Comment: Affective Control of Action

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1. Four Problems of Agency and a Job Description for the Affective System

Railton introduces four interrelated problems of acting for a reason:

1. *The deviant causal chain problem:* The problem arises when a bodily movement has been caused by an agent's reasons and brings about the desired effect, but it does so in a deviant and unintended way. This is problematic, since the behaviour should not count as intentional even though it has been brought about by the agent's intention.

2. *The agency-without-regress problem*: An agent acts for a reason when he guides his activity on the basis of a reason. The problem is that this guidance itself looks like acting on the basis of reasons and so a regress looms.

3. *The problem of non-deliberative attunement to reasons*: The problem arises from the fact that there are actions which do not follow on from deliberation but nevertheless

seem to be responsive to reason. Attunement to reasons seems to require deliberation, but here we have attunement without deliberation. How is this possible?

4. *The rationalization problem*: The problem arises from the fact that unconscious states can guide human behaviour. Often in these cases subjects provide post hoc rationalizations. How can we distinguish the genuine reason for one's action from a confabulated post hoc rationalization?

Since Railton claims that any account of rational agency must solve at least these four problems, they thus provide a job description for a solution to the problem of acting for a reason.

What do these problems of agency have to do with emotion? Railton's central claim is that the affective system solves these four problems and thus is at the core of the capacity to act for a reason. If Railton is correct, in understanding how emotions cause action, we see how acting for a reason is possible.

The two basic questions for Railton's account are: first, whether his formulations of the problems of acting for a reason are correct; and, second, whether the job description provided by the problems is one that can be satisfied by a single system (such as the affective system).

On the first point, it is important to note that the four problems as formulated by Railton are tied to a specific conception of action, namely that of the causal theory of action (e.g. Davidson 1980). Not all philosophers of action would agree that these are the central problems. Philosophers who think that action consists in an agent's exercise of her agentive capacities – as opposed to the causation of bodily movements by mental states – will reject at least the first two problems (e.g. Hornsby 2013). While philosophers in the tradition of Anscombe (1957), who think that agency is practical reasoning, will likely reject all four problems (e.g. Vogler 2002, Thompson 2008).

If the problems of action were characterized in a more theory-neutral way, it would not be clear that the affective system could be a candidate to solving them all. For comparison, consider Frankfurt's (1978) influential suggestion that we should think of the problem of action in terms of control: how is it possible for an action to be under the guidance of the agent? Formulated in these terms, the affective system may offer one among many sources of control of actions. We shall take up this point in Section 3.

On the second point, even if we grant Railton's formulation of the problems, given the generality and scope of the four problems, it is not at all clear that the job they describe can be fulfilled by one system alone or whether it has to be achieved by a range of different systems. One way to see this is to consider Railton's focus on model-based control (control based on an internal model of the problem, e.g. the comparator model in motor control), which is laudable. If non-deliberative attunement requires employing simulations of internal models, why should

we think that such model-based control is limited to the affective system? This is what we shall consider in the next section.

2. Might the Affective System solve Railton's Four Problems?

Can the job description be satisfied by one system alone?

If the answer is 'yes', then one single system fulfills the job description. Railton contends that the affective system does this by providing evaluations which direct action. Assuming the job description is correct, then the question is whether the affective system is the only system required to fulfill the job description.

Railton (2017., p. 335-342) characterizes the affective system as consisting of the limbic system (amygdala, thalamus, hypothalamus, hippocampus, and cingulate gyrus) and key areas for emotion and reward processing (such as the ventromedial prefrontal cortex, orbitofrontal cortex, ventral striatum, insula, and basal ganglia). He also mentions two other "closely integrated structures" as key for linking affect to executive control: the lateral prefrontal cortex and cerebellum.

Three of Railton's problems – deviant causal chains, non-deliberative attunement to reasons, and rationalization – arguably also require a solution that involves the involvement of the motor system, through motor representations. Motor representations are the representations underpinning the planning, initiation, and execution of bodily action (Butterfill and Sinigaglia 2014, Jeannerod 2006). Even if the affective system plays a key role in solving these problems, because it provides a "common currency for representing value in the brain", the affective system will still only be one aspect of the solution to these problems. A more plausible answer will involve the affective system, executive control structures, and the motor system. It will not do to lump all of these into the affective system.

If the answer is 'no', then that means the job description cannot be answered by one single system. The affective system would be a key element of any answer to the problems of action, but does not provide all the answers. The affective system is one system among others involved in the control of action.

What the two horns show is that something other than the affective system is required to solve the problems of action. We want to suggest that what is a lacking is a notion of control that can explain how action is a distinctively active phenomena. Applied to emotion and action, the problem is to explain how emotions (and the affective system) can control behaviour, and how there can be goal-directed behaviour controlled by the affective system that doesn't necessarily require deliberation. But drawing on the affective system as an element in action theory is not yet to arrive at a notion of control. We have simply identified the affective system as one causal control structure.

3. How does the Affective System Control Action?

It seems plausible that the affective system controls action. There are ample examples provided by all the target papers showing this. The question is how the affective system does so. Railton seems to assume that there is one primary way in which the affective system achieves this: by providing evaluations which direct action. But this does not seem to be correct. There are complex ways in which the affective system can influence behaviour, as Blakemore and Vuilleumier (2017) and Ridderinkhof (2017) describe, which do not necessarily derive from evaluations.

Here we want to hint at a more liberal account by drawing on two distinctions, one between the central and peripheral nervous system and another between direct as opposed to indirect effects on behavior. On a hierarchical model of motor control, one can distinguish between more peripheral and more central aspects of the control of behaviour. There is a descending hierarchy of control where central structures dominate the peripheral nervous system. Furthermore, we can distinguish between controlling behaviour by directly controlling the behaviour in question or by indirectly controlling it through modulating states that have a behavioral effect.

The question then arises where emotions sit in the control hierarchy. Drawing these two distinctions helps us see that the affective system could control behavioral output on different levels within the control hierarchy, both centrally and peripherally and directly and indirectly. For example:

1. *Direct Influences of Emotions on Action and Behavior*
    a. More central effects (e.g. action tendencies or facilitation, ideomotor actions, prepared behavioural patterns, such as fear or flight reactions etc.)
    b. More peripheral effects (e.g. autonomic changes, change of heart rate, startle reflex, postural sway)

2. *Indirect Influences of Emotions on Action and Behavior*
    a. More central effects (e.g. changes in attention, decision-making and valuation, memory and cognitive control, phenomenology)
    b. More peripheral effects (e.g. reduced digestion, electrodermal activity)

Furthermore, as Blakemore and Vuilleumier (2017) show, the affective system does not only control the production but also the inhibition of behaviour. This is interesting in two respects: First, inhibition, the ability to suppress or withhold motor responses, is a crucial feature of adaptive behaviour, yet inhibition is largely neglected in philosophy. Second, affective control of

inhibition can only be fully understood when one acknowledges the distinction between peripheral/central control circuits and indirect/direct control of behaviour.

How do emotions control inhibition? To elucidate this question, we shall focus on freeze reactions. Freeze reactions consist in reduced body motion and muscular stiffness in response to threat signals and can typically be observed in animals. However, recent studies show that similar effects can also be observed in human beings (Blanchard et al. 2001). Freeze reactions are thought to play an important functional role which consists in facilitating preparation of overt behavioural responses by making cognitive resources available for action planning (Bradley et al. 2001). To understand the affective control of action in the case of freezing requires taking into account our more liberal conception of control: There are (1) direct effects on the peripheral nervous system such as muscular stiffness, reduced postural sway, cardiac deceleration, increased electrodermal activity, etc. However, there are also (2) indirect effects on behaviour by inducing changes in the central nervous system such as heightened attention, increased perceptual or sensory processing which facilitate the preparation and selection of actions in response to the threat signal (Lang et al. 1997).

We have challenged Railton's claim that the affective system is the key source of control of action. Once we recognize the complexity of pathways from emotion to action and adaptive behaviour, the picture that emerges is one that is less straightforward than Railton's. The affective system is important for understanding how acting for a reason is possible. But there are many levels of control of action and adaptive behaviour and the affective system is not the only source of control. Such a model seems to be more in line with the emerging picture from affective and movement neuroscience. Whether or not the affective system is the key to unlocking the problems of agency, Railton's paper and the other papers in this special issue powerfully illustrate how considering emotion and action together can contribute to their mutual elucidation.

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