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Free Will

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While there is continuing disagreement about the definition of free will, philosophers typically understand it as consisting of the kind and degree of control agents need over their actions and decisions to be blameworthy (or praiseworthy) for them. The focus of the debate over free will has centered on the question of whether possession of this sort of control is compatible with causal determinism (that is, the thesis that all events are completely caused by prior events). While the truth or falsity of determinism is a question for physics, philosophers and psychologists have looked to cognitive science for evidence for and against the claim that free will is compatible with determinism. They have also looked to the judgments of ordinary people to shift the burden of proof in the debate. At the same time, cognitive scientists have argued that there are empirical threats to the existence of free will beyond the threat of determinism. Subsequent debate has focused especially on the role of consciousness in action initiation.

History

The problem of the compatibility of free will with determinism is ancient ([Frede, 2012](#)). While ancient Greek and Roman philosophy understood the problem in something akin to the contemporary manner, as turning on whether causal determinism threatened free will, medieval philosophy instead centered debate on whether free will was compatible with God's foreknowledge of how people would act ([Hunt & Zagzebski, 2022](#)). With the rise of science, the debate returned to its ancient focus on causation.

The history of the engagement with the cognitive sciences (broadly conceived) dates back to its earliest beginnings. Freudian psychoanalysis aimed to discover unconscious causes of significant actions: in one interpretation, free will is achieved through analysis when people come to control the determinants of their choices ([Dilman, 2013](#)). Contemporary cognitive science rejects the Freudian unconscious but a similar—and perhaps more intractable—threat might arise from the kinds of unconscious causes it often postulates (see *Broader Connections* below). However, free will became a major focus of discussion only with the apparent scientific demonstration that consciousness of choice is epiphenomenal ([Libet et al., 1983](#); [Wegner & Wheatley, 1999](#)).

Around the turn of the century, philosophers began to turn to experimental methods to probe philosophical questions ([Knobe & Nichols, 2008](#)). A major focus of work in experimental philosophy was folk theories and judgments concerning free will, especially the extent to which ordinary people judged that free will was or was not compatible with causal determinism ([Nahmias et al., 2006](#); [Nichols & Knobe, 2007](#)).

Core concepts

Free will is standardly defined as a kind of control that people have over their actions: the kind of control they need to be responsible for these actions. But *moral responsibility* is itself a term that is used in different and incompatible ways. The philosophical debate over free will centers around what is known as the *basic desert* sense of moral responsibility ([Pereboom, 2014](#)): to be morally responsible in this sense is to deserve praise or

blame, setting aside all consideration of consequences. This sense of responsibility underlies much, though far from all, legal punishment. While courts take consequences into account in sentencing (e.g., the person's prospects for rehabilitation), imprisonment is largely justified on the basis that it is deserved.

Determinism—the thesis, roughly, that every event is completely caused by prior events—appears to threaten free will because if determinism is true, how agents act is settled prior to their actions. Decisions are brain events; if determinism is true, then every decision an agent makes is caused by prior events in an unbroken causal chain extending into the very distant past. *Incompatibilists* hold that free will and determinism are incompatible. They argue that if determinism is true, free will requires a capacity no one could ever have: to exercise control over states of affairs that existed prior to their birth or to exercise control over the causal laws ([Van Inwagen, 1983](#)).

Compatibilists—people who hold that free will is compatible with causal determinism—argue that whether or not our actions and decisions are determined is irrelevant to whether they are free. They argue, first, that it is a mistake to see the laws of nature as constraints on action. Irresistible urges, coercion, or brainwashing are constraints that reduce or eliminate free will, but mere causation is nothing like that. Second, compatibilists advance an account of free action that is compatible with causal determination.

According to an influential compatibilist account, an action is free if it is caused by cognitive mechanisms that are sufficiently reasons responsive and reasons reactive ([Fischer & Ravizza, 2000](#)). A reason is a consideration in favor of or against an action. Our cognitive mechanisms are reasons responsive when they are capable of tracking reasons. They are reasons receptive when they alter behavior in response to reasons. For good evolutionary reasons, under normal conditions we are reasons receptive and reactive. We want the relationship between reasons and decision to be highly reliable; such reliability might be realized by a set of mechanisms that is deterministic.

Incompatibilists typically maintain that reasons responsiveness is necessary but not sufficient for free action. They argue that freedom requires robust *alternative possibilities*: that is, the capacity to act otherwise holding all the physical facts fixed (some incompatibilists hold instead that free will requires the agent be the *source* of their actions, where being the source is incompatible with complete causal antecedents of the action preexisting the decision to act; [Kane, 1998](#)).

Questions, controversies, and new developments

The contemporary philosophical debate is dominated by discussion of whether manipulated agents are relevantly different from causally determined agents ([Capes, 2023](#)) and by the question of whether alternative possibilities are required for moral responsibility ([Frankfurt, 1969](#)). There are two important ways in which cognitive science has been invoked in the free will debate.

The role of consciousness

Cognitive science research casts doubt on free will by suggesting that decisions and action initiation are unconscious and that this fact threatens free will. An influential study found that the readiness potential (RP), a surge in electrical activity in the motor area known to precede voluntary action, is detectable prior to awareness of the intention to move ([Libet et al., 1983](#)). This effect is apparently robust ([Braun et al., 2021](#); [Dominik et al., 2018](#)) and replicable using different methods ([Fried et al., 2011](#); [Soon et al., 2008](#)). [Libet \(1999\)](#) interprets this evidence as showing that conscious intentions are caused by prior brain activity. That is, some set of brain mechanisms causes both the movement and the feeling that the person has intended the movement.

The view that the conscious feeling of intending or deciding is epiphenomenal receives support elsewhere ([Wegner et al., 2004](#); [Wegner & Wheatley, 1999](#)). Using different methods, Wegner and colleagues found that the feeling of authorship of action is manipulable: for example, when participants had their hands moved to point to an icon, they reported a greater feeling of authorship over the action when the movement was preceded by hearing the icon named immediately beforehand. [Wegner \(2018\)](#) suggests that the experience of conscious will is merely inferred from the presence of thoughts that precede action but has no causal role in bringing about action.

Libet's paradigm has been criticized on a variety of grounds, both conceptual and empirical. First, it has been suggested that the kind of arbitrary actions used in Libet's paradigms are not good models for free actions ([Roskies, 2010](#)). Second, there is evidence that RPs are not correlates of intentional action. Lateralized RPs seem to more strongly correlate with intentional action but are also tightly correlated with awareness of intention ([Haggard & Eimer, 1999](#)). RPs appear to fluctuate stochastically ([Schurger et al., 2012](#)), suggesting that RPs may precede action because such fluctuations are necessary conditions for intentional action.

Wegner's theoretical work has been criticized largely on conceptual grounds. [Wegner \(2018\)](#) argues that (a) there is a double dissociation between the experience of action and actual action and that (b) such a double dissociation is evidence of the absence of a causal link between the two. But (b) does not follow from (a) ([Nahmias, 2002](#)). There is a double dissociation between the experience of perception and perception itself. But perception and the experience of perception are causally linked. Furthermore, Wegner's data does not support strong conclusions about the experience of authorship. Wegner measured the experience of authorship using a scale ranging from "not at all" to "very much." While the manipulation succeeded in altering the sense of authorship, participants' attribution of authorship to themselves never exceeded the halfway point of this scale when the person was not, in fact, the author of the action.

[Newell & Shanks \(2023\)](#) have argued that our sense of ourselves as responsible agents is secure because we have no reason to think that decisions arise from unconscious processes. They argue that any prior neural activity reflects the processes involved in forming an intention, not its irrevocable formation. This view is congruent with highly influential accumulator models of decision-making ([Cassey et al., 2014](#); [Golman et al.,](#)

[2020](#)). Newell and Shanks point out that intentions are brain processes and therefore can only be simultaneous with them. However, the formation of an intention and awareness of the formation of an intention need not and probably are not realized by the same neural processes; the latter may well follow the former ([Dennett, 2004](#)).

It is a further question whether consciousness lagging behind decision-making would threaten free will. Compatibilists and incompatibilists agree that a free decision is made by agents in the light of their reasons and values. Adapting the influential global workspace model of consciousness ([Baars, 1997](#)), especially its later development into a mechanistic neuroscientific account ([Dehaene & Changeux, 2011](#); [Mashour et al., 2020](#)), some theorists have argued that consciousness is needed for the integration of information rather than for the formation of decisions ([Levy, 2014](#)). According to this view, a delay in becoming aware of how we have decided to act is irrelevant to whether our doing so is free. Theorists who insist on the need for consciousness at the very moment of decision have yet to develop a model that explains the difference such consciousness would make.

Folk judgments

A different line of research focuses on empirical investigation of ordinary beliefs and judgments about free will. Since *free will* and *moral responsibility* are everyday terms that are deeply embedded in social practices, the ordinary understanding of free will might help settle whether it requires the falsity of determinism. A number of theorists have argued that folk intuitions might shift the burden of proof in the debate between compatibilists and incompatibilists. Accordingly, experimental philosophers have aimed to assess whether incompatibilism is intuitive.

The most common methodology has operationalized the concept of free will by probing assessments of the responsibility of agents in scenarios stipulated to be deterministic. Determinism, in turn, has usually been operationalized in terms of predictability. For example, participants might be asked to imagine that in the future, a supercomputer is invented that allows for the infallible prediction of every action prior to its performance ([Nahmias et al., 2006](#)). Participants are then asked whether agents who performed morally wrong actions (e.g., robbed a bank) acted of their own free will and were morally blameworthy. They found that a strong majority of participants answered “yes” to both questions. This suggests that ordinary people are natural compatibilists ([Nahmias et al., 2005](#); [Nahmias et al., 2006](#)).

A contrary perspective is that folk competence is incompatibilist, and the responsibility judgments reported by Nahmias et al. reflect a performance error. [Nichols & Knobe \(2007\)](#) used a between-subjects design, contrasting high-affect cases with low-affect cases. For the high-affect condition, vignettes like the following were used:

In [deterministic] Universe A, a man named Bill has become attracted to his secretary, and he decides that the only way to be with her is to kill his wife and 3 children. He knows that it is impossible to escape from his

house in the event of a fire. Before he leaves on a business trip, he sets up a device in his basement that burns down the house and kills his family.

Is Billy fully morally responsible for killing his wife and children?

For the low-affect condition, participants were simply asked “In Universe A, is it possible for a person to be morally responsible for their actions?”

Nichols and Knobe report that a strong majority (86%) of participants in the low-affect condition gave the incompatibilist answer, but in the high-affect condition most (72%) judged the agent responsible. They argue that the judgment made in the low-affect condition reflects agents’ competence and that the judgment in the high-affect condition reflects a performance error: high affect triggers a desire to punish, which causes the confabulation of a responsibility judgment.

Nichols and Knobe’s account is congruent with other evidence that free will beliefs are caused by, rather than causing, a desire to punish (e.g., [Clark et al., 2017](#)). Moreover, the finding that participants are more likely to judge agents responsible in concrete cases seems to be robust (including cross-culturally; see [Sarkissian et al., 2010](#)). However, the difference in judgments across concrete versus abstract cases does not seem to reflect differences in emotional arousal ([Cova et al., 2012](#); [Feltz & Cova, 2014](#)). Which judgment reflects competence and which a performance error remains an open question.

Some compatibilists have argued that these conflicting judgments are explained by experimental participants implicitly assuming that if determinism is true, then agents’ mental states do not cause their actions; these states are “bypassed.” Nahmias and colleagues ([Nahmias, 2006](#); Nahmias et al., 2007) gave participants scenarios that contrasted psychological with neurological determinism. In psychological determinism scenarios, agents make decisions that are completely caused by their mental states, which are in turn caused by antecedent events. In neurological determinism scenarios, agents make decisions that are completely caused by neural events. A strong majority of participants assessed agents in the psychological determinism scenarios as both free and responsible, whereas fewer than 20% attributed either freedom or responsibility to agents in the neural determinism scenarios. Nahmias and colleagues suggest that because the concrete cases make salient the psychological causes of decisions and behavior (the agent kills his wife in order to be with his secretary), participants do not make the bypassing error. They argue, accordingly, that determinism is understood to rule out free will only when scenarios are misconstrued.

While the bypassing hypothesis is perhaps the dominant view currently, it faces at least two major challenges. First, it has been argued that the bypassing error is caused by, rather than causing, judgments of free will and moral responsibility. Structural equation modelling suggests that this is a better fit for the data than the bypassing hypothesis ([Rose & Nichols, 2013](#)). Second, participants may fail to accept the deterministic scenario as described. Previous research has found that a large majority of participants believe the actual world

is indeterministic (e.g., [Roskies & Nichols, 2008](#)); belief bias might color their reception of the scenarios presented. [Nadelhoffer et al. \(2020\)](#) call this the *intrusive metaphysics* account. They found that many participants judged that agents in a deterministic world could act otherwise than they were determined to (only 47% of participants judged that agents in concrete cases could not act otherwise, and even fewer—32%—made the same judgment in abstract cases).

While the nature of folk judgments is a question worth pursuing in its own right, it is not clear that folk intuitions are relevant to settling the question of the reality of free will. Folk physics—even the folk physics of those with scientific training—is known to be inaccurate in some respects ([Halloun & Hestenes, 1985](#)). Perhaps folk metaphysics should not constrain theorizing in any way. Insofar as philosophers invoke their own intuitions in advancing arguments for and against free will, however, a well-established account of the etiology of free will beliefs might threaten to debunk philosophers' own intuitions.

Some theorists have suggested that folk judgments of free will and moral responsibility might be important for very different reasons. First, the apparent causal influence of punitive motivations on free will beliefs (see, for example, [Shariff et al., 2014](#)) suggests that support for retributive punishment might be reduced by widespread awareness of the (putative) unreality of free will. Second, and conversely, there is evidence that reduced belief in free will correlates with a decrease in prosocial behavior ([Baumeister et al., 2009](#); [Vohs & Schooler, 2008](#)). While these latter claims have been widely influential, there is a large question mark over their replicability ([Crone & Levy, 2019](#); [Nadelhoffer, Shepard, et al., 2020](#)).

Broader connections

If free will requires a capacity for responsiveness and reactivity to reasons, a range of work in various disciplines is relevant to the existence and nature of free will. A major theme of work in social psychology is that (a) people lack introspective access to the causes of their decisions and (b) would repudiate them if they were aware of them. The second condition provides the element missing from the argument that consciousness lags behind volition. If it is true, then action does not reflect the assessment of the weight of reasons, which in turn suggests that action is not caused by reasons-responsive mechanisms.

Work in cognitive science that suggests that decisions and actions reflect unconscious processes, and not agents' deliberations or values, comes from a variety of research programs. Work on *implicit attitudes* suggests that many people possess biases they consciously reject ([Greenwald et al., 1998](#)) and that these biases cause significant behaviors ([Spencer et al., 2016](#)). However, there are question marks over implicit bias research. Different measures of implicit bias correlate modestly with one another and are poor predictors of behaviors ([Oswald et al., 2013](#)), which undermines the claim that they are robust causes of actions. Moreover, agents have reasonable insight into their implicit attitudes, suggesting that they are not unconscious ([Hahn et al., 2014](#)).

Evidence of motivated cognition might seem to threaten free will in a closely related way. An enormous body of research suggests that consequential decisions and actions might reflect an evaluation of evidence that is biased by concern for self-esteem or group identity (Kunda, 1990). Such evidence might suggest that some or all decisions are unfree: they do not reflect values or beliefs people would endorse if they had the ability to assess them dispassionately.

While motivated reasoning is apparently well established, some researchers have suggested that the evidence for its existence is weaker than is usually thought. A common problem in research on motivated reasoning is a failure to control sufficiently for background beliefs (Tappin et al., 2020). Motivated cognition might, therefore, reflect fully Bayesian reasoning, when participants' priors that evidence presented is misleading are sufficiently high. In this light, Coppock (2023) has suggested that the debate between Bayesians and proponents of motivated cognition is intractable: each side can explain all the evidence satisfactorily.

Two reviews aim to establish that motivated cognition is a better explanation for the full range of data. Sommer et al. (2024) argue that though belief updating itself is Bayesian, motivated cognition best explains some of the inputs into the belief updating mechanism. Much of their evidence itself seems amenable to Bayesian explanation, however, or reflects conscious effort to reach a particular conclusion. Williams (2023) argues that a group identification account of motivated cognition is both more fruitful and simpler than the alternative Bayesian account. Proponents of Bayesianism may respond by arguing that group identification plays an epistemic role, mediated by the implicit belief that since the group is steered by the best evidence, adjusting beliefs to reflect well on the group is an indirect way of tracking truths.

Further reading

- Knobe, J., & Nichols, S. (Eds.). (2008). *Experimental philosophy*. Oxford University Press. <https://doi.org/10.1093/oso/9780195323252.001.0001>
- Levy, N. (2014). *Consciousness and moral responsibility*. OUP Oxford. <https://doi.org/10.1093/acprof:oso/9780198704638.001.0001>
- Newell, B. R., & Shanks, D. R. (2023). *Open minded: Searching for truth about the unconscious mind*. MIT Press. <https://doi.org/10.7551/mitpress/14922.001.0001>

References

- Baars, B. J. (1997). *In the theater of consciousness: The workspace of the mind*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195102659.001.1>

↩

- Baumeister, R. F., Masicampo, E. J., & Dwall, C. N. (2009). Prosocial benefits of feeling free: Disbelief in free will increases aggression and reduces helpfulness. *Personality and Social Psychology Bulletin*, 35(2), 260–268. <https://doi.org/10.1177/0146167208327217>

[↑](#)

- Braun, M. N., Wessler, J., & Frieze, M. (2021). A meta-analysis of Libet-style experiments. *Neuroscience and Biobehavioral Reviews*, 128(2), 182–198. <https://doi.org/10.1016/j.neubiorev.2021.06.018>

[↑](#)

- Capes, J. A. (2023). Manipulation and direct arguments. In J. Campbell, K. M. Mickelson, V. A. White (Eds.), *A companion to free will* (pp. 144–156). John Wiley & Sons, Ltd., <https://doi.org/10.1002/9781119210177.ch9>

[↑](#)

- Cassey, P., Heathcote, A., & Brown, S. D. (2014). Brain and behavior in decision-making. *PLoS Computational Biology*, 10(7), e1003700. <https://doi.org/10.1371/journal.pcbi.1003700>

[↑](#)

- Clark, C. J., Baumeister, R. F., & Ditto, P. H. (2017). Making punishment palatable: Belief in free will alleviates punitive distress. *Consciousness and Cognition*, 51, 193–211. <https://doi.org/10.1016/j.concog.2017.03.010>

[↑](#)

- Coppock, A. (2023). *Persuasion in parallel: How information changes minds about politics*. University of Chicago Press. <https://press.uchicago.edu/ucp/books/book/chicago/P/bo181475008.html>

[↑](#)

- Cova, F., Bertoux, M., Bourgeois-Gironde, S., & Dubois, B. (2012). Judgments about moral responsibility and determinism in patients with behavioural variant of frontotemporal dementia: Still compatibilists. *Consciousness and Cognition*, 21(2), 851–864. <https://doi.org/10.1016/j.concog.2012.02.004>

[↑](#)

- Crone, D. L., & Levy, N. (2019). Are free will believers nicer people? (Four studies suggest not). *Social Psychological and Personality Science*, 10(5). <https://journals.sagepub.com/doi/full/10.1177/1948550618780732>

[↑](#)

- Dehaene, S., & Changeux, J.-P. (2011). Experimental and theoretical approaches to conscious processing. *Neuron*, 70(2), 200–227. <https://doi.org/10.1016/j.neuron.2011.03.018>

[↑](#)

- Dennett, D. C. (2004). *Freedom evolves*. Penguin Random House.

[↑](#)

•

↑

- Dominik, T., Dostál, D., Zielina, M., Šmahaj, J., Sedláčková, Z., & Procházka, R. (2018). Libet's experiment: A complex replication. *Consciousness and Cognition*, 65, 1–26. <https://doi.org/10.1016/j.concog.2018.07.004>

↑

- Feltz, A., & Cova, F. (2014). Moral responsibility and free will: A meta-analysis. *Consciousness and Cognition*, 30, 234–246. <https://doi.org/10.1016/j.concog.2014.08.012>

↑

- Fischer, J. M., & Ravizza, M. (2000). *Responsibility and control: A theory of moral responsibility*. Cambridge University Press.

↑

- Frankfurt, H. G. (1969). Alternate possibilities and moral responsibility. *The Journal of Philosophy*, 66(23), 829–839. <https://doi.org/10.2307/2023833>

↑

- Frede, M. (2012). *A free will: Origins of the notion in ancient thought*. University of California Press.

↑

- Fried, I., Mukamel, R., & Kreiman, G. (2011). Internally generated preactivation of single neurons in human medial frontal cortex predicts volition. *Neuron*, 69(3), 548–562. <https://doi.org/10.1016/j.neuron.2010.11.045>

↑

- Golman, R., Bhatia, S., & Kane, P. B. (2020). The dual accumulator model of strategic deliberation and decision making. *Psychological Review*, 127(4), 477–504. <https://doi.org/10.1037/rev0000176>

↑

- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology*, 74(6), 1464–1480. <https://doi.org/10.1037/0022-3514.74.6.1464>

↑

- Haggard, P., & Eimer, M. (1999). On the relation between brain potentials and the awareness of voluntary movements. *Experimental Brain Research*, 126(1), 128–133. <https://doi.org/10.1007/s002210050722>

↑

- Hahn, A., Judd, C. M., Hirsh, H. K., & Blair, I. V. (2014). Awareness of implicit attitudes. *Journal of Experimental Psychology. General*, 143(3), 1369–1392. <https://doi.org/10.1037/a0035028>

↑

- Halloun, I., & Hestenes, D. (1985). Common sense concepts about motion. *American Journal of Physics*, 53, 1056–1065. <https://doi.org/10.1119/1.14031>

↑

- Hunt, D., & Zagzebski, L. (2022). Foreknowledge and free will. In E. N. Zalta (Ed.), *The Stanford encyclopedia of philosophy* (Summer 2022). Metaphysics Research Lab, Stanford University. <https://plato.stanford.edu/archives/sum2022/entries/free-will-foreknowledge/>

↑

- Kane, R. (1998). *The significance of free will*. Oxford University Press.

↑

- Knobe, J., & Nichols, S. (Eds.). (2008). *Experimental philosophy*. Oxford University Press. <https://doi.org/10.1093/oso/9780195323252.001.0001>

↑

- Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin*, 108(3), 480–498. <https://doi.org/10.1037/0033-2909.108.3.480>

↑

- Levy, N. (2014). *Consciousness and moral responsibility*. OUP Oxford. <https://doi.org/10.1093/acprof:oso/9780198704638.001.0001>

↑

- Libet, B. (1999). Do we have free will? *Journal of Consciousness Studies*, 6(8–9), 47–57.

↑

- Libet, B., Gleason, C. A., Wright, E. W., & Pearl, D. K. (1983). Time of conscious intention to act in relation to onset of cerebral activity (readiness-potential). The unconscious initiation of a freely voluntary act. *Brain*, 106(3), 623–642. <https://doi.org/10.1093/brain/106.3.623>

↑

- Mashour, G. A., Roelfsema, P., Changeux, J.-P., & Dehaene, S. (2020). Conscious processing and the global neuronal workspace hypothesis. *Neuron*, 105(5), 776–798. <https://doi.org/10.1016/j.neuron.2020.01.026>

↑

- Nadelhoffer, T., Rose, D., Buckwalter, W., & Nichols, S. (2020). Natural compatibilism, indeterminism, and intrusive metaphysics. *Cognitive Science*, 44(8), e12873. <https://doi.org/10.1111/cogs.12873>

↑

- Nadelhoffer, T., Shepard, J., Crone, D. L., Everett, J. A. C., Earp, B. D., & Levy, N. (2020). Does encouraging a belief in determinism increase cheating? Reconsidering the value of believing in free will. *Cognition*, 203, 104342. <https://doi.org/10.1016/j.cognition.2020.104342>

↵

- Nahmias, E. (2002). When consciousness matters: A critical review of Daniel Wegner's the illusion of conscious will. *Philosophical Psychology*, 15(4), 527–541. <https://doi.org/10.1080/0951508021000042049>

↵

- Nahmias, E. (2006). Folk fears about freedom and responsibility: Determinism vs. reductionism. *Journal of Cognition and Culture*, 6(1–2), 215–237. <https://doi.org/10.1163/156853706776931295>

↵

- Nahmias, E., Morris, S., Nadelhoffer, T., & Turner, J. (2005). Surveying Freedom: Folk Intuitions about free will and moral responsibility. *Philosophical Psychology*, 18(5), 561–584. <https://doi.org/10.1080/09515080500264180>

↵

- Nahmias, E., Morris, S., Nadelhoffer, T., & Turner, J. (2006). Is incompatibilism intuitive? *Philosophy and Phenomenological Research*, 73(1), 28–53. <https://doi.org/10.1111/j.1933-1592.2006.tb00603.x>

↵

- Newell, B. R., & Shanks, D. R. (2023). *Open minded: Searching for truth about the unconscious mind*. MIT Press. <https://doi.org/10.7551/mitpress/14922.001.0001>

↵

- Nichols, S., & Knobe, J. (2007). Moral responsibility and determinism: The cognitive science of folk intuitions. *Noûs*, 41(4), 663–685. <https://doi.org/10.1111/j.1468-0068.2007.00666.x>

↵

- Oswald, F. L., Mitchell, G., Blanton, H., Jaccard, J., & Tetlock, P. E. (2013). Predicting ethnic and racial discrimination: A meta-analysis of IAT criterion studies. *Journal of Personality and Social Psychology*, 105(2), 171–192. <https://doi.org/10.1037/a0032734>

↵

- Pereboom, D. (2014). *Free will, agency, and meaning in life*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780199685516.001.0001>

↵

- Rose, D., & Nichols, S. (2013). The lesson of bypassing. *Review of Philosophy and Psychology*, 4(4), 599–619. <https://doi.org/10.1007/s13164-013-0154-3>

↑

- Roskies, A. L. (2010). Why Libet's studies don't pose a threat to free will. In W. Sinnott-Armstrong & L. Nadel (Eds.), *Conscious will and responsibility: A tribute to Benjamin Libet* (p. 11–22). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195381641.003.0003>

↑

- Roskies, A. L., & Nichols, S. (2008). Bringing moral responsibility down to earth. *The Journal of Philosophy*, 105(7), 371–388. <https://doi.org/10.5840/jphil2008105737>

↑

- Sarkissian, H., Chatterjee, A., de Brigard, F., Knobe, J., Nichols, S., & Sirker, S. (2010). Is belief in free will a cultural universal? *Mind & Language*, 25(3), 346–358. <https://doi.org/10.1111/j.1468-0017.2010.01393.x>

↑

- Schurger, A., Sitt, J. D., & Dehaene, S. (2012). An accumulator model for spontaneous neural activity prior to self-initiated movement. *Proceedings of the National Academy of Sciences of the United States of America*, 109(42), E2904–E2913. <https://doi.org/10.1073/pnas.1210467109>

↑

- Shariff, A. F., Greene, J. D., Karremans, J. C., Luguri, J. B., Clark, C. J., Schooler, J. W., Baumeister, R. F., & Vohs, K. D. (2014). Free will and punishment: A mechanistic view of human nature reduces retribution. *Psychological Science*, 25(8), 1563–1570. <https://doi.org/10.1177/0956797614534693>

↑

- Sommer, J., Musolino, J., & Hemmer, P. (2024). Updating, evidence evaluation, and operator availability: A theoretical framework for understanding belief. *Psychological Review*. 131(2), 373–401. <https://doi.org/10.1037/rev0000444>

↑

- Soon, C. S., Brass, M., Heinze, H.-J., & Haynes, J.-D. (2008). Unconscious determinants of free decisions in the human brain. *Nature Neuroscience*, 11(5), 543–545. <https://doi.org/10.1038/nn.2112>

↑

- Spencer, K. B., Charbonneau, A. K., & Glaser, J. (2016). Implicit bias and policing. *Social and Personality Psychology Compass*, 10(1), 50–63. <https://doi.org/10.1111/spc3.12210>

↑

- Tappin, B. M., Pennycook, G., & Rand, D. G. (2020). Thinking clearly about causal inferences of politically motivated reasoning: Why paradigmatic study designs often undermine causal inference. *Current Opinion in Behavioral Sciences*, 34, 81–87. <https://doi.org/10.1016/j.cobeha.2020.01.003>

↵

- Van Inwagen, P. (1983). *An essay on free will*.

↵

- Vohs, K. D., & Schooler, J. W. (2008). The value of believing in free will: Encouraging a belief in determinism increases cheating. *Psychological Science*, 19(1), 49–54. <https://doi.org/10.1111/j.1467-9280.2008.02045.x>

↵

- Wegner, D. M. (2018). *The illusion of conscious will*. The MIT Press.
<https://doi.org/10.7551/mitpress/9780262534925.001.0001>

↵

- Wegner, D. M., & Wheatley, T. (1999). Apparent mental causation: Sources of the experience of will. *The American Psychologist*, 54(7), 480–492. <https://doi.org/10.1037/0003-066X.54.7.480>

↵

- Wegner, D. M., Sparrow, B., & Winerman, L. (2004). Vicarious agency: Experiencing control over the movements of others. *Journal of Personality and Social Psychology*, 86(6), 838–848.
<https://doi.org/10.1037/0022-3514.86.6.838>

↵

- Williams, D. (2023). The case for partisan motivated reasoning. *Synthese*, 202(89). Advance online publication. <https://doi.org/10.1007/s11229-023-04223-1>

↵