a suffering person, empathy corresponds to the activation of neural structures involved in the direct experience of pain (inner portion of the insular cortex - AIC) and the medial and anterior cingulate cortex (mCC/aCC) [122]. Compared to empathy, compassion activates regions associated with reward, affiliation, positive social feelings and prosocial motivation [123], components of a social-cognitive order that have, as a neural correlate, a network connecting the ventro-medial region of the prefrontal cortex (vmPFC) with the ventral striatum (VS). This ensures an integrative process involving memory and future projection, self-perception and social knowledge, emotion and reward, elements of the autonomic and endocrine system, which provide meanings for empathic reactions (emotional meaning), meanings that mitigate the destructive potential of empathic suffering and support the availability of the subject to help the one in pain [124,125]. Furthermore, unlike empathy, which corresponds to the activation of the anterior portion of the insular cortex (AIC), compassion activates a medial portion of the insular cortex (mIC), also involved in the experience of love [126].

Compassion differs, therefore, from the reception of suffering present in empathy, through specific cognitive and social contents, which assign virtuous meanings to emotional reactions (emotional meaning), meanings that support aid behaviors [127]. Table 2 lists the cortical and subcortical areas active in the experience of compassion, compared to those that mediate the experience of empathy. The colour-coded boxes highlight the regions active in the experience of compassion, not empathy that have been identified so far. Table 2 includes only a small number of results. In most of the studies mentioned here, the authors argue that evidence is still limited, stressing the need for more detailed research and analysis. The cited studies do not have the same degree of accuracy, some being older - evaluated in meta-analyses, whereas others are recent, relying on a larger number of studies and references. One should take into account that the consulted studies do not operate with the same definitions for empathy and compassion and that some of them also looked at other emotional reactions in the face of suffering, such as adopting the other's perspective (mentalizing), emotional contagion, awareness of the other's emotional state, the somatic (physical) component of empathy, compassion for psychological pain, compassion for physical pain etc. It should be noted that the results listed here come from experimental studies or research that have made observations and measurements using different methods. There are also significant differences in the composition of experimental groups, having young or elderly subjects, groups of women or men or heterogeneous groups. Some clinical studies included people with neuropsychiatric conditions as subjects, others measured various parameters in the case of ordinary subjects or in the case of experts in various types of meditation. Finally, the experimental design of these studies also differs. Some introduce, for the experience of empathy/compassion, photographs with facial expressions expressing suffering, some use audio recordings, whereas others have foreseen the use of written accounts, so the results are also different. For example, one study found that the neural networks active in subjects participating in the experience of empathy change with the experimental design. A central neural network remains active in receiving a person's distress. These are the bilateral anterior insular cortex (baIC) and the medial/anterior cingulate cortex (mCC/aCC). In addition, however, two distinct brain regions are co-activated, depending on the experimental design. Viewing images showing parts of the human body in painful situations activates, in addition to the central network, the inferior parietal/ventral premotor cortex – (ipPC/ivPC). Abstract visual information regarding

the affective state of the other, in addition to the central empathy network, also co-activates areas involved in the representation of the mental states of self and others (precuneus, medial ventral prefrontal cortex (mvPFC), superior temporal cortex (sTC) and temporo-parietal junction (TPJ) [207].

EMPATHIC DISTRESS INSTEAD OF COMPASSION FATIGUE

We have seen that linguistic analyses and considerations or psychological assessments fail to clarify the distinctions between compassion and empathy, and that neuroscientific studies can provide important clarifications. However, numerous studies argue that empathy differs from compassion. Empathy and compassion are two different emotional responses to suffering. Although both aim at the affective perception and understanding of the psychic landscape of another person, compassion is differentiated from empathy due to the fact that it is felt as a positive emotion, accompanied by a willingness to help, to care for the other, to reduce suffering. Unlike empathy, compassion cultivated through meditation activates the premotor cortex [208], a fact that corresponds to the mentioned distinctions. In general, differences are found in three major areas: in psycho-behavioral terms, in vagal and cerebral patterns, but also regarding the effects produced by the training interventions. The differences highlighted so far between empathy and compassion indicate the need for the different use of the two concepts in the field of medical psychology, in the psycho-emotional descriptors that concern the doctor-patient relationship. Unlike empathy, compassion cultivated through meditation activates the premotor cortex [208], a fact that corresponds to the mentioned distinctions. In general, differences are found in three major areas: in psycho-behavioral terms, in vagal and cerebral patterns, but also regarding the effects produced by the training interventions. The differences highlighted so far between empathy and compassion indicate the need for the different use of the two concepts in the field of medical psychology, in the psycho-emotional descriptors that concern the doctor-patient relationship. Differentiating between empathic behavior and the compassionate approach may elucidate the causes and neural mechanisms of occupational burnout [209]. Secondly, the empathy – compassion distinction is important for specifying desirable conduct in nursing. It is proposed, in this regard, to replace the phrase *compassion fatigue* with *empathic distress* [210]. Thirdly, clarifying the distinction between compassion and empathy is important for protecting health care workers, as those at risk of burnout are the very ones who are highly motivated to provide care. Studies show that, among the medical staff, the most vulnerable to burnout are those who are dedicated, emotionally involved, who assume the medical mission [211], being at the same time the indispensable ones in the provision of quality medical services [212], ensuring the humanistic, spiritual component of the medical act. Distinguishing compassion from empathy is necessary, since compassion training has beneficial emotional effects, increasing caregiving resilience and reducing the risk of burnout. Interventions through the cultivation of compassion suggest that this is the effective behaviour in the doctors and nurses' relationship with patients. In this sense, it is necessary to understand and affirm compassion as a desirable cognitive-emotional and behavioral approach in the relationship between the nursing staff and the patient. Several compassion cultivation programs, which could be used in the training of medical personnel, are currently under observation: Compassion Cultivating Training – CTC [213], Compassion Focused Theraphy – CFT [214], Cognitively-Based Compassion Training – CBCT [215], Cultivation Emotional Balance - CEB [216], Loving-Kindness - LKM [217] or Mindfulness Self-Compassion Programs - MSC [218]. All these are brought together under the generic name of Compassion-Based Interventions – CBI [219]. The experimental results obtained so far, with such programs, provide important elements for understanding the specificities of compassion and the concrete possibilities of cultivation, in the training of medical personnel, to optimize the therapeutic interaction with patients, to avoid empathic distress [220].

RESEARCH FOR THE IMMEDIATE FUTURE

Medical psychology and the neurosciences of the spiritual life highlight that, in the face of suffering, there is a diversity of emotional reactions, a wide spectrum of states similar to and yet different from empathy. Besides compassion, a whole series of emotional concepts and contents are under discussion: sympathy [221,222], attachment [223], altruism [224], kindness [225], generosity [226], caring [227,228], pity [229] and even love [230]. On another level, clinical psychology and psychotherapy use concepts such as identification, imitation or emotional contagion to describe emotional reactions in the interpersonal context [231]. The considerable variety of emotional reactions to suffering and the multitude of concepts used at once highlight a dilemma, an immediate challenge in neuroscience studies and the need for clarification. It is expected that, also in these cases, the lexical analysis of the words denoting these emotional reactions and the

TABLE 2. Cortical and subcortical areas active in empathy and compassion

	Regions active in empathy (E)		**Regions active in compassion (C)**
	Cognitive empathy	*Emotional empathy*	
		Mirror neurons system (MNS) [128, 129]	Mirror neurons system (MNS) [130], statement later amended [131, 132]
		bilateral amygdala [133]	amygdala [134]
		Hypothalamus [135]	Hypothalamus [136,137]
	ventromedials PFC [138]	mPFC [139]	ventromedials PFC [140]
	left mPFC [141]		Left mPFC [142]
	right PFC [143]	Right PFC [144]	
	medial PFC [145] dorsal medial PFC (dmPFC) [146]		
		inferior frontal cortex (iFC) [147]	
		orbito-frontal cortex (OFC) [148]	medial orbital-prefrontal cortex (mOPC) [149,150]
	inferior frontal gyrus IFG [151] right IFG [152]	inferior frontal gyrus (IFG) [153]	
	left anterior mid-cingulate cortex (lamCC) [154] dorsal anterior mid-cingulate cortex (damCC) [155]	anterior mid-cingulate cortex (amCC) [156, 157, 158] mid-cingulate cortex (MCC) [159] anterior cingulate cortex ACC [160]	anterior cingulate cortex (aCC) [161,162,163]
			left anterior cingulate cortex (leftACC) [164] Ventral/subgenual anterior cingulate cortex (v/sg aCC) [165,166], also present in the experience of benefit from prosocial behavior, of helping[167]
			pregenual anterior cingulate cortex (pgACC) [168]
			posterior cingulate cortex (pCC) [169,170]
			anterior cingulate gyrus (aCG) [171]
	TPJ		right TPJ [172, 173]
	anterior insular cortex (aIC) [174, 175, 176] left anterior insular cortex (laIC) [177] bilateral insular cortex (bIC) [178, 179]		
		right anterior insular cortex (raIC) [182]	
			medial insular cortex [183, 184]
			Precuneus [185]
			right posterior superior temporal sulcus (pSTS) [186]
	supplementary motor area (sMA) [187, 188]		
			retrosplenial cortex [189]
			right angular gyrus (rAG) [190] (intensifies in loving/ kindness meditation - LKM)
			posterior parahippocampal gyri (pPG) [191] (intensifies in LKM)
			ventral striatum (VS) [192, 193, 194]
			pallidum, putamen, ventral tegmental area [195, 196]
Training	Increases negative status reporting and activates anterior insular (AI) and anterior mid-cingulate cortex regions (aMCC) [197, 198]		Increases resilience In addition to brain areas involved in empathy, it also activates the active ones in the case of feelings of happiness and pleasure (medial orbito-frontal cortex, ventral striatum) [199, 200] Loving Kindness Focused Meditation/ compassion (LKM) activates limbic areas and the network associated with theory of mind [201], namely the right temporal lobes, TPJ, mPFC and posterior cingulate [202, 203,204]. In a meta-analysis evaluating 16 studies fMRI on cultivation-focused meditation intensifications of compassion, increased brain activity in the periaqueductal gray, the anterior insular cortex (aIC), anterior cingulate (ACC) and inferior frontal gyrus (iFG) [205, 206] are highlighted.

psychological evaluations related to the subjective perception of their meanings cannot highlight the relationships between them and their particularities. In their case, neuroimaging or molecular neurobiology studies prove indispensable to mark possible distinctions or similarities among all these

emotional reactions. For instance, the relationships between kindness and compassion [232], between empathy, sympathy and pity [233] are evaluated. Some studies explore the similarities and differences between empathy and emotional contagion [234], altruism and empathy [235], compassion and altruism [236], sympathy and empathy [237,238]. Beside these, there are studies that propose distinctions within the same concept, such as those that aim at cognitive empathy and emotional empathy [239] or that concern compassion and self-compassion [240]. Other approaches discuss psycho-pathological aspects, analyzing possible mental conditions that could cause excessive forms of empathy [241] or pathological altruism [242]. New approaches, from areas such as the neuroscience of spiritual practices [243] or the neuroscience of virtues [244,245], evaluate compassion meditation [246], the effects of loving-kindness training [247], the neuropsychological particularities of kindness [248] or the possible links between generosity and the state of happiness [249,250]. Finally, other medical studies try to provide contributions in organizing/structuring the existing results [251].

CONCLUSIONS

Neuroscientific research in the immediate future will be decisive for clarifying the neurobiological particularities of emotional reactions that concern the emotional spectrum of empathy and for highlighting their specific effects in emotional, behavioral and sanogenic terms, for better patient care as well as for emotional protection and resilience of the medical staff.

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