

# The Science of Empathy

Helen Riess, MD<sup>1</sup>

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## Abstract

Empathy plays a critical interpersonal and societal role, enabling sharing of experiences, needs, and desires between individuals and providing an emotional bridge that promotes pro-social behavior. This capacity requires an exquisite interplay of neural networks and enables us to perceive the emotions of others, resonate with them emotionally and cognitively, to take in the perspective of others, and to distinguish between our own and others' emotions. Studies show empathy declines during medical training. Without targeted interventions, uncompassionate care and treatment devoid of empathy, results in patients who are dissatisfied. They are then much less likely to follow through with treatment recommendations, resulting in poorer health outcomes and damaged trust in health providers. Cognitive empathy must play a role when a lack of emotional empathy exists because of racial, ethnic, religious, or physical differences. Healthcare settings are no exception to conscious and unconscious biases, and there is no place for discrimination or unequal care afforded to patients who differ from the majority culture or the majority culture of healthcare providers. Much work lies ahead to make healthcare equitable for givers and receivers of healthcare from all cultures. Self- and other-empathy leads to replenishment and renewal of a vital human capacity. If we are to move in the direction of a more empathic society and a more compassionate world, it is clear that working to enhance our native capacities to empathize is critical to strengthening individual, community, national, and international bonds.

## Keywords

empathy, Neuroscience, cognitive empathy, perspective taking, empathic concern

“I’ve learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel.” Maya Angelou

## Introduction

Empathy plays a critical interpersonal and societal role, enabling sharing of experiences, needs, and desires between individuals and providing an emotional bridge that promotes prosocial behavior. This capacity requires an exquisite interplay of neural networks and enables us to perceive the emotions of others, resonate with them emotionally and cognitively, to take in the perspective of others, and to distinguish between our own and others' emotions.

Studies have shown that empathy declines during medical training (1,2) and without targeted interventions, uncompassionate care and treatment devoid of empathy results in dissatisfied patients who are unlikely to follow through with treatment recommendations, resulting in poorer health outcomes and damaged trust in health provider relationships.

In the past, empathy was considered an inborn trait that could not be taught, but research has shown that this vital

human competency is mutable and can be taught to healthcare providers. The evidence for patient-rated empathy improvement in physicians has been demonstrated in pilot and retention studies (3,4) and a randomized controlled trial (5). Further evidence that communication skills training for physicians improves patient satisfaction scores was reported in a large-scale observational study (6). Empathic medical care is associated with many benefits including improved patient experiences, adherence to treatment recommendations, better clinical outcomes, fewer medical errors and malpractice claims, and higher physician retention (5).

Why is the human brain designed for this complex, intricate task? If human existence was simply the result of “survival of the fittest,” we would be wired solely to

<sup>1</sup> Empathy and Relational Science Program, Harvard Medical School, Massachusetts General Hospital, Boston, MA, USA

### Corresponding Author:

Helen Riess, MD, Empathy and Relational Science Program, Harvard Medical School, Massachusetts General Hospital, 55 Fruit St, Boston, MA 02114, USA.

Email: hriess@mgh.harvard.edu



dominate others, not to respond to their suffering. Our capacity to perceive and resonate with others' suffering allows us to feel and understand their pain. The personal distress experienced by observing others' pain often motivates us to respond with compassion. The survival of our species depends on mutual aid, and providing it reduces our own distress. Mutual aid exists in the earliest reports of tribal behavior and remains a powerful force in today's world, where thousands of organizations and millions of people work to relieve global suffering (7).

The concept of empathy was first introduced by aestheticians in the mid-19th century. They used the German word "Einfühlung" to describe the emotional "knowing" of a work of art from within, by feeling an emotional resonance with the work of art. At the end of the 19th century, the psychologist Theodore Lipps expanded this concept to mean "feeling one's way into the experience of another" by theorizing that *inner imitation* of the actions of others played a critical role in eliciting empathy. The philosopher Martin Buber added deeper texture to the concept of empathy by describing the empathic relationship as "I and Thou," versus unempathic disrespect, as "I and It" (8). In this powerful description, humane respect and concern for the other is contrasted with objectification and dehumanization of another person, which is in evidence too often in today's societies.

## Empathy is a Hardwired Capacity

Research in the neurobiology of empathy has changed the perception of empathy from a soft skill to a neurobiologically based competency (9). The theory of *inner imitation* of the actions of others in the observer has been supported by brain research. Functional magnetic resonance imaging now demonstrates the existence of a neural relay mechanism that allows empathic individuals to exhibit unconscious mimicry of the postures, mannerisms, and facial expressions of others to a greater degree than individuals who are unempathic (10). Patients unconsciously mimic the actions and facial expressions of others through brain mechanisms that mirror the actions of others by stimulating the same motor and sensory areas in the observers' brains as the person they are observing. This mirroring capacity has been demonstrated at the level of single muscle fibers. If a person's hand muscle is pricked by a fine needle, for example, the same motor and sensory areas are activated in the brain of an observer (11).

Studies also demonstrate that while patients are either imitating or simply observing emotional facial expressions, activation of a similar network of brain areas occurs in the observer. Within this network, there is activity during simple observation of emotional faces, and greater activity during imitation of emotions (12). In addition to inner representations of others' facial displays, shared neural circuits have also been demonstrated for tone of voice, touch, disgust, and pain. Researchers conclude from these studies that observers

feel what others feel to an attenuated degree. This is achieved through a mechanism of neural action representation that often modulates observers' own emotional content and motivates empathic responses. Differences in these neural processes may account for different individual capacities for empathy (13).

A novel study showed that the expression, "I feel your pain," is much more than just a figure of speech. Sixteen female volunteers had brain scans performed while they received painful electric shocks to their hands. While they received the shock, a well-defined "pain matrix" was activated in their brains. Afterward, they received a signal that their spouses were receiving similar shocks. This activated a similar (but not entire) pain matrix in the females' brains.

This is the first neuroimaging study to demonstrate that we actually do feel the pain of others, but only in an attenuated form (10). Attenuation makes it possible to empathize but not become overwhelmed with another's personal distress. Our own distress would likely render us less helpful. Indeed, there is a balance between empathy leading to helping or distancing behaviors due to personal distress. An important balance must be struck by ensuring that health-care providers receive enough care, support, and empathy from their institutions in order to provide high-quality empathic care and to benefit from the positive side effects of empathy (14).

## Empathy, Medicine, and Society

A cardinal feature of empathy is that it usually helps connect people to others. Because of the evolutionary development of this brain-based capacity, affective empathy, or emotional sharing, most easily occurs among members of the same "tribe". Individuals tend to have the most empathy for others who look or act like them, for others who have suffered in a similar way, or for those who share a common goal. We see these biases play out repeatedly in communities, schools, sports teams, and religious communities. The truth of the matter is that empathy is not always an equal opportunity benefactor (15). People are evolutionarily wired to recognize and respond to differences and socially or culturally based perceptions can trigger subconscious fears that threaten emotional homeostasis.

All perceptions in our environment are routed through the thalamus. From there, the amygdala, the threat sensor in the brain, reacts to threats, unfamiliar stimuli, conditioned fears, and perceived threats in as few as 50 milliseconds long before conscious thoughts come into play. When these threat signals reach the midbrain, (specifically in the area of the pons) automatic reactions such as the fight, flight or freeze response take place unless there is cognitive input from executive functions in the prefrontal cortex.

Because of this evolutionary bias, *cognitive empathy* must play a role when a lack of emotional empathy exists because of racial, ethnic, religious, or physical differences. Health-

care settings are no exception to conscious and unconscious biases, and there is no place for discrimination or unequal care afforded to patients who differ from the majority culture or the majority culture of health-care providers. Much work lies ahead to make health care equitable for givers and receivers of health care from *all* cultures. A health-care system that does not value its workforce and offer equal rights and protections for all, risks attrition, systemic distress, burnout, loss of trust in the health-care system and tarnished institutional reputations. Such attitudes and consequences affect employees, professional staff and ultimately patients, and the extended community.

Important research on empathy and altruism has demonstrated that enhancing perspective taking, the capacity to see a person's situation from his or her point of view, coupled with enhanced value being placed on the welfare of those who are unfamiliar can override bias. For example, Batson and colleagues found that empathic concern is *not necessarily* elicited by perceived similarity to others or by affective sharing but can also be elicited by valuing the welfare of people who appear dissimilar (16).

In an interesting study, Batson explored the relationship of perspective-taking to valuing a person who is in need. Perspective taking is a well-known precursor to empathic concern. In the first experiment, both perspective taking and valuing were variables and each increased empathic concern independently. In second experiment, valuing the person in need was the only independent variable. Interestingly, increases in valuing the other person increased perspective taking and also increased empathic concern which, in turn, increased helping. We can conclude from these experiments that valuing a person in need is an important, and largely overlooked, variable and precursor of feeling empathy for that person (16).

Empathy is a factor that draws individuals to helping professions and plays a critical role in understanding the nuances of others' experiences. Empathy is a complex capability enabling individuals to understand and feel the emotional states of others, resulting in compassionate behavior. Empathy requires cognitive, emotional, behavioral, and moral capacities to understand and respond to the suffering of others. Compassion is a tender response to the perception of another's suffering. Compassion cannot exist without empathy, as they are part of the same perception and response continuum that moves human beings from observation to action.

Self-empathy is a much neglected area and is necessary to ensure that health-care workers have the necessary resources to remain empathic toward others. Human beings have intricate, shared neural circuits in motor, sensory, and emotional (limbic) areas of the brain to help them understand the experience of others, leading to helping behaviors. However, when emotionally overloaded, overwhelmed, exploited, or burned out, the capacity for empathy declines as a result of the degree of emotional labor expended. It is critical that as medical professionals and caregivers that we exercise self-care to maintain healthy levels of empathy.

Plato's ancient question, "Can virtue be taught?" is one to consider at our present day juncture in health care. When newly minted doctors take the Hippocratic Oath on graduation day, they swear to provide ethical and compassionate care for their patients. What can be done to ensure they will keep their promise? Understanding that self-empathy is necessary in order to provide empathic care to others is at the core of wellness programs that are growing in popularity in medical education. Enterprise wide faculty development programs that include empathy training need to become an institutional priority to preserve and refresh the vitality of our health-care system.

Self-empathy and other empathy lead to replenishment and renewal of a vital human capacity. If we are to move in the direction of a more empathic society and a more compassionate world, it is clear that working to enhance our native capacities to empathize is critical to strengthening individual, community, national, and international bonds. As the Dalai Lama so succinctly stated, "Love and compassion are necessities not luxuries. Without them humanity cannot survive" (17). Let us be the examples in health care that the world may follow.

### Author's Note

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### Author Biography

**Helen Riess** is an associate professor of psychiatry at Harvard Medical School and director of the Empathy and Relational Science Program at Massachusetts General Hospital in Boston. She is a co-founder and chief scientist of Empathetics.com.