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Voluntary action and neural causation

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Abstract: I agree with Nachev and Hacker's general approach. However, their criticism of claims of covert automaticity can be strengthened. I first say a few words on what voluntary action involves and on the consequent limited relevance of brain research for the determination of voluntariness. I then turn to Nachev and Hacker's discussion of possible covert automaticity and show why the case for it is weaker than they allow.

The criteria for whether an action is voluntary are whether we can do it or abstain from doing it on request, whether we can wait with it or do it earlier if given a reason, whether when required we can do it faster, more slowly, or modify it in other ways. Also, when we act voluntarily, we are not surprised by our action, and we know what we are doing.

The judgment of voluntariness is accordingly independent, as a rule (exceptions noted below), of any knowledge about brain or nervous system events. If the criteria mentioned above apply, then no knowledge about the brain can establish that an action we took to be voluntary isn't such.

Given our physiology, any movement that involves the activation of a muscle involves neural activity and usually brain activity as well. And possibly, there are systematic distinctions between patterns of brain activity during voluntary action and those during involuntary action. (I say only possibly, because I don't know of any theoretical or empirical reason that shows a system to be necessary.) If so, then once correlations between voluntary action and patterns of brain activity are established, the latter can be used as an indirect indication of voluntariness.

But such correlations need not exist. A person might hit the table with his fist for a variety of reasons and in a variety of ways, and presumably these actions are caused by different patterns of brain activity. Still, the hitting is voluntary because had he been warned not to do it, he wouldn't have hit the table. The hitting is voluntary because of things that could have occurred but didn't, and these unrealized possibilities needn't be noticeable in the occurring brain events. So possibly nothing in the brain is correlated with voluntary action.

The relevance of brain activity to the voluntariness of an action of which it is a partial cause is therefore at best of a limited nature: It can at most be indirect, inductive evidence for voluntariness.

Nachev and Hacker's discussion of these issues is insufficient. They write,

> Where an antecedent or coincident somatic event of some kind is highly correlated with an action, the possibility arises that the movement is directly caused by a component marked by the event, whatever the subject might say. In such circumstances a movement that may appear to be voluntary […] may in fact be covertly automatic.

They continue to discuss the likelihood of such correlations.

However, even if such correlations exist, this goes no way towards establishing involuntariness. A voluntary movement of our arm is probably correlated with activity in the motor neurons innervating the relevant muscles. Yet the agent who raises his arm would not have raised it if we had given him a reason not to do so, or he would have done it differently had he thought it preferable, etc. So his action is voluntary, irrespective of the existence of this correlation. And such a correlation with neural events in the brain would not affect the voluntariness of the action, if this responsiveness to reasons exists. Accordingly, correlations of the kind Nachev and Hacker mention do not raise the possibility that a movement is only apparently voluntary.

Nachev and Hacker don't explain what they mean by automaticity. As this term has two relevant meanings, I shall consider both. Automaticity can mean the ability of a cell to depolarize itself, reach threshold potential and produce a propagated action potential, as in the pacemaker cells of the heart. To rule out the automaticity of an action in this sense we should ask the agent to do it, abstain from doing it, modify it in various ways, and so on. No one can do that with one's heartbeat (unless by doing something else which is voluntary, e.g., doing exercise). However, this does apply to raising one's arm, so this action is not automatic in this sense. Accordingly, the discovery of correlations between an action and an antecedent brain event wouldn't raise the possibility of such covert automaticity, as long as we have the mentioned responsiveness to reasons.

Automaticity is also used to characterize actions done inattentively. Actions done as a result of learning and repetition, like walking and assembly-line work, can be automatic in this sense, as well as changing one's posture while sitting. But an action automatic in this sense can be voluntary: An assembly-line worker works for a reason, he can stop his work if requested, or modify his action if required, for instance, fasten the bolts tighter. A person can be asked not to move so much in her chair or not to sit like this or that: Only when she cannot but change her posture, say because of the pressure, is the change of posture involuntary (but then it is usually not automatic).

The fact that Nachev and Hacker are unclear on the relation between somatic correlates of action and voluntariness makes them worry that backwards causation from the voluntary action to a correlated neural event occurring (say) 100 ms before it might be involved, "for how else could [the neural event] be a consequence and not a cause of [the voluntary action]?" To answer this worry,

they argue that the onset of the action cannot be dated precisely enough to postdate the neural event. But this is probably wrong and, moreover, unnecessary. The correlated event is a cause of the later movement, and the movement is yet voluntary. It is voluntary because had we convinced the agent before he acted and before the neural event occurred that he better not do what he in fact did, he wouldn't have done it. Neither the action nor the correlated event would then have occurred. So neural causation and voluntariness can coexist.

Nachev and Hacker's discussion of alleged automaticity contains other aspects, with some of which I agree, but I don't have space for more detail here.