

Keeping Determinism, Ditching Materialism: A Bohmian Account of Compatibilist Free Will and its Relationship to Criminal Responsibility

Andrew J. Marlow

ABSTRACT

The contribution of quantum mechanics to the debate on whether free will exists is usually limited to considerations of how the indeterminism implied by certain interpretations of quantum mechanics might allow room for free will where the classical determinism of Newtonian mechanics seemingly would not. However, this Paper advances the idea that such arguments are flawed, as they cannot account for how an agent would exercise control over an indeterministic choice, which could just as easily be resolved by chance or randomness. This Paper will put forward an alternative account of how quantum mechanics could account for free will, based on the deterministic and non-materialistic interpretation of David Bohm. In this interpretation, the human mind, seen objectively as “active information” and perceived subjectively as “meaning”, can have an “informational” causal influence on the behaviour of the human body. This is shown to complement a compatibilist account of free will, where free will is taken to mean simply that an agent can act according to his/her will without impediment and is thus compatible with determinism, and to augment it, by giving mind a fundamental place in reality and thus explaining the mental causation necessary for any account of free will. This analysis is then taken to legal philosophy, to show that a Bohmian account of compatibilist free will can similarly augment the ‘Act Requirement’ of criminal jurisprudence and the ‘formal agency’ element of Brudner’s liberal theory of penal justice, such that it can better ground our philosophical justification of holding individuals responsible for criminal acts.

Key Words: free will, determinism, indeterminism, Bohm, compatibilism

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Introduction

The debate around free will and quantum mechanics has traditionally been based on the indeterminism implied by quantum mechanics. On this view, free will is impossible in a deterministic universe, because in principle all of

an agent’s future material states will be determined by all their past material states, leaving no room for mind to influence their actions. The traditional attack on this argument is made through determinism, via the argument that quantum mechanics implies an indeterminism in which alternative future possibilities are allowed to exist. Such alternative possibilities make it plausible that the sensation an agent has of choosing between one course of action and another represents a real choice and exercise of free will. However, although making this scenario more plausible, the mere existence of alternative possibilities does not establish

Corresponding author: Andrew J. Marlow

Address: 296 Court Lane, Erdington, Birmingham, UK, B23 5LQ

Phone: + (44) 7964 889 490

e-mail ✉ a.marlow@hotmail.co.uk

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whether it is chance or choice differentiating between those possibilities, and nor does it establish who would be the agent making that choice.

Because of this, an alternative argument is put forward in this paper, attacking the proposition above for its reliance not on determinism, but on materialism. Quantum mechanics in general, and Bohm's quantum ontology in particular, can be said to imply that reality does not entirely consist of matter, at least in a traditional understanding of that term, and might even imply further that mind is as fundamental a part of reality as matter. Mind and matter are conceived as two aspects of an underlying psychophysically neutral reality. If the past states of an agent's brain can be seen as causally responsible for its present state in a deterministic universe, and the agent's mind is merely the mental aspect of the psychophysically neutral reality whose material aspect is the brain, then the past states of an agent's mind can be seen as causally responsible for its present state. One can therefore hold an agent morally and legally responsible for their present actions based on their past choices following a chain of mental and physical causation in that agent's mind-brain.

To make this case, this paper will be divided into the following section. Part I will give an overview of the argument for incompatibilist free will and why it is incoherent. Part II will establish how quantum mechanics and Bohm's quantum ontology discredit materialism and imply instead a panpsychist worldview where mind and matter exist as dual aspects of an underlying psychophysically neutral domain. Part III will then defend a compatibilist view of free will and demonstrate how causal determinism in the mental and material aspects of reality renders an agent's past self responsible through its decisions for that agent's present actions. Part IV will close the argument by reviewing several jurisprudential bases for criminal responsibility and demonstrating how the causal responsibility of Part III translates into criminal responsibility in the courtroom.

I. Indeterministic Physics and Incompatibilist Freedom

In this Part I, the traditional argument for bringing quantum mechanics into the debate on Free will is examined and, ultimately, discredited.

To begin, it is helpful to distinguish two different ideas of Free will: incompatibilism and compatibilism. Incompatibilism takes free will to be incompatible with determinism, as it posits that free will requires the agent to be able to make a real choice between alternative possible actions (the "*Principle of Alternative Possibilities*"), while determinism would hold that such a choice is illusory as the agent's action had already been determined by prior factors. As these two ideas are contradictory, one must reject either determinism or free will as viable hypotheses. Compatibilism, on the other hand, sees nothing contradictory between determinism and free will. Here, free will is nothing more than the freedom to follow one's will. An agent may desire to do a particular action, and this desire causes him to act in that way – one may say that his/her desire causally determined the action s/he was to take. It is clear that this notion of Free will is entirely compatible with a deterministic reality, and so this view of Free will is called compatibilism.

Traditionally, arguments that invoke quantum mechanics in the debate on free will assume an incompatibilist viewpoint and then argue that the indeterminism implied in quantum mechanics opens room for the "*Principle of Alternative Possibilities*" to operate in a way precluded in a deterministic Newtonian reality. This argument is successful as far as it goes in demonstrating that the indeterminism of a quantum reality makes it plausible for incompatibilist free will to exist. However, if indeterminism is a necessary condition for free will, it is certainly not a sufficient condition. Much more needs to be shown in this approach before it can represent a complete account of free will in an indeterministic quantum reality, and unfortunately there are severe omissions in this account that prevent it from offering that complete picture.

The first omission is the failure of this account to adequately demonstrate how the randomness of quantum mechanics translates into choice rather than chance. To illustrate this, let us take an imaginary human being A making a decision between X and Y. Let us assume with Wendt (2015, p. 37) that "human beings are walking wave functions" and accordingly let us model this decision in quantum terms. Before the decision is made, X has a certain probability amplitude of being the chosen option, and Y has different probability amplitude. Let us now



calculate the probabilities of X and Y by squaring those probability amplitudes. Perhaps we find that X has an 80% chance of being the chosen option, and Y a 20% chance. If A chooses option X, how can we tell whether this was because A chose option X, or whether this was because of an entirely impersonal process in which the most likely option was chosen through a process of random chance?

The question can be recast in terms of control: how do we demonstrate that A has any control over the choice he makes between options X and Y? Certain philosophers have attempted to answer this riddle, chief among them Robert Kane, who has developed the concept of “ultimate responsibility” (2005). In Kane’s account, the control required for effective free will requires that the agent be the “ultimate source of one’s will to perform the action” (2005, p. 127). Crucially, it is noted that the agent must be the source of his/her *will* to act, but not necessarily the action itself. This opens the possibility that an agent’s action in the present may be causally determined by his/her prior will, but the agent may still be acting freely and with responsibility if s/he had been the ‘ultimate source’ of that will originally. In order for the agent to be the ‘ultimate source’, the outcome of the decision about what one’s will should be (called a “will-setting action” or a “self-forming action” (Kane, 2005, p. 130)) must lack sufficient causes; otherwise, there would be no need to posit the agent as ‘ultimate source’ of anything as we would already have all the causes necessary to decide the outcome. And if the outcome of the will-setting action lacks sufficient causes, this leaves room for the agent to step in as an extra necessary cause that controls what is decided as one’s will.

Elaborate though Kane’s approach may be, it barely establishes anything more than we already knew: that indeterminism leaves space for causal action by the agent to influence the outcome of a decision. However, it goes nowhere towards establishing how that agent enters the causal process, or what causal influence that agent could have. It remains plausible that the outcome of our agent A’s will-setting action from the past was decided by chance, not choice.

In fact, it is difficult to see how it could be otherwise, even if we place our agent in the causal framework. Granted, the indeterministic choice between X with 80% probability and Y

with 20% probability currently lacks sufficient causes, as we do not know which outcome will occur on state reduction. However, if our agent A is added to the mix, what influence could he have on the outcome? S/he might desire the outcome that happens to occur; in this case, the agent is causally redundant, as we can say the outcome occurred because it was more probable without needing to invoke an agent to explain why. S/he might perhaps act to increase the probability of a certain outcome by action of will; however, this could leave us with the ridiculous situation where the agent’s will causes the probability of X to become 75% and of Y to become 25%, but because X remains more likely, the outcome is that the agent has will X after state reduction because he desired will Y before. Or s/he might act directly, without the need to attach probabilities to various different outcomes in some kind of agent-causal account such as those suggested by Clarke (2003) and O’Connor (2000). However, such agent-causal accounts have been dogged by criticism about the implausibility of a substance causing an event, and in any case would render a quantum indeterministic account of a probabilistic choice between alternative outcomes irrelevant. It is clear that none of these options are satisfactory and, accordingly, even if an agent were included in the indeterministic causal process as a further necessary cause, it is difficult to see what this cause would do or how it would contribute to the control required for free will.

Notwithstanding the weaknesses of philosophical attempts to understand an agent’s control over the hypothetical state reduction of their mind, there are good theoretical reasons from the literature on quantum physics itself to doubt whether such agent control could ever be possible. Chiefly this comes from the fact that most interpretations of quantum mechanics break down the distinction between subject and object, at least before state reduction occurs. This is the philosophical implication drawn out from the well-known “indivisibility of quantum systems” (Wendt, 2015, pp. 73-4), whereby a quantum system can only fully be described by including the entire experimental situation, both observer and observed. Bohr interpreted this instrumentally, to say that we can never know the objective reality being measured and quantum mechanics is only useful for making predictions; Steven French, however, took a realist view, and one that demonstrates how the



control problem in incompatibilist free will might be insoluble, at least from a quantum perspective. French argues for a “phenomenological” view of the measurement problem, based on the view that “[w]hen we look closely for the subject of experience, the “I”, we only find the unity of experience itself... [with] no further object “experiencing” experience”. On this view, a quantum measurement is taken to be the ensemble of a quantum object, a measurement device and the observer, all entangled and described by a global wave function. French relies on the observer’s “faculty of introspection” enabling him/her to obtain “immanent knowledge” of her own brain state to separate him/herself from the entanglement; an “act of reflection” thus cuts the von Neumann chain and collapses the superposition into a definite outcome (Wendt, 2015, pp. 84-5). Crucially, however, the system is entangled and there is no subject/object distinction before the “act of reflection”, so the “I” who seeks to exercise control over the free choice presented by quantum indeterminism would not exist as a subject until after that choice was made; or, more accurately, the “I” would be created by that choice. If the subject that is supposed to control the outcome of a choice does not exist until that choice is made, it seems that an account of incompatibilist free will based on quantum indeterminism is doomed to failure from the start.

It is noted that French’s phenomenological approach is not immune from criticism, not least because of the lack of explanation of how an observer may have “immanent knowledge” of his/her superposed brain states. Nevertheless, in the main French’s contribution is merely a logical extension of earlier subjectivist accounts of quantum mechanics suggested by von Neumann, Wigner, Wheeler and Stapp (Wendt, pp. 81-5). Accordingly, any subjectivist account based on the indivisibility of the observer/observable quantum system will face the same problem we see in French’s account when trying to account for an agent’s control in free will.

The present account of free will is based on a mental subject taking advantage of quantum indeterminism to make free choices. There are several requirements of an interpretation of quantum mechanics that allows such an account to exist. It must be realist, so that it takes indeterminism to be a feature of reality. It must be idealist, in that it “assign(s) an explicit role to

consciousness in quantum processes” (Wendt, 2015, p. 81)). It must be indeterministic, which not all interpretations are. Finally, it must not posit the indivisibility of quantum systems, so that a subject may exist before state reduction occurs. However, such an interpretation does not exist. To satisfy the realism and idealism requirements, we must consider either a subjectivist interpretation or a panpsychist interpretation. The subjectivist accounts of von Neumann, Wigner, Wheeler and Stapp require the indivisibility of a quantum system before state reduction (Wendt, 2015, pp. 81-5), and the panpsychist accounts of Bohm, Hiley and Pylkkänen are deterministic (Wendt, 2015, pp.85-9). Accordingly, no interpretation of quantum mechanics exists to the author’s knowledge in which consciousness can plausibly act before state reduction as an independent subject to exploit quantum indeterminism to make real free choices.

On these bases, it is suggested that an account of incompatibilist free will based on quantum indeterminism can never be complete as it can never account for an agent’s control over their supposedly free choice. All we are left with is randomness and chance, at best with the agent appearing as the ‘observer’ simultaneously with the chosen option once a choice has been made. Further, no interpretation of quantum mechanics exists that complies fully with the requirements of incompatibilist free will. For these reasons, the rest of this paper will argue that a compatibilist free will based on the deterministic reality of dual-aspect Bohmian quantum ontology represents a far better and more complete picture of free will than that ordinarily presented in literature discussing quantum mechanics.

II. Quantum Ontology and its Threat to Materialism

The proposition in the introduction above is that “free will is impossible in a deterministic universe, because in principle all of an agent’s future material states will be determined by all their past material states, leaving no room for mind to influence their actions”. The previous Part I demonstrated how this proposition cannot be adequately attacked by countering determinism with indeterminism; the present Part II will begin the argument that it can be attacked by countering materialism with a dual-aspect monism in which mind and matter are



taken to be two aspects of one underlying psychophysically neutral reality. This Part II will initially set out the way in which quantum mechanics represents a threat to materialism, and the following Part III will demonstrate how the dual-aspect monism implied by certain interpretations of quantum mechanics renders plausible a compatibilist notion of free will and responsibility in a deterministic reality.

Materialism is defined here as the belief that “reality is composed exclusively of matter, within which there is no trace of mentality”, where here matter is defined as “objects, things, or substances; their existence is context- and mind-independent; they have hardness or mass; they have definite location and extension in space; and they are dead” (Wendt, 2015, pp. 59 - 60). The threat to free will from materialism comes in the idea that if the entirety of reality is matter with no trace of mentality, then all the real causes of an agent’s present actions must have their roots in matter rather than mind. Accordingly, we would not be able to attribute someone’s actions to their prior intentions, beliefs or desires, except insofar as these intentions, beliefs and desires are materially correlated with brain states; our descriptions of causal chains would be limited to the physics and biochemistry of an agent’s brain. While this may be acceptable for a scientist, from the perspective of philosophy, social science and criminal justice (with which this paper is particularly interested), this is highly inadequate, especially given the necessity to prove *mens rea* (guilty mind) before a defendant can face conviction.

It is therefore suggested that the most relevant implications from quantum mechanics for free will come from its threat to materialism. This comes in two forms: in general, the way in which quantum mechanics challenges the context- and mind-independence and definiteness of matter; in particular, the way in which certain interpretations of quantum mechanics, most specifically that suggested by Bohm and Hiley, imply a certain panpsychism that would allow mind a causal influence once more.

The general implications are not hard to envision: if an essential feature of matter is its objectivity, definition, and independence from its immediate context or the mind of its observer, then quantum mechanics at the very least forces us to radically re-evaluate our conception of

matter. It is well known that quantum mechanics posits a reality in which observables such as an electron’s position and momentum have no definite or objective quality before they are observed or measured, and that once this observable does gain a definite and objective quality, this is only in the context of an experiment in which a human observer has measured it. The reality described by quantum mechanics is therefore not objective, definite and context-independent as required by the above definition of matter. Whether it is mind-independent is more open to dispute, and this question boils down to where one draws the line in the “von Neumann chain” when solving the measurement problem. If one follows the thinking of von Neumann and Stapp, the reality of an observable does not become definite or objective until it is observed by that observer’s “abstract ego” or metaphysical consciousness, the effect of which is to collapse the wave function of several superposed potential brain states into one where a certain measurement has been observed (Stapp, 2012; Wendt, 2015, p. 68). From the above, one of two things are clear: either, materialism is incorrect, as large portions of our reality need to be described in ways that do not fit the above definition of matter; or, that definition of matter needs to be amended. The former view will be taken for the remainder of this Paper.

If not materialism, then what? The view of the author is that a non-dual monism is to be preferred. It is undeniable that there is a very close correlation between mind and matter, in that observed brain states very closely match the subjective experiences of those whose brains are in that state. The question is how to interpret this correlation. Correlation can often mean that one of the correlated factors is the cause of the other, so let us examine this possibility. Could it be that mind is the cause of matter, or exhibits a causal influence on matter? Certainly, hypotheses have been suggested where this might be the case, such as Stapp’s suggestion that quantum indeterminism is “not actually random but positively or negatively biased by the... values in the minds of the observers” (Stapp, 2015, p. 187), or Eccles’ suggestion that mind acts by “momentarily increasing the probability of exocytosis” (Beck and Eccles, 1992). Yet these ideas have been criticised as “unorthodox” (Atmanspracher, 2015, p. 10) and are not widely accepted, largely because of the difficulty of



explaining the mechanism by which mind could influence matter. Could matter be the cause of mind, which comes about as an epiphenomenon or illusion created by a complicated physical brain? It is possible, but in the absence of any plausible mechanism by which objectivity could create subjectivity, such accounts of the emergence of mind often boil down to “and then a miracle happens” (Wendt, 2015, p. 16). Given the unsatisfactory state of either of these possibilities, it seems sensible to consider a third option: that mind and matter are correlated not because one causes the other, but because both are caused by a common cause in their shared causal history. This leads us to a dual-aspect monism or, in other words, panpsychism.

Panpsychism takes the fact that mentality is a known effect at the macroscopic level and scales that down to argue that “matter is intrinsically minded”, that “[m]ind and matter constitute a duality... [that] emerges from an underlying reality that is neither mental nor material” (Wendt, 2015, p. 31). The implications of this are astounding: that every element of matter has some element of mind, even down to subatomic particles (Skrbina, 2005, p. 199). Though astounding at first, it is important to make some distinctions: this is not to say that every material object is self-conscious or even conscious. Rather, just as the human brain is a particularly special and complex formation of the matter that makes up the material aspect of reality of which it is a part, so the human mind would be a particularly special and complex formation of the mentality that makes up the mental aspect of reality of which it is a part. The key idea here is better stated as *mentality* rather than consciousness or self-consciousness and, just as it is impossible for us to imagine what material existence might be as a rock given how different it is from our material human bodies, so it should not be surprising that it is impossible for us to imagine what mental existence might be as a rock given how different it is from our human minds. To argue that all of reality has a mental as well as a material aspect is not to argue that all of reality has consciousness or self-consciousness in the way we daily experience it.

The particular panpsychist approach developed in the remainder of this paper is that of David Bohm, more lately carried on by Basil Hiley and Paavo Pylkkänen. This approach has been chosen because it involves a “relative” determinism (1989, p. 15) and the idea that

mentality is fundamental to reality, both of which are ideal for the development of a compatibilist account of Free will later in this paper.

The determinism comes from Bohm’s unique description of the wave and particle aspects of matter. For him, particles are real objects with positions and momenta, while the wave aspect also describes a real field called the “quantum potential”. These two are united such that “a quantum system is an indivisible union of two separate entities, a particle and a wave” (Wendt, 2015, p. 87). The form of the quantum potential affects a particle’s movement in a manner analogous to de Broglie’s pilot wave (Bohm & Hiley, 1982) via “active information”, which is a general concept that can be applied at all scales of reality. “Information” is understood to be the objective quality of material form, and it becomes “active information” when it is carried across to another medium. So, the “information” of the environment is its physical form, which is “active information” when it is detected by the senses and enters human perception, changing the form of human sense organs and the brain in the process (1989, p. 2). Equally, the quantum potential of an electron consists of “active information”, which “exercises causal agency of its own... the quantum field informs its associated particle about the environment, giving it a “perspective”, to which the particle responds deterministically according to the Schrödinger equation” (Wendt, 2015, p. 88). In this way, Bohm’s quantum ontology posits a deterministic world, whose particles follow paths determined and predictable according to the Schrödinger equation and guided causally by active information in their quantum potentials.

It also describes a world where mind is fundamental. The account of “active information” above has so far been purely material, but Bohm considered the relationship between objective “active information” and subjective meaning, and concluded that the two were identical; like form and content, the subjective and objective are two sides of the same coin (1989, p. 2). This applies on the macroscopic level, as the active information transferred from environment to brain through the senses is subjectively perceived as meaningful experience. But for Bohm, it also applies identically at the microscopic level: the only difference between the active information of a human mind guiding a brain and of a quantum potential guiding an electron is scale, such that electrons may have



“certain primitive mind-like qualities” (1990, p.272) and “the whole notion of active information suggests a rudimentary mind-like behaviour of matter” (1990, p. 281).

At face value, then, it is easy to see how an account of free will could be built on the back of Bohm’s quantum ontology. Free will would be defined as the freedom to follow one’s will, where that will evolve deterministically over time, with one’s present state of will being caused by one’s previous mental states. An agent’s present and previous mental states would be the past and present states of active information causally guiding his/her behaviour. The agent would have control over his/her choices, as Bohm’s account gives the agent’s mind as active information a direct causal influence over the agent’s material body, with no dispute over whether it is chance or choice causing the outcome. Further, the agent would be able to exercise control over the decision, rather than only emerging as a subject once it has already been made. In these ways, a compatibilist account of free will in line with Bohm’s quantum ontology is preferable to the incompatibilist account discussed in Part I above.

To develop this account further, Part III will discuss more generally arguments from the philosophical literature about compatibilist and incompatibilist freedom, and will provide further justification for a compatibilist account over an incompatibilist one, both generally and in relation to the model being developed in this paper.

III. Compatibilist Freedom and Causal Responsibility

Compatibilism takes the view, as stated above, that determinism is compatible with free will. Several definitions of compatibilist freedom exist: for Kane, “[y]ou have freedom of will when nothing would have prevented you from choosing or from choosing otherwise if you had wanted to” (2005, p. 15); for Hobbes, such freedom exists when one has “no stop in doing what he has the will, desire or inclination to do” (1958, p. 108). On this account, then, one exercises free will when one’s mental states deterministically cause one’s actions and when one is not prevented from acting according to those mental states by any external or internal impediments. Clearly, such an account of Free will is compatible with determinism.

This Part III will initially demonstrate why compatibilism is generally preferable to incompatibilism when discussing free will, addressing some objections to compatibilism along the way, and will then show why compatibilism and materialism might be uncomfortable bedfellows. It will emerge that not only can Bohmian quantum ontology provide a better account of free will than incompatibilist accounts based on indeterminism, but it can also provide a better account of compatibilism by explaining the role of deterministic mental causation.

The defence of compatibilism will begin with a rebuttal of one of its criticisms: “if determinism is true, there is only one possible future... and this fact alone seems to rule out the possibility of free will and responsibility for actions” (Kane, 2005, p. 22). This criticism seems to be a restatement of the idea that free will requires the *Principle of Alternative Possibilities* to be effective. However, it can easily be shown that the *Principle of Alternative Possibilities* is incoherent, or at least removes any grounding for finding agents responsible for their action. The *Principle of Alternative Possibilities* implies that the *same* past can lead to different possible futures, while determinism holds that the same past leads to only one future. Applying this to the context of an individual agent making a decision between option A and B (for example, choosing whether to accept a job or not), there might exist different possible futures, one in which the agent chooses A and one in which s/he chooses B. These different possible futures are based on the same past – i.e. “exactly the same prior deliberation, the same thought processes, the same beliefs, desires and other motives” (Kane, 2005, p. 16). If either future is possible based on the same past, then it seems sensible to say that this past has no causal influence on the future that is chosen. At best, these past causes could affect the probability of choosing A over B, but in the end it falls once more to chance whether A or B is chosen. An agent’s mental identity may be nothing more than his/her beliefs, memories, motives, reasons and desires etc., and if this only affects the probability of that agent acting one way or another, without mere chance having the deciding vote, then the agent does not exercise ultimate control over the outcome. Far better, a compatibilist would argue, that the agent’s present action be determined by his/her past mental states, as this is the only scenario in which



the agent could be said to control the outcome, such control being an essential element of exercising free will.

Such control is not only necessary for Free will per se, but also for the related issue of responsibility. This is demonstrated best by a famous quote from David Hume: “[w]here [actions] proceed not from some cause in the character and disposition of the person who performed them, they can neither rebound to his honour, if good; nor infamy, if evil... The person is not answerable for them, and as they proceeded from nothing in him that is durable and constant... it is impossible he can, upon their account, become the object of punishment or vengeance” (1960, p. 411). Since the thrust of this paper is not just about free will, but also about the way this grounds moral and ultimately criminal responsibility, it is argued that compatibilism is the only way that such responsibility could be justified, given the lack of a plausible account for how an agent might control and thus be responsible for his/her choices in incompatibilist free will.

One further reason to favour compatibilism over incompatibilism is its implicit need to question materialism, which is absent from indeterministic incompatibilist accounts of free will whose thrust is based in attacking determinism. This is because of the reliance of classic compatibilist accounts, such as those of Hume, Mill and Hobbes, on ideas of mental causation. This becomes obvious from a cursory reading of classical literature on this topic. For example, in arguing against fatalism, Mill defines determinism as the idea that “whatever is about to happen will be the infallible result of causes that precede it” (1874, p. 274). However, against the fatalist view that “there is no point struggling against it [as] it will happen however we may strive to prevent it” (1874, p. 274), he explains that some of the causes that precede an action may well be mental causes: one’s actions are caused by one’s character, which “is formed by his circumstances... but his own desire to mold it in a particular way is one of those circumstances, and by no means the least influential” (1874, p. 274). In addition to the ‘desires’ mentioned by Mill, other authors describe a causal role for beliefs, thought processes, and other motives (Kane, 2005, p. 16). It becomes clear, then, classical compatibilist accounts of Free will imply a discomfort with materialism, given the reliance of materialism upon only material causes for

material events and given compatibilist accounts’ reliance on mental causes for physical actions.

It has been demonstrated in this Part III that, generally, compatibilism is preferable to incompatibilism for the control it affords the agent in exercising free will, for its ability to ground an agent’s responsibility for his/her actions, and for its strained relationship with materialism based on incompatibilism’s reliance on mental causation. It is suggested that Bohm’s quantum ontology fits neatly with compatibilism in these regards – one may view the objective “active information”, subjectively experienced as “meaning”, that guides an agent’s material form as providing “informational” (Wendt, 2015, p. 88) causal control over the agent, for which that agent can be held responsible, in a way that answers materialism by showing how a panpsychist approach can explain mental causation as the activity of “active information”. If quantum mechanics is to make any contribution to the debate on free will and responsibility, an account such as this is likely to garner more support than one based on indeterminism, due to the weaknesses of incompatibilism and indeterminism based accounts outlined in this Part III and in Part I above. Part IV will complete this argument by showing how such a determinist and panpsychist approach could move beyond free will and moral responsibility to the more practical realm of criminal responsibility.

IV. Applications in the Courtroom: Theoretical Justification of Criminal Responsibility

This might seem a curious adjunct to a paper in this journal. However, as the author has trained as a barrister, his interest is naturally inclined beyond the realms of moral philosophy towards the realm of jurisprudence. The question that this section, and indeed this paper, proposes to answer is as follows: in what sense are we justified in holding individual criminals responsible for their criminal acts? This question is posed as it may be argued that no individual can be held responsible for an act they did not choose to do, and in a deterministic universe, no action is ever caused by an agent’s choice, as all of an agent’s actions are materially predetermined. Any sensation of choosing between different outcomes must then be an illusion.

One counter-argument is that indeterminism implies the *Principle of Alternative*



Possibilities, discussed in Part I above. This at least implies the individual could have acted otherwise and opens the door to argue that the individual acted as s/he did because s/he chose to do so. This then explains why a criminal may be held responsible for his/her actions: s/he chose to act criminally, and this choice caused the crime. However, as has been demonstrated above, arguments of this kind based on quantum indeterminism fall down for lack of ability to explain how the agent exercises control over that choice. If our criminal could not exercise control over his/her decision to commit a crime, then such a decision comes down to chance rather than choice and cannot be attributed to the criminal in a morally meaningful way.

Another argument, and the one that will be advanced here, is based on the determinism and panpsychism of Bohm's quantum ontology. Here, our criminal agent is a material body guided by "active information" that is subjectively experienced as "meaning", where "active information" and "meaning" are identical, merely the objective and subjective aspects of the same underlying neutral reality. The "active information" guides the criminal's behaviour via an "informational" (Wendt, 2015, p. 88) causal influence, satisfying the requirement of determinism that "whatever is about to happen will be the infallible result of causes that precede it" (Mill, 1874, p. 274). Because "active information" is merely the objective aspect of what is subjectively perceived as "meaning", which is here extended to be understood as mental or subjective states in general, then if we can say that "active information" exercises a causal influence on our criminal's behaviour, we can also say that our criminal's mental states exercise a causal influence too. This overcomes the difficulty that a deterministic materialist account of free will might have in explaining how an agent's character, desires, beliefs etc. influence his/her behaviour. This approach, more than the incompatibilist approach described above, allows an agent to be held responsible for criminal actions: although we have abandoned the *Principle of Alternative Possibilities*, it was inherent in this principle that the prior deliberations, thought processes, beliefs, desires and other motives (Kane, 2005, p. 16) would have no more than a probabilistic or chance-based effect on the agent's decision, meaning that we could not hold our agent responsible for its outcome. Determinism, on the other hand, allows

us to see directly how it is "some cause in the character and disposition" (Hume, 1960, p. 411) of the agent that led to an action, leaving us able to morally justify holding this agent criminally responsible for their actions.

Such an idea could find a home in the literature on philosophical jurisprudence, specifically in the context of the Act requirement for criminal responsibility posited by John Austin, Oliver Wendell Holmes and Michael Moore, and in the context of Alan Brudner's liberal theory of penal justice. Each of these approaches will be considered below, along with discussion of how the deterministic and materialistic approach to Free will modelled in this paper could apply to them.

The 'Act requirement' for criminal responsibility, suggested by John Austin, Oliver Wendell Holmes and Michael Moore, proposes that, for an individual to be criminally responsible for an action, there must have been an "act" committed by that individual. For Austin, an "act" is a voluntary bodily movement; for Holmes, an "act" is a voluntary muscular contraction. Moore personally favours Austin's approach (1993, p. 81), but the crucial thing to note about all of these accounts is the essential causal chain in which a volition causes bodily movement, without which there is lacking "the minimum link between mind and body required for responsibility" (Hart, 1968, p. 99) and accordingly the individual cannot be held responsible for the criminal outcome of that bodily movement.

The application of this idea to positive criminal law as it has developed in common law jurisdictions such as England and the USA is debateable. For example, Hart was unable to find explicit support for this being a requirement of English law when he considered the case-law in 1968, finding only two cases - *Hill v Baxter* (1958; 1 Q.B. 277) and *R v Sibbles* (1959; Crim L.R. p. 660) - where it could be said that the judges deciding the case might have been "influenced in construing the words [of statute] by the general [Austinian] doctrine, though this is left unexpressed" (p. 110). Further, it is clear that the Act requirement does not account for the way in which certain omissions might incur criminal responsibility in the positive criminal law of England and Wales, where the volition-causation-movement chain of causation does is lacking. At best, in this scenario, the Act requirement might

cover willed omissions, where one's volition causes the body not to act.

Nevertheless, the role of legal philosophy is partly to explain the development of positive law, and partly to prescribe how it should develop in a morally just way, and it is in this latter sense that the Act requirement should be understood today – as the link between ideas of moral responsibility and criminal responsibility that would, if applied, ensure that Moore's words are true when he writes that “criminal law... [is] most directly reflective of an underlying moral responsibility” (2009, p. 3). One outstanding issue with the Act requirement is its reliance on volitions or mental states to cause bodily movements that then constitute criminal actions – certainly, in a reality assumed to be materialistic, there is no mechanism by which such volitions or mental states could exercise causal influence. To the extent, then, that the Act requirement has validity, either as a reflection of positive criminal law or as a prescription for how it should be, it is supported by the determinist and panpsychist approach to Free will developed above, where mental states as “active information” can exercise an “Informational” causal influence on the agent's actions. This is in preference to the indeterminist account usually offered, where no explanation is given for how an action is caused by an agent's volition or choice rather than mere randomness or chance.

An alternative approach to justifying criminal responsibility is offered by Alan Brudner, whose main concern is justifying the State's punitive coercion of a culpable individual. Specifically, Brudner is concerned only with the State in a liberal legal order, the focus of which is to preserve the freedom of its citizens by protecting their rights. In such an order, all rights are based on mutual recognition of the other's right to autonomy. This necessarily limits an agent's liberty: no longer can s/he steal or murder, as these would violate the autonomy of the victims, but equally no other may steal from or murder our agent, as this would violate our agent's autonomy. Thus one trades in liberty for rights, chiefly the right to autonomy and freedom from coercion, even from the State. However, such a system is based on mutual recognition of rights to autonomy. If one agent acts in a manner that violates a victim's autonomy, then such mutual recognition has vanished: our first agent no longer recognises the victim's right to autonomy and has instead claimed an absolute

liberty to do as s/he pleases irrespective of the victim's rights. At this point, by acting in a way that disclaims the victim's right to autonomy, the agent is also seen to have disclaimed the entire system of mutually recognised rights, even his/her own. By claiming absolute liberty to coerce others, our agent has implicitly consented to other actors having that same liberty, even the State. And if this is so, there is nothing preventing the State from then coercing our agent by means of punishment for violating the liberal legal order of mutually recognised rights.

The crucial part of this narrative for the present paper is Brudner's statement that it is “a free choice to do that from which a denial of right may logically be imputed... [that] marks the threshold of criminal liability to punishment” (2009, pp. 61-2). To define freedom, Brudner uses two paradigms: ‘formal agency’ and ‘real autonomy’. The former is used to define the threshold beyond which an agent is criminally responsible, the latter to define the agent's liability for harm once that threshold is crossed, and hence the extent of punishment to be meted out by the State. In ‘formal agency’, freedom is “the capacity for freely choosing ends... whether or not the potential for achieving self-authored ends is realized” (2009, p. 28). The reference to ‘self-authored ends’ refers to a situation where, for example, the agent is forced at gunpoint to act in a certain way: from a ‘formal agency’ perspective, this is a free choice between two options; from a ‘real autonomy’ perspective, this is not a free choice as the agent is being coerced and is not acting towards “self-authored ends”.

For both conceptions of freedom, the materialist and determinist account of free will developed in this paper offers a better account of the agent's free choice than one based on indeterminism. This is so because it allows the agent control where indeterminism denies it. One must be able to impute a denial of rights to the agent's initial choice – this can only be done by reference to the agent's prior reasons, beliefs and desires, rather than by reference to the probability or chance of a certain decision being made, such chance implying a risk that the decision might weigh against the agent's prior mental states. Freedom implies the agent being in control of the decision, which s/he is not if it is governed by randomness. And if control by the deciding agent is a necessary ingredient of freedom, then ‘the capacity for freely choosing ends’ may best be understood as the capacity for



freely choosing the end that best fits one's prior states of reasoning, belief and desire, even if that desire is simply not to be shot by a gun. Accordingly, we may posit an agent's mental state, subjectively perceived as "meaning" and objectively viewed as "active information", freely choosing in accordance with his/her prior states of belief, reason, desire and other motives to act in a way that implies a denial of the victim's rights; and it is a free choice plausibly conceived in this manner that justifies the state to coerce our agent by punishment.

It has been demonstrated, then, that the materialist and determinist account of compatibilist free will developed in this paper can better account for the role of free will in establishing criminal responsibility than can a quantum indeterminist account.

Conclusion

The threat to free will posed by a classical worldview comes not from determinism, but from materialism. Interpretations of quantum mechanics that describe a world of indeterminism and materialism do not succeed in giving free will a place in descriptions of human action: rather, in such a world, the indeterminism of the outcome of a decision reflects chance rather than choice, especially in a materialist worldview where mental causation is denied. An incompatibilist account is made more implausible, as the indivisibility of quantum

systems in indeterminist interpretations means that a separated subject who could exercise control over a decision's outcome cannot exist before the decision is made.

Therefore, if one seeks to use quantum mechanics to rehabilitate free will to our account of human behaviour, it is necessary to abandon materialism rather than determinism. It has been shown in this paper that panpsychism or neutral monism in the vein of David Bohm, for whom mentality in the form of "active information", subjectively perceived as meaning, is a fundamental part of reality, can ground such a deterministic and non-materialistic account of free will. It is suggested that such an account is preferable to accounts based on quantum indeterminism in debates around moral and legal philosophy, largely for the manner in which it accounts for the control an agent would need to exercise his/her Free will. Such control is exercised by an agent's mental states, subjectively perceived as meaning and objectively perceived as active information, having an "informational" causal influence on the agent's actions.

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