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Navigating Empathy's Paradoxes: Conceptual and Methodological Perspectives

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 question its usefulness. Furthermore, empathy, which is often regarded and promoted as a positive trait, may manifest in paradoxical ways. Here, after reviewing in-depth its scientific treatment, we propose a novel approach for conceptualisation and operationalisation of the concept, building upon Decety's recent model. We aim to facilitate future unified and rigorous investigations that address the complexity of empathy and its role in contemporary societal challenges, both in personal and professional interactions. We survey the history of empathy definitions, highlighting their paradoxes. We discuss Decety's model, which defines empathy as an interaction between being touched by a person and feeling concerned for their well-being. Then we explain how this model could be reconceptualized and extended. Finally, we explore operationalisation and measurement issues, discuss pitfalls of prominent paradigms in cognitive neuroscience research, and envision how existing paradigms could be modified toward more valid assessments.

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

Introduction

Empathy, labelled a "jingle-jangle concept" by Hall and Schwartz (2022), eludes straightforward scientific treatment. The description by Jean Decety (2020) reflects the challenge of pinning down and defining the 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 concern is largely shared by the community, as illustrated by critical reviews addressing the inconsistencies and controversies surrounding the concept (Batson, 2009; Bloom, 2017; Cuff et al., 2016; Duan & Hill, 1996; Gladstein, 1983; Hall & Schwartz, 2022). The aim of this article is not to add fuel to such semantic fire. In fact, we consider that the term used to name the underlying psychobiological process – such as empathy, sympathy, compassion, affective sharing, mentalizing, etc. – may not be the most important matter. In spite of these semantic debates, most investigators agree that there is a complex yet integrated function that these terms try to pinpoint, which exists at the core of human social interactions and plays a key role in their regulation. Many claim that it might constitute the essence of our humanity, even though there is growing evidence that it might also operate in the animal kingdom (Adriaense et al., 2020; Pérez-Manrique & Gomila, 2018). A constructive path of research is to concentrate on clarifying the processes underlying this putative function - that we choose to call '*empathy*'. Herein, we propose an approach to conceptualising and operationalising it, considering its paradoxical manifestations, wishing to facilitate future unified and rigorous investigations, which would tackle its complexity and help address 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. Likewise, empathy may at times induce negative attitudes toward the self or others, in particular when individuals experience guilt, powerlessness, cognitive overload or exhaustion, in face of the other's distress. That may lead to a variety of interactions between one's sensitivity to others' state and one's desire to help them, in the generation of empathy-related behaviours. Such considerations suggest a key difference between empathic behaviour and prosocial behaviour.

We start 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 yield paradoxes, which are in our sense, constitutive of empathy. In this context, we discuss a recent model of empathy by Decety (2021), which offers useful foundations for our rationale. The next section explains how our approach integrates Decety's model, extending his conceptualization, notably by shedding light on the intricate dynamics of social interactions and uncovering paradoxical elements when experiencing empathy. The last section attempts to tackle the challenge of operationalising and measuring the effects of empathy in the laboratory. It begins by discussing the limitations of the traditional paradigm of pain observation commonly used to investigate the cerebral bases of empathy, which we claim tend to confuse empathy for pain and the perception of pain in others. Then, we advocate for the adoption of experimental and data analysis approaches targeting the interactions between sensitivity to others' states and concern for their well-being, taking into account individual differences in the experience and expression of empathy.

Empathy: Historical Foundations, Concepts and Debates

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 shades 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,

1984). The translation of 'Einfühlung' to 'Empathy' was coined by the British psychologist Edward Titchener in 1909 (Gladstein, 1984) : *'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'* (cited in Gladstein, 1984, p. 40). Later on, his conceptualization became more precise, and he described 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 was conceived of as a reactive and sensorial phenomenon, referring to a form of self-projection into objects or identification with an object that is humanised (Duan & Hill, 1996; Gladstein, 1984).

Contemporary conceptions of Empathy. After the Second World War, the concept of empathy unfolded across various branches of psychology (social, developmental, humanistic)¹, generating widespread enthusiasm within the scientific community (Duan & Hill, 1996; Wispé, 1986). 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 gave 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 may differ 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 has undoubtedly been the affective and/or cognitive nature of empathy (Cuff et al., 2016). 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, affective empathy is more specific and *"refers to one specific set of congruent emotions, those feelings that are more other-focused than self-focused"*. 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**

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

***share their sadness'* then means that I feel their distress and experience sympathy or compassion for that person.**

In the cognitive domain, empathy refers to the act of putting oneself in another's shoes to identify and understand as accurately as possible what they might be thinking and feeling. This is exemplified by the role ascribed to the psychotherapist by psychoanalyst Carl Rogers : *'the counselor is perceiving the hates and hopes and fears of the client through 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 as integral to empathy: without the two components acting together, it is not considered as empathy. Alternatively, others hold that empathy can be either affective or cognitive depending on the situation (Hornblow, 1980; Duan & Hill, 1996; Batson et al., 1997). For example, Carl Rogers' own conceptualization in 1975 has evolved and now also incorporates an affective dimension (Gladstein, 1983).

These multiple visions of empathy introduce certain ambiguities. 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 before all a circumscribed mental state, a series of multimodal perceptual and appraisal mechanisms leading to it, or the behaviours it modulates, or a combination of the three? Another area of confusion arises from the debate between empathy as a disposition *versus* as a situational state. In views of empathy as a disposition, it is a personality trait, therefore relatively stable, often innate and predetermined. In this case, it is assumed that some individuals are more empathetic than others. Alternatively, empathy can be viewed as situational, that is an emotional state expressed in a specific situation: for example, one may have empathy for a loved one but not for a stranger (Cuff et al., 2016). The idea that empathy is dispositional has given rise to numerous questionnaires², which nevertheless often show little to no correlations among them (Hornblow, 1980). On the other hand, a conception of empathy as situational implies to design experimental tasks where researchers seek to manipulate the conditions of elicitation of empathy and explore intra-individual differences in empathy (In what context does my empathy manifest? What factors influence its expression?). This is evident in the work of Daniel Batson on the links between empathy and altruism (Batson et al., 1991; Batson & Coke,

² For example, the Barrett-Lennard Relationship Inventory (Ganley, 1989; Hill et al., 1994; Hogan, 1969; Mehrabian & Epstein, 1972) ; the Interpersonal Reactivity Index (IRI) by M.H. Davis (1980) (Davis, 1980). The latter is undoubtedly the most well-known and widely used in neuroscience today.

1981). This perspective also leads to studies aimed at training empathy and proposing empathy programs to address a variety of disorders (Feshbach, 1975).

Irrespective of their outcomes, these debates reflected a remarkable enthusiasm surrounding the concept of empathy, with a rich literature yielding several compelling observations. First, empathy varies significantly from one individual to another, and in all likelihood within the same individual, as it appears to be influenced by numerous factors such as the more or less direct and personal connection or more or less symbolic identification one experiences with another person, how one interacts with that person, and the features of the situation. The determinants and modalities of expression of one's empathy, therefore, heavily depends on the context in which we find ourselves. Second, empathy emerges over the course of development and can be learned or at least up- or down-regulated over some period of time.

Empathy in cognitive and affective neuroscience. In the early 2000s, cognitive and affective neuroscientists somewhat rediscovered the concept of empathy, considering it, like many before them, as a fundamental ability for interpersonal relations. The prevailing view has been that of a multidimensional definition borrowed from conceptions in psychology. Empathy has been 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 would enable us to share the feelings of individuals with whom we interact, and thus to understand and act appropriately toward them. One of the very first models (Decety & Jackson, 2004) aptly illustrated this 'plural' vision, termed 'heuristic' by the authors, who adopted a phenomenological approach in defining empathy, 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).

According to 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). Taking 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, according to such model, for empathy to occur, resonance has to be coupled with other processes, including a fundamental one that develops in early childhood: *self-awareness in relation to others (or self/other distinction)* (De Vignemont & Singer, 2006; Decety & Jackson, 2004; Decety & Meyer, 2008; 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 processes that can be cognitively demanding (also referred to as executive control in Decety & Meyer, 2008, Figure 1): *perspective-taking (or mentalization)* and *emotion regulation*; which are important for detaching ourselves from our own emotions and more explicitly appraising (judging, evaluating) what the other person is feeling and why. Perspective-taking refers to a form of mental flexibility allowing us to adopt or simulate the subjective viewpoint of others. It is cognitively demanding as, according to this model, it requires detaching ourselves from our 'default' mode of functioning - i.e., egocentrism (Decety & Meyer, 2008) – in order to infer how and why 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, in that sense, may not be possible without some degree of *regulation of one's own emotions* (for example, those triggered by 'resonating' with the distress of the 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, perhaps experiencing guilt in the face of his own pitiful incapacity.** In this context, emotional regulation enables us to control our reactions to the emotions of others, and would thus be an essential component of empathy (Decety & Jackson, 2004, but also Decety, 2011; Engen & Singer, 2013; Zaki, 2014). According to this type of models, 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). Thus, in line with authors such as Daniel Batson (Batson, 1987, 2011) or Martin L. Hoffman (Hoffman, 2008), cognitive and affective neuroscientists assume a strong connection between empathy and altruism. Generally, definitions of empathy incorporate this dimension through the concept of empathic concern, signifying that empathy is typically accompanied by an altruistic sentiment that may translate into a motivational component or drive, such as 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.**

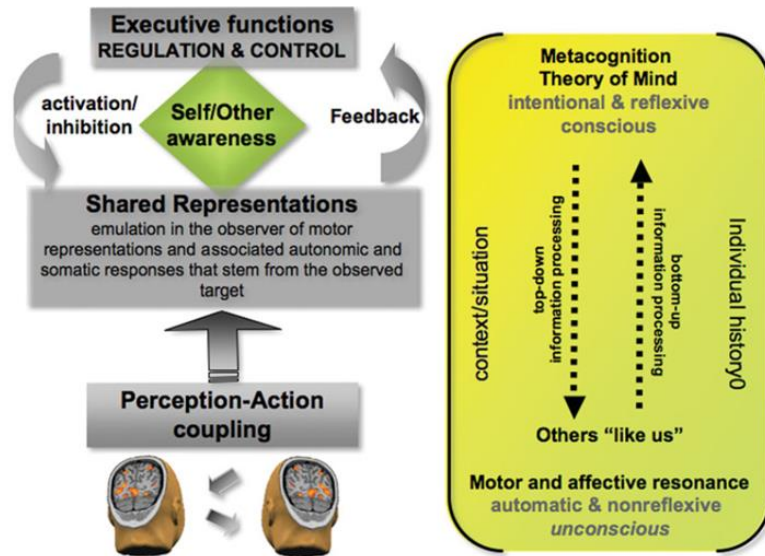


Figure 1: The processes underlying an experience of empathy (Decety & Meyer, 2008), reproduced with the author's permission

The model by Decety & Jackson (2004) greatly impacted neuroscientific research into empathy and remains a reference in cognitive and affective sciences. Other more recent models align with this multidimensional perspective, where empathy denotes a complex subjective experience involving sharing and understanding of others' mental states, and entailing a broad functional architecture (Bird & Viding, 2014; De Waal & Preston, 2017; Schurz et al., 2021; Stevens & Taber, 2021; see Luis et al., 2023 for a critical review). This multidimensional perspective guided neuroscience studies on the brain's underpinning of empathy. Notably, neuroimaging studies have supported the hypothesis that implicit psychosocial biases influence the perception of pain in others, and contributed to identify brain regions generally associated with processes related to the construct of empathy (Han, 2018 for a review). However, this heuristic and multidimensional perspective, along with functional-anatomical interpretations, have contributed to reinforcing the sentiment that empathy may be after all a jingle-jangle fallacy, ultimately reflecting a medley of processes related to social cognition, without a core function.

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

(a) *affective sharing*, which would correspond 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 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 cognitive and affective neuroscience view of affective sharing, and would rather fit with a definition of empathy centred on the notion of 'sensitivity', as proposed in the introduction, pertaining to a form of emotional reactivity.

(b) *concern for others*, which would be linked to biological mechanisms primarily selected for offspring care. Being empathetic thus would involve, for instance, **feeling sad FOR (or WITH) one's child because one cares about their well-being**. Attachment and dependence would therefore be integral determinants of empathy, which would then translate into altruistic behaviours or feelings. Note that what generally distinguishes empathy from emotional contagion in the literature is the ability to differentiate oneself from others (Bird & Viding, 2014; Decety & Jackson, 2004; Singer & Lamm, 2009). In this model, such differentiation is conceived of at the level of the presence or absence of a prosocial dimension (concern for others). If one is solely reactive to the emotions of others, one is dealing more with 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 the model, Decety views perspective-taking as a mechanism of 'influence' of empathy—but no longer as one of its core components. He also specifies how empathy may manifest at the behavioural level, establishing an explicit link between the underlying processes of empathy and associated behaviours (Figure 2).

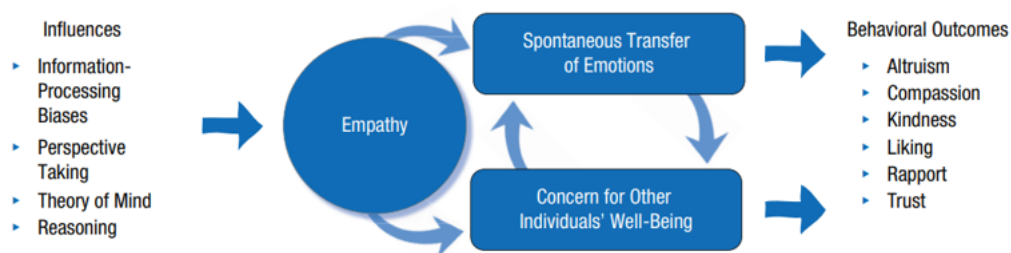


Figure 2 : Empathy and its consequences (Decety, 2021). Reproduced with author's permission.

In the model, empathy itself, as an interactive process between mechanisms of spontaneous transfer of emotions and concern for other individual's well-being, is controlled by social contexts and cognition (coined by J. Decety as "*influences*", Figure 2). These influences include psychological biases modulating information perception, and perspective-taking is one of these *influences* – which is no longer a constituent of empathy proper. 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, Decety's model also specifies how empathy plays a motivational role and manifests at the behavioural level, establishing an explicit link between the underlying processes of empathy and associated feelings and behaviours. In line with Batson's empathy-altruism theory (Batson et al., 1991), the model entails that empathy leads to prosocial behaviour, meaning that generally, the attitudes or feelings that dominate and reflect empathic behaviour are benevolence, a desire to help and support, and compassion³. Note that Decety's points out that these behavioural outcomes are interpersonal, suggesting that there may be a variety of emotional reactions consecutive to empathy depending on individual differences.

Building upon Decety's narrowed model for an integrative and operational approach that accounts for empathy's paradoxes

Although the construct validity of Decety's recent model is still open for debate, it is worthwhile to envision, in a heuristic manner, possible elaborations and operationalizations that could emerge from it, as it represents a promising functional model for empathy.

The three main elements constituting this model are the following. (1) It emphasizes a narrowed definition of empathy centred on its affective dimension, based on two interacting core automatic abilities: affective sharing and concern for others. (2) Cognitive processes have their place in the model, not as one of its core constituents, but as sources of influence and control of the core process. (3) The core process controls and modulates motivation and behavioural outcomes. The following section explains how several aspects of this model can be extended and complemented toward what we believe would be a more encompassing conceptualization of empathy. We do not aim at proposing major modifications or a completely novel perspective, but we believe that the

³ We are not referring to the Buddhist perspective of the notion of 'compassion' (Mosig, 2006). Here, the term "compassion" relates to an emotional response (a feeling, an attitude), namely an outcome resulting from the engagement of empathy.

distinctions we introduce and the theoretical and practical ramifications we consider are useful and important.

First, we claim that Decety's recent proposal (2021) is compatible with two main forms of manifestation and conditions of triggering of empathy (Figure 3). (1) Empathy, as underpinned by the core processes, i.e. the interaction between affective sharing and concern for others, can be induced spontaneously (automatically), while strongly influenced by environmental factors and psychological biases. Depending on the context and the individual with whom one interacts, empathy may or may not be triggered, e.g. if you find the person in front of you very unsympathetic, it is likely that your empathy for the person would be inhibited. (2) Empathy can be more controlled, with the core process interacting with cognitive control or other processes implicated in social cognition (such as perspective-taking, reasoning, and affect regulation), although in Figure 2, such interaction is presented as a unidirectional mechanism of influence. Notably, such controlled empathy involves distancing oneself from one's own emotions to focus on better understanding the other and provide a more adaptive response. Controlled empathy would align with the multidimensional view proposed in Decety & Jackson (2004), representing a deliberate empathetic response, such as seen for instance in medical empathy (Decety, 2020). Therefore, when studying empathy, it is important to specify and control for the particular aspects of empathy under consideration, as empathy can involve a more intricate set of processes than solely the action of the core process, depending on the form of its manifestation and context.

Second, there is a key difference regarding the motivational and behavioural outcomes of empathy (*empathic response* or *empathic behaviour*) between Decety's proposal and our perspective on empathy. We agree with the fact that, in general, empathy manifests through prosocial behaviours. However, we emphasise one important paradox of empathy, the expression of which may not always be prosocial outcomes, such as: altruism, compassion, kindness, liking, rapport, trust (Figure 3). 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, altogether scared, sad and angry. Conversely, another individual may possess a low level of empathy, possibly no empathy at all, e.g. as a result of a psychiatric disorder such as psychopathy (Lockwood, 2016). Yet, this individual could manifest prosocial behaviours as a result of education, social conformity or strategic plans to achieve

selfish outcomes. Of note, individuals may also experience empathy towards non-human 'entities', such as an animal, an object, or a fictional character, which is consistent with the original notion that empathy can extend beyond human beings to encompass various entities.

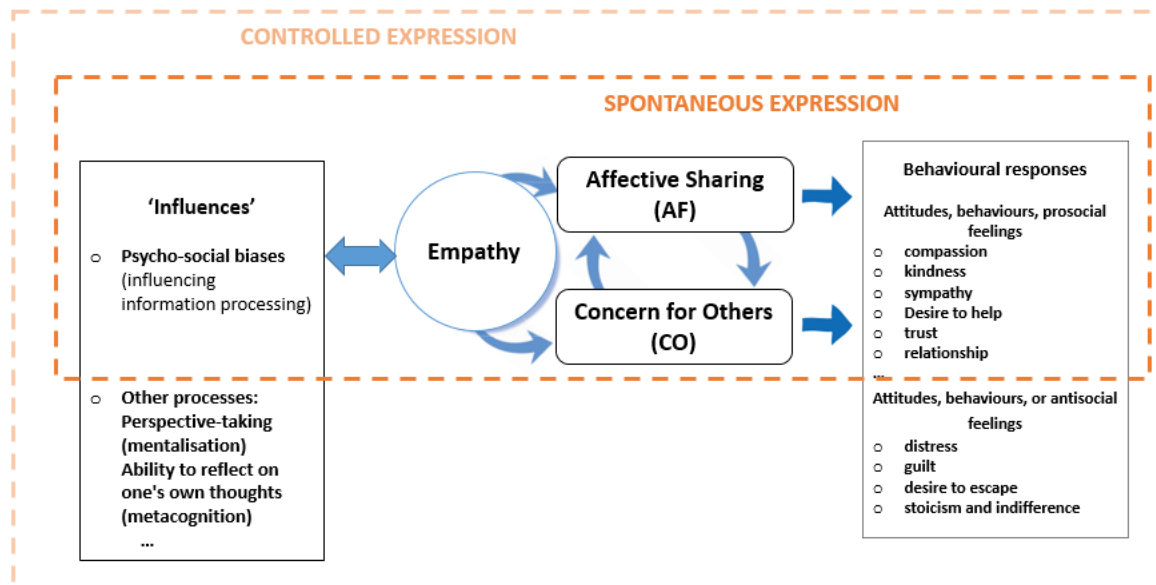


Figure 3: The processes of empathy and its expression modified according to our approach. It is important to note that it is not impossible to experience a mix of prosocial and antisocial responses; however, one response will likely dominate within this mixture of emotions, leading to a particular behaviour.

The theoretical perspective we propose aims at better accounting for empathy as a complex yet coherent set of mechanisms, while maintaining a theoretical framework largely consistent with the core process and overall setup of Decety's recent model. It opens the possibility to study empathy in a variety of contexts and forms of manifestations, in a manner that is compatible with its paradoxes of expression, e.g. maladaptive negative, antisocial reactions and behaviours hiding the actual presence of a genuinely empathetic action of the core process in individuals. It may also offer directions for developing and training empathy and its connections to motivation and behaviours in a more realistic and adaptive manner. The question of the links between spontaneous and controlled empathy, both in terms of understanding their fundamental mechanisms of interaction and finding interventional solutions based on those mechanisms, remains largely open, and is relevant for emerging research on the role of emotional regulation processes in empathy (Thompson et al., 2019; Zaki, 2020). The question could also be considered from a developmental perspective, aligning with several theoretical proposals (Decety & Holvoet, 2021; Decety & Michalska, 2020; Demetriou, 2018) : empathy starts developing very early in infants, and evolves during childhood along with the development of cognitive control processes (mental flexibility, emotion regulation, and so on).

Children are normally able to spontaneously manifest empathy at an early age, but it takes several years for them to be able to do so in a controlled manner, to adaptively tackle its complexity and paradoxes.

One notable implication of our theoretical perspective is the need to better analyse and disentangle the links and interactions between affective sharing, concern for others, motivation and manifest behaviours. Decety's model presents affective sharing and concern for others as intertwined, yet their interactions remain largely unexplored, and, to the best of our knowledge, Decety did not elaborate on their potential relations, at least in his recent seminal article introducing the new model (Decety, 2021). As shown in Figure 2, in the model, affective sharing and concern for others appear to mutually influence each other. But does their interactions always entail a self-reinforcing positive feedback, which might become maladaptive, e.g. leading to alienation and oblation, or does they at time involve negative feedback, with potentially complex dynamics of cross-inhibition, to inherently regulate the core process and maintain it within adaptive boundaries? Likewise, how do the core process and its different sources of cognitive and affective influence interact, e.g. to account for paradoxical motivational processes and behaviours that are in contradiction with the model's expectation of prosocial behaviours? In line with Coll et al. (2017), we also believe that it is crucial to understand and study with fine-tuned methodologies the mechanisms and determinants underlying inter- and intra-individual variability in empathic processing and responses. Notably, it is essential to isolate contextual factors that may hinder or reinforce adaptive behavioural outcomes when an individual engages his/her empathy. This would allow us to better apprehend the complexity of empathy and account for its apparent paradoxes.

The Need for new Methodological solutions to Measure and Characterize Empathy

Perhaps because the notion of empathy is conceptually elusive, research has often been criticised for inadequately operationalising the construct, with measurement tools that poorly capture the definitions proposed by authors (Coll et al., 2017; Hall & Schwartz, 2022; Main et al., 2017; Sulzer et al., 2016). In this section, we first discuss the lack of specificity of prominent methods for assessing empathy and its impact on behaviour, drawing upon neuroscientific research as an illustration. This pitfall can also be found in purely behavioural sciences using the experimental method, building upon psychological, philosophical, medical, linguistic, and anthropological perspectives (Main et al., 2017). Then, leveraging our conceptual elaborations above, we consider possible solutions to better measure

and characterize empathy. We propose principles of measurement that could reinforce the validity of empathy's operationalisation for scientific research and applications.

Looking back in the rear-view mirror: the lack of specificity and confusion between Pain Empathy and Perception of Others' Pain in the neuroscience of empathy. During the first decade of research in the neuroscience of empathy, two processes from the multidimensional model of empathy - resonance and perspective-taking - took the lion's share (Zaki & Ochsner, 2012). Studies did not delve into empathy's integral complexity but instead focused on one of these two processes. It was typically done 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 see: Jauniaux et al., 2019; Lamm et al., 2011; Xiong et al., 2019). These tasks captured a spontaneous reaction when observing someone in pain, allowing investigators to study the brain responses 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 specifically at investigating brain responses associated with perspective-taking. Another type of tasks, called '*cue-based*' tasks, induced pain experiences in two (or three, Singer et al., 2006) individuals, typically heterogeneous couples (Singer et al., 2004), all participants being unaware of the studies' aims. Participants alternatively received electrical or thermal stimuli on the hand that were painful or not depending on conditions. The brain activity of one participant was recorded while the other person was physically close. 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 the brain activity specific to the pain conditions between 'self-pain' *versus* 'other-pain' conditions was used to extract overlapping brain activations associated with the resonance mechanism, and non-overlapping activations more specifically associated with perspective-taking and the perception of the other's pain *versus* one's own, as a proxy for brain processes underpinning "empathy" (Lamm et al., 2011 for a meta-analyse). Generally, the task was complemented with the administration of a questionnaire commonly used to assess a person's general level of empathy for further correlational analyses (Interpersonal Reactivity Index - IRI, Davis, 1980).

This type of paradigm was developed at a time when researchers were particularly interested in the resonance mechanism, and sought an experimental situation capable of demonstrating that witnessing an emotion in someone activates this emotion 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, pain's anatomic-functional correlates in the brain were already well-identified, and experimental studies had well documented how to reliably replicate them in the laboratory (Decety & Meyer, 2008). Pain became the ideal candidate for testing the hypothesis of shared neural representations in the realm of emotions (although it is still debated whether pain constitutes an emotion proper). The aim was then to demonstrate that "*sharing*" others' pain meant activating our own brain representations of pain. Several variants of this paradigm were also used to study the cognitive dimension of empathy (Fan et al., 2011; Lamm et al., 2011). However, we argue that, over the long run, the systematic recourse to paradigms based on the observation of others' pain to study empathy in the highly constrained context of cognitive and affective neuroscience methods, has fostered the establishment of a common categorical confusion that, in focusing too narrowly on the perception of a person's pain, can't see the forest for the trees and reduces empathy for a person to just that perception. The validity and specificity of standard empathy's proxies and methods of assessment in cognitive and affective neuroscience are therefore questionable.

It is important to note that, beyond cognitive and affective neuroscience research, these types of methodological issues are pervasive in the broader field of behavioural sciences. Throughout the history of empathy research, the lack of specificity in assessing empathy and inconsistencies between its definitions and methods of measurement have been recurrent, irrespective of the conceptualisation of the authors and their disciplinary perspective (Cuff et al., 2016; Wispé, 1986).

There is no clear established link between empathy (or any of its processes and/or brain correlates) and the behavioural measures used for neuroscientific studies. Regardless of the task ('*visual cues*' or '*cue-based*'), in each trial, the participants evaluate the level of pain of the person they observe or whose pain they imagine on a visual analogue scale (VAS: left end = no pain; right end = worst imaginable pain, e.g. subsequently translated into a score between 0-100). Many studies also assessed the discomfort or distress felt by the participants in each trial, using a similar VAS. This measure is 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 accounting for how it might reflect the involvement of the participant's empathy, and thus be considered an 'empathic response' at the cognitive, affective and behavioural levels. Should we then consider that when we witness someone in pain, the more it arouses our empathy, the more we might judge their pain as intense? This link is hypothetical, and to date, neuroimaging and electrophysiological results (fMRI, EEG) show that correlations between brain responses associated with empathy for others and the judgement of others' pain are inconsistent

(Coll, 2018). Such discrepancy could be due to a small sample size, considered insufficient for this type of analysis (Schönbrodt & Perugini, 2013), potentially increasing the risk of false-positive results (Button et al., 2013). However, this methodological concern has been debated as several researchers, perhaps themselves downplaying the risk of Type I error, consider that the problem of a small sample is mitigated by tasks including a large number of trials (DeBolt et al., 2020; Forrester, 2015; Rouder & Haaf, 2018).

This issue 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 believed (Coll, 2018): out of 20 studies some showed a significant increase whereas others a significant decrease in N2 amplitude when comparing 'pain' stimuli to 'neutral' stimuli. This heterogeneity resulted in non-significant effects in the meta-analysis conducted by the author (see Coll, 2018, p. 1011). Coll concluded that the N2 component was not a reliable measure to study pain processing in general, and, specifically, the involvement of empathy, construed as an affective sharing process in response to perceived pain by participants. The author also conducted exact binomial tests, considering statistical power and sample size, suggesting a possible overestimation of effects on the N2 component. It is thus 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 relate to the detection and identification of the expression of pain, rather than, as traditionally proposed, resonance and cognitive processes involved in empathy.

Another issue concerns the control condition often used in neuroscientific studies on empathy, which is a 'pain-free' condition and not a 'non-empathic' condition. Therefore, one cannot be confident that (1) participants did indeed experience empathy during the task, and (2) the factors manipulated in these studies specifically engaged the participant's empathy when observing or imagining others' pain. Regardless of the context of the situation (basic emotions, negative, positive affects, physical or social pain), studies on empathy should strive to 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) *versus* 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). Studies 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) have aimed at better operationalising empathy in the laboratory and have offered promising avenues for reinventing experimental paradigms dedicated to the study of empathy.

Another approach is to compare two groups of empathic *versus* not empathic individuals. This would require to clarify what is (or is not!) an 'empathic person' according to the definition of this concept and associating it with valid corresponding measures (Coll et al., 2017; Hall & Schwartz, 2022; Main et al., 2017). For instance, Coll and collaborators (2017) proposed a new methodological framework for assessing empathy according to a specific but debatable definition of the concept⁴. They elaborated an approach based on information processing models in order to analyse 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. Of particular interest is the authors' endeavour to offer precise definitions of two processes, 'emotion identification' and 'affect sharing', they believe underlie an empathic response, and to clearly describe how these processes should manifest and interact to elicit (or not) empathic behaviours. The approach aims to explain the variance in empathic behaviour or "response". According to their model, 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).

In the following section, we leverage a similar approach to propose the bases for an assessment framework, aimed at bridging the gap between the conceptualization of empathy we brought forth above, which differs from the model of Coll et al. (2017) and its operationalization and measurement in the laboratory.

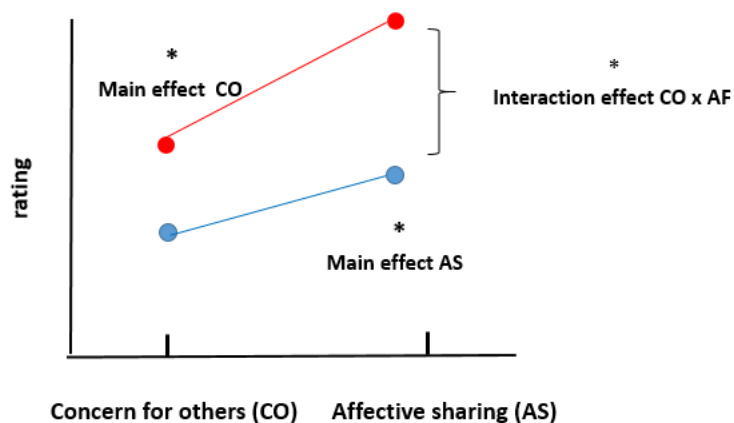
Principles and recommendations for assessing empathy's core process and behavioural manifestations. According to our elaboration of Decety's model (2021), for empathy to occur, both in the context of spontaneous and controlled empathy, the individual must both : **be touched**, in the sense of being sensitive or affected by others' emotions, which relates to the mechanism of affective

⁴These authors define empathy as *the sharing of another's affective state*, 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; De Vignemont & Singer, 2006; De Waal, 2008; Decety & Jackson, 2004; Shamay-Tsoory et al., 2009; Zaki & Ochsner, 2012; see also the sub-section 'Empathy in neuroscience' above).

sharing (AS), and **feel concerned for** the well-being of the person with whom he/she is interacting, which relates to the mechanism of concern for others (CO). Note that herein we purposefully use a different term than 'share' when defining the AS 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, but as we emphasized throughout this report, paradoxical behaviours and feelings may be induced depending on the context.

Thus, in this perspective, the study of (spontaneous or controlled) empathy requires the presence in the experimental design of its two core factors (AS and CO), and a significant interaction between them. It is necessary to ensure that, in their operationalisation, these two factors remain independent. A dependent variable sensitive to empathy's core process should then yield a significant interaction effect between the AS and CO factors. According to this criterion, existing approaches to measure empathy, e.g., questionnaires, would only be valid if they demonstrate such an interaction effect.

The application of these principles can be illustrated using the following example of possible study. Let us consider the case of parents who see their child in tears in their bedroom. The parents experience empathy if they are deeply touched by their child's suffering and wish to comfort them, e.g., by embracing them and offering soothing words. The level of AS could be manipulated by the context, for instance the cause of the child's suffering. If, upon questioning their child, the parents learn that the child is victim of bullying at school, there should be a high level of affective sharing, consistent with the terribly unfair and dramatic situation and the significant suffering of their child. In contrast, if their child's distress is due to a poor grade in school because the child has kept carelessly playing video games instead of doing homework in spite of repeated warnings by the parents, the parents may be affected by the child's distress, but to a much lesser extent than in the previous scenario. The level of CO could be manipulated by modulating the relationship between the participants and the child. One may expect that if the child is presented as their own, the parents should feel greater concern for the child's well-being than if it is a child that they do not know as well, such as a friend of their child for instance. Figure 4 illustrates typically expected results under this two-way within-participant experimental design.



Manipulation of conditions: Factor AS = relationship between the two people; Factor CO = context
Condition A : AS = Child ; CO = school bullying
Condition B : AS = child's friend ; CO = bad grade in maths

Figure 4 - Illustration in the case of a within-subjects design

The same logic can be applied when considering a 3-way experimental design with a between-participant factor aimed at comparing levels of trait empathy between two groups. For example, in the medical context, comparing empathy between different healthcare professions, e.g., nurses *versus* medical doctors, or between clinical populations, e.g., individuals with psychiatric disorders altering empathy such psychopathy *versus* autism spectrum disorders (see also Lockwood, 2016). The logic would be similar when empathy is understood as a state. For instance, a person experiencing burnout *versus* a person not stressed, or persons belonging to an out-group *versus* to an in-group (see Hein et al., 2010, about the latter case). Of note, when considered as a state, empathy could be studied in this manner either by introducing a between-participant or within-participant factor in the 3-way experimental design. In all case, there should be both a 3-way significant interaction between AS, CO and the trait or state empathy factor.

As an illustration, let us consider a study aiming at comparing the empathy in nurses *versus* medical doctors working in an oncology service and interacting with a patient. The level of affective sharing could be manipulated by the context, with one condition in which the patient has a good prognosis of recovery and another condition in which the prognosis of the patient is low. Concern for others could be manipulated by modulating the proximity with the patient: one condition in which the caregiver has no emotional attachment to the patient, e.g., as it is a patient the clinician has never interacted with directly, and the other CO condition in which they have strong sympathy for the patient,

e.g. a patient to whom the clinician has provided care for long and who has been particularly kind with the staff. The concern for the patient should be much lower when the caregiver feels no particular sympathy for them (Figure 5).

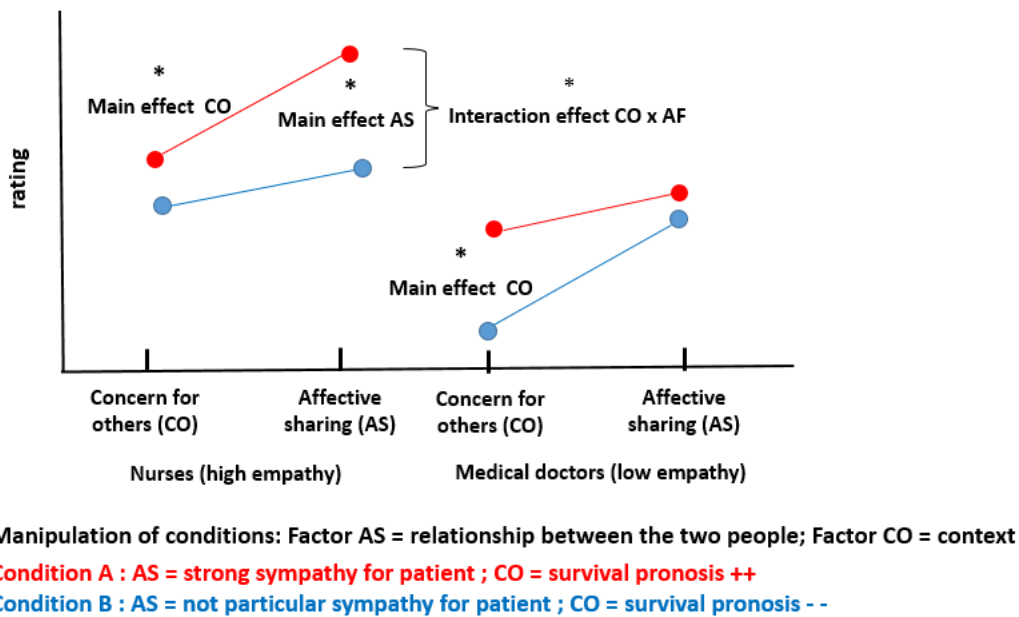


Figure 5 - illustration in the case of a between-subjects design

Different dependent variables could be used and assessed in such experimental designs, pertaining for instance to psychological or physiological arousal, basic or social emotions, feeling of kindness, willingness to help or support others, compassion, behaviours of approach or avoidance, facial expressions and reaction times. What matters is that the design induces the expected effects of interaction on the dependent variables, which in and of themselves are not specific to empathy or always related to prosocial behaviours. Likewise, interindividual variability in the size of the expected interactions could be used to validate interindividual measures of empathy, such as questionnaires. In this framework, valid interindividual measures of empathy would then be expected to demonstrate a positive correlation with the size of the interactions across individuals.

Finally, this approach could also be used to assess paradoxical manifestations of empathy as discussed in this report. In the most typical case, in which explicit prosocial feelings or behaviours would be induced by empathy's core process, e.g. compassion or behaviours of approach, empathy should manifest through "ordinal interactions" between AS and CO, i.e. interactions in which the direction of the effects are consistent across the levels of a factor but their magnitude vary across the

two factors. This type of interaction is illustrated in Figure 4 and 5. However, in some cases, for instance when the sight of a loved one suffering might engage empathy's core process but with a feeling of powerlessness and terror in a context of deep distress or exhaustion, perhaps accompanied with a self-denigrating sense of guilt, paradoxical feelings and behaviours may be triggered and perhaps potentiated. In such cases, the interaction of AS and CO in the core process might manifest as a "disordinal (crossover) interaction," which occurs when the interaction effect reverses direction at different levels of the other factor. For instance, to use the same example as in Figure 4, the father might experience higher AS for his own child but a paradoxical lower level of CO than for the other child, as a result of his own maladaptive internal conflict leading to an inhibitory effect of one factor over the other. This is of course preliminary and remains to be studied in greater details.

A refinement of such design, introducing continuous measurements, e.g. using VAS, in a longitudinal manner through the task, could be envisioned to study the dynamics and chronometry of the interactions between AS and CO in empathy's core process, but also the unfolding of different emotional states throughout. For instance, some affective states could dominate and persist longer than others during the interaction, and then, could be selected as targets for standard measurements of empathy. No matter what, according to this framework, the dependent variables, in the presence or not of prosocial feeling and behaviours, must show the expected interaction effects between at least the two factors (AS and CO) manipulated in the experiment to claim that the experiment studies and captures empathy as a core process. The difference between a truly empathic process and a prosocial behaviour independent from empathy, e.g. induced by education and social norms, is that the latter would not be associated with such interaction effect between AS and CO.

Conclusion

From its origins to the neuroscientific research initiated in the 2000s, the concept of 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 insolvable and endless. One consensus about empathy is that it is a 'jingle-jangle fallacy' concept, referring to multiple interchangeable constructs. The aim of this article was not to settle the debate once and for all, but instead to adopt an integrative approach that acknowledges the complexity and paradoxes of empathy, while endeavouring to clarify the definition of its underlying processes, as well as presenting a way to operationalise and study it in the laboratory.

We argued in favour of leveraging the recent model proposed by Decety (2021), relying on a narrowed and processual definition of empathy that resonates with its original sense. In the elaboration of the model we proposed in this report, empathy is strongly associated with a core affective process, in which cognitive mechanisms requiring executive control such as perspective-taking and higher-order Theory-of-Mind, and more generally mechanisms pertaining to social cognition, are less essential, although they are expected to interact with empathy's core process. We also held that there could be a variety of, sometimes paradoxical behavioural manifestations of empathy. We also expect that the two core abilities that shape empathy are flexible and can be engaged spontaneously or voluntarily regulated, cultivated, and more generally amenable to learning in order to improve their adaptive value for the individual. Thus the type of experimental approach we proposed could also be used to assess the outcome of training on individuals' empathy, e.g. a successful training would increase the expected interaction effects. The elaboration of our framework has been driven by the aim of bridging the gap between the definition of empathy and its operationalisation and measurement in the laboratory. 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 more fully and better understand its functioning.

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