



Conceptual issues in neuroscientific research on empathy

Gerrit Glas*

Vrije Universiteit, Department of Philosophy, Faculty of Humanities, De Boelelaan 1105, 1081 HV Amsterdam, The Netherlands



ARTICLE INFO

Article history:

Received 22 April 2018

Accepted 22 May 2018

Available online 11 June 2018

Keywords:

Empathy

Enactivism

Simulation theory

Theory theory

Mind-reading

Theory of mind

ABSTRACT

This paper gives an analysis of some conceptual issues in the neuroscientific study of empathy. The focus will almost exclusively be on a seminal paper by Decety and Jackson (2004) on the functional architecture of empathy. The authors withstand reductionistic tendencies in the exposition of what their findings might mean for the psychology of social cognition. They are aware of the thorny conceptual issues that arise when attempting to bridge intuitive folk psychological conceptions of empathy with explanations offered by social psychology, developmental science, and, most of all, neuroscience. They defend a conception which puts emphasis on the developmental, interactional and human aspects of empathy. In the second part of the paper we will see that this overt contention is at some points at odds with the conceptual framework that underlies the presentation of scientific findings. It will appear that the method of decomposition, i.e., breaking empathy down into (mutually interacting) 'pieces', is difficult to reconcile with the idea that empathy should primarily be defined as an interactional phenomenon. The method of decomposition puts empathy back within the brain, whereas recent philosophical work argues that empathy needs a definition which includes both processes in the empathizing subject and in the person with whom the subject empathizes. In the final part of the paper it is asked whether, how and to what extent it does matter that professionals know about the social neuroscience of empathy and, especially, its underlying conceptual framework. It is argued that conceptual innovations that currently are emerging in social neuroscience do matter for clinical and legal practices. In spite of the limitations mentioned earlier, Decety & Jackson's developmental and interactional approach helps to overcome reductionistic and mentalistic interpretations of human empathy.

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Contents

1. Introduction	1
2. Empathy – preliminary conceptual considerations	2
3. Decety and Jackson's analysis of the functional architecture of human empathy	3
4. Discussion and conclusion	4
References	5

1. Introduction

Philosophical questions about neuroscientific research typically arise at the intersection between neuroscience and clinical practice and between neuroscience and lay people's understanding of brain processes. Such questions do often emerge as a result of translating neuroscientific research findings to other domains than science proper. One of the assumptions behind this paper is that philosophical issues typically arise as

a result of these translations; and that they depend on subtle shifts in meaning of concepts that are used at both sides of the boundaries between neuroscience, clinical practice and the life-world of lay people. One other assumption of the current investigation is, that in these zones of transition between different domains and their relevant vocabularies it is not always clear whether one is dealing with empirical or conceptual issues.

This paper focuses on one phenomenon, i.e., empathy, more particularly, on one authoritative, neuroscientific account of it, i.e., a review by Decety and Jackson (2004) (see Singer & Lamm, 2009, for a shorter review; recent updates in Decety, 2015; Decety & Yoder, 2015, 2017; Yoder & Decety, 2018). Decety and colleagues have devoted much of their scientific work to the analysis of human empathy and its role in

* Corresponding author.
E-mail address: g.glas@vu.nl.

psychological, psychopathological and moral functioning. Their 2004 article is seminal because of its explicit focus on conceptual issues. Their stance on these issues has not changed in later years. It is also relevant for the field of mental health and law, because of the role of (lack of) empathy in forensic psychiatric settings, especially the assessment and treatment of offenders with autism or antisocial personality disorder.

In this paper, I will especially address the question whether and, if so, how and to what extent it does matter that professionals know about the neuroscience of empathy. Would it make a difference to their attitudes, their decisions, how they behave and what they generally do, if they would have in-depth knowledge about the neuroscientific underpinnings of empathy? A related issue is what such 'in-depth knowledge' would be. Is it scientific knowledge, or 'translated', clinical knowledge, or even further translated, popular, everyday lay-knowledge? These questions may also arise in the reverse direction. What exactly is meant with the concept of empathy in a neuroscientific context? If we assume, as many scientists do, that empathy is something like 'feeling and knowing what another person is feeling, knowing, and/or intending', then, what exactly are neuroscientists studying? The entire phenomenon? Or, aspects or components of the phenomenon? And, if we assume that our understanding of empathy is derived from our everyday understanding of it; and that it has acquired an only slightly more specific meaning in the context of (developmental) psychology, then, again, what does this everyday folk psychological and developmental concept of empathy mean in the context of neuroscientific research? On what grounds are we going to decide about which scientific findings are essential for the understanding of empathy? Are these grounds empirical or conceptual, or both? And how do we know whether the neuroscientifically explained phenomena (the *explanandum*) are relatively meaningless correlates or manifestations of a deeper explanatory reality, i.e., a mechanism or causally relevant process (the *explanans*)?

Decety & Jackson's, 2004 paper is particularly interesting because of its strong conceptual focus and its resistance against reductionistic tendencies. The authors appear to be aware of thorny conceptual issues that arise when attempting to bridge the intuitive folk psychological conception of empathy with explanations offered by social psychology, developmental science, and, most of all, neuroscience. They defend a conception which puts much emphasis on the developmental, interactional and human aspects of empathy. However, we will see that this overt contention is somewhat at odds with the conceptual framework that underlies the presentation of scientific findings. It will appear that the method of decomposition, i.e., breaking empathy down into (mutually interacting) 'pieces', is difficult to reconcile with the idea that empathy should primarily be defined as an interactional phenomenon. The method of decomposition puts empathy back within the brain, whereas recent philosophical work argues that empathy needs a definition which includes both processes in the empathizing subject and in the person with whom the subject empathizes. We will analyse some of conceptual issues that arise as a result of this tension between 'within-the-subject' (individualistic) and 'between subjects' (interactional) approaches. Attention will be paid to differences between underlying conceptual frameworks in the relevant domains of scientific and clinical understanding. We will analyse these differences from a translational point of view, i.e., the point of view that is implied in the popular notion of translational neuroscience.

In the final section, we will see that many of the questions that emerge at the zones of transition between folk psychological, clinical, and scientific approaches to mental phenomena are both empirical and conceptual; and that it is often impossible to disentangle the conceptual from the empirical. It will be argued that instead of trying to keep distance to the conceptual vagueness of these transition zones, neuroscientists should tolerate the intrinsic uncertainties at the boundaries of their subdisciplines and exploit their creative potential when facing this intrinsic unclarity and ambiguity at the

boundaries of their fields. It is here that new and innovative insights are born.

2. Empathy – preliminary conceptual considerations

Empathy is a psychological capacity which is crucial for human social functioning. Until today, the scientific study of this capacity is influenced by age-old philosophical ideas and frameworks of understanding. One such idea is the notion of empathy as a form of 'mind-reading' which returns in the widely used concept of 'Theory of Mind' (ToM). ToM accounts of empathy are vulnerable for the Cartesian problem of knowing 'other minds' (De Bruin, 2010). Descartes thought that human beings only know their own minds (the famous 'ego cogito' as starting point of all knowing) and that there is no immediate way to know what is going on in the mind of others. Knowledge of other minds becomes a matter of observation and induction. It was David Hume who provided the answer to the Cartesian problem, by reconstructing empathy as process that is based on the observation of 'resemblance' and on inferential reasoning based on drawing analogies between body – mind associations in others and in myself. The idea is that when we feel empathy for another's mental state, for instance an emotion like anger, that we begin by observing changes in the bodily state of the other. We see for instance an increase in muscle tension and a frown on the other's face and recognize the *resemblance* between this body state and facial expression and similar body states and facial expressions in ourselves. We subsequently associate our own (imagined, simulated) bodily state and facial expression with the mental states we tend to have when our bodies are in the same condition. We finally *infer* from this association between bodily and mental states in ourselves that the other must be in a similar mental state.

Recent philosophical accounts on social cognition build forth on this Humean account, by emphasizing either the element of 'resemblance' (simulation theory) or the role of 'inference' (theory theory). *Simulation theories* (ST) focus on resemblance by hypothesizing that we know the mental state of others, i.e., their intentions, feelings, and thoughts, on the basis of an 'internal simulation' of what is going on in them. Neuroscientific support for this idea comes, among others, from the so-called mirror-neuron theory (Gallese & Goldman, 1998). Mirror neurons are a group of visuomotor neurons, that discharge both when the subject performs a particular action and when it observes another individual performing a similar action (Rizzolatti & Craighero, 2004; see also Gallese, Fadiga, Fogassi, & Rizzolatti, 1996, Rizzolatti, Fadiga, Fogassi, & Gallese, 1996). Perception and action are coupled: observing the emotions and intentions of another person activates parts of our brains that underlie similar emotions and intentions in ourselves. The other strand of theorizing, known as *theory theory* (TT), puts emphasis on the inferential nature of empathy. Knowing the mind of the other is based on inferences about the other's behaviour.

Both approaches have been criticized of being mentalistic. 'Mentalistic' are those conceptions of the mind that consider the mind to be transparent only for itself. Mentalism leads to solipsism, i.e., the idea that we can only know our own (conscious) mind. Knowing what others feel and think occurs indirect and after the fact. Empathy is basically a form of 'retrodicting', a backward explanation of phenomena that were not transparent by themselves at the moment they occurred. This idea runs counter to lay-conceptions of knowing others, which tend to view empathy as a form knowing 'by direct acquaintance'. Or, with the words of Shaun Gallagher (2005): the traditional Humean view on empathy suggests that "the subject who understands the other person is not interacting with the other person so much as interacting with an internally simulated model of himself pretending to be the other person". This means that real "second-person interaction is reduced to a first-person internal activity".

Moving now to the conceptual challenges that are awaiting us, we have just mentioned one of the biggest, i.e., the challenge of doing justice to the interactional ('second-person') nature of empathy. If

empathy is not just a process or state within the mind of the beholder, but essentially a process or interaction) between two persons, then this should in some way be reflected in theories on empathy. There are other challenges. One is that empathy is more than sympathy. It is not just some form of (affective, mental) resonance. One reason is that it is very well possible to empathize with what is going on in someone else, without identifying oneself with the feelings and intentions of the other. This is, for instance, crucial in the professional formation of psychotherapists. They need to be able to 'be with the patient' while at the same time being aware of their own feelings and inclinations, which may differ from those of the patient. This brings us to two other features of empathy, which are implied in this capacity: the ability to distinguish the feelings, attitudes and inclinations of the other from those of oneself (self-other distinction) and self-regulation. Spontaneous inclinations, i.e., for instance, a reaction of disgust for a patient who smells and looks dirty, should be inhibited to be able to empathize with this person. This self-regulation includes the ability to adopt the perspective of another person, while maintaining one's own perspective.

3. Decety and Jackson's analysis of the functional architecture of human empathy

In their landmark paper on empathy Decety and Jackson (2004) are clear from the start that they see the conceptual challenges mentioned in the previous section. They state that empathy is not just an inference, or just sympathy (feeling the same as someone else). They quote Ickes (2003) who defines empathy as the ability to feel and to know what another person is feeling, while having the intention to respond compassionately to the other's feelings. So, empathy is not only a state of being receptive to the signals of others, it is also an active attempt to tune in into the mind, or better, the world of the other. Empathy is a complex and typically human phenomenon, they argue. It differs from animal empathy in that it does not only involve sympathy, i.e., recognizing and sharing the feelings and intentions of others, but also the capacities mentioned in the last section: self-other distinction, the ability to flexibly navigate between different perspectives (mental flexibility) and self-regulation. Evolutionary accounts have something to offer to the analysis of social cognition, but they fall short in the explanation of this typically human aspect of empathy, i.e., the capacity to adopt different stances or perspectives. It is on the basis of this capacity that humans are able to adopt the perspective of another person without identifying their feelings with those of the other. This kind of higher order regulation is in turn determined by social understanding and moral concerns, as Decety argues in a recent publication (Decety & Yoder, 2015).

Social neuroscience should be considered as a science that harbors and integrates several disciplines. Among those disciplines are developmental science, cognitive and social psychology, and neuroscience. The integration is guided by a putative model which describes the constitutive components of empathy and their interaction. This latter expression ('constitutive components') indicates how Decety and Jackson attempt to solve the methodological problem of how to scientifically investigate empathy as a complex and interactional phenomenon. This complexity is dealt with by 'breaking the concept down into its constitutive components' and by 'examining the respective neural instantiations' of these components.

Decety and Jackson discern three of these components. All three contribute to the subjective experience of empathy:

- a) an *affective* response to another person, which often, but not always, entails sharing that person's emotional state; based on perception-action coupling that leads to shared representations;
- b) a *cognitive* capacity which enables us to distinguish between self and other; and.
- c) *regulatory mechanisms* that keep track of the origins of self and other-feelings; that enable one to adopt the perspective of other

persons (mental flexibility) and to temporarily identify with the feelings and inclinations of others, without confusion between oneself and the other.

These three 'components' are intertwined and interact with one another.

The first component (sharing the other's mental state) is made possible by *shared representations between self and others*, Decety and Jackson argue. The idea is similar to the thesis defended in the mirror neuron theory, i.e., that there exists a continuity between perception and action, which implies that the perception of certain intentions or affects in other humans evokes a response in action neurons of the perceiving person that are similar to those of the observed person. Decety and Jackson suggest that empathy should be seen as the developmental result of a shared practice, i.e., as a capacity that has evolved, in the course of time, out of patterns of interaction between people. The neural correlate of this 'sharing' and 'interacting' is neural similarity between recognition and expression of emotion and intentions within the subject and similarity between neural activity in the empathizing person and the object of empathy. The key conceptual question with respect to this neural reconceptualization of empathic responses is, whether the interactional aspect of these responses, i.e., empathy as a process of attuning to the other, is sufficiently accounted for with this notion of neural similarity, both within the empathic subject and between this subject and the object of empathy. Is similarity between neurons a sufficient explanation of the temporal and dynamic aspects of the process of attuning? Similarity would, indeed, be compatible with the notion of resonance, or, to use a visual analogy, with mirroring. However, resonance and mirroring are analogies that highlight the receptive side, the passive occurrence of something similar, whereas attuning also involves activity from the side of the empathizing subject.

The second component of empathy is awareness of the distinction between self and others. The idea is twofold. Action representations of oneself and of the one with whom one empathizes, are (again) based on the same intentional schema's, which are mediated by the medial prefrontal cortex (mPFC). This identity, or overlap, 'explains' recognition of intention. But the overlap between self- and other-related representations is only partial. The existence of non-overlapping parts explains why we can distinguish our own agency from the agency of others. The notion of agency is supposed to entail the ability to act in accordance with one's intentions. Recognition of intentions/agency of others overlaps in the mPFC but not in other areas of the brain. Recognition of others is also mediated by activity in the right inferior parietal cortex (riPC), whereas recognition of agency of oneself is (also) associated with activation of the insula (I) and the prefrontal cortex (PFC). From a conceptual point of view, a similar question arises as with respect to the notion of shared representations: does similarity, or, in this case, the combination of similarity and difference, explain interactive attuning as a dynamic process? A related question concerns the notion of recognition itself, which not only entails recognition of similarity, but also recognition of otherness. Empathy may lead to recognition of similarity between one's own reactions and the reactions of another person, but how does it lead to recognition of otherness ('difference'). What kind of difference, or otherness, are we talking about? Is it what remains after subtracting the recognition of similarity/identity (mPFC + I + PFC) from the experience of empathy as a whole (mPFC + riPC + I + PFC)? That would in fact reduce recognition of difference/otherness to a discrepancy between neural maps/circuits representing different mental states. Difference can be conceptualized in many ways: numerical, spatial, in terms of dynamic patterns, or genetics, or temperament, or social roles, or existential attitudes (et cetera). The recognition (and appreciation) of difference/otherness that is implied in empathy as a human capacity is insufficiently caught with a conceptual framework that derives its notion of difference from mathematical (dynamical pattern) or spatial (brain maps) or physical (brain circuits) approaches to the brain.

Finally, with respect to the third component (mental flexibility and self-regulation) the authors suggest that it might be explained by frontal inhibition, which counteracts the natural bias toward adopting an 'egocentric perspective', combined with the ability to put oneself in the shoes of the other person. This requires an active effort of the empathizing subject that entails more than just recognition of intentions and emotions. The key conceptual problem is here, how to conceptualize this perspective taking. Is the ability to adopt the perspective of another person a purely internal process, i.e., a form of 'mentalizing'? Is it, to use an earlier expression, an internal simulation of the mental state of the other in oneself? If that would be the case, we would again be back at the traditional mentalistic conception of empathy and lose the interactional and dynamic quality of empathy. But it is difficult to see how this consequence could be avoided. The method of decomposition seems a prerequisite for scientists to say anything at all about empathy. But one of the by-products of this method for neuroscientists is that it puts empathy back within the brain, thereby reintroducing all the problems of representationalist and mentalistic approaches to the mind.

4. Discussion and conclusion

Empathy is a complex and layered phenomenon. It is not a simple resonance of affect between the self and other. It involves an explicit representation of the subjectivity of the other and the ability to navigate between different (self- and other) perspectives. Today's social neuroscience is able to investigate the neural background of these capacities. There is not only conceptual, but also empirical evidence that there is no unitary empathy system in the brain. Decety and Jackson discern at least three dissociable (sub)systems mediating the experience of empathy. In recent publications they also discuss the role of another, fourth, 'system', i.e., higher order social schema's and moral intuitions which regulate the balancing of the different perspectives on others and oneself (Decety & Yoder, 2015, 2017).

We have seen that the strategy of breaking empathy down into components easily detracts from the 'holism' of the interactional perspective. The idea of 'shared practices' serves as a guiding idea. It is derived from folk psychological and developmental perspectives on the knowing of others. However, the inclusive and dynamic nature of empathic attunement could only partially be accounted for from a neuroscience perspective. Decety and Jackson clarify how other brain circuits than those mediating resonance and mirroring may contribute to the typical human capacities of perspective taking, mental flexibility and self-regulation. This is a very important contribution. However, there remains an explanatory gap between – in short – the functioning and collaboration between these brain circuits on the one hand and empathy as a primarily dyadic, interactional and dynamic process of attunement on the other hand. Interaction is both reaction and action, as Decety and Jackson acknowledge. However, the phenomenology of empathy involves more than a cycle of action and reaction at the level of motor repertoire, physiological responses, the presumed intentions and feelings behind (or 'within') them and the neural correlates of these behavioural and mental states. It presupposes a notion of 'world', a shared world, the world of the person with whom one is empathizing as well as the world of the subject who tries to empathize. Sharing this world implies a 3-D kind of understanding of the needs and concerns of the other, paying attention to his or her 'landscape of saliences', being aware of the effects of the interaction itself on the behaviour, intentions, and emotions of the other, and, of course, oneself.

We cannot require neuroscientists to do justice to all these different aspects. What one could require however, is that their findings, including the ways these findings are presented, remain consistent with the general framework, which is interactional and dynamic. I have worries in this respect. Decety and Jackson suggest about the future of social neuroscience that "more discrete subdivision of the prefrontal cortex is necessary because each subregion is likely to play a specific role in empathy behavior". Along this path of progressive decomposition

there awaits " an important task to explore the respective computational role of every key region of the prefrontal cortex ... in mental, affective state attribution, as well as in executive functions, in relation to how humans navigate the social world". My worry is that this road of further decomposing empathy will no longer remain in touch and be consistent with a general framework that puts emphasis on interaction and dynamic, in spite of Decety and Jackson's intentions.

The other worry is that the shift from the interactional perspective to what is going on inside the brain will lead to reintroduction of elements of the traditional Humean framework. We saw that use of 'old' terminology is quite common in the rapidly evolving field of social neuroscience; think of the terms mind-reading, similarity ('resemblance') and representation, with their mentalistic connotations. Decety and Jackson are not entirely consistent in this respect, by on the one hand arguing for a dynamical system view on empathy and on the other hand freely speculate whether certain research findings can be seen evidence for the brain as an internally simulating system.

It is again difficult to see how this can be avoided if interaction and attunement are reconceptualised as processes that are going on in the brain of the empathizing subject. Without a conception of the brain that views the brain as fundamentally embedded in the body and in interactions with the context, the temptation to view empathy as a reflection or internal simulation within the brain of an interaction between the person having the brain and someone else cannot be resisted. The consequence is a (partial) return to old mentalistic ideas about empathy.

I don't think there will be an easy solution for this problem in the near foreseeable future. I agree with Kendler (2005) that psychiatry must move beyond a prescientific "battle of paradigms", should embrace complexity and support empirically rigorous and pluralistic explanatory models. This would imply a strive for, what Kendler calls, a 'patchy reductionism', with the goal of 'piecemeal integration'. In the meantime, we should also strive for richer conceptual frameworks.

Much can be learned in this context from the so-called enactive approach. This novel approach to mental phenomena and mental disorders sees them as the endpoint of a dynamical process; a process which presumes interaction, development, and emergence. Traditional approaches take their starting point in a behavioural phenotype and view the underlying (dys)function or mechanism as a more or less 'static' condition within the individual. Adherents of the enactivist approach suggest that psycho(patho)logical phenomena should always be conceived as (emergent) results of (patterns of) dynamic interactions. There is no place here to give a more detailed account of this approach (see Thompson, 2007). Enactivism is still very much a philosophical project, it has proven to be notoriously difficult to operationalize enactivist views (see however Klin, Jones, Schultz, & Volkmar, 2003, Lewis, 2005; de Jaegher, 2013; Glas, in press). Maybe we should be content with the suggestions of Kendler (2005), on the condition that researchers keep their conceptual frameworks open for the required interactional and dynamic approaches that enactivism envisions. These insights and intuitions will then serve than as reminder of the richness and complexity of empathy as human capacity.

This openness requires tolerance of the inherent vagueness of boundary questions. This vagueness might disappear someday, when a clever researcher invents an operationalisation of a question that until then was thought to be just philosophical; or when an equally clever philosopher detects a way of putting the problem at hand in a new, transforming light. We saw that these boundary questions typically occur in the transition zones between science, clinical practice, and everyday folk psychological understanding. The interactional and dynamic nature of the folk psychological concept of empathy could only partially be justice be done to in a neuroscientific context. This aporia in turn was as an invitation to think differently about the brain, not as an organ that 'produces' a set of activities that – as neural processes – remain confined within the skull, but as an ensemble of dynamically interacting networks which themselves can only defined in conjunction

with bodily functioning and real-time connections with the surrounding world. But, as a skeptic voice might ask, are we, then, still talking about the brain? Or, are we dealing with something bigger than the brain, a variant of Andy Clark's 'extended brain' (Clark, 2011)? Does the notion of neural functioning as something physical not evaporate in such broader conceptualizations? But, the reverse seems to hold too: did neural functioning as a physical process not already evaporate in some of today's branches of neuroscience, in variants of what has become known as connectomics, with its many meanings of the term network and its different definitions of connectivity (Seung, 2013; Sporns, 2012)? Current neuroscience is full of philosophical questions. Neuroscientist may deny this, but it seems wiser to choose the other bet and uphold the view that neuroscience can only be better off by opening-up for the philosophical dimension of its empirical challenges.

To conclude, we have mainly followed the line from outside to inside neuroscience, by focusing on the question what neuroscience can make of an interactional concept like empathy. But we might also take the other direction, from inside out, and ask whether it would make a difference to the attitudes and decisions of clinicians and lay people, if they would have in-depth knowledge about the neuroscientific underpinnings of empathy (see Lebowitz & Ahn, 2014 for an empirical approach to this question). After the discussion in this paper, I would like to suggest, that it would make a difference. There is, for instance, sound empirical evidence that empathy is more than just resonance of what is going on in the other and that it involves other capacities like flexibly adopting the stance of the other, while maintaining one's own point of view. This is important to notice. One other thing is the finding of the functional overlap between perception and action and the concomitant notion of perception – action coupling. This idea has given a strong impetus to the view that the brain should be seen as a self-organizing link in a cycle of interactions between subject and environment. This impetus toward a more dynamic and interactional model of brain functioning replaces the old 'sandwich' model of brain functioning in which the brain is basically thought as the organ that is squeezed between (sensory, environmental) input and (motor and mental) output. It is in other words because of these newer findings that we have begun to think differently about brain-mediated processes. They are no longer seen as just the output of an 'organ', but as the result of dynamic, multi-level interactions between the subject and his/her context. This is why the work of Decety and Jackson is so interesting: their minds are open for other, richer conceptualizations. The criticism in this paper should be seen as an exhortation to continue with following this path.

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