

# What Are the Subjective Processes in Our Brain? Empirical and Ethical Implications of a Relational Concept of the Brain

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The subjective brain therefore embodies the significance attached to things and the way that it shapes itself in the light of experience and inheritance.

—Gillett, 2009 (5)

I focus in my commentary of Gillett's (2009) target article on the empirical and ethical implications of his relational approach to the brain. Empirically, his account raises the question for the kind of neural processes that organize and code the incoming stimuli in a relational and thus embedded way. While ethically, his relational approach make a reconceptualization of ethical concepts such as informed consent in a relational rather than isolational way necessary. This means that more basic functions like emotions and empathy may be crucial in the outcome of the informed consent.

Grant Gillett (2009) describes in his wonderful target article the brain as essentially subjective as indicated in this quote. By the concept of *subjectivity*, he refers to the relation to the world, *embeddedness*. While he discusses some revealing clinical cases, the question for the exact process in the brain that makes such embeddedness, the relation to the world, possible. He may now argue that such process can neither be 'located' in the brain itself nor be characterized by neural content, or matter in the Aristotelian terms he uses so nicely. This would mean to fall back into isolating the brain from its environment and thus to opt for isolation rather than embeddedness. This has both empirical and ethical implications.

## EMPIRICAL IMPLICATIONS

How must a brain process look like and be characterized in order to allow for embeddedness (rather than isolation) in the sense of Gillett (2009)? First, such brain process must be characterized by constituting and establishing a certain form, a relational form, which allows us to relate to the world and be embedded in it. The question is for a certain kind of neural form or better neural organization than for a specific neural content. Such neural form or neural organization is made possible by a certain kind of coding,

the neural code. Hence, Gillett basically raises the question for the neural code, the neural processes that organize and shape the incoming stimuli from the world in such way that they are attached significance.

Second, such brain process must account for a very basic sense of subjectivity in the sense of Gillett (2009). His sense of subjectivity seems to be more basic than the meaning of subjectivity often (rather implicitly) presupposed in the current philosophy of mind and neurophilosophy. Here the concept of subjectivity is equated with the first-person perspective (FPP) as distinguished from third-person perspective (TPP) that then is characterized by objectivity. This is however is not what Gillett means when he talks of subjectivity. His concept of subjectivity is more basic lying beneath the distinction between FPP and TPP (that he would probably associate with the distinction between individuality and generality rather than subjectivity and objectivity). He would probably argue that his more basic sense of subjectivity first and foremost makes the distinction between FPP and TPP (and hence between individuality and generality) first and foremost possible. While conceptually his notion of subjectivity seems to be very much in the sense of Kant, empirically he may associate rather lower-order processes like affective and sensorimotor functions than higher-order processes like cognitive functions with the concept of subjectivity.

What do these notions of neural coding and subjectivity imply in experimental-empirical and conceptual-ethical regard? Experimental-empirically, we must search for a very basic neural process that organizes and codes incoming stimuli in a relational and thus embedded way. Our group pursues the search for such process and assumes what we call 'self-related processing' to be such basic organizing and coding neural process (Northoff 2004, Northoff and Bermpohl 2004, Northoff et al. 2006). By the concept of self-related processing, we do not refer to some entity or substance termed self; rather we mean by 'self' subjective experience very much in the sense of Gillett's (2009) concept of subjectivity. By 'related' we mean that the process establishes a relation between the own organism including the brain's actual (resting) state of neural activity and the

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incoming stimulus from the environment. By relating stimuli in such a way to itself, the brain has no choice other than to code the stimuli according to their actual relation to the organism and the brain's actual state itself. Such kind of 'relating' may then be described by the outside observer (as for instance Grant Gillett) as meaningful and embedded. It is important to distinguish this notion of 'relational' from the one of 'referential' which rather points out the ability to refer to one's own subjective experience and self (see Northoff 2007). The notion of referential does not describe the processes constituting a self, as the concepts of relating and relational do. Instead, referential describes some self-referring processes that allow for reflection and awareness of one's self as one's self and consecutively for subjective experience of one's self in FPP as distinguished from TPP.

Is there any empirical evidence for such basic organizing and coding process like self-related processing? One would expect such self-related processing to implicate many regions, a whole neural network, in the brain. This may indeed be the case since we associated the medial regions in our brain, the subcortical-cortical midline network, with self-related processing (Northoff and Bermpohl 2004, Northoff et al. 2006, Northoff and Panksepp 2009). Interestingly, these regions show high neural activity in the resting state and it is this high resting state activity that may serve as measure or threshold to relate the incoming stimulus to the brain in a relational (rather than isolational) way.

One would further expect that such process may be closely associated with sensory and affective functions so that the subcortical-cortical midline network may be crucial in associating self-relatedness with affective functions and thus emotions. There is indeed empirical evidence for that as demonstrated in a recent study of ours (see Northoff et al. 2009). Finally, one would expect such organizing and coding process to be implicated in all the various basic and higher cognitive function investigated in cognitive neuroscience. We just begin to collect empirical evidence for that but were already able to demonstrate this for the case of reward showing that reward-related activity in the reward network may be crucially determined by the degree of self-relatedness of the rewarding stimulus (deGreck et al. 2008; 2009).

## ETHICAL IMPLICATIONS

Finally, one may ask for the ethical implications of the concept of self-related processing. I characterized self-related processing as intrinsically relational and hence as social and context-dependent. This implies that ethical concepts like informed consent must be considered relational, social and context-dependent way. The interaction between the subject from which the consent is obtained and the investigator obtaining consent may be determined by their self-related processing and how both sides match with each other. Psychologically, such match between investigator and subject

in informed consent may be realized in their emotional correspondence and more specifically in their mutual degree of empathy. This means that emotions and empathy may be crucial in constituting the decisional capacity implicated in informed consent and also in determining the outcome of informed consent, i.e., whether the subject refuses, accepts or remains ambivalent. If so, one may conduct empirical studies about the impact of emotions and empathy on the decisional capacity and the outcome of the informed consent (see, for example, Northoff 2006; Northoff 2009). Furthermore, one may need to include the emotional and empathic abilities of both the consenting subject and the investigator obtaining the consent. Conceptually, this implies that one may need to develop a truly relational or social and embedded concept of informed consent as distinguished from an isolational (and cognitive) one (Northoff 2009). ■

## REFERENCES

- Greck de, M., Rotte, M., Paus, R., Moritz, D., Proesch, U., Bruer, U., et al. 2009. The insufficient self and addiction. Decreased neural activity in reward circuitry during self-relatedness in abstinent alcoholics. *Human Brain Mapping*. In press.
- Greck de, M., Rotte, M., Paus, R., Moritz, D., Thiemann, R., Proesch, U., et al. 2008. Is our self based on reward? Self-relatedness recruits neural activity in the reward system. *Neuroimage* 39(4): 2066–2075.
- Gillett, G. R. 2009. The subjective brain, identity, and neuroethics. *American Journal of Bioethics-Neuroscience* 9(9): 5–13.
- Northoff, G. 2004. *Philosophy of the Brain. The brain problem*. Amsterdam, The Netherlands: John Benjamins Publishing.
- Northoff, G. 2006. Neuroscience of decision making and informed consent: An investigation in neuroethics. *Journal of Medical Ethics* 32(2): 70–73.
- Northoff, G. 2007. Psychopathology and pathophysiology of the self in depression – A neuropsychiatric hypothesis. *Journal of Affective Disorders* 104(1–3): 1–14.
- Northoff, G. 2009. What is neuroethics? Empirical and theoretical neuroethics. *Current Opinion of Psychiatry*. In press.
- Northoff, G., Bermpohl, F. 2004. Cortical midline structures and processing of the self. *Trends in Cognitive Science* 8(3): 102–107.
- Northoff, G., and Panksepp, J. 2009. The trans-Species ecological concept of self: Self-related processing and the subcortical-cortical midline system. *Trends in Cognitive Sciences*. In press.
- Northoff, G., DeGreck, M., Bermpohl, F., and Panksepp, J. 2006. Self-referential processing in our brain – A mental analysis of imaging studies on the self. *Neuroimage* 31: 440–457.
- Northoff, G., Schneider, F., Rotte, M., Dahlem, Y., Bogerts, B., Tempelmann, C., et al. 2009. Differential parametric modulation of self-relatedness and emotions in different brain regions. *Human Brain Mapping*. In press.