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CASE REPORT

Empathy - from Brain Correlation to Mind and Behavior Cultivation: Bridging Neuroscience, Psychology and Philosophy

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Abstract

In this paper, the flow of the argument follows the sequence of the areas of studies alluded to in the title. That is, I start with some neuroscience data relative to empathy, then I address the topic from a psychological perspective and I close with a section that tackles a philosophical perspective. As such, I begin illustrating the neural correlations of empathy, drawing on a couple of studies conducted by renowned scientists such as Simon-Baron Cohen, Jean Decety and Joseph LeDoux. Based on this knowledge of the correlations between the brain and empathy, I go on to demonstrate the importance of cultivating these correlations cognitively, affectively and behaviorally (through action) so that we (human beings) develop and strengthen an empathic mind. This is where developmental psychology steps in. Adding the mental development to the physiological/neural knowledge creates the channel to expressing empathic behavior; thus leading to the section about ethics or philosophy. I conclude by stressing on the powerful role of empathy in transforming societies for the better, given its phenomenal characteristic of bridging between different sciences.

Keywords

Social neuroscience, Cognitive behavior, Psychology, Philosophy of mind, Social ethics

Introduction

One of the most recent definitions of empathy in the academic world reads as follows:

Empathy is a motivational force to action - an action fully oriented towards the good and totally free from any bias or selectivity - triggered by the awareness to perceive beyond our own perspective the emotional state of the other, to share this state and to act on it appropriately [1].

This definition navigates from awareness to perception of emotions, to sharing these emotions and to taking appropriate action. It highlights in some way the three disciplines to be discussed in this article: The section "Empathy and Neuroscience" illustrates the "empathy circuit" i.e. the regions in the brain that are correlated with empathy. This circuit includes the mirror neurons known by the Mirror Neuron System (MNS). Drawing on some neuro-imaging studies that are based on situations involving empathic or compassionate responses, the correlations between empathy and the neural circuit are summarized in an easy-to-read table format. Empathy cannot be explained only in neural correlations' terms; it rather develops through learning and nurturing. The section "Empathy and Psychology", examines how nature and nurture are to be considered together in the development of empathy. Given that the psychological factors are as powerful as the physical factors on the brain development, nurturing empathy is as much powerful in developing empathic minds and behaviors. The last section "Empathy and Philosophy" describes how empathy relates to philosophical concepts or domains, such as moral behaviors. Denoting some important philosophers who wrote about empathy, this section underlines the link that empathy forms between the disciplines chosen in this paper.

Empathy and Neuroscience

The brain scanning studies carried out by S. Baron-Cohen and his team located ten regions in the brain to be the neural basis of empathy. Those regions which revealed to be activated during imaginative experi-

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ments using neuro-imaging, form what it is called the *empathy circuit* [2]:

1. MPFC: vMPFC and dMPFC Medial Prefrontal Cortex (ventral and dorsal)
2. OFC: Orbito-Frontal Cortex
3. FO: Frontal Operculum/IFG: Inferior Frontal Gyrus
4. cACC: caudal Anterior Cingulate Cortex/MCC: Middle Cingulate Cortex
5. AI: Anterior Insula
6. RTPJ: Right Temporal Parietal Junction
7. pSTS: Superior Temporal Sulcus
8. IPL/IPS: Inferior Parietal Lobule and Inferior Parietal Sulcus
9. SMC: Somatosensory Cortex
10. Amyg: Amygdala

Neuroscientist Jean Decety considers that the expression of pain is a critical stimulus to motivate a caring behavior in others or empathy towards others. Different studies of empathy for pain demonstrated consistently the role of the ACC-Anterior Cingulate Cortex and the Anterior Insula in the affective pain and the perception of pain in others. However, for the *self-perspective of pain* a more extensive neural network proved to be activated, such as the Secondary Somatosensory Cortex, the mid-Insula (posterior for the self) and the posterior part of the ACC. Whereas for the *perspective of pain in others*, a clear activation of the right temporal parietal junction RTPJ is noted, in addition to the anterior aspect of the Insula [3].

Neuroimaging data (fMRI and Positron Emission Tomography PET) have shown both similarities and distinctiveness in neural networks recruited for emotion generation and emotion perception in others. Shared neural circuits between self and other have been noted for action understanding, emotion recognition and pain processing. These circuits are at the basis of inter-subjectivity and allow an implicit connection between the self and the other. Decety, based on many researches, also supports the role of the right temporal parietal

Table 1: Empathy and neural correlations.

Situation		Active neural regions	Empathy circuit
Self-perspective of pain or actual experience of pain	1. 2. 3. 4.	ACC (more posterior) Posterior insula Secondary somatosensory cortex Left inferior parietal lobe [4]	#4 (affective) #5 (affective) #9 (affective) #8 (affective)
Perspective of pain in others	1. 2. 3. 4.	ACC [5] RTPJ Anterior insula Right inferior parietal lobe [6]	#4 (affective) #6 (affective) #5 (affective) #8 (affective)
Taking perspective of others for a motoric action (e.g. winding a watch)	1. 2. 3. 4. 5.	Frontopolar cortex/OFC Right inferior parietal lobule Supplementary Motor Area (SMA) Premotor cortex Occipito-temporal region	#2 (cognitive) #8 (affective)
Taking perspective of others for a concept (e.g. taking antibiotic drugs causes general fatigue)	1. 2. 3.	Frontopolar cortex/OFC Medial prefrontal cortex Right inferior parietal lobule	#2 (cognitive) #1 (cognitive) #8 (affective)
Taking perspective of others for an emotional experience (e.g. someone enters the changing room you have forgotten to lock)	1. 2. 3. 4.	Frontopolar cortex/OFC Medial prefrontal cortex Ventro medial prefrontal cortex Right inferior parietal lobule	#2 (cognitive) #1 (cognitive) #1 (cognitive) #8 (affective)
Emotion regulation	1. 2. 3. 4.	ACC OFC Ventro medial prefrontal cortex Right temporal cortex	#4 (affective) #2 (cognitive) #1 (cognitive) [#6,#7] (affective)

#Number.

junction RTPJ in *mental state processing* and in lower level processing of socially relevant stimuli. The function of this area, the author suggests, is crucial for empathy, in maintaining a minimal distinction between the self and the other and in keeping track of the origin of the feelings [3].

In addition neuro-imaging studies were performed by Decety to investigate the neural underpinning of *perspective-taking* in three different modalities (motoric, conceptual, and emotional). Interestingly enough, three areas listed among the ten regions of the empathy circuit, were systematically involved when participants adopt the perspective of another person, and these areas are: the frontopolar cortex/OFC, the Medial Prefrontal Cortex and the posterior Cingulate Table 1 [3].

Contagious and cognitive forms of empathy are mapped by LeDoux into two processes: 1) Fast reflexive sub-cortical processes, directly from sensory cortices to thalamus to amygdala to response, and 2) Slower cortical processes, from sensory cortices to thalamus to *cortex* to amygdala to response Figure 1 [5].

The "Mirror Neuron System" MNS, was first discovered in monkeys during research on action performance and action observation. These experiments performed by Rizzolatti, provided evidence for a direct understanding of others, through the discovery of the same network of neurons that fires when people perform a given motor act, e.g. grasping a food to eat (voluntary grasping), and when they watch someone else grasping the food and eating it (involuntary grasping); assuming we can classify these two actions as "voluntary/involuntary". Rizzolatti's discovery of the mirror neurons, in the parietal cortex of the monkey and in motor and viscero-motor areas of the human brain, added to a discovery by other scientists of the song-producing motor areas of the birds, have led to suggest that all these neurons have in common "the mirror mechanism". A mechanism by which, sensory representations of actions are transformed into motor actions. According to Rizzolatti, we are able to understand others' actions *directly*, without the need of any inferential processing, thanks to the similarity of neurons activation when performing and when observing a given motor act [6].

The MNS for a motor action was proven to be located in the ventral premotor cortex and the inferior parietal lobule. Single cell recordings in monkeys and neuro-imaging data have demonstrated that mirror responses (neurons firing or Blood Oxygen Level Dependent) are weaker during action observation (involuntary) than during action performance (voluntary). In humans, mirror-neuron-related responses were demonstrated to be in the dorsal part of the IFG Inferior Frontal Gyrus, i.e. the pars opercularis (#3 in the empathy circuit) and in the rostral part of the IPL Inferior Parietal Lobule (#8 in the empathy circuit). Studies reveal that both observing (involuntary) and imitating (voluntary) emotional expressions show increased activity in the pars opercularis in IFG (#3 in the empathy circuit), the ventral premotor cortex (#9 in the empathy circuit), the insula (#5 in the empathy circuit) and the amygdala (#10 in the empathy circuit). The MNS is associated with the affective component of empathy which will be explained in the section "Empathy and Psychology". This association is more prominent in children Table 2 [7].

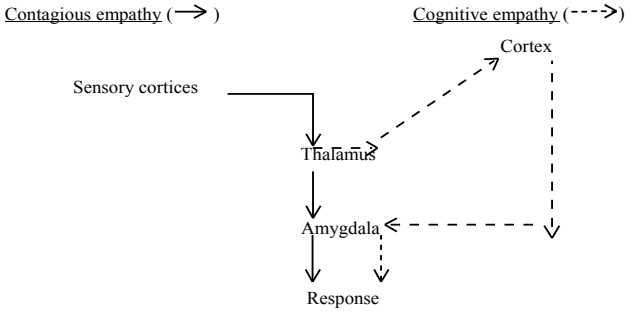

Figure 1: Contagious and cognitive forms of empathy.

Table 2: Mirror Neuron System (MNS) in humans.

Brain area	Empathy circuit
Pars opercularis in inferior frontal gyrus	#3 (cognitive)
Rostral part of Inferior parietal lobe	#8 (affective)
Ventral premotor cortex	#9 (affective)
Insula	#5 (affective)
Amygdala	#10 (affective)

#Number.

As Christian Keysers a neuroscientist of the University of Groningen puts it:

Mirror neurons are what give you the richness of empathy, the fundamental mechanism that makes seeing someone hurt really hurt you [8].

It is interesting to note the multi-disciplines in this statement: A neuroscientist, who studies the brain and its physiological mechanisms, explains with such simplicity and automaticity a hardware component like the "mirror neurons", using psychological, interpersonal and emotional terminology. This leads us to discuss empathy from a psychological perspective.

Empathy and Psychology

Now that we somewhat know the nature (i.e. the neural correlations) of empathy, we should see how to nurture these neural correlations in order to develop empathy. But first, we suggest a quick overview of the 3 aspects of empathy and their neural correlations.

Cognitive, affective and compassionate empathy

As per Antonio Damasio, emotions and feelings, such as empathy, are not intangible and vaporous qualities. Their subject matter is concrete (cognitive and neural), and they can be related to specific systems in body and brain [9].

Two macro-components of the cognitive empathy, self-awareness and mentalizing are key abilities to the experience of empathy. The more we become the ob-

ject of our own attention, the more we have an introspective awareness of our own mental states and able to attribute the mental states to others. The development of the executive functions is linked to the development of understanding self and other mental state. The maturation of the prefrontal cortex leads to the development of this cognitive control system. Numerous studies have argued that the right hemisphere is the key player in self-awareness and mental states attribution [10].

The affective empathy includes the ability to recognize other people's emotions, the ability of emotional responsiveness; and the ability to properly identify one's own emotional and cognitive states. This emotional sharing needs to be measured properly, in the sense that individuals must be able to separate themselves from others. Otherwise, a complete overlap between self and other might induce emotional distress or over arousal of empathy, (a self-oriented aversive emotional response) which is not the aim of empathy. Therefore, self-agency such as self-awareness and mentalizing, is crucial in navigating the shared emotion of empathy [11].

In summary, it appears that while the cognitive empathy seems to involve more *theory of mind* processing, i.e. the ability to engage in a cognitive process of adopting another's perspective or the process of perspective-taking, the affective empathy unlike the cognitive empathy, involves more mimicry or mirroring via mirror neurons, also known as *simulation* processing. Note that the areas of the brain engaged in the theory of mind processing are: medial Prefrontal Cortex (mPFC), Temporal Poles (TP) and Superior Temporal Sulcus (STS) for cognitive Theory of Mind (ToM), and Ventromedial Prefrontal Cortex (VMPFC) for affective Theory of Mind (ToM). And the areas of the brain involved in simulation processing are: Anterior Cingulate Cortex (ACC), Amygdala, Insula and Inferior Frontal Gyrus [12].

The compassionate empathy is the level where the process of empathy is concluded through an empathic action. Emotion regulation is a fundamental element for the compassionate empathy to be expressed properly and to be experienced in a beneficial way for both the helper (the self) and the helped (the other). Emotion regulation is a combination of perspective-taking (cognitive empathy), and affective reappraisal (affective empathy). It engages both cognitive and affective circuits in the brain. This supports the view that one's responses to the pain of others modulated by cognitive and motivational processes, influence whether these responses will result in empathic concern, an initiator of compassionate empathy or helping behavior. Conversely, the fostering of empathy from early age is fundamental for developing emotion regulation or stress regulation which the next paragraph illustrates.

Nurturing empathy

To raise a child to become empathic requires not just a basic set of genes but also a good dose of parenting or other appropriate social experiences. Neuroscientist Michael Meaney's studies on mice show the more nurturing the mother, the more quick-witted, confident and fearless the pups will become and will have denser connections between their brain cells particularly in the hippocampus the seat of memory and learning and also of stress regulation. According to Meaney the human equivalent of licking and grooming seem to be empathy, attunement, and touch. And in human as in rats, some brain systems, like the hippocampus continue to be shaped by experience throughout life. Thus, in humans the way parents treat their children, will leave its imprint on the genes' expression. Researchers conclude that the many ways a family and parents operate, help set the expression of many genes. This suggests that small caring acts of parenthood - and no doubt to add caring and warm acts of educators, as well as of siblings and friends - matter in lasting ways and that nurturing plays a fundamental role in the brain's continuing redesign [13].

LeDoux demonstrated the unquestionable effects of mild stress v/s repeated or severe stress from life events, on the physiological development of the brain, mainly the Amygdala, the hippocampus and its memory functions [14]. If we take the positive effects of mild stress on the Amygdala and the strengthening of the memory, then we maybe would have no reason to doubt that positive emotional nurturing such as empathy as opposed to negative emotional fostering such as aggression or anger would alter some areas of the brain by developing them empathically. If we also look at the adverse effects of severe stressful life events on the degeneration of some specific areas in the brain, then maybe we would have no reason to doubt that pleasant life events such as being exposed to scenarios or occurrences in which empathy is conveyed, through education, in school, at home and in daily life, would lead to a physiological structuring of the brain in a way that empathic networks are instated.

Psychological factors appear to be as powerful as the physical factors on the brain development: Factors such as stress on the child or on the family, differences in parenting, and different amounts of cognitive stimulation, such as books in the home, trips to the zoo, amounts of conversation at home, etc. A body of research has proved that affectionate parental nurturing has a tremendous positive effect on better memory of the child versus lower parental nurturing which has a clear negative effect on the memory of the child [15].

On the other hand, studies with monkeys reveal that specific cells in the hippocampus that take up their positions only during infancy may fail to migrate to their

designated positions if the infant undergoes extreme *stress* during that period. In contrast, caring and loving parents can make better their migration. Also neuroscience data suggests that influences like family *stress* or a warm and loving atmosphere have great impact, for the worse or the better respectively, on where and how richly spindle cells connect. If the "neural scaffolding" has established and strengthened the empathic behavior pattern in the child due to repeated use of those connections, then that is fine, what better can we ask for? If however this "scaffolding" was built toward the opposite pattern than "empathic behavior", psychologists acknowledge that, with new opportunities, or sometimes just with effort and awareness, a new track or "scaffolding" can be laid down and strengthened to produce "empathic behavior" pattern [16].

A special instance of feelings called somatic markers, generated from secondary emotions [17] are acquired by *experience* (nurturing), combining the control of an internal preference system with the influence of an external set of circumstances including not only entities and events with which the organism must interact, but also social conventions and ethical rules. The development of somatic markers requires both brain and culture be normal. When either brain or culture is defective, at the beginning, somatic markers are unlikely to be settled. For example in developmental sociopaths or psychopaths, social factors interact with biological ones to aggravate the condition, or to increase its frequency. It has been proved that the effect of a "*sick culture*" on a normal adult system of reasoning can be dramatic. Examples like in Germany and the Soviet Union during the 1930s and 1940s, where a normal mechanism of reason was absent leading to disastrous consequences [18].

Another factor that can influence the development of empathy was found to be the training. It is known that some of the aspects of empathy appear to be innate, and others might be enhanced by training and self-reflection. Empathy can be learned and improved. We can learn to read affect more accurately and to be more attentive to affective cues. If we engage in self-reflection in order to increase our level of self-awareness and insight, we can better differentiate our own feelings from those of others. We can be trained to effectively regulate our own emotions so that we do not suffer undue distress or emotional contagion when we work with people who are experiencing a lot of pain. Cognitive skills can be fostered if we are encouraged to de-center and to look at problems from multiple perspectives and in different ways [19].

There are in general two types of response when the subject *experiences* empathy [20]:

- Response *with* the other observed (similar responses such as pain to pain and joy to joy) and
- Response *to* the other (helpful responses such as consolation to the distress perceived in the other).

The first type of response is about imitation and since studies show that imitation emerges before pro-social behavior, responses with the other should emerge earlier and with less learning (*nature*). The second type of response looks at the empathic behavior, where people learn to inhibit and control emotional contagion and imitation. Data indicates the need for *experience* (i.e. *nurture*) to fine-tune the responses *with* the other so that they become more effective responses *to* the other.

Furthermore, psychologists such as M. Hoffman, A. Meltzoff and M. Keith Moore claim that the development of empathy is highly correlated with the development of selfother differentiation and both are correlated with the development of the prefrontal cortex [21].

All these works and evidences lead us to conclude with conviction that a good parental nurturing, a normal social environment and a normal (as opposite to sick) culture can have a tremendous positive effect on the brain networks responsible for empathic behavior which can be set by the thousands of routine interactions a person experiences growing up. This brings us to tackle how empathic behavior is reflected upon in the field of moral philosophy.

Empathy and Philosophy

Our life is based on relationship. The philosophical definition of the person as a "*relational being*" can be the base to the philosophical concept of empathy. Empathy is the most important pillar of our relationship with others. And vice-versa, the self and the other are major elements in the study of the process of empathy. Evan Thompson put it nicely affirming this plausible interrelation between the self, the other and empathizing:

My sense of self-identity in the world, even at the basic level of embodied agency, is inseparable from recognition by another, and from the ability to grasp that recognition empathetically [22].

The same author writes about the "*mutual circulation*" approach in his paper on "Empathy and human experience" suggesting and analyzing the mutual circulation of cognitive science, phenomenology (philosophy) and contemplative psychology [23]. He also postulates that empathy provides the source of a moral experience and the entry point into it. Empathy is the basic capacity that underlies all the moral attitudes and emotions one can have for another (a moral attitude can be broadly understood as adopting a right behavior and avoiding a wrong one). Concern and respect for others as persons - as ends-in-themselves - is impossible without empathy [24]. Given these statements, we cannot but recognize the unequivocal bridging feature of empathy between the fields of Neuroscience, Psychology and Philosophy as we are trying to demonstrate in this article.

Empathy generates harmonious and peaceful environment. Thus, empathy is fundamental for peace between people and nations. Hence, the relevance of the golden rule: *"do unto others what you want them to do unto you";* in this study, the golden rule translates into "the mirroring of moral behavior".

But, we should ask ourselves, is it really a "mirroring of behavior" or can there be some self-interest involved in an act of empathy? Take for example, the philosophical view of Thomas Hobbes when asked about his motivation behind helping the needy, his explanation was that he feels some pain himself when he sees another's misery; so just as helping relieves some of the other's suffering, it does also ease him as a helper [25]. Can this view from Hobbes suggest that there is a bit of some self-interest in empathizing with others? The answer goes back to the third century B.C., way before Hobbes, when the Chinese sage Mencius wrote: *"All men have a mind which cannot bear to see the suffering of others"* [25]. Already here we sense the inter-relation and synchrony between mind (Psychology), body (Neuroscience) and behavior (Philosophy). The expression "*cannot bear to see*" holds in it some urge to respond with an empathic behavior towards the suffering of others. It expresses the natural presence of empathy in each one of us and the spontaneity or automaticity that we all embody to act with empathy in response to the other's emotional expression or sharing. Mencius' statement suggests that the impulse for helping the "suffering other" prevails above any self-interest or social reward or personal relief. Unlike Hobbes' reasoning, Mencius' view of empathy with others who are suffering denotes the act of helping as spontaneous and free from self-interest.

Furthermore, I consider that if we understand empathy in its far-reaching components up to the level of compassionate empathy and not just the cognitive and affective empathy, only then we would be able to perceive the richness of empathy as a motivational force to action - A selfless action fully oriented towards the good of others and totally free from any bias or selectivity.

Blair's studies on the necessity of empathy for moral development showed that normally developing children have an innate tendency to empathize with observed distress. So, if one child causes another child to cry, the offending child will catch the observed emotion and feel badly. This bad feeling serves as an inhibition signal that causes her/him to cease the actions that are causing the distress and to associate bad feelings with that kind of action in the future. Blair thinks that violence inhibition (or *impulse*) is mediated by empathetic distress and that moral rules are emotionally grounded. If empathy is absent, moral rules would never acquire emotional grounding. Thus Blair concludes that empathy is necessary for moral development [26]. Blair in his article refers to normally developing children and to classical conditioning. He notes therefore, that if the child is rewarded, particularly during the attack, by peer or parental praise for example, the child is likely to overrule the violence inhibition (disengaging from empathetic distress), will obviously not experience the withdrawal response and consequently will not experience the aggression as aversive [27].

Even though the word empathy was discovered only in the twentieth century [28], I find it appropriate referring to the eighteenth century philosopher Adam Smith when he describes empathy, known as sympathy at that time, as "*a fellow feeling plus approbation/disapprobation"*. Here is how Smith's description smartly relates the philosophical and the psychological that the concept of empathy holds:

That where there is no approbation of the conduct of the person who confers the benefit, there is little sympathy with the gratitude of him who receives it: and that on the contrary, where there is no disapprobation of the motives of the person who does the mischief, there is no sort of sympathy with the resentment of him who suffers it (1759: 143; chapter abstract) [29].

The above description contains enough moral elements such as: approbation, conduct, conferring benefit, receiving benefit, gratitude, etc. all of which form a substantial input to our discussion where we try to explore empathy as bridging philosophy and psychology.

Empathy and the actualization of moral behavior

Aristotle wrote about the concept of "becoming *aware* of what is like itself". The most striking examples to assert this assumption are given by Empedocles: "*For by earth, we see earth, by water, water,… we see love by love, and strife by mournful strife*" [30]. It is inevitable to see in Empedocles' examples the connection with empathy and how they navigate between "being and becoming". With the role of mirror neurons, the role of imitation and of nurturing in the development of one's empathy, we can change our being to become empathic human beings or our being empathic to become more empathic human beings. May be the use of an analogy helps us to clarify what we mean by these noticed aspects of changing/becoming, perception, cognition and awareness in relation with our argument of the cultivated and cognitive empathy. Rephrasing Empedocles' examples, with emphasis on empathy, we get the following: "*For by empathy we see empathy"* meaning that through mirror neurons, imitation, nurturing, training, or education, Empedocles' examples could be summarized in: "*For by being empathic, the other becomes an empathic other, and by seeing the other empathic, we become ourselves empathic".* This movement between the states of being, seeing and becoming, relates very well to the cognitive, affective and compassionate aspects associated to empathy in this paper.

Edith Stein has written about the effect of one's lived

experiences proving that an influence of the psycho on the psycho also exists. The author suggests that through "*training*" every capacity can be potentiated. For example if one works in the field of natural science, one would develop a "spirit of observation". Similarly, one would potentiate the capacity of enjoying things if one's life is organized on the basis of pleasure [31]. Furthermore, Stein suggests that if one has never known another worth of love or of hate, one would never live the depth into which love and hate are rooted in; or if one has never seen a piece of art, the pleasure of art or one's sensitivity to art would remain absent in that person, perhaps forever [32]. Applying Stein's examples to the topic of empathy, it would translate to: *if one grows up in an environment where empathic behaviors are never experienced or lived out, or mirrored, one would never live the depth into which empathy is rooted in, and one's familiarity to, or experience of empathy would remain absent in that person, perhaps forever.*

As a result of this third section, an account of empathy can be articulated as follows:

"Empathy is for the moral behavior, a form, an actuality; and moral behavior is for empathy a potentiality. Empathy gives form to our moral behavior, it brings life to it."

Conclusion

Cultivating, nurturing and mirroring empathy between adult and child or between two adults, not only restructures the brain to become empathic (psycho-physical causality), but also potentiates the capacity for empathic behavior (psycho-moral causality). Given the scope by which empathy touches our daily lives, this paper attempted to demonstrate how empathy bridges the physiological (brain), the psychological (mind) and the ethical (behavior). This essential asset of empathy, if learned or taught with awareness and consistency from early age all the way to adulthood, would transform the minds and the behaviors to become empathic, contributing generation after generation, into the building of peaceful and just societies.

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References

1. Marie Challita (2014) The empathic brain as the neural basis of moral behaviour-presented from interdisciplinary perspectives. Ateneo Pontificio Regina Apostolorum, Roma, 195.
2. Simon, Baron-Cohen (2011) "The empathy bell curve". Phi Kappa Phi 91: 10.
3. Jean Decety (2006) "Human empathy". Japanese J Neuropsychol 22: 11-33, 18-23.
4. Jennifer H Pfeifer, Mirella Dapretto (2009) "Mirror, mirror, in my mind: Empathy, interpersonal competence, and the mirror neuron system". In: Jean Decety, William Ickes, The social neuroscience of empathy. MIT Press, Cambridge, 186.
5. Stephanie Preston D, Frans BM de Waal (2001) "Empathy: its ultimate and proximate bases".
6. Giacomo Rizzolatti, Corrado Sinigaglia (2013) "Understanding action from the inside". In: Wolfgang Prinz, Miriam Beisert, Arvid Herwig, Action science: foundations of an emerging discipline. MIT Press, Cambridge MA, 201-227.
7. Jennifer H Pfeifer, Mirella Dapretto (2009) "Mirror, mirror, in my mind: Empathy, interpersonal competence, and the mirror neuron system". In: Jean Decety, William Ickes, The social neuroscience of empathy. MIT Press, Cambridge, 187-191.
8. Daniel Goleman (2007) Social intelligence: the new science of human relationships. Arrow Books, London, 57.
9. Antonio Damasio (2000) Descartes' error: Emotion, reason and the human brain. HarperCollins Publishers Inc. Quill, New York, USA, 162-164.
10. Jean Decety (2006) "Human empathy". Japanese J Neuropsychol 22: 11-33, 20-22.
11. Jean Decety (2006) "Human empathy". Japanese J Neuropsychol 22: 11-33, 18-20.
12. Simone G Shamay-Tsoory (2009) "Empathic processing: its cognitive and affective dimensions and neuroanatomical basis". In: Jean Decety, William Ickes, The social neuroscience of empathy. MIT Press, Cambridge, 215-227.
13. Daniel Goleman (2007) Social intelligence: the new science of human relationships. Arrow Books, London, 151-156.
14. Joseph LeDoux (1998) The emotional brain: the mysterious underpinnings of emotional life. Simon & Schuster, New York, USA, 206.
15. Martha Farah (2012) "15 years of cognitive, affective and developmental neuroscience".
16. Daniel Goleman (2007) Social intelligence: The new science of human relationships. Arrow Books, London, 157-161.
17. Secondary emotions are non-basic emotions as opposed to the 6 basic emotions (anger, fear, disgust, sadness, happiness, surprise) identified by Ekman. Secondary emotions, such as empathy, require cognitive operation to derive them.
18. Antonio Damasio (2000) Descartes' error: Emotion, reason and the human brain. HarperCollins Publishers Inc. Quill, New York, USA, 177-179.
19. Jeanne C Watson, Leslie S Greenberg (2009) "Empathic resonance: a neuroscience perspective". In: Jean Decety, William Ickes, The social neuroscience of empathy. MIT Press, Cambridge 133.
20. Stephanie D Preston, Frans BM de Waal (2001) "Empathy: its ultimate and proximate bases". 10-11.
21. Stephanie D Preston, Frans BM de Waal (2001) "Empathy: its ultimate and proximate bases". 29.
22. (2016) Evan Thompson, Empathy and human experience. 12.

23. (2016) Evan Thompson, Empathy and human experience. 24.

24. (2013) Evan Thompson, Empathy and human experience. 14.

25. Daniel Goleman (2007) Social intelligence: the new science of human relationships. Arrow Books, London, 59-60.

26. Prinz J (2011) Is empathy necessary for morality? In: A Coplan, P Goldie, Empathy: Philosophical and Psychological Perspectives. Oxford University Press, 211-229.

27. Blair RJ (1995) A cognitive developmental approach to morality: investigating the psychopath. Cognition 57: 1-29.

28. (2013) The English word "Empathy" was coined in 1909 by Edward B.Titchener translating it from the German word "Einfühlungsvermögen", in Wikipedia.org, and/or Internet Encyclopedia of Philosophy, Empathy and sympathy in ethics.

29. (2011) Internet Encyclopedia of Philosophy, Empathy and sympathy in ethics.

30. Ronald Polansky (2007) Aristotle's de anima. Cambridge University Press, New York, 69-73.

31. Edith Stein (1985) Il problema dell'empatia. Edizioni Studium, Roma, 137-140.

32. Edith Stein (1985) Il problema dell'empatia. Edizioni Studium, Roma, 219-221.