A social neuroscience perspective on clinical empathy

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Clinical empathy is an important element of quality health care. Empathic communication is associated with improved patient satisfaction, increased adherence to treatment, and fewer malpractice complaints (1). Patients' perceptions of their physicians' empathy are positively related to more favorable health outcomes (2-4).

In addition to improving patient outcomes, clinical empathy is associated with increased overall well-being for the physician (5). High levels of practitioner empathy have been associated with decreased burnout, personal distress, depression and anxiety, along with increased life satisfaction and psychological well-being (6,7).

Despite increasing appreciation of the value of empathy, medical educators continue to struggle with how best to educate students and residents on empathy maintenance. There have been several promising creative approaches that have shown demonstrable short-term success (8). However, there is a lack of evidence for enduring success, that is, for interventions during medical education that will enable physicians to sustain empathy throughout their careers. A more comprehensive and precise understanding of the subcomponents of empathy and how they are influenced by stress and anxiety is needed in order to design targeted interventions.

CLINICAL EMPATHY AND DETACHED CONCERN

Empathy is difficult to define, and an operational definition remains elusive. In medicine, empathy has often been conceptualized as consisting of two primary features: *cognitive empathy*, defined as the ability to recognize and understand another's experience, to communicate and confirm that understanding with the other person, and to take effective action to then act appropriately in a helpful manner (9), and *affective empathy*, defined as emotional resonance with the patient (10).

Cognitive empathy has been singled out as beneficial in the clinical relationship, while affective empathy has been viewed as interfering with the physician's ability to make effective diagnoses and facilitate better outcomes. This has resulted in the teaching and practice of "detached concern", a process where physicians establish a certain emotional distance from their patients in order to maintain objectivity and limit exposure to the negative emotions routinely experienced by those patients (11).

However, recent research has demonstrated that the underlying rationale for implementing a "detached concern" approach is no longer tenable. First, affective engagement contributes to empathy, improving cognitive accuracy as well as affective understanding (12). Second, patients respond differently to emotionally engaged physicians. Patients who perceive their physicians as emotionally attuned or genuinely concerned disclose more, are more adherent to treatment, and show greater agency in addressing serious health problems such as cancer (11). Furthermore, there is now convincing empirical evidence that cognitive and affective aspects interact in the experience of empathy (13). Finally, the primary motivation behind the "detached concern" approach, that emotional connection will necessarily lead individuals into emotional turmoil, is not supported by the literature (14).

LACK OF EMPATHIC COMMUNICATION IN CLINICAL PRACTICE

Despite the clear importance of empathy in clinical settings, many physicians experience difficulty empathizing with their patients. For instance, a study which coded interviews between physicians and lung cancer patients found that, out of 384 empathic opportunities – defined as patients' statements including an explicit description of emotion or patients' statements or clues that indicated an underlying emotion – physicians responded empathically to only 39 (10%), most often reacting with little emotional support and shifting to biomedical questions and statements (15).

Using patient-physician interaction videos where students are taught to identify and code these types of empathic opportunities, as well as what would be appropriate empathic responses, could help them more effectively address those opportunities. Additionally, sustaining empathy during distressing moments begins with doctors learning to take their own emotional temperatures, so that they can notice when they are anxious and take a deep breath or count to ten before responding to the patient.

Both implementing mindfulness skills (16) and learning to return focus on the patient by becoming curious about what the patient is most concerned about at that moment can help physicians maintain empathy (11). Intensive training in mindful communication has been shown to reduce psychological distress and burnout, and increase empathy (17).

The vast majority of individuals have the capacity for empathy, and research suggests that medical students start school with similar or higher levels of empathy compared to an age-matched control group (18). However, empathy significantly declines over the course of medical school (10). The precise underlying causes of this decline are not well understood, and multiple factors likely play a role. The decrease has been attributed to a curriculum that promotes the objectification of the patient (19), increasing workload, mistreatment by supervisors, and lack of emotional support (6,20). High levels of burnout, personal distress, depression and anxiety have also been found to contribute to the erosion of empathy in medical school (7,20).

Notably, the decline in empathy is not consistent across students. A longitudinal study of 446 medical students found two distinct groups, with 70% showing a significant decline on the Jefferson Scale of Physician Empathy, and 30% seeming to have protective factors that neutralize the erosion of empathy (10). This study demonstrated that individuals in patient oriented specialties showed less decline in empathy than those in technology oriented specialties, and suggested that students with individual traits that protect against empathy erosion self-select into the more patient focused specialties (10). This could be the case, or it could be that training for patient focused areas places more emphasis on skills such as listening to the patient and how to counteract objectification of the patient, important to maintaining empathy in a patient-physician interaction.

Additionally, greater perceived social support from faculty and greater satisfaction with the learning quality of the environment have been associated with increased resilience to burnout, and high levels of stress and fatigue have been associated with decreased resilience to burnout (21). As increased burnout has previously been associated with decreased empathy in medical students (22), it is possible that these protective factors might also contribute to maintaining empathy.

A SOCIAL NEUROSCIENCE APPROACH TO EMPATHY

Empathy is a natural socio-emotional competency that has evolved with the mammalian brain to form and maintain social bonds, and which encompasses different components (13). Affective sharing, the first element of empathy to appear during ontogeny, refers to the unconscious sharing of the affective state of another, which can be assessed by measures of concordance of skin conductance (an index of autonomic arousal) between two individuals (23). Empathic understanding entails the conscious awareness of the emotional state of another person. Empathic concern refers to a motivation to care for someone in need. Successful emotion regulation enables the control of emotion, drive and motivation in the service of adaptive behavior. Even though these components are intertwined and not independent of one another, it is helpful to consider them separately, as each contributes to various aspects of the experience of empathy, and could be the target of specific interventions to promote clinical empathy in medical students (24).

Recent work in social neuroscience using functional neuroimaging demonstrates that the affective, cognitive and regulatory components of empathy involve interacting neural circuits (25). Empathic arousal is mediated by strong bidirectional connections between the brainstem, amygdala and sensory cortices, as well as connections with the hypothalamus, insula and somatosensory cortex (13,24). The cognitive aspects of empathy, such as emotion understanding and emotion regulation, are closely related to processes involved in perspective taking, self-regulation, and executive attention subserved by the medial prefrontal cortex, dorsolateral prefrontal cortex and temporo-parietal junction. Finally, the ability to feel concern and care for others has deep evolutionary roots that likely evolved in the context of parental care (26). Its neural underpinnings are found in subcortical neural systems similar to those known to regulate maternal behavior, especially the hypothalamus and orbitofrontal cortex (27).

These components differently contribute to the experience of clinical empathy. Affective sharing may act as a gain antecedent to empathic understanding, while cognitive components are important for representing the mental states of self and other, necessary to make decisions in a medical context (24). Importantly, the type of emotion regulation an individual employs largely determines whether cognitive resources are drained or primed (28). Specifically, research shows that a detached perspective can quickly dampen emotional reactions or filter out emotional information. This can be adaptive to a surgeon while operating on his anesthetized patient, but maladaptive when the same physician interacts with his patient after the surgery (28). This example illustrates the flexibility of emotion regulation in clinical settings, depending on both the physician's goals and the patient's needs.

The perception of pain in others acts as an empathic signal, alerting individuals that another person is at risk, attracting their attention and motivating social behaviors. The neural response to the pain and distress of others, a situation familiar to physicians, has been used in social neuroscience research as a window into the neurobiological underpinnings of empathy. Several regions involved in the experience of physical pain, including the anterior cingulate cortex, insula, periaqueductal gray, orbitofrontal cortex and amygdala, are activated by the perception or even the imagination of another individual in pain (29). Importantly, the pattern of neural response is highly flexible and can be modulated by a number of contextual, cognitive, social and interpersonal factors (25).

In the context of medicine, two neuroimaging experiments examined the neurophysiological response to the perception of pain in physicians (30,31). Physicians as well as matched non-physician controls underwent functional magnetic resonance imaging while watching videos of needles

being inserted into another person's body parts (face, hands and feet), as well as videos of the same areas being touched by a cotton bud (30). Physicians showed significantly less activation in brain areas involved in empathy for pain (anterior cingulate cortex, insula) than did non-physicians. In addition, physicians showed significantly greater activation in areas involved in executive control, self-regulation, and mental states understanding.

These findings suggest less empathic arousal and greater cognitive regulation of an emotional response among the physicians, and indicate that physicians' down-regulation of the pain response dampens their negative arousal to the pain of others. This may have beneficial consequences by freeing up cognitive resources necessary for being of assistance and perhaps even for expressing empathic concern.

These results may also inform individual differences in empathic decline and professional distress. Meta-analyses show that clinicians' distress is a key determinant of empathy decline (6). Medical students who are most vulnerable to professional distress, which may lead to emotional exhaustion, detachment and a low sense of accomplishment, may be those who have difficulties regulating their negative emotions. On the other hand, students with overly suppressed pain responses and insufficient negative arousal will also have problems with empathy. Some modicum empathic arousal (or affective sharing) may be necessary to help physicians attune to and empathically understand patients' emotions. A positive emotional reappraisal requires emotional content from the patient to be reinterpreted, molding potentially important information once it is available (28).

INDIVIDUAL DIFFERENCES IN EMPATHIC RESPONDING

Empathic disposition varies across individuals, and these differences are likely in part accounted for by interactions between an individual's life history, psychological traits and genetic makeup. Attachment is one construct, first proposed by Bowlby (32), which appears to reside at the interface of all three of these determinants. Attachment theory offers a compelling framework for understanding one's capacity to connect with others and develop supportive relationships as coping resources, and predicts individual differences in empathy (33). Security of attachment correlates with the individual degree of empathy and successful emotion regulation, and is inversely related to pain report and emotional distress (34). Empirical research also indicates that attachment security provides a foundation for empathic concern and caregiving (35). Importantly, these attachment styles are relatively stable across the lifespan.

In recent years, a great deal of work has begun to reveal some of the underlying neuroanatomical and neurochemical foundations of attachment-related processes and the variance in such attributes both between and within species (36). Such research has identified a number of neuropeptides that are clearly involved in an array of attachment-related social behaviors, including opioids, vasopressin and oxytocin.

Oxytocin, for example, has been demonstrated to play a central role in the initiation of maternal behaviors, social recognition and pair bonding in rodents (37). Studies in humans have demonstrated that oxytocin infusion can modulate a number of attachment-related behaviors, including trust, generosity, empathic concern, and empathic accuracy (38). Oxytocin administration selectively reduces emotional arousal to threatening social images (39) and differentially modulates visual attention toward social signals of positive approach (40). Moreover, it appears that individuals lacking high quality social connections show significantly reduced responses to oxytocin administration (39), which may reflect reduced receptor sensitivity.

Research into the influence of genetic variation within the oxytocin receptor has provided converging evidence of the role that oxytocin plays in human social behavior. Polymorphisms within the oxytocin receptor have been shown to be related to affiliative behavior, behavioral and dispositional empathy, and perceived social connectedness (41). Similarly, genetic variation in the oxytocin receptor is related to decreased neuroendocrine and autonomic reactivity to social stress and interacts with perceived social support to dampen physiological reactivity to social-evaluative threat (41).

Importantly, this does not suggest that empathy-related behaviors are genetically determined. Particular alleles in the oxytocin receptor system (or vasopressin or opioid systems) previously considered "vulnerability genes" can actually be viewed as "plasticity genes" in that they allow some individuals to be more sensitive to the social environment in general (42). This is consistent with the observation of large individual differences in what can be viewed as a "biological sensitivity to context", in which people are especially interpersonally adept in socially supportive environments and especially anxious and withdrawn in noxious environments (43).

CLINICAL EMPATHY AND PATIENT HEALTH: POTENTIAL MECHANISMS

A meta-analysis of studies that evaluated various contextual influences on patient outcomes found that physicians who adopted a reassuring warm and friendly approach were more effective than those employing detached concern (44). Empathic medical care may provide patients with a sense of personal connection and perceived control over their health that results in more effective coping strategies, influencing health outcomes through chronic modulation of physiological stress responses. In fact, a quarter century of research in neuroendocrinology and stress physiology has clearly demonstrated that the perception of social support and stressor controllability can have profound influences on the hormonal, cardiovascular and immunological response to a

broad array of physiological responses in both humans and non-human animal models (45).

Indeed, perceived controllability over a stressor is associated with prefrontal cortex mediated regulation of limbic (amygdala and hypothalamus) and brainstem (dorsal raphe nucleus) structures associated with neuroendocrine and autonomic nervous system reactivity (45). This provides a direct pathway through which the perception of one's ability to control aspects of his/her disease is capable of regulating physiological processes ranging from glucose metabolism and blood pressure to immunomodulation and neurogenesis (46).

Physicians routinely present information to their patients capable of generating substantial physiological stress responses. In many such cases, the physician-patient relationship represents the front line in the battle against disease, as it has the potential to shape the endogenous responses to illness-related stress that, in some cases, can have effects similar to pharmacological interventions (3). Empathic concern, as opposed to detached concern, allows physicians to better understand their patients and modify their approach to fit the individuals they are attempting to treat. Given the past quarter century of work showing that quality emotional connection has comparable influences on health outcomes as obesity and hypertension (47), it is clear that empathic approaches are needed for patient care.

CONCLUSIONS

The current view of empathy in clinical practice is limited and focused primarily on self-reports of physicians, with little understanding of the mechanisms which contribute to declining empathy during medical school and a lack of empathy generally within the medical field. A better scientific understanding of the connections between the mechanisms involved in interpersonal sensitivity, empathy, and care-giving behavior is needed to help physicians maintain high levels of empathy in clinical practice while limiting burnout and personal distress (48). This understanding should be incorporated into research on the organizational and contextual factors that shape medical professionalization.

It is now possible to bring to the study of clinical empathy a risk-vulnerability approach that promises to be both more precise and more comprehensive than previous research. This approach will increase our capacity to design better institutions and educational interventions to support empathy within clinical practice and to protect against its decline. Some interventions to improve empathy and communication between physicians and patients have already shown positive effects on both physicians' professional satisfaction and well-being. There is a need, however, for dedicated research to respond to the vital call for empathy enhancement in medicine with programs using social neuroscience-based knowledge.

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