

My question is not about free will in the sense of whether a choice is caused or constrained by something that happens at an earlier time. Instead, my question is whether a choice to do some action is efficacious in the sense that it causes the agent to perform that chosen action (or any other physical event) at a later time. I also want to ask the same question about consciousness of choosing: Is such consciousness potent or impotent with respect to the physical world?

Our choices do intuitively seem to cause our bodies to move. And if consciousness causes no effect in the physical world, it is hard to see why we evolved to be conscious. On the other side, however, choices and consciousness are mental entities or events that have no physical momentum or energy. Their lack of energy, among other things, makes it mysterious how such psychological states could possibly cause a physical effect, such as a hand movement.

It might seem easy to solve these mysteries if mental properties were strictly identical with or reducible to brain states, which do have energy. However, multiple realizability of the same mental state in different physical states (such as different particular sets of neuroscience firings) speaks against such reducibility, so the mysteries remain.

Can neuroscience help us solve these mysteries of mental causation? Our research group began to address these questions in "Hypnotizing Libet: Readiness potentials with non-conscious volition", by Alex Schlegel, Prescott Alexander, Walter Sinnott-Armstrong, Adina Roskies, Peter U. Tse, and Thalia Wheatley. *Consciousness and Cognition* 33 (2015), 196-203. We found no difference between readiness potentials when subjects were and were not hypnotized to become unconscious of their choices to move in a Libet paradigm. If this result holds up, it suggests that consciousness of choosing to move a hand in circumstances like these does not play any necessary role in the causal chain that produces such hand movements.

This study has not been replicated and included only a small number of subjects, so my questions are: Can it be replicated with more subjects? If so, are there other explanations of these results that do not imply that consciousness of choice is not necessary to cause movements in the body? Are there better ways to manipulate consciousness or choice in order to determine whether these mental events or states cause changes in the body? Can any of these techniques determine the causal roles of choice and consciousness in a wider range of actions beyond simple bodily movements?