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Navigating through the Paradoxes of Empathy:
Proposing a new conceptual and methodological approach to study Empathy.

Aurore MEUGNOT & David RUDRAUF

Abstract. Empathy is an enthralling topic. However, researchers concur that it serves as an umbrella term, overlapping with other psychological constructs to such an extent that some authors question its usefulness. This article, within the realm of neuroscience, aims to leverage empathy's paradoxes to propose a novel approach for conceptualisation and operationalisation. This approach aims to facilitate future unified and rigorous investigations, addressing its complexity and contemporary societal challenges in personal and professional interactions. The article starts by explaining the foundations of the proposed conceptual framework, offering a historical survey of empathy definitions to highlight the paradoxes shaping it. A recent neuroscientific model of empathy is then introduced, which defines it as being touched by the person who is the object of one's empathy, and feeling concerned for their well-being. Subsequently, the following section elucidates how our approach extends this model of empathy. Finally, the last section deals with the operationalisation and measurement of empathy, emphasising the need to modify existing paradigms, with an illustration of their pitfalls through the example of neuroscientific research.

Key words : empathy, conceptualisation, operationalisation, neuroscience perspective, empathic behaviour.

Introduction

Empathy, labelled as a "jingle-jangle concept" (Hall & Schwartz, 2022) seems by nature elusive. The description by Jean Decety also reflects the challenge of pinning down and defining this term :

Empathy is a neologism used to describe a variety of distinct psychological phenomena. It covers a broad spectrum, including feeling concern for other people that creates a motivation to help or care for them, experiencing emotions that match another individual's emotions, knowing what the other is thinking or feeling, and blurring the line between self and other. Batson lists half a dozen definitions of phenomena that are related to one another. However, they are not elements, aspects, facets, or components of a single thing that is empathy because one might say that an attitude has cognitive, affective, and behavioural components. Rather, each phenomenon is a conceptually distinct psychological state. (Decety, 2020)

This assumption is largely supported by critical reviews which address the inconsistencies and controversies surrounding the concept of empathy (Gladstein, 1983 ; Duan & Hill, 1996 ; Batson, 2009 ; Cuff et al., 2016 ; Bloom, 2017; Hall & Schwartz, 2022). The aim of this article is not to get into the debate and add fuel to the fire. In fact, we consider that the term used to name this psychological phenomenon – such as empathy, sympathy, compassion, affective sharing, mentalizing, etc. – is not the most important. What matters is that all people agree that this function is at the core of social interactions (ref) and constitutes perhaps the essence of our humanity (ref). Then, what account is rather to clarify the processes underlying this function - that we choose to call 'empathy'. Herein, the originality is to draw upon the paradoxes of empathy to propose a new approach to conceptualising and operationalising it, thereby enabling future unified and rigorous investigations which would tackle its complexity and the current societal challenges within our personal and work-related interactions. This approach relies on two crucial elements : firstly, it refocuses the definition of empathy on the idea of *being sensitive* to others' emotions rather than, as conventionally proposed, the ability to *share and understand* others' emotions. Secondly, it distinguishes two forms of empathy expression - taking into account different contexts of interpersonal relationships : empathy can either be expressed spontaneously or, in other circumstances, in a deliberate and controlled manner. Thus, in this view, empathy can manifest as a personality trait if it is very prominent in an individual. Yet, empathy would also refer to a state, which spontaneously expresses itself in humans but not systematically. Then, a highly empathic individual may not be empathic at all in certain situations. By contrast, antisocial individuals who are

characterised by a lack of empathy, may be empathic in certain situations. Finally, this approach strengthens a key difference between empathic behaviour and prosocial behaviour.

The article starts by explaining the foundations of the proposed conceptual framework, understanding them through a historical, albeit non-exhaustive, overview of a range of definitions of empathy. These definitions form a set of paradoxes, which are in our sense, constitutive of empathy. This section concludes by presenting a recent neuroscientific model of empathy (Decety, 2021). The next section explains how our approach to empathy integrates with Decety's model, while completing his conceptualization, notably by shedding light on the intricate dynamics of social interactions and uncovering paradoxical elements when experiencing empathy. The last section tackles the challenge of operationalising and measuring empathy in the laboratory. It begins by pointing out the limitations of the traditional paradigm of pain observation commonly used to investigate the cerebral bases of empathy. Then, we advocate for the adoption of a new experimental framework that takes into account individual differences in the experience and expression of empathy, specifically enabling the deconstruction of the persistent confusion between empathy for pain and the perception of pain in others.

The Conceptual Foundations of Our Approach to Empathy

The origins of empathy. The concept of empathy, originally 'Einfühlung' in German, was introduced by the philosopher Robert Vischer (1873) in the domain of aesthetics to explain our emotional response to a work of art. At that time, 'Einfühlung' referred to the spontaneous projection of oneself into a work of art, attributing meaning to it based on the emotions that its forms and colours could evoke in us. The concept of 'Einfühlung' became very popular in the fields of art and aesthetics. Later, it was adopted in psychology, notably by Theodor Lipps. Lipps's definition of empathy evolved between his early writings (1897) where it was restricted to the perception of objects and his later works (1903, 1913) that included the perception of emotions and human movements (Gladstein, 1983). The translation of 'Einfühlung' to 'Empathy' was coined by the British psychologist Edward Titchener in 1909 (Gladstein, 1983) : *'Not only do I see gravity and modesty and pride and courtesy, but I feel or act them in the mind's muscle. This is, I suppose, a simple case of empathy, if we may coin that term as a rendering of Einfühlung'* (pp et ref exacte). A bit later, his conceptualization becomes more precise, and he describes empathy as 'a process of humanising objects, of reading or feeling ourselves into them' (Titchener, 1924; cited by Duan et al., 1996). Thus,

at its origins, empathy is a reactive and sensorial phenomena, referring to a form of self-projection onto objects or identification with an object that is humanised (Duan & Hill, 1996; Gladstein, 1983).

Contemporary definitions of Empathy. After the Second World War, the concept of empathy unfolds across various branches of psychology (social, developmental, humanistic)¹, generating widespread enthusiasm within the scientific community (Wispé, 1986 ; Duan & Hill, 1996). As highlighted by Jean Decety (2004), '*There are almost as many definitions of the concept of empathy as there are authors*' (Decety, 2004). This diversity gives rise to several conceptual debates, numerous investigative methods (self-reported questionnaires or scales, physiological measures, judgement of others' behaviour), and above all, significant confusion about what empathy is and how it differs from other related concepts: sympathy, compassion, perspective-taking (Cuff et al., 2016; Duan & Hill, 1996; Eisenberg & Lennon, 1983; Wispé, 1986).

The most divergent aspect among different definitions is undoubtedly the affective and/or cognitive nature of empathy (ref Cuff et al., 2016) : When it is in the affective domain - a perspective prevalent in social and developmental psychology (Batson et al., 1987) - empathy refers to a spontaneous reaction to the emotions perceived in others. It involves a form of affective sharing (Horbrow, 1980), which takes different meanings: (a) empathy reduces to emotional contagion, meaning that the reaction is similar to the other person's emotion; for example, **'I share their sadness' in this case means that I feel sad myself.** (b) Empathy is a coherent reaction to the other person's emotion, but not necessarily identical; for instance, **'I share their sadness' means that I feel their distress, and this may elicit discomfort in me as I feel powerless in the face of their distress.** According to Daniel Batson, empathy is even more precise and "*refers to one specific set of congruent emotions, those feelings that are more other-focused than self-focused*". A bit further, he adds, "*the specific label for this other-focused congruent emotional response is, of course, not crucial. We are calling it empathy, but it has also been called sympathy, compassion*". (Batson et al., 1987 p. 20). **'I share their sadness' then means that I feel their distress and experience sympathy or compassion for that person.**

In a cognitive view, empathy reflects the act of putting oneself in another's shoes to identify and understand as accurately as possible what they might be feeling. This is exemplified, for instance, in the role of a psychotherapist, extensively described and theorised by Carl Rogers, a distinguished psychoanalyst: *'the counselor is perceiving the hates and hopes and fears of the client through*

¹ Also in psychoanalysis, in line with Freud, with key authors such as Heinz Kohut (1959), and in other humanities disciplines (ethnology, sociology, philosophy).

immersion in an empathic process, but without himself, as counselor, experiencing those hates and hopes and fears' (Rogers, 1951; cited by Gladstein, 1983): **"I perceive his sadness, I understand what he may be feeling at this moment."** However, this dichotomy between the affective and cognitive dimensions has been questioned since the 1970s, and many perspectives consider both dimensions in empathy: without one of the two components, it is not considered empathy. Alternatively, empathy can be either affective or cognitive depending on the situation (Hornblow, 1980; Duan & Hill, 1996; Batson et al., 1997). For example, Carl Rogers' conceptualization in 1975 has evolved and now also incorporates an affective dimension (Gladstein, 1983).

These multiple visions of empathy also introduce other ambiguous elements : It is unclear whether empathy refers solely to a response (i.e. a state, e.g., an altruistic or non-altruistic feeling) or also designates the mechanisms that give rise to this response (i.e. a mental function). In other words, is empathy a matter of behaviour or of the psychic ? Another area of confusion arises from those who advocate for a view of empathy as dispositional (a personality trait, therefore relatively stable, innate, and predetermined) (ref). In this case, it is understood that some individuals are more empathetic than others (ref). Alternatively, empathy can be situational (an emotional state expressed in a specific situation: for example, I have empathy for a loved one, but I do not feel it for a stranger) (ref). The idea that empathy is dispositional gives rise to numerous questionnaires², which, however, often show little to no correlations among them (Hornblow, 1980). A conception of empathy as situational involves designing experimental tasks where researchers seek to manipulate empathy to explore intra-individual differences in empathy (In what context does my empathy manifest ? What factors influence its expression ?). This is evident in the works of Daniel Batson on the links between empathy and altruism (Batson and Coke, 1981; Batson et al., 1991). This perspective also leads to studies aimed at training empathy and proposing empathy programs to address certain disorders (Feshbach, 1975).

This period was marked by remarkable enthusiasm surrounding the concept of empathy, with a rich literature yielding several compelling observations : empathy varies significantly from one individual to another, and likely within the same individual, as it appears to be influenced by numerous factors such as the connection with the person with whom one interacts . The expression of our empathy, therefore, heavily depends on the context in which we find ourselves. Empathy develops over the course of development and can be learned or at least enhanced over a short period. Finally, empathy seems to be negatively correlated with personality disorders (ref).

² Par exemple, le Barrett-Lennard Relationship Inventory (Ganley, 1989), Mehrabian & Epstein, 1972 ; Hogan, 1969 ; Hill et al., 1994 ; l'index de réactivité interpersonnelle (IRI) de M.H. Davis (1980). Ce dernier est sans doute le plus connu et utilisé actuellement en neurosciences.

Empathy in neuroscience. In the early 2000s, neuroscientists rediscovered the concept of empathy, considering it, like many before them, as a fundamental ability in interpersonal relations. The prevailing view is that of a multidimensional definition borrowed from conceptions in psychology. Empathy is defined as a natural function of communication among humans (also observed in other mammals in a more rudimentary form, De Waal & Preston, 2017; Preston & De Waal, 2002). It enables us to share the feelings of individuals with whom we interact, and thus to understand and act appropriately with them. One of the very first models (Decety & Jackson, 2004) aptly illustrates this 'plural' vision, termed 'heuristic' by the authors, who adopt a phenomenological approach in defining empathy, enabling to capture its complexity. Their article begins with an example describing what it is like to undergo an experience of empathy : *“You are peacefully reading your favourite newspaper while your child is playing with others in a playpen nearby, when suddenly, she cries. It does not take long to orient your attention toward her, perceive her distressed state, and understand what she feels. Not only do you perceive her plight, but you also actively want to comfort her.”* (Decety & Jackson, 2004, p 71).

In this view, empathy primarily involves an automatic and unconscious mechanism : *resonance (or affective sharing)* (Decety & Jackson, 2004, but also De Vignemont & Singer, 2006; Lamm et al., 2019; Singer & Lamm, 2009; Stevens & Taber, 2021; Zaki & Ochsner, 2012). When we perceive an emotion in someone, it activates our own representations of that emotion, thereby triggering a similar emotion in us (also coined ‘shared representations’ mechanism). Referring to the example from Decety & Jackson (2004), ***seeing his child's tears, the father feels distressed himself, even though he was calm and relaxed just moments before.*** This mechanism enables us to quickly respond to the emotions of others and provides us with intuitive understanding of the situation. However, for empathy to occur, resonance is coupled with other processes, including a fundamental one that develops in early childhood: *self-awareness in relation to others (or self/other distinction)* (Decety & Jackson, 2004, and also Decety & Meyer, 2008; De Vignemont & Singer, 2006; Lamm et al., 2019). ***The father is aware that his own sadness is provoked by his daughter - he is sad WITH or FOR his daughter.*** Empathy also involves two cognitively demanding processes (also referred to as executive control in Decety & Meyer, 2008), in order to detach ourselves from our own emotions and more explicitly understand (i.e. judge, evaluate) what the other person is feeling: *perspective-taking (or mentalization)* and *emotion regulation*. Perspective-taking refers to a mental flexibility allowing us to adopt the subjective viewpoint of others. It is cognitively demanding as it requires detaching from our 'default' mode of functioning - i.e., egocentrism (Decety & Meyer, 2008) - to infer how this emotion is experienced by the other. **The father sees his daughter crying - he**

understands that she just bumped her knee. He can clearly see that his daughter's distress is not feigned. From her perspective, the pain seems sharp and intense. Perspective-taking is not possible without some degree of *regulation of one's own emotions* (for example, those triggered by 'resonating' with the distress of his child). Indeed, imagine that the father is very sensitive to his daughter's cries and that they evoke a strong distress reaction in him. **Feeling helpless, he remains stoic in front of her, unable to find the right words to comfort her.** Emotional regulation enables us to control our reactions to the emotions of others, and is thus an essential component of empathy (Decety & Jackson, 2004; but also Decety, 2011; Engen & Singer, 2013; Zaki, 2014). When there is an optimal combination of its components, empathy usually leads to prosocial behaviour (a desire to help, comfort) or prosocial feelings (sympathy, compassion). In line with authors such as Daniel Batson (Batson, 1987; 2011) or Martin L. Hoffman (Hoffman, 2008), neuroscientists attribute a strong connection between empathy and altruism. Generally, definitions of empathy incorporate this dimension with the concept of empathic concern signifying that empathy is typically accompanied by an altruistic sentiment that may translate into a desire to assist someone in distress or feelings of compassion and sympathy for that person (Decety et al., 2016; Decety & Jackson, 2004; Lamm et al., 2019; Singer & Klimecki, 2014; Weisz & Zaki, 2018; Zaki & Ochsner, 2012). **The dad's experience concludes with the desire to comfort his child.**

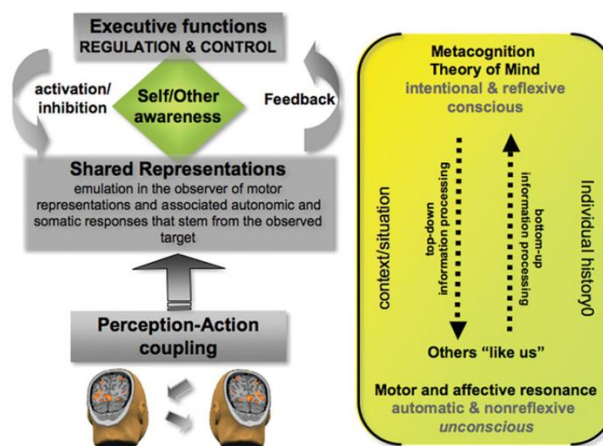


Figure 1: The processes underlying an experience of empathy (Decety & Meyer, 2008), reproduced with the author's permission

The model by Decety & Jackson (2004) greatly impacted the neuroscientific research into empathy and remains a reference in cognitive sciences. Other more recent models align with this multidimensional perspective, where empathy denotes a complex subjective experience involving sharing and understanding others' mental states, assuming a broad functional architecture (Bird & Viding, 2014; De Waal & Preston, 2017; Steven & Taber, 2021; Schurz et al., 2021; see Luis et al.,

2023 for a critical review). This multidimensional perspective guided neuroscience studies on the neural foundations of empathy. Notably, neuroimaging studies highlighted how implicit psychosocial biases influence the perception of pain in others, as well as brain regions generally associated with empathy (Han, 2018 for a review). However, this heuristic and multidimensional perspective has contributed to reinforcing the jingle-jangle fallacies that empathy was already facing, ultimately portraying empathy as a medley of processes related to social cognition.

Two decades later, the conceptualisation of empathy has evolved with a 'revisited' proposal of this model (Decety, 2021). Questioning the link between empathy and moral judgement, Jean Decety adopts a 'narrowed' view of empathy, focusing on its affective dimension and highlighting its altruistic nature. According to this model, empathy rests on two components :

(a) *affective sharing*, which corresponds to an automatic mechanism of spontaneous emotion transfer. This mechanism would have served an evolutionary function, specifically facilitating coordination, cohesion, and social bonds. Note that Jean Decety seems to distance himself from the idea of 'shared representations' that originally defined the concept of affective sharing, opting for the term 'spontaneous emotion transfer'. Herein, affective sharing implies emotional contagion without an association with reactivating one's representations of that emotion. The emotional response mirrors others' emotions in valence and intensity but differs from what one would typically feel in that situation. This shift marks a rupture from the classical neuroscientific view of affective sharing, and would rather fit with a definition of empathy centred on the notion of 'sensitivity', as proposed in the introduction.

(b) *concern for others*, which is linked to biological mechanisms selected for offspring care. Being empathetic involves, for instance, **feeling sad FOR (or WITH) one's child because one cares about their well-being**. This translates into altruistic behaviours or feelings. Note that generally, what distinguishes empathy from emotional contagion is the distinction between oneself and others (Decety & Jackson, 2004; Bird & Viding, 2014; Singer and Lamm, 2009). In this proposition, the distinction between these two concepts is made by the presence or absence of a prosocial dimension (concern for others). If one is solely reactive to the emotions of others, it relates more to the phenomenon of emotional contagion. For example, if the predominant feeling upon seeing a sad person is discomfort and the desire to escape the situation, then, it is not empathy. Moreover, in this model, Jean Decety views perspective-taking as an 'influence' of empathy—no longer as one of its components. He also specifies how empathy manifests at the behavioural level, establishing an explicit link between the underlying processes of empathy and the associated behaviour (Figure 2).

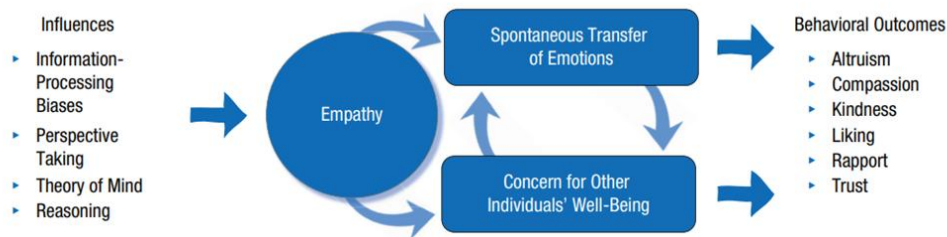


Figure 2 - modèle Decety - extrait de son papier.

To complement the description of the mechanisms underpinning empathy, this model includes the interactions of empathy within social contexts (coined by J. Decety as "*influences*", Figure 2), such as psychological biases modulating information perception. Perspective-taking is one of these *influences* - no longer as a constituent of empathy. Other cognitive capacities, such as theory of mind, and reasoning, can influence the degree to which empathy is triggered, and also reduce psychological biases. Moreover, Jean Decety also specifies how empathy manifests at the behavioural level, establishing an explicit link between the underlying processes of empathy and the associated behaviour. In line with Batson's empathy-altruism theory (Batson, xxx), he acknowledges that empathy leads to prosocial behaviour, meaning that generally, the attitudes/feelings that dominate and reflect empathic behaviour are benevolence, a desire to help and support, and compassion³. Note that he points out that these behavioural outcomes are interpersonal, suggesting that there may be varied emotional reactions consecutive to empathy depending on individual differences.

A new proposal aligned with a narrowed, yet integrative approach to empathy.

Our approach to empathy is in line with this proposition, as we agree with the three main elements constituting this model and described above : (1) A narrowed definition of empathy centered on its affective dimension (in fact, there is no cognitive dimension in empathy), based on two core automatic abilities: affective sharing and concern for others. (2) However, cognitive processes would have their place in a theoretical model of empathy, not as one of its constituents, but as a key aspect which could influence empathy. (3) the presence of the behavioural outcomes of

³ We are not referring to the Buddhist perspective of the notion of 'compassion' (Klimecki & Singer, 2014 ? xxx ref). Here, the term "compassion" relates to an emotional response (a feeling, an attitude), namely an outcome resulting from the engagement of empathy.

empathy. The following section outlines how our approach extends several aspects of this model, complementing it and proposing an original conceptualization of empathy.

Importantly, we suggest that the recent proposal by Decety (2021) allows for the consideration of empathy according to its form of manifestation : One manifestation would be spontaneous, underpinned by the above-mentioned two processes (affective sharing and concern for others) which could be heavily influenced by environmental factors and psychological biases. In fact, depending on the context and the individual with whom one interacts, empathy could or could not manifest. For instance, if the person in front of you is very unsympathetic, it is likely that your empathy would be inhibited. The other manifestation would be more controlled, with the core system of empathy interacting with cognitive control or other processes implicated in social cognition (such as perspective-taking, reasoning, and affect regulation). Notably, this controlled empathy involves distancing oneself from one's own emotions to focus on understanding others or providing a well-considered response. Controlled empathy would align with the multidimensional view in Decety & Jackson (2004), representing a deliberate empathetic response, such as seen in medical empathy (Decety, 2020). Therefore, when studying empathy, it is crucial to specify the particular aspect under consideration, as empathy can involve a more intricate set of processes than solely the core system, depending on the form of its manifestation and the context.

There is also a key difference concerning the behavioural outcomes of empathy (*empathic response* or *empathic behaviour*) between Decety's proposal and our approach to empathy. We agree with the fact that, in general, empathy manifests through prosocial behaviours. However, we emphasise one important paradox of empathy, whose expression is not always the attempted prosocial outcomes, such as those suggested by Jean Decety in his paper: altruism, compassion, kindness, liking, rapport, trust (Figure 2). For instance, consider the case of a woman, who is very close to her mother and learns that she had hidden from her the fact that she was suffering from cancer. She learns this while her mother is already in the terminal phase of the illness and has been hospitalised in a palliative care unit. This woman visits her mother: when she sees her bedridden, she intensely feels empathy, i.e., she is deeply affected by her mother's condition and feels the desire to comfort her. However, she reacts surprisingly : she freezes at the door of the room, turns around, and flees the hospital. Conversely, another individual may possess low empathy, possibly no empathy at all for humans due to psychiatric disorders (e.g., psychopathy, Lockwood, 2016). However, this individual could potentially demonstrate empathy towards another 'entity', such as an animal, an object, or a fictional character if we adhere to the original notion that empathy can extend beyond human beings to encompass various entities.

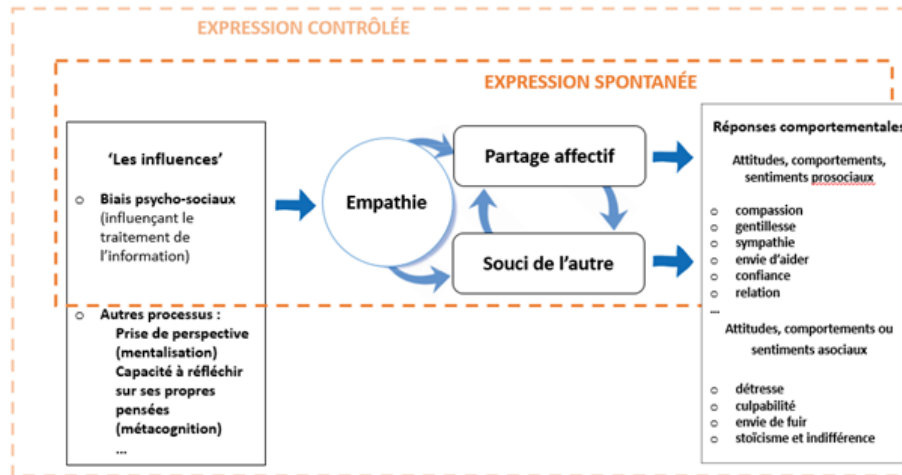


Figure 3 : Les processus de l'empathie et son expression modifié selon notre approche. Préciser que ça n'est pas impossible de ressentir un mélange de réponses prosociales et asociales ; mais que sans doute une réponse dominera parmi tout ce mélange d'émotions et entrainera un comportement en particulier.

Thus, this approach offers the possibility to explore empathy in various contexts, examining its paradoxes, while maintaining a consistent theoretical framework. This is the essence of our approach, which aims to embrace the complexity of empathy. If the endeavour of establishing clarity regarding the specific form of empathy is addressed, then, one could consider this complexity as a richness. For instance, one actual issue is to explore the role of virtual reality in combating domestic violence (Seinfeld et al., 2018, 2022). These studies could align with our theoretical framework, concentrating on the spontaneous manifestation of empathy, as the objective of this tool is to evoke empathy naturally by touching the sensitivity of perpetrators. As above-mentioned, controlled empathy is relevant when considering the healthcare provider-patient relationship in the field of health (for e.g. Hojat, 2007; Decety, 2020). Yet, spontaneous empathy also raises important issues regarding the patient-caregiver relationship. As humans, caregivers cannot remain insensitive to the suffering and distress of others, then, being empathic in a clinical context is a “hard work” (Wilkinson et al., 2017, xxx voir aussi chapitre livre Simon, sur mac). Therefore, clinical empathy would involve both regulating the spontaneous affective reaction triggered by a person in distress and expressing a humanistic and compassionate attitude. At the fundamental level, the question of a link between spontaneous and controlled empathy remains entirely open and could be of interest for emerging research on the role of emotional regulation processes in empathy (Thompson et al., 2019; Zaki, 2020). This question could also be considered from a developmental perspective of empathy, aligning with several theoretical proposals (Decety & Holvoet, 2021; Decety & Michalska, 2020; Demetriou, 2018) : empathy develops very early in infants, being immature, and evolves during childhood through the development of cognitive control processes (mental flexibility,

regulation). A child is able to spontaneously express empathy at an early age, but it will take several years for them to do so voluntarily and in a controlled manner.

Moreover, one important theoretical implication of our approach will be to disentangle the link between AF and CO. In fact, Decety's model mentioned that they are intertwined, yet these interactions remain entirely unexplored, and Jean Decety did not elaborate on potential relations in his paper (Decety, 2021). For instance, does AF cause the triggering of CO? Or do AF and CO mutually influence each other? In line with Coll et al. (2017), we agree that another crucial theoretical issue in the future of empathy research would be to explore how inter- and intra-individual differences in these abilities may explain variance in empathic responses. Notably, it will be critical to isolate contextual factors that may hinder the intended behavioural outcomes when an individual engages his/her empathy. This would allow us to apprehend the full complexity of this phenomenon and then to highlight its paradoxes.

The Need for a new Methodological Paradigm to Measure Empathy

Parallely (or perhaps due to the conceptual elusiveness surrounding the notion of empathy), research is often criticised for inadequately operationalising this construct, resulting in a measurement that does not align with the definition proposed by the authors (Sulzer et al., 2016; Coll et al., 2017; Main et al., 2017; Hall & Schwartz, 2022). This section addresses the lack of specificity in measuring empathy, drawing upon neuroscientific research on empathy as an illustration. Overall, this pitfall may also be pointed out in other behavioural sciences employing the experimental method, such as psychological, philosophical, medical, linguistic, and anthropological perspectives (Main et al., 2017). Subsequently, we will elaborate on how empathy should be measured to overcome this methodological weakness, presenting the key principles of measurement that would guarantee a valid operationalisation of empathy within the context of our approach.

Looking back in the rearview mirror of neuroscientific study of empathy : A lack of specificity resulting in confusion between Pain Empathy and Perception of Others' Pain. During the first ten years of research in neuroscience, two processes of the multidimensional view of empathy - resonance and perspective-taking - took the lion's share (Zaki & Ochsner, 2012). Studies did not delve into the experience of empathy in all its complexity but rather focused on one of these processes, typically through tasks involving the observation of others' pain using images (*visual cues*)

depicting either the faces of people expressing pain or a limb in a potentially painful situation (for meta-analyses: Jauniaux et al., 2019 ; Lamm et al., 2011 ; Xiong et al., 2019). These tasks captured a spontaneous reaction when observing someone in pain, allowing the examination of the brain response associated with the resonance mechanism. In some studies, participants were required to judge the pain of individuals in the image by imagining themselves or someone else in that situation (Jackson et al., 2006; Jauniaux et al., 2019; Lamm et al., 2007). This instruction aimed to specifically apprehend the brain response associated with perspective-taking. Another type of task, called '*cue-based*', replicated a pain experience involving two (or three, Singer et al., 2006) individuals, typically heterogeneous couples (Singer et al., 2004) when both participants were naive. Participants received alternatively electrical or thermal stimuli on the hand. The brain activity of one participant was recorded while the other person was next to them. The person whose brain activity was recorded did not see their partner, but arrows of different colours and directions were shown, indicating who (either 'self-pain' or their partner: 'other-pain') would receive an electrical stimulation and whether it would be painful or not. The comparison of brain activity specific to a pain situation in 'self-pain' vs. 'other-pain' conditions allowed the highlighting of common brain activations (associated with the resonance mechanism) and distinct activations (associated with the perspective-taking of others) involved in perceiving one's own pain compared to empathy for the pain of others (Lamm et al., 2011 for a meta-analyse). Generally, studies complemented this task with a questionnaire on empathy commonly used to assess a person's general level of empathy (Interpersonal Reactivity Index - IRI, Davis, 1980).

This paradigm developed at a time when researchers were particularly interested in the resonance mechanism in empathy, seeking a situation that would demonstrate that witnessing an emotion in someone reactivates it in the observer (Jackson et al., 2005 ; Morrison et al., 2004 ; Singer et al., 2004). Pain is inherently a source of empathy as it generally leaves no one indifferent. Scientifically, these brain correlates were already well-identified, and experimental studies to replicate them in the laboratory were well-documented (Decety & Meyer, 2008). Pain became the ideal candidate for examining the hypothesis of shared representations in the realm of emotions, thus verifying whether "*sharing*" others' pain meant activating our own brain representations of pain. Several variants of this paradigm also highlighted the cognitive dimension of empathy (Fan et al., 2011 ; Lamm et al., 2011). However, over the long term, the systematic use of observing others' pain to study empathy has created confusion between the perception of others' pain and empathy for those individuals. The validity and specificity of empathy measures in neuroscience are therefore questionable as they relate not to empathy but rather to the perception of others' pain. Herein the focus is made on neuroscientific research, yet, this issue concerns the broader field of behavioural

sciences. Throughout the history of empathy research, the lack of specificity in measurement is recurrent, with inconsistency between the definition and measurement of empathy, regardless of the conceptualisation of the authors and their disciplinary perspective (Wispé et al., 1986 ; Cuff et al., 2016).

Firstly, there is no clear established link between empathy (or any of its processes and/or brain correlates) and the behavioural measures used in neuroscientific studies. Regardless of the task ('visual cues' or 'cue-based'), in each trial, the participant had to evaluate the level of pain of the person they observed or whose pain they imagined on a visual analog scale (VAS: left end = no pain; right end = worst imaginable pain, subsequently translated into a score between 0-100). Many studies also assessed the discomfort or distress felt by the participant in each trial, using a similar VAS. This measure was particularly associated with the involvement of the affective sharing mechanism (Danziger, 2006; Decety et al., 2010; Fan & Han, 2008). Yet, the judgement of the level of others' pain is systematically evaluated without explaining how it might reflect the participant's empathy involvement and thus be considered an 'empathic response' at the behavioural level. In other words, should we consider that when we see someone in pain, the more it arouses our empathy, the more we might judge their pain as intense ? This link is hypothetical, as to date, neuroimaging results (EEG, fMRI) regarding correlations between brain responses associated with empathy for others and the judgement of others' pain are inconsistent (Coll, 2018). This discrepancy could be due to a small sample size, considered insufficient for this type of analysis (Schönbrodt & Perugini, 2013), increasing the risk of false-positive results (Button et al., 2013). However, this methodological point is debated because other researchers downplay the risk of Type I error with a small sample in a task with a large number of trials (DeBolt et al., 2020; Forrester, 2015; Rouder & Haaf, 2018), which is the case in a study using neuroimaging techniques.

This limitation particularly concerns the interpretation of ERPs obtained in response to observing others' pain. The results of a recent meta-analysis suggest that the association between early ERPs (N1, N2) and affective resonance is not as reliable as initially proposed (Coll, 2018). Out of the 20 studies considered in this meta-analysis, some show a significant increase in the amplitude of N2, while others observe a significant decrease in the amplitude of N2 when comparing 'pain' stimuli to 'neutral' stimuli. This heterogeneity resulted in a non-significant outcome in the subsequent meta-analysis conducted by the author, testing the difference in N2 between pain and neutral conditions (see Coll, 2018, p. 1011). Michel Pier Coll concluded that the N2 component was not a reliable measure to account for pain processing in general, and specifically to the involvement of empathy, the affective sharing process in response to perceived pain by the participant. Moreover, the author

conducted exact binomial tests revealing a possible overestimation of effects on the N2 component, considering their power and size. It is possible that ERPs generally associated with empathy for others' pain reflect purely perceptual processes unrelated to those involved in empathy. In other words, these ERPs might infer the detection and identification of the expression of pain, rather than, as traditionally proposed, resonance and cognitive processes involved in empathy.

Secondly, the control condition in neuroscientific studies on empathy is a 'pain-free' condition, not a 'non-empathic' condition. Therefore, it cannot be concluded that (1) participants did indeed feel empathy during the task, and (2) the factors manipulated in these studies specifically impact the participant's empathy when observing or imagining others' pain. Regardless of the context of the situation (basic emotions - negative, positive, physical or social pain, etc.), studies on empathy should include a control condition that is not emotionally neutral (e.g., pain-free) but 'non-empathic' (a situation where one perceives others' emotion, but it does not trigger empathy). For example, a study on paternal relationships examined the brain activity of fathers with a child under 3 months when they hear their child's cries (experimental condition: expecting the father to be empathic), of a child who was not theirs, or an instrumentalized sound with controlled tone and intensity (control conditions : less or no empathy when hearing these sounds ; Rilling, 2013). In fact, work on parental relationships (Feldman, 2017; Levy et al., 2019), social touch (Goldstein et al., 2018), or social pain regulation (Fauchon et al., 2017, 2019; Korisky et al., 2020) has demonstrated a desire to better operationalise empathy in the laboratory and has already offered promising avenues for reinventing experimental paradigms dedicated to the study of empathy.

Another solution would be to compare two groups of individuals: one empathic and the other not. This requires clarifying what is (or is not!) an 'empathic person' according to the definition of this concept and associating it with measure(s) validating this definition (Coll et al., 2017; Hall & Schwartz, 2022 ; Main et al., 2017). For instance, Coll and collaborators (2017) proposed a new methodological framework that would allow the measurement of empathy according to the definition they refer to⁴. They elaborated an approach based on information processing models to detail the different processing stages necessary for empathy to occur (see also Bird & Viding, 2014). For them, a person is considered empathic when he/she correctly identifies and shares the target's emotion. What is of particular interest is the authors' endeavour to provide precise definitions of the

⁴For these authors, empathy is defined as *the sharing of another's affective*, and results in "the adoption of another's affective state so that both the *empathizer* and the *empathic target* are in a similar state" (Coll et al., 2017, p 133) which corresponds to the most consensual definition of empathy among researchers in the field of cognitive neuroscience and psychology (Cuff et al., 2016; Decety and Jackson, 2004; de Vignemont and Singer, 2006; de Waal, 2008; Zaki and Ochsner, 2012; Shamay-Tsoory et al., 2009; see also the sub-section 'Empathy in neuroscience' above).

two processes they believe underlie an empathic response, and especially to clearly describe how these processes manifest and interact to elicit (or not) empathic behaviour. This approach aims to explain the variance in empathic behaviour (or response according to these authors). In fact, the inter-individual differences in the manifestation of empathy may be explained "in terms of individual differences in the ability to identify another's emotional state ('emotion identification'), and the degree to which identification of another's state causes a corresponding state in the self ('affect sharing')" (Coll et al., 2017, p. 132). Within the following section, we employ the same approach and propose a measurement framework bridging the gap between our definition of empathy and its measurement in the laboratory (its operationalisation).

Measuring empathic behaviour according to our approach: Key principles and recommendations. Under the definition proposed by Decety (2021) and accepted in our approach, for empathy to occur, regardless of its form of manifestation (spontaneous or controlled), the individual must both : - **be touched** (in the sense of being sensitive or affected by others' emotions, referring to the mechanism of affective sharing [AO]), and, - **feel concerned for** the well-being of the person with whom he/she is interacting (referring to the mechanism of concern for others [CO]). Note that herein we voluntarily use a different term than 'share' when defining the AO process to avoid confusion with the 'standard' definition of empathy (Coll et al., 2017 ; Decety & Jackson, 2004). Under our definition of empathy, therefore, a person would be considered *empathic* if they **are touched** by another individual's emotion and **feel concern for** this individual's well-being. In general, the behaviours and feelings that prevail when one is empathic, and may complement our definition of empathy, are kindness, willingness to help or support others, and compassion.

Thus, the study of empathy, regardless of its form of manifestation (spontaneous or controlled), requires the presence and covariance in the experimental design of its two core components (AF and CO). And, it is necessary to manipulate these two factors separately so that the dependent variables sensitive to empathy will be sensitive to both components. In other words, any measure purporting to assess empathy should yield a significant interaction effect between the AF and CO factors. Therefore, by this criterion, existing approaches to measure empathy (e.g., questionnaires) would only be valid relative to our definition of this construct, if they demonstrate such an interaction effect. Albeit it may appear artificial, the following example of study illustrates the manipulation of AF and CO : Consider the case of a parent who sees their child in tears in their bedroom. The parent feels empathy, deeply touched by their child's suffering, and will spontaneously try to comfort them by embracing them and offering soothing words. The level of AF

will be manipulated by the context, as illustrated in this example by the cause of the child's suffering. If, upon questioning their child, the parent learns that they are a victim of bullying at school, there will be a high level of affective sharing, consistent with the dramatic situation and the significant suffering of their child. In contrast, if their child's distress is due to a poor grade in school, the parent will be affected by their distress, but to a much lesser extent than in the previous scenario. Concern for others will be manipulated by modulating the relationship between the two individuals : in the case of their own child, the parent will feel much greater concern for their well-being than in the case of a child they do not know well, such as a friend of their child (Figure 4).

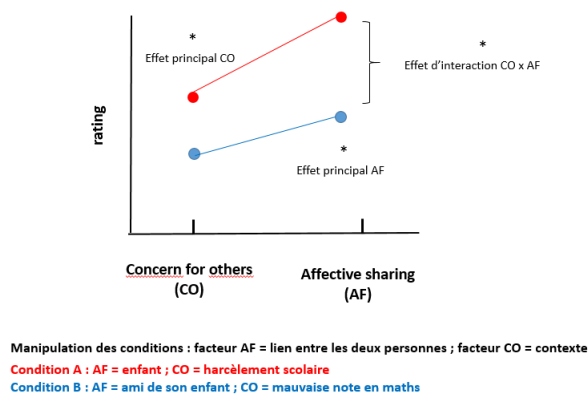


Figure 4 - illustration dans le cas d'un design within-subjects

The same logic applies to between-subjects comparisons. If the aim of the experiment is to compare levels of empathy, for instance by examining which of two groups is more empathic, considering it more as a trait: For example, in the medical context, comparing empathy among different healthcare professions (e.g., nursing vs. doctor), or in clinical populations, such as individuals with psychiatric disorders altering empathy (psychopathy vs. autism spectrum disorders, see also Lockwood, 2016). The logic is similar when empathy is understood as a state: for instance, a person experiencing burnout vs. a person not stressed, or the out-group vs. in-group effect (see also Hein et al., 2010 for the latter situation). As an illustration, consider a study aiming to compare the empathic behaviour of nurses vs. doctors working in an oncology service and interacting with a patient. The level of affective sharing will be manipulated by the context, with one condition where the patient has a high prognosis of recovery and another condition where the prognosis of the patient is low. Concern for others will be manipulated by modulating the proximity with the patient: one condition where the caregiver has no emotional attachment to the patient, and the other condition where the patient is sympathetic to them. The concern for the patient will be much lower when the caregiver feels no particular sympathy for them (Figure 5).

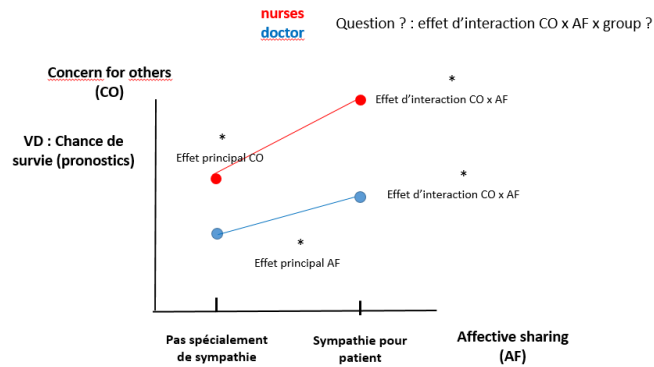


Figure 5 - illustration dans le cas d'un design between-subjects

Concretely, in general, the behaviours and feelings that prevail and could therefore serve as a measure of empathic behaviour (e.g., through a self-report assessment) are kindness, willingness to help or support others, and compassion. However, these measures are absolutely not exclusive and specific to empathy, and not necessarily related to prosociality. An interesting question could be to raise the interindividual variability or modularities in the emotions that compose this set of emotional reactions, and for instance to identify whether some of them will dominate and persist longer during the interaction, and then, could be considered as standard variables to measure empathic behaviour. To do that, it will be crucial to use a continuous measure (e.g., rating on a visual analog scale) to assess the empathic response throughout the task. Overall, whatever the variable (prosocial behaviour or not), it must show an interaction effect of the two factors (AF and CO) manipulated in the experiment to claim that the experiment allows the study of empathy. Thus, the difference between an empathic and a prosocial behaviour is that the latter would not show this interaction effect between AF and CO.

Conclusion

From its origins to the neuroscientific research initiated in the 2000s, empathy appears as *"an important, but problematic concept"* (Hall & Schwartz, 2022). *"Important"* since it is a human capacity that is essential to social interactions. But *"problematic"* since the problem of its definition seems insoluble and endless. One consensus about empathy is that it is a 'jingle-jangle fallacy'

concept, meaning it refers to multiple constructs and is interchangeable with other constructs. The aim of this article was not to settle the debate, but to adopt an integrative approach that acknowledges the paradoxes of empathy, while endeavouring to clarify the definition of its underlying processes, as well as presenting a way to operationalise it in the laboratory.

The recent model proposed by Jean Decety (Decety, 2021) seems to address the need to better understand what empathy is, relying on a narrowed definition that aligns with its original sense, i.e. assuming that empathy belongs solely to the domain of the affective. Empathy does not fall within the domain of the cognitive, although it interacts with numerous executive and controlled processes. We also assume that the behavioural manifestations of empathy could remain flexible, if we accept the idea that the two core abilities that shape empathy can emerge spontaneously or be voluntarily used, cultivated, or susceptible to be learned in order to improve their control, depending on the context in which we interact with others. By encouraging and enabling the precise definition of empathy, our framework offers the possibility of bridging the gap between the definition of empathy and its measurement in the laboratory (its operationalisation). Empathy is likely the most beautiful gift offered to human beings. As scientists, it is challenging yet truly captivating to model and capture its complexity, in order to explore it fully and better understand its functioning.

References.