Libertarian Free Will and the Physical Indeterminism Luck Objection

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Libertarian free will is, roughly, the view that agents (or, agent-involving events) cause actions to occur or not occur: Maddy's decision to get a beer causes her to get up off her comfortable couch to get a beer, though she almost chose not to get up. Libertarian free will notoriously faces the luck objection, according to which agential states do not determine whether an action occurs or not, so it is beyond the control of the agent, hence lucky, whether an action occurs or not: Maddy's reasons for getting beer in equipoise with her reasons to remain in her comfortable seat do not determine that she will get up or stay seated, so it seems beyond her control, hence lucky, that she gets up. In this paper I consider a sub-set of the luck objection called the Physical Indeterminism Luck Objection, according to which indeterministic physical processes cause actions to occur or not, and agent's lack control over these indeterministic physical processes, so agent's lack control over, hence it is lucky, whether action occurs or not. After motivating the physical indeterminism luck objection, I consider responses from three recent event-causal libertarian models, and conclude that they fail to overcome the problem, though one promising avenue is opened up.

This paper is divided into six parts. In Section One, I minimally define libertarian free will as accepting agential indeterminism, which is the conjunction of indeterminism and agential causation, where agential indeterminism occurs when an agent's reasons, efforts or character indeterministically cause actions. In Sections Two and Three I outline the physical indeterminism luck objection to libertarian free will, which states that sub-agential physical processes in the brain indeterministically cause actions to occur, and agents lack control over these indeterministic physical causes, so agent's lack control over whether their actions occur. If agent's lack control over whether actions occur, the occurrence of these actions is lucky, where this luck jeopardizes free will and moral responsibility. In Sections Four through Six I consider three recent libertarian responses to this objection—Mark Balaguer in Section Four, Chris Franklin in Section Five, and Robert Kane in Section Six. I conclude that none of these models satisfactorily overcomes the physical indeterminism luck objection, though one interpretation of Kane yields a promising avenue of reply.

1 Libertarian Free Will

As Peter Van Inwagen defines it, *Determinism* is "the thesis that there is at any instant exactly one physically possible future'' (Van Inwagen, 1983, 3). Or, causes and/or conditions *C* (i.e., the arrangements and properties of all the substances in the universe at time *t*), necessarily determine that effect *E* occurs. As Laura Ekstrom succinctly summarizes, *Indeterminism*, then, "is defined simply as the negation of the thesis of determinism" (Ekstrom, 2019, 127). Or, it is not the case that *C* necessarily determines that effect *E* occurs. Although *C* does not determine that effect *E* occurs, it is common to presume that *C* nevertheless indeterministically causes *E* to occur.[1] There are two discernibly distinct versions of *Indeterminism*: physical indeterminism and agential indeterminism. Here is the doctrine of physical indeterminism, as it applies to some particular effect *E*:

> *Physical Indeterminism*: physical causes and/or conditions *P* (i.e., the arrangements and physical properties of all the physical substances in the universe at time *t*) indeterministically causes *E* to occur.

The emphasis in *Physical Indeterminism* is on the fact that *physical* states *P* indeterministically cause *E* to occur. Some examples of *Physical Indeterminism*: a subatomic particle's capacities for tunnelling indeterministically causes it to pass through a thin barrier, though the particle may or may not have passed through the barrier; an atom's radioactive half-life indeterministically causes the atom to decay at a certain time. And, on the plausible assumption that physical indeterminism occurs in human brains: chemical processes in a fired

[1] I leave open the particular model of indeterministic causation. Most commonly, *C* is an indeterministic cause of *E* when *C* raises the chance of *E* occurring (Suppes, 1984, 28; Lewis, 1986, 176–177). As Murali Ramachandran explains: "If we want to allow that there is causation even in indeterministic worlds, there is little alternative but to take causation as involving chance-raising" (Ramachandran, 2004, 152). This is sometimes conceived as the 'causation of probabilities' where *C* causes *E* by influencing the probability of *E* occurring. Others take indeterministic causation to involve actual causal processes operating within indeterministic contexts, where *C* is an indeterministic cause of *E* when there is a chance of *E* occurring, and *C* causes *E* via an actual causal process (cp. Schaffer, 2001). To borrow an example from Christopher Hi*9tchcock, two gunmen are shooting at a vase, each with a fifty percent chance of hitting the vase, thus jointly there is a seventy five percent chance of the vase smashing. Gunman *A* strikes the vase, while gunman *B* misses. The firing from gunman *B* raises the chance the vase will break from fifty percent to seventy five percent, but does not cause the vase to break. Rather, it is gunman *A* that actually causes the vase to break. He concludes that "the two gunshots do not simply contribute to the probability of the vase's shattering, after which 'nothing else causal happens.' Something else causal does happen: the bullet fired from the first gun strikes the vase" (Hitchcock, 2004, 410; cp. Woodward, 1994, 366). This is sometimes conceived as the 'probabilities of causation' where *E* has a certain probability of occurring, and *C* then causes *E* to occur. I remain neutral on the particular model of indeterministic causation.

neuron's terminal indeterministically causes calcium channels to open in the neuron's terminal which causes vesicles in the neuron's terminal to fuse to the cell membrane thereby causing neurotransmitters to release into the synaptic cleft.[2]

While libertarian free will includes the view that *Determinism* is false, rejecting *Determinism* alone is insufficient for establishing libertarian free will. Indeterministic physical processes occur in stars and decaying atoms, but they presumably lack free will (cp. Miltenburg & Ometta, 2019, 175). Even physically indeterministic processes occurring in brains seem insufficient for libertarian free will. Neuroscientists notice the stochastic processes in neuron terminals mentioned above in squids (Augustine et al., 1985) and in vitro (Branco & Staras, 2009)—though presumably squids and in vitro neurons lack free will. As Alfred Mele expresses, "fruit flies lack free will even if some of their behaviour is produced by indeterministic brain processes" (Mele, 2013, 74). Likewise, with respect to living human brains, if Jennie, while sleeping, twitches her arm due to some indeterministic neural processing, she would not have done so freely.

Libertarians commonly supplement the rejection of *Determinism* with acceptance of *Agential Causation*, according to which agents cause their actions, where actions include conscious choices and overt bodily movements resulting from conscious choices. Agent-causal libertarians argue that actions are caused by *sui generis* agent causation, where the agent *qua* agent causes agents to act (Jacobs & O'Connor, 2013; Steward, 2012; Chisholm, 2003). Event-causal libertarians imagine that actions are caused by agent-involving events, where the agent's reasons, intentions, preferences, motivations, character, or efforts cause agents to act (Balaguer, 2014a; Franklin, 2018; Kane, 2019). In both cases, *Agential Causation* is emphasized. Numerous libertarians argue that the conjunction of some form of *Agential Causation* with *Indeterminism* nicely captures the nature of libertarian free will (Ekstrom, 2019, 132–134; Miltenburg & Ometto, 2019, 166; Franklin, 2018, 11–23; Furlong, 2017, 515; Franklin, 2011, 203; Clarke, 2003, 17). Here is this combination, as applied to some particular effect *E*:

[2] Scientific evidence for physical indeterminism in the brain is often provided by libertarians (Balaguer, 2014a, 95–96; Franklin, 2013, 132–136; Kane,1996, 128–130). They cite sources and evidence suggesting that neurotransmitter release and uptake are at present understood as stochastic processes. Here is one particularly acute synopsis of this view: "transmitter release is a stochastic process. Release of transmitter at a presynaptic terminal does not necessarily occur every time an action potential arrives and, conversely, spontaneous release can occur even in the absence of the depolarization due to an action potential" (Dayan & Abbott, 2001, 179; cp. Hammond, 2008, 157–159). I shall reference processes related to neurotransmitter release probability, such as the probabilities surrounding the opening and closing of voltage gated calcium channels in axon terminals (Gessell, 2017, 1210ff; Weber, 2005, 669;), and probabilities surrounding the fusing of vesicles to the presynaptic cell membrane (Dittman & Ryan, 2019, 180–183; Glimcher, 2005, 48–49). The hypothesis that physical indeterminism occurs in the brain does not rely on establishing that these particular processes are ultimately stochastic, but only relies on physical indeterminism being present somewhere in the neural processing relevant to volition.

Agential Indeterminism: agential causes and/or conditions *A* (i.e., the background reasons, motivations, efforts and/or character traits of the agent at time *t*) indeterministically causes *E* to occur.[3]

The emphasis in *Agential Indeterminism* is on the fact that *agential* causes *A* indeterministically cause *E* to occur. For example, Maddy is deciding whether to get up and get another beer. Her reasons to stay seated inhibits her to some degree, but her reasons for a beer renders it likely that she will get up. She gets up and gets another beer, though she almost stayed seated. Here her reasons for getting a beer causally contributed to her getting a beer, satisfying *Agential Indeterminism*.

2 The Luck Objection

The Luck Objection has been described as "the most powerful and pervasive objection" (Kane, 2014b, 50) to libertarian free will. It is wielded against libertarian free will by numerous philosophers, both historical (Ayer, 1954; Hume, 1740, II.iii) and contemporary (Coffman, 2015; Schlosser, 2014; Levy, 2011; Shabo, 2011; Haji, 2001; Mele, 1999a; van Inwagen, 1983, 126–152) To understand the luck objection, it is helpful to have a clear definition of luck itself. The literature on luck suggests numerous different conditions required for an event to be considered lucky. While a Significance Condition (i.e., the event must involve an agent) (Ballantyne, 2012) and a Probability Condition (i.e., the event must be unlikely) (Rescher, 2014) are relevant to luck, I emphasize the following *No Control Condition* on an event being lucky, as it is most germane to possessing free will and moral responsibility:

No Control Condition on Luck: If an agent cannot control whether event *E* occurs, then *E* occurring is a matter of luck for the agent.[4]

Here is an example: if Jan has never spoken to, or known about the existence of, a distant relative, so she has no control over what this distant relative does or does not do, and this relative decides to pass along an estate home to Jan in her will, then Jan

[3] I take *Agential Indeterminism* to represent a necessary condition for libertarian free will, though not necessarily a sufficient condition for libertarian free will. Many libertarians propose additional features needed to secure libertarian free will, and I do not dispute this possibility. Indeed, the result of this paper is that those endorsing only *Agential Indeterminism* must overcome the *Physical Indeterminism Luck Objection* before deliving libertarian free will. I also take *Agential Indeterminism* to represent the possibility that the agent *contributes to E* occurring, rather than being the *sole factor* in *E* occurring. Clearly other processes, including some possibly deterministic agential contributions such as an agent's upbringing and genetic make-up and fixed character, and including some possibly indeterministic physical processes such as physical indeterminism in the brain, contribute to whether *E* occurs. I also remain flexible on the exact definition of agential causes and/or conditions. While agent causal libertarians take the agent herself to be included in these agential causes, event-causal libertarians take agent-evolving events such as the agent's reasons, motivations, character and/or efforts to be the agential causes.

[4] While luck, in general, may have other necessary conditions (i.e., a probability condition and a significance condition), as becomes clear below, my emphasis is that the *No Control Condition* on luck is a sufficient condition for free will and moral responsibility undermining luck. That is, an agent's lack of control over *E* is sufficient to establish that the agent has no free will in bringing about *E*, and is not morally responsible for *E*.

receiving the estate home is a matter of luck for Jan. As Ishtiyaque Haji and Ryan Hebert summarize this aspect of luck, "Roughly, something is a matter of luck if it is beyond your control" (Haji & Hebert, 2018, 192; cp. Broncano-Berrocal, 2015; Zimmerman, 1993, 231).

I focus on the *No Control Condition* because it is especially significant in cases where free will and moral responsibility are involved. Consider the following link between no control luck and free will first:

> *Luck Objection to Free Will*: If *E* occurring is a matter of luck for the agent (in the sense of the agent not having control over *E* occurring), then the agent does not freely cause *E* to occur.

Here is an example: whether a distant relative gives away her estate or not is a matter of luck for Jan (in the sense that Jan has no control over whether the relative gives away the estate), so Jan does not freely bring about the estate being given to her. The connection between no control luck and free will is intuitive: of course, if Jan lacks control over the distant relative, she does not freely bring it about that the estate is given to her—how could she? Further support for this connection will be provided below. Even on the definitions given above, libertarian free will requires *Agential Causation*, which amounts to some degree of agential control, so without agential control, there is no libertarian free will. Here are some articulations of this connection between the lack of agential control and the lack of free will:

> A necessary, but not sufficient, condition of an event's being lucky for an agent in either sense is that the event was not under the agent's control. However, for purposes of assessing one's freedom and responsibility, this (it seems) is all that matters (Franklin, 2015, 755).

> In the free will context, something is a matter of luck for *A* if and only if it happens to *A* ... what happens to someone is not something she does (Griffiths, 2010, 45).

> To say that a decision is random in this sense is to say that it wasn't me who made the decision, that the decision just happened to me. I think that this is the kind of randomness that's relevant to free will (Balaguer, 2014a, 72; cp. Lemos, 2018a, 107; Levy, 2015, 780).

If agents lack control over whether *E* occurs, it is lucky to the agent that *E* occurs, so the agent does not freely bring about *E*. The problem extends one step further, namely:

> *Luck Objection to Moral Responsibility*: If *E* occurring is a matter of luck for the agent (in the sense of the agent not having control over *E* occurring), then the agent does not freely bring about *E*, so the agent is not morally responsible for *E* occurring.

The loss of moral responsibility seems to follow intuitively as well. The distant relative giving away her estate was a matter of luck for Jan, as she lacked control over this outcome, so she did not freely bring it about, so she should not be held responsible for the fact that the distant relative gave away her estate. The loss of

moral responsibility also follows from the already presumed loss of free will, at least for those persuaded that a necessary condition for moral responsibility is free will. The loss of moral responsibility also follows from the meta-ethical principle that an 'ought implies a can' (Cohen, 2018), as this principle says one cannot be responsible for *E* without freely causing *E*. The connection between no control luck and moral responsibility is also frequently articulated and debated in the moral luck literature (Mickelson, 2019, 224; Hartman, 2019, 3179; Nagel, 1979, 26). As Mele summarizes, "Agents' control is the yardstick by which the bearing of luck on their freedom and moral responsibility is measured" (Mele, 2006, 7).

To briefly summarize, if an agent cannot control whether *E* occurs, then *E* is lucky to the agent in the sense that the agent does not freely bring about *E*, and the agent is not responsible for *E*. Given the direct link from the agent's lack of control over *E* to the agent's failure of free will and moral responsibility for *E*, the legitimacy of the luck objection to libertarian free will shifts to whether or not the agent has control over *E*. It is the burden of the next section to address this issue.

3 Physical Indeterminism Luck Objection

In this section I outline the physical indeterminist luck objection, which provides support for the view that the agent does not actually have control over *E*, which activates the dire consequences raised in Section Two. Here is the physical indeterminism luck objection:

> *Physical Indeterminism Luck Objection*: physical causes and/or conditions *P* indeterministically causes *E* to occur, and the agent lacks control over *P*, so the agent lacks control over *E* occurring, so *E* occurring is a matter of luck to the agent.

The *Physical Indeterminism Luck Objection* has three central planks. The first plank is acceptance of *Physical Indeterminism* as defined above: physical causes *P* indeterministically causes *E* to occur. What support is there for *Physical Indeterminism*? *Physical Indeterminism* is itself an indeterministic version of a principle of *Physical Causal Completeness* (cp. Tse, 2018, 254; Papineau, 2009, 59; Bennett, 2008, 281), which crystalizes the naturalistic sentiment that physical effects *E* are completely caused (deterministically or in this case indeterministically) by physical causes *P*. For example, if the physical effect *E* is neurotransmitter release from a presynaptic neuron terminal, then whether *E* occurs or not is indeterministically caused by antecedent physical causes *P*, such as whether calcium channels in the presynaptic neuron terminal open or not. *Physical Indeterminism* is accepted by the philosophers discussed below, so I shall not motivate it further.

The second component of the *Physical Indeterminism Luck Objection* is the following principle:

> *No Control Over Physical Indeterminism:* agents have no control over the physical conditions and/or causes *P* that indeterministically cause *E* to occur.

It is common to support *No Control Over Physical Indeterminism* by deploying a *Remote-To-Local Strategy* (Pereboom, 2001, 50ff; Shabo, 2011; Shabo, 2013; Shabo,

2014; Haji, 2000, 333–336; van Inwagen, 1983, 134–142; McCall, 1985, 672–674; Dennett, 2003, 132; Mele, 1999b, 277). Let *E* be the effect of a typical microphysical indeterministic cause *P*—say an atom that decays—in remote space, billions of years ago. Whether this atom decays or not is indeterministically caused by *P*, such as the quantum properties of this microphysical particle, and agents clearly lack control over the quantum properties of microphysical particles—agents don't even exist in this region of spacetime! Now imagine that *E* is the effect of a typical microphysical indeterministic cause *P*—say an electron's position within its atomic orbital—in the present day on Earth somewhere. Where the electron is positioned is still indeterministically caused by *P*, such as the quantum properties of this microphysical particle, and even though agents are present in the neighborhood, agents clearly lack control over the quantum properties of microphysical particles—agents cannot even see these subatomic indeterministic processes occurring, let alone have a rudimentary understanding of the indeterministic microphysical mechanisms causing *E* to occur.

Now imagine that *E* is the effect of a typical microphysical indeterministic cause *P* in an agent's brain—say the opening of voltage gated calcium channels in axon terminals. Whether these calcium channels open or not is still indeterministically caused by *P*, such as the quantum or stochastic properties of these microphysical particles, and even though these effects occur in agent's brains, agents lack control over the quantum or stochastic properties of microphysical particles. After all, there is no substantial difference between indeterministic microphysical processes in remote space and indeterministic microphysical processes in brains. Nature is uniform, so the same microphysical particles follow the same indeterministic processes no matter where they are located. As Robert Larmer notes, "there is no reason to think that sub-atomic particles behave any differently in the brain than elsewhere" (Larmer, 1985, 187). Moreover, agents lack the introspective ability to locate the appropriate chemicals within the axon terminals in their brains to influence them. And, even if they could locate these indeterministic physical causes, they cannot imagine how to intervene on these chemicals in such a manner as to influence whether calcium ions open. And, if they could unearth the hidden mechanisms behind microphysical indeterminacy in their brains, they still would not know how to properly tinker with these microphysical processes in such a way as to ensure their desired choices occurred. Since the agent lacks control over the indeterministic microphysical causes *P* of *E*, the *No Control Over Physical Indeterminism* principle is established.

The third component of the *Physical Indeterminist Luck Objection* is the following transitivity principle:

(3) *Transitivity of No Control*: Agents that do not have control over the cause *P* of *E* do not have control over *E*.

This principle shares intuitive force with Peter Van Inwagen's notorious Rule Beta (van Inwagen, 1983, 94–95; cp. Finch & Warfield, 1998). To modify one of his examples, since agents have no control over the fact that the sun explodes in 2000AD, agents have no control over the effect of this cause, namely, that life on earth will end in 2000AD (van Inwagen, 1983, 98). While the technicalities of Rule Beta are disputable, few dispute the intuitive force behind the principle, and further support for this principle will be provided below.

To briefly summarize: agents have no control over the indeterministic physical cause *P* of *E* (by *No Control Over Physical Indeterminism*), but it is *P* that indeterministically causes *E* to occur (by *Physical Indeterminism*), so agents have no control over *E* occurring (by *Transitivity of No Control*). But if agents cannot control whether *E* occurs, *E* occurring is a matter of luck for the agent (by *No Control Condition on Luck*). And, if *E* occurring is a matter of luck for the agent (in the sense that the agent has no control over whether *E* occurs), agents do not freely bring about *E* (by *Luck Objection to Free Will*) and agents should not be held responsible for *E* (by *Luck Objection to Moral Responsibility*). For their own part, numerous philosophers have expressed similar worries to the *Physical Indeterminism Luck Objection*. Here are some examples:

> How can agents be personally responsible for outcomes that are undetermined and result from indeterminate processes in their brains? In what sense can such outcomes be called *choices* at all, much less morally responsible choices? (Bernstein, 1995, 154).

> Critics of libertarianism find it a mystery why [an agent] chose *A*, rather than *B*, given that she was in the identical psychological state immediately prior to her actual choice of A and her unactualized selection of *B*, and given that the deciding factor was an amplified, undetermined quantum event. To critics, it was a matter of luck that fixed her decision to give aid. The atoms swerved at just the right time to produce the choice that resulted. And if the deciding factor was an undetermined quantum event, in what sense is it reasonable or morally fair to hold the woman morally responsible for the result of the quantum event? (Double, 2020, 300-301).

> If my decision to have a second cup of coffee this morning was due to a random release of neurotransmitters, how could the indeterminacy of the initiating event count as the free exercise of my will? Chance occurrences are by definition ones for which I can claim no responsibility. And if certain of my behaviors are truly the result of chance, they should be surprising even to me … You would live as one blown about by an internal wind (Harris, 2012, 28).

These critics are here expressing sympathy with the view that libertarian free will faces the challenge that physical causes *P* indeterministically cause *E* to occur, so *E* occurring is beyond the control of the agent, so is a matter of luck, which threatens the agent's free will and moral responsibility over *E*.

4 Balaguer's Neurological Libertarianism

Libertarians are aware of the concerns raised in Sections Two and Three, and have models circumventing the *Physical Indeterminism Luck Objection*. In the remainder of this paper, I consider three such libertarian responses.

Libertarians typically respond as follows: the *Physical Indeterminism Luck Objection* stipulates that *E* is indeterministically caused by physical processes *P*, which the agent does not control, so the luck concern arises. But, a central plank of libertarian free will is *Agential Indeterminism*, according to which the occurrence of *E* is in part indeterministically caused by the agent's reasons, efforts and character, so the agent regains control over the occurrence of *E*, and the luck concern

dissipates (cp. Ekstrom, 2019, 139; Kane, 2019, 154; Miltenburg & Ometto, 2019, 164; McCall & Lowe, 2005, 685; Clarke, 2003, 77).

It is common to object to this initial response by emphasizing an *Agential Indeterminism Luck Objection*. Namely, the agent's reasons, efforts and character leave it underdetermined whether *E* occurs, so it is not up to the agent's reasons, efforts and character whether *E* actually occurs (Schlosser, 2014, 378–381; Haji, 2013, 241–243; Blumenfield, 2011, 312–313; Griffiths, 2010, 43; Levy & McKenna, 2009, 121; Mele, 2006, 8–9; O'Connor, 2002, 40; Pereboom, 2001, 48). Maddy's reasons to stay seated and to get up render it underdetermined whether she will stand, so it is not up her whether she actually stands. I shall raise a different objection. Namely, this libertarian response introduces the potential for conflict between *Physical Indeterminism* and *Agential Indeterminism*. According to *Physical Indeterminism*, it is physical states *P* that indeterministically causes *E* to occur, which generates *prima facie* tension with the *Agential Indeterminism* principle that it is agential states *A* that indeterministically causes *E* to occur. If the outcome *E* is indeterministically caused by *P*, how can the outcome *E* be partly indeterministically caused by *A*?

In a series of works (Balaguer, 1999, 2010, 2014a, 2014b), Mark Balaguer introduces an innovative response to this difficulty, which he calls "neurological libertarianism" (Balaguer, 1999, 191). On neurological libertarianism, not-predetermined free will occurs during torn decisions, which are conscious decisions made when "you have multiple options that seem to you to be more or less tied for best … and you decide while feeling torn" (Balaguer, 2014a, 63). For example, Pablo is contemplating whether to go out to the bar tonight or simply stay home, both of which have their appeal. During this torn state where he could go in either direction, he freely chooses to stay home. Not-predetermined free will combines *Indeterminism* with *Agential Causation*, which amounts to *Agential Indeterminism*. As Balaguer summarizes, "For a decision to be a product of my free will … two things need to be true. First, it needs to have been *me* who made the decision; and second, my choice needs to have not been predetermined by prior events" (Balaguer, 2014a, 75–76).

The question returns: don't the physical processes *P* in Pablo's brain indeterministically cause Pablo to stay home? Balaguer says yes, thereby endorsing *Physical Indeterminism*. Balaguer outlines in exquisite detail how *Physical Indeterminism* in the brain is possible (Balaguer, 2014a, 95–96; Balaguer, 2010, 143–165; Balaguer, 1999, 197ff). He says our choices are "settled by [these] undetermined brain events" (Balaguer, 2010, 108), and our "decisions do arise out of the ordinary workings of the subatomic particles in our brains" (Balaguer, 1999, 194). Thus, Balaguer says "I have no problem with Quantum-Settles-It" (Balaguer, 2014b, 90), where Quantum-Settles-It means "Which option was chosen was settled by some quantum events" (Balaguer, 2014b, 90). So, Balaguer endorses *Physical Indeterminism*.

But, if decisions are indeterministically caused by *P*, the agent's reasons *A* do not seem to play a role, leaving *Agential Indeterminism* false, and jeopardizing libertarian free will. Balaguer overcomes this problem by endorsing the following identity theory:

Agential/Physical Identity Theory: An agent's conscious decision *A* is identical with indeterministic physical causes *P*, so *Agential Indeterminism* is identical with *Physical Indeterminism*.

P indeterministically causes Pablo to go out, but Pablo's conscious decision *A* just is *P*, so Pablo's conscious decision *A* indeterministically causes Pablo to go out, so *Agential Indeterminism* is true, re-establishing libertarian free will. As Balaguer says: "the decision just was the relevant bunch of quantum events. But if the decision just was the relevant bunch of quantum events, and if the quantum events jointly settled which option was chosen, then the decision settled which option was chosen" (Balaguer, 2014b, 91; cp. Balaguer, 2014a, 83; Balaguer, 2014a, 56–57).

There are three problems with Balaguer's solution. First, there are difficulties associated with securing the requisite identity, but I shall leave these issues aside.[5] Second, there is an Active Control Problem. At best Balaguer's model secures *passive* control rather

[5] Here are those issues: Balaguer's identity solution is a specialized version of traditional mind-brain identity solutions to the mental causation problem. Traditional mind-brain identity solutions face two difficulties in securing the requisite identity, as does Balaguer's model. First, there may be discernible distinctions between mental (properties of) events and physical (properties of) events, and discernibly distinct entities cannot be identical, so mental (properties of) events cannot be identical with physical (properties of) events. Here is one discernible distinction between *A* and *P*: on agential indeterminism, the conscious decision A is "a certain kind of action" (Balaguer, 2014a, 61), as it is caused by the agent's reasons and motivations. In fact, on the standard causal theory of action, a necessary condition for the occurrence of an action is the agent's reasons causing the action (Smith 2010, 47; Davidson, 1980, 44). So, it is theoretically possible to replicate the physical indeterministic conditions *P* without the agent's causing these conditions. Imagine again the case where a scientist manipulates Pablo's brain via an electrical device such that the scientist causes *P* to occur in Pablo's brain. In this case, *P* occurs, but *P* is not an action, as it was not caused by Pablo's reasons, so *A* does not occur. But if *P* is identical with *A*, wherever *P* is, *A* is. How can *P* be the agent's action of consciously deciding *A*, when *P* occurs but the action *A* does not occur? Here is another important distinction between *A* and *P*. As discussed, physical indeterminism in the brain may involve whether hosts of voltage gated calcium channels open or not, thereby leading to the opening or not opening of synaptic vesicles for neurotransmitter release. Agential indeterminism involves agent's with reasons and motivations consciously deliberating until a logically related phenomenologically sensed decision occurs. This conscious decision is, at the very least, occurrent to the agent, or, the agent is aware of this event occurring. But the agent lacks conscious access to the calcium channels in neuron terminals—they do not even know they are there. How can the event which is the agent's conscious awareness of decision be the event which the agent lacks conscious awareness of? The requisite identity is also strained by the problem of multiple realizability. Applied to Balaguer's model, this problem suggests the conscious decision *A* can be variously realized by different indeterministic physical states P_1 or P_2, indicating that *A* can be present where P_1 is not, so *A* cannot be P_1. Presumably Pablo's decision to stay home would have been the same decision if a few different physically indeterminate events occurred (i.e., if a few more or less calcium ions entered one or two axon terminals, or a few more or less neurotransmitters crossed the synaptic cleft slightly more slowly). If this is plausible then Pablo's conscious decision to stay home still occurs, despite the fact that P_2 rather than P_1 occurs. This is an especially plausible result when considering decisions of considerable duration: Pablo resolves to never go to the bar again at time *t*, where this resolution *A* is allegedly the neural state P_1. But, a year later, Pablo's resolution *A* remains firm and the same, he's still sure he's never going to a bar again, but slight variations in his brain networking from P_1 to P_2 are likely over time, so *A* is not neural process P_1.

than *active* control.[6] Passive control occurs when some event *C* is the cause of *E*, so *C* has passive control over *E* in virtue of *C* being the thing that causes *E*. A tossed coin has passive control over whether it lands on heads or tails in virtue of being the coin that lands on heads. A leaf floating down a river has passive control over whether it hits the stone in virtue of being the leaf that hits the stone. An empty runaway car speeding down a hill has passive control over whether it bumps into the street light in virtue of being the car that hits the light. Likewise, on Balaguer's model, an agent's choice has passive control over the action in virtue of being the thing that causes the action: "we say that Ralph authored and controlled his decision because (roughly) the event that settled which option was chosen was the conscious decision itself" (Balaguer, 2014b, 84).

Active control occurs when some event *C* not only causes *E* but *C* controls itself in the sense that *C* can steer or change whether *C* causes *E* to occur or not. None of the examples above are instances of active control. The coin cannot control itself such that it steers itself to land on heads, or change the course of what is happening to it. The leaf does not steer itself towards the rock, nor can it change the course it is on, it just obeys the whims of the current. The empty car has no driver, so it does not steer or change its course as it heads towards the street light. Likewise, on Balaguer's model, an agent lacks active control because she cannot control which choice she makes, rather the choice she makes are whatever the indeterministic microphysical processes in her brain happen to do, and the agent cannot change or steer the microphysical course of affairs.

The requirement for active control in addition to mere passive control is common in the literature on free will. Compatibilists, for example, notoriously face the following issue: if the laws of nature combined with the arrangements of particles in the remote past determines agential actions, and the agent lacks control over the arrangements of particles in the remote past and the laws of nature, then the agent lacks control over agential actions, so the agent does not freely bring about the action (cp. Mele, 2006, 77; Levy, 2011, 85; Pereboom,

[6] Distinctions similar to the division between passive control and active control have been proposed elsewhere. Shabo thinks that what is needed is not only the agent's causing *E* or not-*E* (i.e., passive control), but the agent's further 'power to settle' which of *E* or not-*E* occurs (Shabo, 2014, 162; cp. Murday, 2017, 1325; Haji, 2001, 190). Marcus Schlosser distinguishes between an agent's reasons causing actions and an agent having "the power or control to select which alternative to pursue" (Schlosser, 2014, 379; cp. Caruso, 2015, 25). Others register similar complaints about how event-causal libertarians cannot accord agents the power to settle which of several possible outcomes occurs (i.e., active control), despite the fact that agent's reasons cause their actions (i.e., passive control) (Jacabos & O'Connor, 2013, 179; Clarke, 2003, 220; Pereboom 2014, 32ff).

2001, 39; Van Inwagen, 1983, 56; Nagel, 1979, 36–38).[7] Despite the fact that the agent has passive control—since the microphysical forces pass through the agent on their way to bringing about the inevitable action—the agent is not free since the agent cannot steer or change the course of the microphysical processes, the agent is merely the conduit through which the microphysical forces pass on their way to bringing about the action. Similarly, despite the fact that Balaguer's model delivers passive control—since the indeterministic quantum processes that cause actions are conscious choices—the agent is not free since the agent has no active control, as the agent cannot steer or change the path of the indeterministic quantum processes happening in her brain. The fact that the agent is identical to the indeterministic quantum processes that she has no control over does not help the agent have control over whether *E* occurs, in fact it guarantees she lacks control over whether *E* occurs, since the agent *is* nothing but something the agent has no control over. This type of concern has been

[7] Compatibilists also face a related problem: if an agent's upbringing and genetic make-up determine the agent's character, and the agent lacks control over their upbringing and genetic sequencing, the agent lacks control over who they are, so the agent does not freely constitute themselves (cp. Levy, 2011, 85–87; Nagel, 1979, 28). Libertarians face a similar problem as well: if an agent's reasons leave it undetermined whether the agent will perform an action, then whether the agent performs that action is not controlled by the agent's reasons, so the agent does not freely choose to act (Levy, 2015, 780; Schlosser, 2014, 378–381; Haji, 2013, 241–243; Mele, 2006, 8–9). Additional support for the problem of 'no active control' is available from considering the case of compatibilist free will. Compatibilists endorse the principle of physical determinism, according to which physical conditions *P* necessarily determine that effect *E* occurs. Compatibilists take free will to be compatible with physical determinism, often by embracing a causal theory of action according to which mere bodily movements are transformed into responsibility-bearing action if an agent's reasons are proximal causes of those actions. Thus, so long as physically deterministic processes *P* pass through agents such that *P* determines that an agent's reasons *R* determine their actions E, those actions are freely performed by the agent (i.e., passive control). A common objection raised against compatibilist free will is that physically deterministic processes *P* in the remote past determine *E*, and agents have no control over physically deterministic processes *P* in the remote past, so agents have no control over the fact that *E* occurs (i.e. no active control). Numerous authors have noticed the symmetry between 'no active control' problems facing compatibilist free will and 'no active control' problems facing libertarian free will. For example, Al Mele says "… the sphere of luck for an agent is the sphere of things having the following two features: the agent lacks complete control over them; even so, they affect his or her life … Notice that luck, in this sense, is found not only in indeterministic worlds but also in deterministic worlds. Events that occurred even before we were born affect us, whether our world is deterministic or indeterministic, and we plainly have no control over the occurrence of such events. Libertarians appeal to deterministic luck in attacking compatibilism, and compatibilists appeal to indeterministic luck in attacking libertarianism" (Mele, 1999a, 97; cp. de Calleja, 2014; Balaguer, 2014a, 80; Harris, 2012, 5; Vargas, 2009, 257–258; Berofsky, 2000, 139). Compatibilists often reply that, despite the fact that the uncontrolled event *P* determines *E*, agents are nevertheless free and responsible since their reasons cause E (i.e., passive control). This is similar to the libertarian free will reply that endorses passive control without active control, where even though uncontrolled events *P* settles whether *E* occurs, agents are nevertheless free and responsible since their reasons are these indeterminist physical causes of *E*. But, libertarians are typically unsatisfied with the compatibilist response—how can agents freely bring about *E* when *E* is ultimately determined by factors in the remote past beyond their control? I am attempting to motivate the same incredulity towards the libertarian free will response—how can agents freely bring about *E* when *E* is settled by sub-agential microphysical conditions in their brains beyond their control?

raised against Balaguer's identity theory before (Lemos, 2018b, 53; Lemos, 2018a, 89–91; Kane, 2014a, 55).[8]

Balaguer's model also faces the notorious Quausation Problem that pervades the literature on mental causation. The quausation problem begins by noting that objects have different properties. The slippers are mauve and the slippers are fleecy. Objects cause in virtue of certain properties, and not others: the slippers are warm in virtue of their fleeciness, not in virtue of their mauvishness (Honderich, 1982, 63). Likewise, events have different properties, and cause in virtue of those properties. Jennie's long and satisfying jog causes Jennie to sweat in virtue of the length of the jog, not the satisfactoriness of the jog. The floating oak-shaped green leaf causes the rock to be struck in virtue of the shape of the leaf, not the colour of the leaf. The spinning nickel causes the nickel to land on heads in virtue of the coin's spin rate, not the monetary value of the coin. Similarly, when mind-brain identity theorists propose that mental causation is established because mental events are causally efficacious physical events, detractors introduce the following quausal dilemma: does the event cause in virtue of its physical properties or mental properties? Naturalistically inclined philosophers say that the event causes in virtue of its physical properties (in order to preserve *Physical Causal Completeness*), leaving *M* causally irrelevant in bringing about the effect (cp. Honderich, 1982, 63; Kim, 1984, 267; Sosa, 1984, 277; Horgan, 1989, 48–51; Robb, 1997, 279–280).

Balaguer faces this quausation problem as well. For him, the conscious decision *A* is identical with an indeterministic physical cause *P*. This event has the property of being the conscious decision *A* and the property of being the indeterministic physical process *P*. Here is the quausal dilemma: does the event cause in virtue of being the conscious decision *A*, or in virtue of being the indeterministic physical process *P*? Since Balaguer endorses 'Quantum-Settles-It', and otherwise embraces *Physical Indeterminacy*, his naturalistic answer is that the event, in virtue of being *P*, not in virtue of being the conscious decision *A*, settles the outcome. This result follows from the remote-to-local strategy as well. Imagine a slightly warped coin is tossed billions of times in a row, landing on heads 49.2% of the time during those tosses. Now the coin comes in possession of a gambler named Hart. He tosses the coin one hundred times, and 49 times it lands on heads. Does the coin land on heads these 49 times because of its slight warp, or because it is owned by Hart in this moment? Presumably, since the coin is simply doing what it has done billions of times before (and since the shape seems more germane), the answer is that Hart's momentary possession of the coin is causally irrelevant. Likewise, indeterministic microphysical processes *P* have always acted uniformly across the universe of time and space in accordance with indeterministic laws. When those processes continue to act in the same way for the brief moment in which those processes occur in brains as conscious decisions, it is still in virtue of the microphysical processes *P* that actions occur, not in virtue of those processes being conscious decision at that moment. The

[8] Most relevantly for the discussion below, Robert Kane worries: "For even if these neural coin tosses—in the form of undetermined firings or non-firings of certain neurons—were parts of, or internal to, the neural correlates of the torn decisions themselves … the agent does not have control over how the neural coin tosses come out" (Kane, 2014a, 54–55).

fact that the indeterministic process *P* is *A* changes nothing about what outcome occurs. This issue, along with the prior problem of active control, will continue to be fleshed out below, as they apply to other models as well.

5 Franklin's Minimal Libertarianism

In this section I consider, but ultimately reject Christopher Franklin's attempts at solving the *Physical Indeterminism Luck Objection*. Franklin endorses what he calls "minimal event-causal libertarianism" (Franklin, 2018, 23), which also combines *Agential Causation* with *Indeterminism* to arrive at *Agential Indeterminism*. He says: "An agent *S*'s action [*A*] at time *t* was directly free and one he was directly morally responsible for iff … (*ii*) [*A*] was a basic action, (*iii*) *S*'s reasons that favored [*A*] nondeviantly brought about [*A*] at *t*, and (*iv*) it was possible, given the past and laws of nature up until *t*, that *R* not have caused [*A*]" (Franklin, 2018, 23). After suppressing Franklin's condition (*i*) since it is not germane, the result is that an agent's action *A*, which includes an agent's choice *A* (Franklin, 2018, 28), is directly free if *A* is a basic action appropriately caused by reasons favouring *A*, and *A* might or might not have occurred. This is consistent with the *Agential Indeterminism* model of libertarian free will as defined above.

Franklin tackles the *Physical Indeterminism Luck Objection* in an article dealing with Seth Shabo's Assimilation Argument (Franklin, 2012). Shabo's Assimilation Argument is a recent example of what I called the Remote-To-Local Strategy for establishing *No Control over Physical Indeterminism*. Shabo imagines a particle in remote space with a 0.5 probability of swerving in one direction. The particle ends up swerving in that direction, where physical conditions indeterministically cause this result (Case 1) (Shabo, 2013, 301–302; Shabo, 2014, 153). Scientists then transmit the results of the swerving particle to a receiver in Alice's brain, which then determines Alice to intend to lie or tell the truth, depending on how the particle swerves (Case 2). Scientists then implant a particle swerving device into Alice's brain, once again indeterministically causing her intent to lie or tell the truth, depending on the how the particle swerves (Case 3). Finally, the scientists implant a device in Alice's brain that detects indeterministic brain activity in Alice's brain, which leads the device to send a corresponding signal to intention forming pathways in Alice's brain which indeterministically causes her to lie or tell the truth (Case 4). Shabo then compares this to typically functioning Alice (Case 5), with no implants, but where standard neural indeterminacy in her brain indeterministically causes her to lie or not. He concludes, "the decisions' being based on her reasons in [the normal case 5], whichever way she decides, does little to allay our sense that these decisions, too, aren't up to her" (Shabo, 2011, 304–305).

Franklin thinks an important distinction obtains between Case 4 and the normal Alice of Case 5. In Case 4 a particle swerving device *D* detects indeterministic brain activity in Alice's brain, leading the device to send a signal to intention forming pathways in Alice's brain which causes her to lie or tell the truth. Franklin thinks: "In Case 4, Alice's 'choosing' … is caused by a *device*, not by any of her mental states, and thus there is no choice or intention at all. However, in case 5, Alice's

choice is genuine because it is caused … by her agent-involving mental states and events" (Franklin, 2012, 401). In Case 4, the device state *D* causes the physical state *P* that is intrinsically indistinguishable from Alice's intention to lie *A*, but *P* is not an action *A* since it was not caused by Alice's reasons *R*, hence *P* is not a choice, hence Alice does not freely intend to lie. In Case 5, the physical state P_{-1}, which is identical with Alice's reasons *R*, causes the physical state *P* which is identical with Alice's intention to lie *A*, so Alice's reasons *R* cause Alice's intention to lie *A*, so *A* is an action, hence Alice does freely intend to lie. Since Alice's intention to lie *A* is indeterministically caused by her reasons, Alice is in causal control over whether she lies or not, so the occurrence of *A* is not subject to physically indeterminate luck. . There are several problems with Franklin's reply.[9] First, it is possible to re-create the problem in a manner that dodges Franklin's solution. Imagine the device in Case 4 monitors indeterminate activity in Alice's brain, but instead of spitting the result out in the intention forming pathways of Alice's brain, the device spits the result out upstream in the deliberative pathways of Alice's brain. Now, while Alice is contemplating whether to lie or tell the truth, her reasons supporting lying suddenly seem appealing to her, and these reasons *R* cause Alice to intend to lie *A*. In this case, her reasons for lying *R* do cause her intent to lie *A*, so *A* is the action of her choosing to lie. But Alice lacks control over whether she lies or not, since this decision is ultimately settled by the signal the device sends to the brain regions associated with her deliberation which causes her reasons to cause the intent to lie.[10]

Second, even in the original case, the *Physical Indeterminism Luck Objection* still applies. In case 5, physical state P_{-1}, which is Alice's reasons *R*, indeterministically causes physical state *P*, which is Alice's intention to lie *A*, so Alice's reasons cause Alice's intention, so her intention is a free action. But Alice's reasons *R* are multiply realizable, indicating that *R* can be token identical with P_{-1} or *D*. Imagine, as Franklin does, that the specific realizer P_{-1} is replaced by a set of prosthetic artificial neurons *D* which perform the same function as P_{-1} (cp. Franklin, 2012, 401–402). In this case, the devices *D* is *R*, which causes *P*, which is the intention to lie. Since Alice's reasons cause her intention, her intention is a freely chosen action (Franklin, 2012, 402). But Alice has no control over the devices *D*—the manufacturer of the devices controls how the devices track neural indeterminacy in her brain, and how

[9] I leave aside the problem of securing the requisite identity that Franklin also faces. Namely, he agrees that *A* is *P*, but also agrees with the causal theory of action that *P*, if not caused by *R*, is not *A*. How can *P* be *A* when *P* can be present where *A* is not? Franklin avoids this issue by emphasizing that *P* is intrinsically indistinguishable from *A*, thereby leaving the particular causal history out of the issue. But, *P* and *A* are not intrinsically indistinguishable if *A* has a property that *P* lacks, and *A* must have the property of being a certain type of action, while *P* may lack this property.

[10] An anonymous referee notes that free will seems to still exist in cases where another person offers new considerations on an issue we are deliberating, and these new considerations ultimately win out and cause us to act differently. Likewise, free will may be preserved when a device influences our deliberations and causes us to act differently. In response, presumably our free will is preserved in the conversational influence case because we assume that our deliberative processes are still free to arrive at a variety of conclusions. If we replaced the influence case with a manipulation case, where a powerful force manipulates our deliberations to such an extent that we are compelled to agree with the manipulator, our free will seems jeopardized. The device thought experiment is closer to the manipulation example, as we do neither deliberate on new ideas nor have the ability to withstand the influence of the device.

and where it then spits out the result. But whether or not Alice lies is settled by the operation of these devices *D*, so Alice lacks control over whether she lies or not, so the outcome is lucky in a way that shows she did not freely bring about *A*.

Franklin will object here: even if Alice lacks control over the devices *D*, *D* is identical with indeterministic agential states, and these indeterministic agential states still cause her intention, so her reasons do cause her intentions, so she has causal control over her intentions. This reply remains unsatisfactory, for the two reasons outlined in Section Four. First the Quausal Problem: while Alice's agential states are identical with the devices *D* (or, with indeterministic physical processes *P*), we can still ask whether these states cause in virtue of their agential properties or in virtue of their lower level indeterministic properties *D*? To satisfy *Physical Indeterminism*, as naturalistically inclined philosophers wish to do, the answer is *D*.

This result is also established by stretching the Assimilation Argument back out to remote cases. If the agent's reasons *R* is the devices *D* of case 4, then let us replace devices *D* of case 4 with devices *D* of case 3, where *R* is a set of many swerving par- ticle devices that settle the outcome on their own, without being sensitive to neural activity in Alice's brain.[11] Now, spread some of these devices out across the universe (first, hook the devices up with quantum communication abilities, so they can com- municate instantaneously), such that Alice's reasons *R* is identical with a complex of silicon devices within her brain and spread across the universe. Now, when delib- erating whether to lie or not, it is these devices *D*, working in concert, that settle whether Alice lies or not. That these devices *D* are functioning as Alice's reasons *R* does nothing to change what outcome these devices produce. The devices continue to operate in accordance with manufacturer specifications and the electronic proper- ties of silicon. That these devices so happen to be identical with Alice's reasons *R* (if they even are anymore) does not change the outcome in any way. So, despite the fact that Alice's reasons *R* are identical with the causally efficacious device state *D*, it is not in virtue of Alice's reasons *R* that she forms the intention to lie, rather it is
in virtue of the physical properties of the devices that she forms the intention to lie.

Second, the Active Control problem. Franklin thinks that what I termed passive control is sufficient for agential control: "an agent's exercising control over some action *u* is not something she does in addition to *u*-ing" (Franklin, 2011, 227; cp. Franklin, 2012, 412). Thus, the floating leaf exercising control over whether it bumps into the rock is not something it does in addition to being the leaf that hits the rock. And Alice's exercising control over whether she ends up lying or not is

[11] Franklin thinks that the identity fails for Case Three, as the swerving of a particle cannot be identical with complex deliberative processing (Franklin, 2012, 403). But, let us add additional swerving particles to each device, or many swerving particle devices to the mix, so they each represent the interplay of a myriad of Alice's prudential and moral deliberations, such that the combination of interacting devices is functionally equivalent to, hence identical with, Alice's deliberations and reasons. The possibility of large sections of the brain being subbed out for neural prosthetics which control deliberation and decision making has been raised by others (Haji, 2000, 334–335; Pereboom, [in Kane, 2000, 345]; Dennett, 2003, 132). Robert Kane considers it a live possibility (Kane, 2000, 345–346), though he does not commit to whether or not agential indeterminism would exist in this case. In any event, if we can imagine the iden- tity between conscious decisions and physical processes going through, it is easy to imagine this identity going through as well.

not something she does in addition to ending up lying or not. But I have argued that passive control is not sufficient for the type of control needed to overcome the luck objection. To see this, let us again consider the case where *R* is a set of many swerving particle devices *D* in her brain, and spread across the universe. When deliberating whether to lie or not, it is these devices *D*, working in concert, that settle whether Alice lies or not. She has no active control over these devices *D*. She cannot steer their course, and she cannot change their course. How could she? The manufacturer designed the devices, and they are spread across the universe beyond her reach. So, she has no active control over whether she lies or not, so her lying is lucky and not something she freely brings about.

6 Kane's Dual Efforts Model

In this section I apply the *Physical Indeterminism Luck Objection* to Robert Kane's popular event-causal libertarian model, concluding that he partly succumbs to the problem, but he also illuminates a pathway out of the problem.

Kane is perhaps the leading contemporary event-causal libertarian. He introduces his model by imagining the case of a business woman who, while rushing to an important meeting, witnesses an assault in the alley. She is torn about what to do; on the one hand she has prudential reasons for continuing to the business meeting, on the other hand she has moral reasons to stop and help the victim (Kane, 1996, 127; Kane, 2016, 5–6; Kane, 2019, 150). The business woman is tempted to go to the meeting, but her moral reasons cause her to make an effort to overcome this temptation, and stop to help instead. At the same time, the business woman is tempted to stop and help, but her prudential reasons cause her to make an effort to overcome this temptation, and carry on to the meeting instead.

At the neuronal level, these dual efforts of will are realized by competing neural processes interfering with and inhibiting each other, injecting neural chaos into the other process (Kane, 2019, 148–149; Kane, 2016, 4–5; Kane, 1996, 140). The ensuing neural turbulence opens the door for indeterminacy at the lower-level of individual neurons to be magnified such that they influence the competing higher-level neural processes themselves, so which higher-level process prevails is undetermined. On this picture, physical indeterminism is a hindering part of a larger neural process that realizes the agent's effort to achieve a goal. When the agent achieves the goal by choosing to help the victim, the agent achieves the outcome they were trying to achieve, despite the possibility of failing. The business woman succeeds in her effort to stop and help the victim, despite the possibility that she wouldn't have stopped. This model delivers *Agential Indeterminism*, as the businesswoman's efforts to help cause her choice to help, despite the fact that she could have not helped.

How does Kane's model fare against the *Physical Indeterminist Luck Objection*? In one way, not very well. Kane grants that agents lack control over lower-level indeterministic physical processes happening in axon terminals of neurons, and that whether agents choose to do *A* partly depends on how these indeterministic physical processes influence the macro-level physical processes that realize the agent's efforts: "whether an effort succeeds does depend upon whether certain

undetermined neurons fire or not; and whether these neurons fire is not under the control of the agent" (Kane, 2007, 37; cp. Kane, 2016, 8; Kane, 2019, 155). Since the agent lacks control over the lower-level indeterministic physical processes that influence whether *A* occurs, the outcome seems lucky in a free will threatening way. Numerous authors have registered similar issues with Kane (cp. Double, 2020, 300-301; Murday, 2017, 1325; Balaguer, 2014b, 91; Dennett, 2003, 123; Bernstein, 1995, 154).

Kane spends a considerable amount of time responding to this concern. While he grants that agent's lack control over indeterministic lower-level physical processes, he says that all that is needed for free will is control over the higher-level physical realizers of efforts of will:

> We do not have to micro-manage our individual neurons one by one to perform purposive actions … What we need when we perform purposive activities … is macro-control over processes involving many neurons, processes that may succeed in achieving their goals despite the interfering or hindering effects of some recalcitrant neurons (Kane, 2016, 8; cp. Kane, 2007, 37; Kane, 2019, 156-159).

For Kane, indeterministic lower-level physical processes interfere with the higher-level neural processes realizing the agent's effort to choose *A*. If the agent controls the higher-level neural processes realizing the effort to choose *A*, the agent still freely chooses *A*, despite the possibility that indeterministic lower-level physical processes may hinder the agent's efforts to choose *A*. Kane uses Austin-style examples to prove this point: the assassin who succeeds in his attempt to shoot the president, despite the possibility of missing, still freely chooses to shoot the president, and is morally responsible (Kane, 2019, 149).

The success of Kane's response depends on whether agents have control over the higher-level neural processes realizing the agent's efforts to bring about *A*. There is reason to think they do not, and it only requires a slight expansion of the argumentation already provided above. Support for *Physical Indeterminism* was provided in Section Two. But *Physical Indeterminism* was supported by the broader principle of *Physical Causal Completeness* that naturalistically inclined philosophers such as Kane endorse. *Physical Causal Completeness* grounds the broader view that all effects have complete physical causes, whether the physical cause is deterministic or indeterministic, and whether the physical cause is a lower-level brain process or a higher-level brain process. So, some prior physical process is a complete cause of the neural processes realizing the efforts of the agent. At the same time, support for *No Control Over Physical Indeterminism* was provided in Section Three. But this principle was supported by arguments that also suggest that humans have no control over any physical processes occurring in the brain, whether they be indeterministic or deterministic processes, lower-level or higher-level processes. As Kane grants that agents cannot control whether micro-level indeterministic physical processes cause neurotransmitter release in individual neurons, so it is the case that agents cannot control whether higher-level physical processes cause assemblies of neurons to simultaneously fire such that they reach an activation threshold. The agent cannot locate the appropriate higher-level neural assemblies in their brains, nor would the agent know how to make them simultaneously coactive if they could, nor would they

know which neural assemblies to stimulate in order for their efforts to succeed. Given these expansions, the higher-level neural processes realizing the agent's efforts have complete physical causes which the agent does not control, so the agent has no control over the higher-level neural processes realizing the efforts. Hence the problem: if the agent has no control over the higher-level neural processes realizing the efforts, and it is the higher-level neural processes (in combination with lower-level processes) that cause *A* to occur, the agent has no control over whether *A* occurs, rendering the occurrence of *A* lucky for the agent in a way that threatens free will.

Kane has two options at this point. First, he can appeal to a version of the *Agential/Physical Identity Theory*, according to which the agent's efforts are identical to the higher-level neural processes that causes *A*, so the agent's efforts causally control *A* to occur. Kane gestures at this model at times. He says: "… the complex macro process which, taken as a whole, is the agent's effort of will," (Kane, 1996, 130–131) and, "the indeterministic chaotic process is also, experientially considered, the agent's effort of will" (Kane, 1996, 147). In these passages Kane identifies the agent's efforts with the competing higher-level neural processes combined with the lower-level physical processes. Since the agent's effort is identical with the higher-level neural process that ultimately succeeds in causing *A* despite opposition from other neural processes in the agent's brain, the agent's effort ultimately succeeds in causing *A* despite opposition from other efforts and reasons within the agent. This secures *Agential Indeterminism*, since the agent's efforts causes *A*, despite the possibility that *A* may not have happened.

Despite the increased complexity of this proposed Kanean *Agential/Physical Identity Theory*, the same two problems Balaguer and Franklin face presently re-emerge for Kane. First, the Active Control problem. On Kane's view, the agent's effort has passive control over the choice *A*: since the agent's effort is identical with the complex physical process that causes *A*, the agent's effort has control over *A* by virtue of being the cause of *A*. But Kane does not secure active control. On Kane's model, the agent still cannot steer, or change the course of, what the complex physical processing in the agent's brain does. Whether some action *A* occurs or not is still completely caused by some complex physical cause *P* (let *P* include quantum processes, competing higher-level neural assemblies, and all the neural turbulence presently occurring in the brain), and the agent cannot steer or change the course of this neural processing, so the agent has no active control over whether *P* causes *A* or not.

Kane may protest that his model does secure a robust form of agential control called Plural Voluntary Control, according to which "the agent had the power and opportunity to make either choice be or not be at the time, voluntarily (without being forced or compelled, since an alternative choice was possible), intentionally (on purpose rather than by accident or mistake, since the choice resulted from a goal-directed cognitive process whose goal was that very choice) and for reasons motivating that choice rather than the alternative (which provided causal input to the volitional stream that issued in the choice)" (Kane, 2019, 150; cp. Kane, 2016, 10; Kane, 1996, 109ff). Kane thinks the agent has the 'power to make either choice be or not be' because her reasons-based efforts cause one of the choices to be despite the possibility of failure, while if things go in the opposite direction, another one of

her reasons-based efforts cause the other choice to be, resulting in the agent's power to make either choice be or not be.

On Kane's model, while the course the agent goes down could change, the agent cannot change the course the agent goes down. It is the complex physical cause *P* (which includes quantum processing, competing higher-level neural structures and all the neural competition between these processes) that leads to one effect occurring rather than the other, or, that controls the course the agent goes down. The agent cannot steer or change the course of whether *P* causes *A* to occur or not, for this is decided by higher-level and lower-level brain chemistry beyond the agent's reach and control. To return to the empty runaway car analogy, say a slight steering misalignment acts as a force pushing the car towards the street light while the wind resistance from an open window acts as a force pushing the car away from the street light. These competing forces interact and produce the result that the car hits the street light. The car's success in hitting the street light is caused by its own misalignment despite the possibility of missing the light. While the car's course could have changed, the car itself could not have changed its own course. The car did not act as a driver steering itself, rather the struck street light was just what the car ended up doing, as caused by the interplay of mechanistic causal processes.

Kane also faces the Quausation problem. According to the quausation problem, the complex physical process that is the agent's efforts has physical properties and agential properties. The quausal dilemma: does this complex physical process cause choice *A* to occur in virtue of the physical properties of this complex process, or in virtue of one of the agent's efforts to bring about *A*? Kane is a naturalistically inclined philosopher, so he will grant that this complex physical process, in virtue of its competing neural processing, causes choice *A* to occur. So, it is not the complex physical process, in virtue of being an agential effort, that causes *A* to occur. The agent's efforts, qua agent's efforts, are causally irrelevant to the outcome, as the choice is caused in virtue of the physical processing.

Fortunately, Kane has a second option. Kane says that the agent's efforts are 'realized by' (Kane, 2019, 148–149; Kane, 2016, 5; Kane, 2014b, 42–43), and 'emerge out of' (Kane, 2002, 429–430), the higher-level neural process, possibly indicating that the agent's efforts are distinct from the higher-level neural process. For their parts, Balaguer (Balaguer, 2014b, 89–91) and Franklin (Franklin, 2013, 123) consider this nonreductive model a possibility as well. While developing a nonreductive yet naturalistic model of libertarian free will is beyond the scope of this paper, it is worth briefly noting how such a model solves the two problems raised above. The active control problem arises by identifying the agent's efforts with the physical processes in the brain that the agent has no control over, which of course leads to the result that the agent has no active control over what the physical processes end up doing. If the agent's efforts are instead distinct from the physical processes in the brain, then it is possible for the agent's efforts to play their own distinct role in influencing whether *A* occurs. This solves the quausation problem as well: since the agent's efforts are not identical with physical processing, there is no worry that the agent's efforts, in virtue of being physical processing, rather than in virtue of being efforts, cause *A*. While such a nonreductive naturalistic model of libertarian free will is admittedly underexplored, it shows this preliminary promise. Unfortunately, none of Kane, Balaguer or Franklin definitively stake out this position.

In summary, libertarian free will suffers from the *Physical Indeterminist Luck Objection*, according to which physical processes in brains indeterministically cause effects to occur, and agents lack control over these sub-agential indeterministic physical processes, so agents lack control over which effects occur. If agent's lack control over what occurs, what they do is a matter of luck for them, which jeopardizes free will and moral responsibility. I canvassed three popular libertarian responses to this 'luck problem from below,' but none of them overcame the problem, though one interpretation of Kane opens up a promising possibility.

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References

Augustine, G. J., Charlton, M. P., & Smith, S. J. (1985). Calcium entry and transmitter release at voltage-clamped nerve terminals of squid. *Journal of Physiology., 367*, 163–181.

Ayer, A. J. (1954). Freedom and necessity. *his Philosophical Essays.* (pp. 3–20). New York: St. Martin's Press.

Balaguer, M. (1999). Libertarianism as a scientifically reputable view. *Philosophical Studies, 93*(2), 189–211.

Balaguer, M. (2010). *Free Will as an Open Scientific Problem*. Cambridge, MA: MIT Press.

Balaguer, M. (2014a). *Free Will*. MIT Press.

Balaguer, M. (2014b). Replies to McKenna, Pereboom, and Kane. *Philosophical Studies, 169*, 71–92.

Ballantyne, N. (2012). Luck and interests. *Synthese, 185*, 319–334.

Bennett, K. (2008). Exclusion again. In J. Hohwy, & J. Kallestrup (Eds.), *Being Reduced* (pp. 280–305). Oxford: Oxford University Press.

Berofsky, B. (2000). Ultimate responsibility in a deterministic world: the significance of free Will. *Philosophy and Phenomenological Research, 60*(1), 135–140.

Bernstein, M. (1995). Kanean libertarianism. *Southwest Philosophy Review, 11*(1), 151–157.

Blumenfeld, D. (2011). Lucky agents, big and little. *Philosophical Studies, 156*(3), 311–319.

Branco, T., & Staras, K. (2009). The probability of neurotransmitter release: variability and feedback control at single synapses. *Nature Reviews Neuroscience, 10*, 373–383.

Broncano-Berrocal, F. (2015). Luck as risk and the lack of control account of luck. *Metaphilosophy, 46*(1), 1–25.

Caruso, G. (2015). Kane is not able: a reply to Vicens. *Southwest Philosophy Review, 31*(2), 21–26.

Chisholm, R. (2003) Human Freedom and the Self. In G. Watson (Ed.), *Free Will* (2nd edn., pp. 26–37). Oxford: Oxford University Press.

Clarke, R. (2003). *Libertarian Accounts of Free Will*. Oxord: Oxford University Press.

Coffman, E. (2015). *Luck: Its Nature and Significance for Human Knowledge and Agency*. Basingstoke UK: Palgrave Macmillan.

Cohen, Y. (2018). An analysis of recent empirical data on 'ought' implies 'can.' *Philosophia, 46*(1), 57–67.

Davidson, D. (1980). *Agency*. Clarendon Press.

Dayan, P., & Abbott, L. (2001). *Theoretical Neuroscience*. Cambridge: MIT Press.

de Calleja, M. (2014). Cross-world luck at the time of decision is a problem for compatibilists as well. *Philosophical Explorations, 17*(2), 112–125.

Dennett, D. (2003). *Freedom Evolves*. Penguin Books.

Dittman, J., & Ryan, T. (2019). The control of release probability at nerve terminals. *Nature Reviews Neuroscience, 20*, 177–186.

Double, R. (2020). Review of John Lemos' a pragmatic approach to libertarian free will. *Criminal Law and Philosophy, 14*, 299–306.

Ekstrom, L. (2019). Toward a Plausible event-causal indeterminist account of free will. *Synthese, 196*(1), 127–144.
Finch, A. & Warfield, T. (1998). The mind argument and libertarianism. *Mind, 107*(427), 515–528.
Franklin, C. (2011). Farewell to the luck (and mind) argument. *Philosophical Studies, 156*(2), 199–230.
Franklin, C. (2012). The assimilation argument and the rollback argument. *Pacific Philosophical Quarterly, 93*(3), 395–416.
Franklin, C. (2013). The scientific plausibility of libertarianism. In I. Haji, & J. Caouette (Eds.), *Free Will and Moral Responsibility* (pp. 123–141) Cambridge Scholars Publishing.
Franklin, C. (2015) Agent-causation, explanation and akrasia: a reply to Levy's hard luck. *Criminal Law and Philosophy, 9*(4), 753–770.
Franklin, C. (2018). *A Minimal Libertarianism: Free Will and the Promise of Reduction*. New York: Oxford University Press.
Furlong, P. (2017). Libertarianism, the rollback argument, and the objective probability of free choices. *Pacific Philosophical Quarterly, 98*(4), 512–532.
Glimcher, P. (2005). Indeterminacy in brain and behavior. *Annual Review of Psychology, 56*, 25–56.
Gessell, B. (2017). Indeterminism in the brain. *Biology & Philosophy, 32*, 1205–1223.
Griffiths, M. (2010). Why agent-caused actions are not lucky. *American Philosophical Quarterly, 47*, 43–56.
Haji, I. (2000). Replies to Kane and Fischer. *The Journal of Ethics, 4*(4), 364–367.
Haji, I. (2001). Control conundrums: modest libertarianism, responsibility, and explanation. *Pacific Philosophical Quarterly, 82*, 178–200.
Haji, I. (2013). Event-causal libertarianism's control conundrums. *Grazer Philosophische Studien, 88*(1), 227–246.
Haji, I., & Hebert, R. (2018). Indeterministic choice and ability. *Journal of Ethics, 22*(2), 191–203.
Hammond, C. (2008). *Cellular and Molecular Neurophysiology*. Academic Press.
Hartman, R. (2019). Moral luck and the unfairness of morality. *Philosophical Studies, 176*, 3179–3197.
Harris, S. (2012). *Free Will*. Free Press.
Hitchcock, C. (2004). Do all and only causes raise the probabilities of effects? In J. Collins, E. Hall, & L. Paul (Eds.), Causation and counterfactuals, (pp. 403–417). MIT Press: Cambridge.
Honderich, T. (1982). The argument for anomalous monism. *Analysis, 42*, 59–64.
Horgan, T. (1989). Mental quausation. *Philosophical Perspectives, 3*, 47–76.
Hume, D., 1740 (1978). In L. A. Selby-Bigge, & P. H. Nidditch (Eds.), *A Treatise of Human Nature*. Oxford: Oxford University Press.
Jacobs, J., & O'Connor, T. (2013). Agent causation in a neo-aristotelian metaphysics. In S. C. Gibb & R. Ingthorsson (Eds.), *Mental Causation and Ontology.* (pp. 173–192). Oxford: Oxford University Press.
Kane, R. (1996). *The Significance of Free Will*. (p. 406). Oxford: Oxford University Press.
Kane, R. (2000). Excerpts from Robert Kane's discussion with members of the audience. *The Journal of Ethics, 4*(4), 343–347.
Kane, R. (2002). Some neglected pathways in the free will labyrinth. In R. Kane (Ed.), *The Oxford Handbook of Free Will* (pp. 406–435) Oxford: Oxford University Press.
Kane, R. (2007). Libertarianism. *In four views on free will*, (pp. 5–43) . Blackwell Publishing: Malden.
Kane, R. (2014a). Torn decisions, luck, and libertarian free will: comments on balaguer's free will as an open scientific problem. *Philosophical Studies, 169*, 51–58.
Kane, R. (2014b). Acting 'of one's own free will.' *Proceedings of the Aristotelian Society, 114*, 35–55.
Kane, R. (2016). On the role of indeterminism in libertarian free will. *Philosophical Explorations, 19*, 2–16.
Kane, R. (2019). The Complex Tapestry of Free Will. *Synthese, 196*(1), 145–160.
Kim, J. (1984). Epiphenomenal and supervenient causation. *Midwest Studies in Philosophy, 9*, 257–270.
Larmer, R. (1985). Free will, hegemony and neurophysiological indeterminism. *Philosophia, 16*(2), 177–189.
Lemos, J. (2018a). *A Pragmatic Approach to Libertarian Free Will*. Routledge.
Lemos, J. (2018b). Kane, Balaguer, Libertarianism, and luck. In Grgic & Pecnjak (Eds.), *Free Will and Action: Historical and Contemporary Perspectives* (pp. 47–55) Springer: Cham, Switzerland.
Levy, N., & McKenna, M. (2009). Recent work on free will and moral responsibility. *Philosophy Compass, 4*(1), 96–133.

Levy, N. (2011). *Hard Luck*. Oxford: Oxford University Press.
Levy, N. (2015). Luck and agent causation: a response to franklin. *Criminal Law and Philosophy, 9*, 779–784.
Lewis, D. (1986). *Philosophical papers: volume II*. Oxford University Press.
McCall, S. (1985). An essay on free will: review. *Canadian Journal of Philosophy, 15*(4), 663–680.
McCall, S., & Lowe, E. (2005). Indeterminist free will. *Philosophy and Phenomenological Research, 70*, 681–690.
Mele, A. (1999a). Kane, luck and the significance of free will. *Philosophical Explorations, 2*(2), 96–104.
Mele, A. (1999b). Ultimate responsibility and dumb luck. *Social Philosophy and Policy, 16*, 274–293.
Mele, A. (2006). *Free Will and Luck*. Oxford University Press.
Mele, A. (2013). Libertarianism and Human Agency. *Philosophy and Phenomenological Research, 87*(1), 72–92.
Mickelson, K. (2019). Free will, self-creation, and the paradox of moral luck. *Midwest Studies in Philosophy, 43*(1), 224–256.
Miltenburg, N., & Ometto, D. (2019). The libertarian predicament: a plea for action theory. *Synthese, 196*(1), 161–178.
Murday, B. (2017). Can self-forming actions dispel worries about luck? *Philosophia, 45*(3), 1313–1330.
Nagel, T. (1979). *Mortal Questions.* Cambridge: Cambridge University Press.
O'Connor, T. (2002). *Persons and Causes*. Oxford University Press.
Papineau, D. (2009). The causal closure of the physical and naturalism. In A. Beckermann, B. P. McLaughlin, & S. Walter (Eds.), *The Oxford Handbook of Philosophy of Mind* (pp. 53–65).
Pereboom, D. (2001). *Living Without Free Will*. Cambridge: Cambridge University Press.
Pereboom, D. (2014). *Free Will, Agency and Meaning in Life*. Oxford University Press.
Ramanchandran, M. (2004) A counterfactual analysis of indeterministic causation. In J. Collins, N. Hall, L. Paul (Eds.), Causation and counterfactuals, (pp. 387–402). MIT Press: Cambridge.
Rescher, N. (2014). The machinations of luck. *Metaphilosophy, 45*(4–5), 620–626.
Robb, D. (1997). The properties of mental causation. *The Philosophical Quarterly, 47*, 178–194.
Schaffer, J. (2001). Causes as probability raisers of processes. *Journal of Philosophy, 98*(2), 75–92.
Schlosser, M. (2014). The luck argument against event-causal libertarianism: it is here to stay. *Philosophical Studies, 167*, 375–385.
Shabo, S. (2011). Why free will remains a mystery. *Pacific Philosophical Quarterly, 92*, 105–125.
Shabo, S. (2013). Free will and mystery: looking past the mind argument. *Philosophical Studies, 154*, 361–371.
Shabo, S. (2014). Assimilations and rollbacks: two arguments against libertarianism defended. *Philosophia, 42*, 151–172.
Smith, M. (2010). The standard story of action: an exchange. In J. Aguilar & A. Buckareff (Eds.), *Causing Human Actions.* (pp. 45–56). MIT Press: Cambridge.
Sosa, E. (1984). Mind-body interaction and supervenient causation. *Midwest Studies in Philosophy, 9*, 271–281.
Steward, H. (2012). *A Metaphysics for Freedom*. Oxford: Oxford University Press.
Suppes, P. (1984). *Probabilistic Metaphysics Oxford*: Blackwell.
Tse, P. (2018). Two types of libertarian free will are realized in the human brain. In G. Caruso & O. Flanagan (Eds.), *Neuroexistentialism*, (pp. 162–190). Oxford University Press.
Van Inwagen, R. (1983). *An Essay on Free Will*. Oxford: Oxford University Press.
Vargas, M. (2009). Taking the highway on skepticism, luck, and the value of responsibility. *Journal of Moral Philosophy, 6*, 249–265.
Weber, M. (2005). Indeterminism in neurobiology. *Philosophy of Science, 72*(5), 663–674.
Woodward, J. (1994). The chances of explanation by Paul Humphreys. *The British Journal for the Philosophy of Science, 45*(1), 353–374.
Zimmerman, M. (1993). Luck and moral responsibility. In D. Statman (Ed.), *Moral Luck*. Albany: State University of New York Press.