

The Interface Between Freedom and Agency

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INTRODUCTION

Few people have read or watched the film adaptation of *The Diving Bell and the Butterfly* without proclaiming it a triumph of the human will. Jean-Dominique Bauby authored the memoir after suffering from a major stroke that left him paralyzed from head to toe with minor exception, but with his mental capacities intact. He did so through a novel form of dictation. Slowly and repeatedly a transcriber recited a French language frequency-ordered alphabet, to which Bauby communicated his story through the blinks of his one working eye. When the transcriber reached the letter of the word Bauby wished transcribed, he blinked once. He signaled the end of a word with two eye blinks, and used rapid eye blinks to communicate that she had guessed a letter or word ending incorrectly. Letter by letter, blink by blink, Bauby conveyed his thoughts to the transcriber. 200,000 blinks later, the story was done. His memoir provides the gripping detail of what it means to have full mental capacity and lack freedom of action to express one’s thoughts, desires, emotions, and expressions of humanity. That he could share his story is at once extraordinary and tragic that anyone should suffer the fate of such obstacles to effectuating his will.

Today, Bauby might have instead used a revolutionary new technology from neuroscience to communicate or to interact with his

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environment. An emerging technology known as brain-machine interface is under development to transmit information to the brain from the external world, but also to translate brain activity into action on external objects in the world.¹ Cyberkinetics Neurotechnology Systems, Inc. has developed a brain-machine interface technology that connects the motor cortex of the brain to a computer, enabling a subject to move a cursor on a computer screen, to check email, to change the volume, and to select or move anything on the screen that would be possible with cursor movements by simply thinking about hand movements, without moving any part of his physical body.² By connecting Bauby to this brain-machine interface, he might have typed out his memoir himself by thinking about the letters of the words he wished to communicate.

Brain-machine interface has already extended beyond the two-dimensional world to control of three-dimensional objects, as well. Researchers at Duke University pioneered a study in which they implanted electrodes into the motor cortex region of the brain of monkeys, to interpret the electrical impulses produced by the nerves that were activated prior to movement of the monkey's limbs. The researchers studied the electrical impulses to learn the neural process involved in moving the monkey's limbs. They then used this knowledge to build a brain-machine interface device to allow the monkey to manipulate a robotic arm solely through his thoughts. After training, the monkeys could manipulate a robotic arm that was connected directly to their brain such that they ceased moving their own arm and were able to move the robotic arm to effectuate their intended movement through their intentional thoughts alone.³

Whether Bauby used brain-machine interface to transcribe his memoir, or communicated via eye-blinks, some scholars would

¹ Gregory Peterson, *Imaging God: Cyborg, Brain-Machine Interfaces, and a More Human Future*, 44 DIALOG 337, 339 (2005).

² *Id.* at 337. Gel is applied to the user's hair or scalp to improve the conductivity of electrical signals from the brain, and a plastic cap is then placed over the head. Brandon Mitchener, *Controlling a Computer by the Power of Thought—Disabled Could be Liberated by Brain-Wave Technology; Good Concentration Required*, WALL STREET JOURNAL, B 1 (March 14, 2001). Cables go from this cap to an electroencephalograph machine (EEG), which is connected to a computer. Software in the computer interprets the electrical signals from the brain into vector components, mapping the brain patterns. *Id.* Abstract mental tasks like “left, right, relax, cube, music,” are mapped which each produce a signal in a different area of the brain, and this allows a user to select things like letters from a special software program and to type emails through their thought process and the machine interface. *Id.*

³ Peterson, *supra* note 1, at 339.

challenge the attribution of freedom to him. Not, as one might suspect, because Bauby suffered from the tragic and rare neurological condition called locked-in syndrome, characterized by the paralysis of all voluntary muscles except for those that control eye movement, but leaving one conscious and able to think and reason. Rather, because even though Bauby had unique constraints on his freedom of action, they believe human actors lack freedom of choice. These scholars claim that all events are determined by every past event including every event in the mind one would call choice. Even Bauby's memoir.

This essay illustrates why neuroscience does not inevitably lead to a deterministic view of human actions. To the contrary, neuroscience opens up new tools to study our conceptions about human choice, freedom, and human agency. Research investigations into the neural processes involved in choice, and new technology like brain-machine interface may offer new insights into human agency and responsibility. These insights help bolster existing theories of freedom of choice and freedom of action, lending credence to concept of agency underlying both.

The grounding neuroscience offers to existing theories of freedom of action and agency confers an immediate benefit to concepts that presume freedom of action but are thin in their existing defense. One such concept is legal free will, underpinning the attribution of responsibility in criminal law. Legal free will has faced persistent attacks as a thin justification for responsibility because it is traditionally defended using consequentialist justifications rather than substantive theories of freedom. This essay does not challenge those consequentialist justifications. Such justifications may in fact be a normatively sufficient basis for attributions of criminal responsibility. Instead, this essay argues that legal free will need not concede the metaphysical free will debate so easily. Rather than eschewing theoretical free will as unnecessary to criminal responsibility, legal free will could embrace advances in neuroscience to supplement a theory of freedom of action that both comports descriptively with attributions of responsibility in criminal law, and normatively with a substantive theory of moral responsibility.

Part I begins with a discussion of legal free will, a concept that appears most controversially in criminal law but also pervades most areas of law. Legal free will has traditionally been described as the willing suspension of disbelief in human freedom adopted in law, otherwise described as the assumption that individuals intend and have control over the natural and probable consequences of their actions. In

criminal law in particular, legal free will creates a problem because its proponents disclaim any need to grapple with metaphysical questions about free will and moral responsibility. Because the power of the state and the threat of its overreach is at its highest in criminal law, this refusal to grapple with questions of theoretical free will leaves it open to a never-ending slew of attacks. Part II illustrates the newest incarnation of these attacks, which have been rooted in neuroscience. The overwhelming use of neuroscience has been to support a reductionist view of determinism, to lend credence to the claim that at the very least some individuals, if not all individuals lack moral responsibility, and that the legal sanctions of the criminal justice system, such as blame, stigma and shame, therefore should not follow. This part offers a rejoinder to these claims, using emerging technology from neuroscience to illustrate a theory of freedom of action that comports with legal free will. Joining these neuroscientific advances with a theory about freedom of action and human agency would ground legal free will more firmly than consequentialism alone.

I: LEGAL FREE WILL AND THE PERSISTENT DEBATE

Elsewhere, James E. Coleman, Jr. and I defined and set out the conflict between theoretical free will and legal free will.⁴ That discussion detailed how the present use and understanding of free will in criminal law—i.e. legal free will—does not depend upon conceptions derived from theoretical free will, “which encompasses the philosophical, metaphysical, psychiatric, and biological perspectives on this topic.”⁵ Irrespective of the many influencing factors on human behavior, criminal law—like other areas of law—presumes that individuals actively and consciously choose to engage in criminal conduct⁶ not because they necessarily do, but because recognizing the autonomy of human choice is fundamental to the operation of a modern system of laws.⁷ Legal free will does not, therefore, codify a preference of one or more viewpoints from theoretical free will. Instead, it

⁴ Nita A. Farahany and James E. Coleman, Jr., *Genetics and Responsibility: To Know the Criminal from the Crime*, 69 L. & CONTEMP. PROBS. 115, 135-38 (2006).

⁵ *Id.* at 135.

⁶ HERBERT FINGARETTE, *THE MEANING OF CRIMINAL INSANITY* 72–73 (1972).

⁷ *Cf.* *United States v. Moore*, 486 F.2d 1139, 1241 (D.C. Cir. 1973) (Wright, J., dissenting) (“[I]n determining responsibility for crime, the law assumes ‘free will’ and then recognizes known deviations ‘where there is broad consensus that free will does not exist’ with respect to the particular condition at issue.”).

subscribes to the consequentialist belief that treating individuals as responsible actors strengthens social systems and allows for the enforcement and creation of social norms.⁸ In essence, criminal law is a social-regulation model that is agnostic as to the truth or falsity of causal determinism, instead holding that irrespective of causal determinism, agents can be influenced by the pressures and incentives created by social institutions like criminal law.⁹

The role of legal free will in criminal law is targeted for attacks because of the sanctions the presumption enables including restraints on individual liberty and societal stigma. Presumptions appear throughout the legal system, such as a presumption of knowledge by actors where none exists. Whether those presumptions raise controversy depends largely on their function. A presumption of legal free will faces greater scrutiny than, for example, a presumption of knowledge of earlier statutes when a legislature acts, because legal free will allows the assignment of blame while the presumption of statutory knowledge simply enables coherence and stability in new legislative enactments. If universal causation is true, however—such that every act is caused by a preceding act—many moral philosophers claim that punishing criminal conduct can be legitimate only on a theory of deterrence rather than retribution.¹⁰ In the face of universal causation, it would be arbitrary and unjust to assign blame to the actor instead of the chain of causation leading up to an event. Criminal law could continue to serve a social welfare purpose, allowing for selective deterrence when determined and dangerous acts of an actor are knowable. But unless vengeful attitudes like resentment could be shown to bring about a better future, the social-regulation model would not legitimate it as a basis for criminal punishment.¹¹

While I believe that social institutions can adopt assumptions that will motivate actors to behave responsibly, criminal law need not concede that it otherwise lacks substantive content or a basis for assigning feelings of resentment and blame toward actors.¹² Instead, the descriptive characteristics of legal free will and the presumptions about

⁸ Farahany & Coleman, *supra* note 4, at 136-37.

⁹ John Martin Fischer & Mark Ravizza, *Introduction* 12, PERSPECTIVES ON MORAL RESPONSIBILITY (John Martin Fischer & Mark Ravizza, eds., 1993).

¹⁰ J.F. Johnston, Jr., *Human Freedom and the Limitations of Scientific Determinism*, 50 MODERN AGE 312, 319 (2008).

¹¹ Fischer & Ravizza, *supra* note 9 at 6.

¹² *Id.*; Richard C. Boldt, *Construction of Responsibility in the Criminal Law*, 140 U. PA. L. REV. 2245, 2304-05 (1992).

the voluntariness of human actions in criminal law comport with a more robust theory of freedom, and one that neuroscience can help illustrate rather than undermine. This theory of freedom would allow legal free will to claim both a moral foundation for responsibility apart from a legal positivist or consequentialist one, and enable a more engaged debate about moral responsibility. Moreover, this account would challenge the assumption that scientific progress points us only in the direction that human actions are causally determined and that legal free will is a fiction devoid of moral content. Finally, this account would enable us to move beyond questions focused solely about freedom and focus on the identity of agents—a question that will become increasingly more important and relevant as brain-machine technology continues to develop.

II: FREEDOM OF ACTION AND AGENTS OF ACTION

A. *Neuroscience in the Theoretical Free Will Debate*

The nature of scientific progress and study is reductive—to break down natural phenomena into its elementary constituents.¹³ This reductive process, of looking at the parts of the whole, can often lead theorists to question the legitimacy of attributing responsibility to the whole for choice or action. In any reductive theory, be it kinetic theory—transfer of energy from the whole versus individual atoms and parts—or responsibility theory, tension arises between a reductive view and a holistic view. Arguments against holding the person, as a whole, responsible for their actions in the face of causal descriptions attributable to their parts (e.g. the brain), has drawn increasingly more prevalently from advances in neuroscience.¹⁴ An emerging strain of

¹³ J.F. Johnston, Jr., *Human Freedom and the Limitations of Scientific Determinism*, 50 MODERN AGE 312, 313 (2008).

¹⁴ See e.g., Nita A. Farahany, *Law and Behavioral Morality*, in NOMOS LII: EVOLUTION AND MORALITY (Sanford Levinson, ed., 20xx) (discussing behavioral morality, the new form of moral reasoning using neuroscience and/or biology to disclaim moral responsibility based on biological contributions to behavior); WILLIAM R. CLARK & MICHAEL GRUNSTEIN, ARE WE HARDWIRED: THE ROLE OF GENES IN HUMAN BEHAVIOR 265 (2000) (asking whether free will actually exists and inquiring into the biological basis of free will); Marcia Johnson, *Genetic Technology and Its Impact on Culpability for Criminal Actions*, 46 CLEV. ST. L. REV. 443 (1998) (equating a genetic predisposition with genetic determinism and claiming that a defense based on a genetic predisposition negates free will and the elements of criminal responsibility); John L. Hill, *Note, Freedom, Determinism, and The Externalization of Responsibility in the Law: A Philosophical Analysis*, 76 GEO. L.J. 2045 (1998) (claiming that if

moral reasoning—behavioral morality—is coalescing around neuroscience and biology to disclaim responsibility based on the biological correlates to human behavior.¹⁵ Even the traditional concepts of materialism and determinism in the theoretical free will debate have incorporated neuroscience into their claims.

Materialism—the concept that “all events, including the operations of the mind, are ultimately operations of matter that obeys the laws of physics”¹⁶—draws on the connection between neural activity and behavior for support. Materialism has been described as akin to the wake of a boat going through the water.¹⁷ Just as the wake of the boat results purely from the boat moving through the water, so, too, argue materialists does the human mind from material causes that precede it.¹⁸ As such, the mind follows from the interworking of the brain, but cannot claim a causal role in instantiating choice and action.¹⁹ The brain causes muscle fibers to contract and neurons to fire, and is the root cause of mental activity, rather than some separate metaphysical mind.²⁰ Thus understood, materialism stands as a rejection of a mind-body dualism, but also removes a role for independent metaphysical human agency, reducing all human action to the material world as part of a series of causal events.

Determinism builds upon and relies upon the concept of materialism. Determinism postulates that past events combine with the laws of nature to determine future events.²¹ Thus, the deterministic universe started out at time t_0 and has continued to evolve along an inevitable path governed

determinism reflects reality, then the criminal law lacks coherence when it holds individuals criminally responsible); *Note, The XYY Syndrome: A Challenge to Our System of Criminal Responsibility*, 16 N.Y.L. SCH. L. REV. 232 (1970) (using the XYY syndrome to argue that the concept of criminal responsibility rests on flawed notions of free will);

¹⁵ See generally, Nita A. Farahany, *Law and Behavioral Morality*, *supra* note 14.

¹⁶ Joshua Greene & Jonathan Cohen, *For the law, neuroscience changes nothing and everything*, in *LAW & THE BRAIN*, 207 (Semir Zeki & Oliver Goodenough, 2004).

¹⁷ Christian Neuroscience Society, *Quantum Physics and Free Will: a misguided concept*, http://www.cneuroscience.org/Topics/Will/Quantum_Free_Will.htm. (last visited Feb 12, 2009).

¹⁸ *Id.*

¹⁹ Brahm Baker & Paul den Dulk, *Causal Relationships and Relationships Between Levels: The Modes of Description Perspective*, in *PROCEEDINGS OF THE TWENTY-FIRST ANNUAL CONFERENCE OF THE COGNITIVE SCIENCE SOCIETY: AUGUST 19-21, 1999*, 43, 45 (Martin Hahn & Scott C. Stoness eds., 1999).

²⁰ *Id.*

²¹ J.F. Johnston, Jr., *Human Freedom and the Limitations of Scientific Determinism*, 50 *MODERN AGE* 312, 312 (2008); Richard C. Boldt, *supra* note 12, at 2255.

solely by prior conditions in the universe and the laws of physics.²² Hard determinists would argue that something as simple as a choice of coffee over tea was predetermined by the laws of physics and the state of the universe millions of years ago.

Determinists have incorporated neuroscience into the theoretical free will debate by arguing that the brain determines and enables the mind.²³ The brain is a physical thing subject to the rules of the physical world.²⁴ The physical world is determined; therefore, the brain must also be determined.²⁵ If the brain is determined and the brain enables the mind, thoughts and actions arising from the mind must also be determined occurrences rather than voluntary expressions of free will.²⁶

Both descriptive (or soft/compatibilist) and prescriptive (or hard/incompatibilist) accounts have been offered for determinism.²⁷ The descriptive account denies that the laws of nature compel human behavior in a morally significant sense; rather, the laws of nature merely describe the manner in which behavior arises.²⁸ The descriptive view thereby allows for a core of human choice of one alternative over another.²⁹ The prescriptive view approaches the laws of nature as compulsory on human behavior and therefore denies the existence of any free will.³⁰

The groundbreaking brain experiments conducted by Benjamin Libet in the early 1980s have invigorated the determinist movement.³¹ Libet found that freely voluntary acts (such as raising a hand) are preceded by a specific electrical charge in the brain—called the readiness potential (RP)—beginning 550 ms before the act.³² Human subjects become aware of intention to act 350–400 ms after RP starts but

²² *Id.*

²³ Michael S. Gazzaniga & Megan S. Steven, *Free Will in the 21st Century: A Discussion of Neuroscience and the Law*, in *NEUROSCIENCE AND THE LAW: BRAIN, MIND, AND THE SCALES OF JUSTICE* 51, 52 (Brent Garland ed., 2004).

²⁴ *Id.*

²⁵ *Id.*

²⁶ *Id.*

²⁷ Richard C. Boldt, *supra* note 12, at 2255.

²⁸ *Id.*

²⁹ J.F. Johnston, Jr., *supra* note 21, at 313.

³⁰ Richard C. Boldt, *supra* note 12, at 2255.

³¹ Benjamin Libet, *Do We Have Free Will?*, in *THE VOLITIONAL BRAIN: TOWARDS A NEUROSCIENCE OF FREE WILL* 47, 47 (Benjamin Libet et al. eds, 1999). [note, alternate citation as noted in the book is: *Journal of Consciousness Studies*, 6, No. 8-9, 1999, at 47.]

³² *Id.*

200 ms before the actual motor act.³³ Thus, the volitional process of acting is preceded by neural activity outside of the consciousness awareness of the individual. By the determinist account, then, the neurological process in the brain initiates action, followed by conscious awareness and a will to act. In other words, there is no place or room in this chain of events for a choice to act—or for agent-driven actions.

B. An Alternate Account Using Neuroscience

These accounts posit that the brain controls human actions, and denies that there exists some correlate to our experience of self that in any real sense can initiate control, choice and movement. Yet the rhetoric used in emerging brain-machine interface studies underscores just how confused this concept is even in scientific discourse.

Cyberkinetics, for example, has been conducting clinical trials on its BrainGate Neural Interface System, which would enable severely paralyzed individuals to communicate through a computer via brain-machine interface.³⁴ The first subject, a fully paralyzed man, had a 100-electrode array implanted into his motor cortex that enabled him to operate a computer cursor on a television monitor.³⁵ When the developers described the scientific breakthrough, they described the freedom of action it gave to the patients:

“The patient was immediately able to send signals from this part of his brain in a controllable and meaningful fashion in response to directional commands even though he had not moved his arm in over three years due to a spinal cord injury. . . . A system has been developed to generate cursor control from these neural signals, enabling the patient to perform tasks and operate basic computer functions in numerous trials. The patient’s control of the cursor was immediate and intuitive, and

³³ *Id.* Certain cognitive disorders, such as “alien hand syndrome” also support the negation of free will. *Id.* Alien hand syndrome patients have a lesion in a fronto-medial portion of the premotor area of the brain. *Id.* This defect causes the affected arm or hand to perform “curious purposeful actions,” such as unbuttoning a shirt while the patient is attempting to button it, without or even against the patient’s intention or will. *Id.*

³⁴ Morgen E. Peck, *Standardizing the Brain-Machine Interface*, IEEE Spectrum Online (April 2008), available at <http://www.spectrum.ieee.org/apr08/6105>.

³⁵ *Id.*

the patient was able to perform tasks while speaking and moving his head, without disruption.”³⁶

Yet other descriptions of brain-machine interface technology instead describe the computer as controlling the action and activity, a computer-driven model:

“Surgeons at New England Sinai Hospital, Massachusetts, USA, implanted almost 100 electrodes into the motor cortex of the brain of a man who is paralysed from the neck down. The electrodes are connected to *a computer*, which *interprets activation in this area of the brain and translates it into ‘action’, thereby controlling everyday objects. The technology enables Matthew Nagle* to turn a television on and off, switch channels and increase or decrease the volume, play video games and even check emails.”³⁷

Still one final description emerges, an agent-activated model—a partnership between agency and machine, but agent-activated nonetheless:

“Cyberkinetics reported that its BrainGate neural interface—100 electrodes implanted in the brain—enabled Nagle to draw the letter ‘o’ with a paint programme, and open and close a robotic hand. *The device ‘reads’ neural signals generated in Nagle’s motor cortex when [Nagle] thinks* about moving his hand, and steers a computer cursor or a robotic hand.”³⁸

This last description, the agent-activated or agent-driven partnership model comports with our natural intuitions about human action—the individual as an autonomous agent, able to activate or drive a causal pathway in the brain and external world via his thoughts and intention to effectuate the movements he desires. Using brain-machine interface as

³⁶ *Six-Month Results of Cyberkinetics’ BrainGate Neural Interface System Pilot Study Presented at AAP Meeting*, April 24, 2005, available at http://www.neuroventures.com/news.html#_Six-Month_Results_of_Cyberkinetics'_1 (last accessed February 15, 2009) (emphasis added).

³⁷ Sarah Archibald, *Opening the BrainGate*, 6 NATURE REVIEWS NEUROSCIENCE 346 (May 2005) (emphasis added).

³⁸ Vicki Brower, *When Mind Meets Machine*, 6 EMBO REPORTS 108 (2005) (emphasis added).

our model to understand human action generally, we posit that in general, a thought process (itself neural activity) precedes action, which generates other neural activity or signals in the motor cortex of the brain, which is then “read” by the brain, which sends signals to the other parts of the body to carry out the desired action. This model fits well with our perceptual experience of voluntary motion, and now also with the experience of the individual connected to brain-machine interface. In the latter, the subject wills some action (e.g. moving a cursor on the screen) via his thoughts, which is followed by some neural activity in the motor cortex of the brain, which is then read by a computer and transmitted to the computer screen, which effectuates the desired motion of the cursor on the screen. The individual perceives this experience much like we perceive an ordinary action—as an agent driven action. Yet the experience of agency will be particularly acute for someone with locked-in syndrome or who is paralyzed. For these individuals, they will have experienced the willing of movements and have been unable to effectuate those movements externally for the period of time since they have been paralyzed or locked-in until being connected to the brain-machine interface. Only after being connected to the brain-machine interface do they experience effective agency—willing a particular action and effectuating that action in the external world.

The determinists and materialists would undoubtedly invoke Libet’s work to counter the role of the agent in this process. They would argue that because neural activity precedes conscious awareness of the choice to move (here the cursor), that the neural activity determined the choice, rather than an agent choosing to act. But Libet’s experiment does not deny the plausibility of an agent-driven model. That preparative neural activity exists before conscious awareness of the decision to act doesn’t disprove the role of an agent willing that action.³⁹ Nor does it deny that the thought itself drove the preparative neural activity. All that Libet’s experiment can tell us is something descriptive—that conscious awareness follows—by nanoseconds—the neural preparation for and awareness of intention. Yet just as the recall of a memory, of smells, of tastes, of a face or of a person may be preceded by neural activity so, too, could action with forethought.⁴⁰ That our neural processes have memories of actions that precede conscious awareness does not explain

³⁹ See David Booth, *Psychobiological Muddle or Model?*, 17 SCI. & CHRIS. BELIEF 243 (2005).

⁴⁰ *Id.* at 246.

the ordering of decision-making by an agent-drive process or by a brain-driven process.⁴¹

Recent studies on the flexibility of choice once an action has been selected cut in favor of the agency-driven model and against the computer or brain-driven model for action. It appears that when choices are made freely, even among a limited set of options, individuals keep alternative possibilities for action viable and flexible even through late stages of motor preparation.⁴² Stephen Fleming at the University College of London led a research team in the study of brain processes involved in free and instructed choice prior to initiating a physical action. Study participants were asked to choose a left or a right key press (using their left or right index finger) or to choose either option freely.⁴³ Before initiating the key press, the participants received a second cue to either change or maintain their selected choice. Finally, they received a cue to act on their choice (“go”) or to stop. The researchers measured the P300 event-related potential at each stage—prior to choice selection, during initial choice selection, when cued to stay or change their choice, and when asked to initiate or halt their action.⁴⁴ They found lower P300 amplitudes evoked by change cues in the free choice scenarios than by change cues in instructed choices scenarios,⁴⁵ revealing a difference between the neural processes involved in updating free choices versus instructed action choices. Building upon prior research, the team deduced that the research undercuts the traditional view that choices are hardwired and determine future events. Rather, when individuals choose freely, they remain flexible in their choices and are able to switch paths easily and up until late stages in the preparation process.⁴⁶ Consequently, even if consciousness awareness of a choice to move is preceded by neural activity, emerging neuroscience demonstrates considerable flexibility in *changing course* before the final movement is initiated. Thus, well after the nanosecond difference between the initial

⁴¹ *Id.*

⁴² Stephen M. Fleming et al., *When the Brain Changes Its Mind: Flexibility of Action Selection in Instructed and Free Choices*, CEREBRAL CORTEX 1 (Feb. 11, 2009).

⁴³ Note that the use of “free choice” in this article may be at odds with the notion of free choice discussed by philosophers; but free choice is here means that the study participant was given a set of two possibilities and asked to select between them. There was no incentive for choosing either alternative, and no constraint on choosing either alternative.

⁴⁴ Stephen M. Fleming et al., *When the Brain Changes Its Mind: Flexibility of Action Selection in Instructed and Free Choices*, CEREBRAL CORTEX 1 (Feb. 11, 2009).

⁴⁵ *Id.* at 7.

⁴⁶ *Id.* at 8.

neural recall and awareness in Libet’s studies, flexibility to change course—and therefore control over choice of movement—remains viable in decision-making.

C. Freedom of Action vs. Contra-Causal Freedom

Libet’s experiment at best supports a theory requiring contra-causal freedom as a precondition for moral responsibility; it does not refute a theory of responsibility based on freedom of action and agency. By contrast, brain-machine interface and Stephen Fleming’s study on choice support a theory of agency-driven freedom. If contra-causal freedom is not a necessary precondition for responsibility, and freedom of action is a sufficient one, then emerging neuroscience may support a conclusion opposite to the one most often drawn.

Freedom of action is described as having no obstacles to doing what one wants to do. Freedom of will is the distinct concept of willing what one wants to will.⁴⁷ One may have freedom of action and yet lack freedom of will, and vice versa. Harry Frankfurt describes freedom of action in the following way: If a person acted in the manner he wanted to and moved with a will that was his own at a time, then he acted freely, irrespective of whether he also acted with freedom of will.⁴⁸ This description, of course, leaves unanswered the important question of what it means to act with a will that can be called one’s own at the time, even if not necessarily free at the time. Answering this question, both for Harry Frankfurt, and perhaps now also for the theory of legal free will, is of central importance. An answer to both affords both a theoretically sufficient model of freedom both for moral responsibility and for legal free will.

While some theorists argue that both senses of freedom are required before ascriptions of responsibility can be made,⁴⁹ others persuasively hold that freedom of action alone can be a sufficient basis for moral responsibility even if the actor’s choice could be described in some manner as constrained.⁵⁰ These scholars, most notably David Hume and his “intellectual heirs” argue that freedom in a morally significant sense

⁴⁷ Eleonore Stump, *Intellect, Will, and the Principle of Alternate Possibilities*, in PERSPECTIVES ON MORAL RESPONSIBILITY 242 (John Martin Fischer & Mark Ravizza, eds., 1993).

⁴⁸ *Id.* at 244-45.

⁴⁹ Richard C. Boldt, *supra* note 12, at 2255 (citing C.A. Campbell, *Is “Freewill” a Pseudo-Problem?*, in FREE WILL AND DETERMINISM 112, 125 (Bernard Berofsky, ed., 1966).

⁵⁰ *Id.*

exists when one acts according to one's desires, to the extent that the action reflects the character of the individual, irrespective of the origin of those desires.⁵¹ As it turns out, this theory also comports descriptively well with the functioning of legal free will.

Freedom of action also stands opposed to contra-causal freedom as a precondition for responsibility—the requirement that an individual can be responsible for bringing about an event only if, with respect to a given act, he or she could have acted otherwise.⁵² This theory, often referred to as the principle of alternative possibilities, seems to motivate materialists, determinists, and those who appeal to Libet's experiment. C.A. Campbell helpfully summarized the contra-causal position as a precondition for moral responsibility:

“If we ask ourselves whether a certain person is morally responsible for a given act . . . we are considering . . . whether or not that person is a fit subject upon whom to pass moral judgment; . . . The really interesting and controversial question is about the *conditions* of moral responsibility, and in particular the question whether freedom of a contra-causal kind is among these conditions. The answer of the common man to the latter question is that it most certainly is among the conditions . . . because he does not see how a person can be deemed morally praiseworthy or blameworthy in respect of an act which he could not help performing.”⁵³

For determinists and those appealing to Libet's experiments, contra-causal freedom cannot obtain. They would argue that because all acts and events are predetermined by the preceding events, a person lacks freedom to do otherwise. Some adherents of determinism would nevertheless find a basis for criminal responsibility, relying on consequentialism or compatibilism, but others would argue that if a person lacks contra-causal freedom he cannot be morally praiseworthy or blameworthy and therefore should not be subject to criminal sanctions. Legal free will need not grapple with this point because contra-causal freedom is not a necessary precondition for moral responsibility.

⁵¹ *Id.*

⁵² *Id.* at 2254.

⁵³ C.A. Campbell, *Is "Freewill" a Pseudo-Problem?*, in *FREE WILL AND DETERMINISM* 112, 119 (Bernard Berofsky, ed., 1966).

Frankfurt demonstrated the falsity of contra-causal freedom as a precondition of responsibility in his famous essay, *Alternate Possibilities and Moral Responsibility*.⁵⁴ A person constrained such that a particular result will come about irrespective of his choice or actions is nevertheless capable of acting in a morally irresponsible manner with respect to those choices or acts. Consider the following example: Person A desires to kill Person B and plans to do so. Unbeknownst to Person A, Person C wants to ensure that Person B is killed. So, Person C has created a fail-safe mechanism to ensure that Person B will be killed. Person C has rewired Person A's brain, such that if Person A should change his mind about killing Person B, the fail-safe mechanism will kick in, and create both the desire in Person A to kill Person B, and produce the series of neurological firings necessary for the action of Person A killing B. Person A therefore has no other option but to kill Person B. Under the precondition of contra-causal freedom, when Person A kills Person B he is not morally responsible for doing so because he lacks any alternative. Frankfurt, however, provided a new insight to this problem. He argued that while Person A lacks alternatives in one sense, in the moral sense, he does not. If Person A acts in response to his initial desire to kill B, and not in response to the fail-safe mechanism, we could still find him morally responsible for the action.⁵⁵ Put otherwise, "[a] person may do something in circumstances that leave him no alternative to doing it, without these circumstances actually moving him or leading him to do it—without them playing any role, indeed, in bringing it about that he does what he does."⁵⁶

Frankfurt thereby refuted the theory that moral responsibility arises only when a person could have done otherwise by proving false the argument that coercion or influence excludes a finding of moral responsibility. Instead, he demonstrated that contra-causal freedom should affect judgments of moral responsibility only when a person acts because he was coerced to do so, such that the coercion accounts for his action.⁵⁷ Hence, even if there are circumstances that make it impossible for a person to avoid performing some action, those circumstances may not in any way have brought about the action that he performed.⁵⁸ So contra-causal freedom is not a necessary pre-condition for moral

⁵⁴ Harry G. Frankfurt, *Alternate Possibilities and Moral Responsibility*, 66 J. PHIL. 829 (1969).

⁵⁵ *Id.* at 830-32.

⁵⁶ *Id.* at 830.

⁵⁷ *Id.* at 833.

⁵⁸ *Id.* at 837.

responsibility, and criminal law might be on sound theoretical footing for finding responsibility in some situations of contra-causal freedom. But in which situations, and how can neuroscience illuminate that answer?

Frankfurt gets us part of the way there. He provides a theory of freedom of action, based on volitional control, defined as the absence of obstacles to acting when an agent identifies with the action.⁵⁹ Our ordinary notions of volitional control comport well with Frankfurt's model, and brain-machine interface may provide us with an opportunity to probe further into this theory. The alignment between volitional control and agent identification also comports well both descriptively and normatively with the function served by legal free will in criminal law. The criminal law presumes that an act implies a choice to have acted, but also allows a defendant to challenge the presumption that he is the agent of his action by demonstrating his movements arose from natural phenomena or external forces.⁶⁰ As a descriptive matter, then, criminal law presumes freedom of action based on a presumption of volitional control, but allows one to disclaim identification with the action in the instances when the action is more properly attributable to natural phenomena or external forces outside the control of the individual. Normatively, criminal law preserves its legitimacy by punishing only those agents who have the capacity to identify with their actions; it exempts the insane and infants largely because of their inability to control their actions and thereby own or identify with their own acts.

Freedom of action also comports with the shift in modern criminal law from focusing on the general wickedness of the defendant to his intention to engage in a particular illegal act. Voluntarily engaging in a criminal act is generally an insufficient basis for criminal liability; criminal liability also requires proof of a mental state that coincides with the act or omission.⁶¹ Earlier, criminal law punished offenders only when their volitional acts were accompanied by a vicious will—meaning that proof of malice or intention to engage in wrongdoing was a necessary element of criminal wrongdoing.⁶² As criminal law developed, the requisite mental element for criminal shifted from an assessment of the

⁵⁹ PHILLIP PETTIT, A THEORY OF FREEDOM: FROM THE PSYCHOLOGY TO THE POLITICS OF AGENCY 51 (2001).

⁶⁰ Farahany & Coleman, *supra* note 4, at ___. (actus reus section)

⁶¹ *Id.* at

⁶² *Id.* at

individual character of the defendant to the intentionality revealed by focusing on the particular act or omission the defendant engaged in, under particular circumstances.⁶³ Thus, by the early twentieth century, criminal law had shifted from its focus on the character of the defendant to a question of whether the defendant's conduct reflected the intention required by the statute.⁶⁴ This fits well with Frankfurt's characterization of freedom of action as underlying moral responsibility: "[W]hat a person does is not relevant to moral evaluations of him merely because it is an indicator of his mental state. People merit praise or blame for what they do,"⁶⁵ rather than because of what their actions reveal about their character. Likewise, criminal law punishes individuals for their acts and attempted acts because of what they have done and not because it indicates their character, desires, and underlying will in the broader sense. Criminal law could embrace legal free will, then, not just on consequentialist justifications but also as demonstrating a preference for a notion of freedom grounded in freedom of action. To do so forcefully, it must also attribute that action to an agent as an agent of action.

D. Agent Driven Choices

Although Jean-Dominique Bauby may have retained his capacity to will freely, he lost his ability to drive his actions in the external world (save eye blinks). Had Bauby been exposed to brain-machine interface, one might instead have asked whether his resulting action was agent-driven action. Brain-machine interface provides a useful analogue to freedom of action in the ordinary case. If one endorses that view that if Bauby acted via brain-machine interface, such action would have been agent-driven, this would likewise imply endorsing agent-driven action model for the individual unconstrained by paralysis or locked-in syndrome. If instead one endorses the computer/brain-driven model, it would likewise imply support for a brain or causal-driven model for the ordinary actor. This section defends the agent-driven action model approach and illustrates how that model comports both descriptively and normatively with legal free will.

Criminal law distinguishes between agent-driven actions and mere bodily happenings, directed actions, or reflexes or convulsions. There is a difference, for example, between one pushing a left-click button, and a

⁶³ *Id.* at

⁶⁴ *Id.* at

⁶⁵ Harry Frankfurt, *What We are Morally Responsible for*, in PERSPECTIVES ON MORAL RESPONSIBILITY 291 (John Martin Fischer & Mark Ravizza, eds., 1993).

left-click button pushing. If Person A is programmed to click a button, or forced to do so by Person B pressing Person A's finger on the button, then one could not call the button clicking a full-blooded agent-causing event by Person A. Agent-causing events require more than mere happenings of the body.⁶⁶ Neither theoretical free will, nor legal free will holds the actor to be a responsible agent under these circumstances.⁶⁷ In these instances the act is more appropriately attributable to an agent or source other than the one performing the act. Such acts may be deemed involuntary acts, thereby negating the presumption of legal free will.

Conceding that some acts may happen involuntarily does not challenge the legitimacy of the agent-driven model over the causal chain of action model. Because contra-causal freedom has already been disproven as a necessary precondition for freedom,⁶⁸ we can instead focus on the role of agency in those instances where actions *are* agency-driven events.

An agent has multiple competing influences on his or her decision to act.⁶⁹ The standard descriptive story omits an agent in the decision to act by failing to mention an intermediary role between desires and bodily movements played by the agent.⁷⁰ We see evidence of this omission in the computer or brain-driven model description of brain-machine interface when the role of the decision-making by the subject is omitted, attributing control instead to the brain and the computer in reading the neural activity. Understanding the relationship between the agent and those desires helps to define whether the action is properly deemed an agent-driven action or not one. When preparing dinner, for example, one might be motivated by a desire to satiate hunger, by the desire to watch television instead, by a desire to finish an essay on legal free will, by a craving for a particular food, by the fact that it is dinner-time, and by the fact that guests are arriving for dinner. Frankfurt's freedom of action

⁶⁶ Stephanie Wykstra, *The Agent in Action: A Critique of Velleman*, 10 DUALIST (2003), available at <<http://www.stanford.edu/group/dualist/vol10/>> (last accessed February 4, 2009).

⁶⁷ *Id.*

⁶⁸ Richard C. Boldt, *supra* note 12, at 2261 (1992).

⁶⁹ THAD BOTHAM, RENDERING FREE WILL INTELLIGIBLE: A DEFENSE OF AGENT-CAUSATION 334, (Graduate Dissertation for Doctor of Philosophy, Notre Dame 2005), available at <<http://etd.nd.edu/ETD-db/theses/available/etd-12052005-114407/unrestricted/BothamTM122005.pdf>> (last accessed February 12, 2009).

⁷⁰ J. David Velleman, *What Happens When Someone Acts*, in PERSPECTIVES ON MORAL RESPONSIBILITY 204 (John Martin Fischer & Mark Ravizza, eds., 1993).

would require both that the actor lack obstacles to preparing the dinner, and also that he identify with the choice to prepare that dinner, in light of his many desires.

Each agency-based model underlying freedom of action recognizes and grapples with the role of desires and influences on freedom of will. Frankfurt proposed a reflective model—if there exists some process of reflection that is internal to the agent among the factors producing an act then the act is properly attributable to the agent.⁷¹ This gives ownership to an agent over an act if he can reflect on the multiple factors that may drive his choice to act. Frankfurt described the self-reflective process in the following manner: Human beings have desires and motives and are able to make choices that satisfy these first-order desires;⁷² Human beings also have the rational capacity to form preferences and to exercise their preferences among their first-order desires—the preference between these first-order desires is known as second-order desires;⁷³ An agent is defined as a person who is able to make their second-order desire the basis upon which they are moved to action,⁷⁴ and thereby commits himself to one of his first-order desires, which resounds throughout his higher-order desires.⁷⁵ Moral responsibility requires that one lack any obstacles to acting in accordance with this identified second-order desire.⁷⁶ Although Frankfurt’s account provides a starting point for understanding the interplay between desires and agent-driven choices, it suffers from some well-described shortcomings.

J. David Velleman, for example, has noted that Frankfurt’s account is question begging as to the role of agency; commitment to particular first-order desires does not help to explain the point at which the agent participated in bringing about an action.⁷⁷ Additionally, like others who have criticized Frankfurt’s view, he notes that a hierarchy of preferences could be infinite; there is no reason why second-order desires could not be trumped by third-order desires, and so-forth. Nor is there a reason why the second-order desires should be privileged in this infinite ordering of desires. Velleman builds, then, on Frankfurt’s model, by proposing that a meaningful role for agency requires that intention be

⁷¹ Richard C. Boldt, *supra* note 12, at 2261.

⁷² See Harry G. Frankfurt, *Freedom of the Will and the Concept of a Person*, in *MORAL RESPONSIBILITY* 65, 66-67 (John M. Fischer ed., 1986).

⁷³ *Id.* at 70-72.

⁷⁴ *Id.* at 70.

⁷⁵ Stephanie Wykstra, *supra* note 66.

⁷⁶ Frankfurt, *supra* note 72 at 78-79.

⁷⁷ Stephanie Wykstra, *supra* note 66.

“formed by the agent himself, not by his reasons for acting.”⁷⁸ This describes a distinct role for agency in the process, rather than being the reason for action, which renders the role of the agent would be superfluous. Here, desires may influence an agent’s intention to act, but are not themselves the cause of moving an agent’s limbs.⁷⁹ Agents move limbs, not intentions.

The alternative Vellement proposes defines the agent as *a state or motive*.⁸⁰ The only possibility for such a mental state would be a “motive that drives practical thought itself.”⁸¹ The desire to act intelligibly in accordance with reason, Velleman posits, provides a role for the agent distinct from the desires competing for influence on the agent’s choice.⁸² This escapes the problem of hierarchy of preferences because the agent as a mental state puts the agent “always behind, and never in front of, the lens of critical reflection, no matter where in the hierarchy of motives it turns.”⁸³ As a functional state, the agent-state does not suffer from Frankfurt’s concern about alienation; as long as one remains an agent, a person will want to act intelligibly.⁸⁴ If one wants to act intelligibly, he will, because his actions correspond to his identified reasons for acting.⁸⁵ This model thereby allows us to conceive of the agent as standing behind Frankfurt’s hierarchy of desires, choosing between motives on the basis of which one provides the best *reason* for acting, and ensuring these reasons prevail over those with weaker rationalizations.⁸⁶ Velleman’s also avoids depicting the agent as a homunculus in the brain, directing and sorting through first and second-order desires. The agent is a *mental state of being* that represents an exercise of choice in favor of reason and intelligibility, but is not itself *another being*.

Before we can fully embrace Velleman’s approach to agency, however, a caveat is in order. Velleman ignores subconscious motivators on influence. Consider, for example, an individual who decides to steal money and rationalizes that he is doing so to pay off his mounting debt that will result in the foreclosure his home. Suppose that

⁷⁸ J. David Velleman, *supra* note 70, at 189.

⁷⁹ *Id.*

⁸⁰ Stephanie Wykstra, *supra* note 66.

⁸¹ J. David Velleman, *supra* note 70, at 206.

⁸² J. David Velleman, *supra* note 70, at ___.

⁸³ J. David Velleman, *supra* note 70, at 205.

⁸⁴ Stephanie Wykstra, *supra* note 66.

⁸⁵ *Id.*

⁸⁶ J. David Velleman, *supra* note 70, at ___.

the actor in fact derives enormous pleasure from stealing money, albeit subconsciously, and has consciously rationalized acting on this subconscious pleasure-seeking desire by his predicament. That he only consciously owns and identifies with his rational reasons of avoiding foreclosure does not deny that his subconscious motivations have also influenced his decision to steal. This is animated by the fact that if he did not have a foreclosure to avoid, he might have found another rationalization for stealing money. Subconscious beliefs and desires may therefore have causal efficacy in full-blooded agent decision, by triggering conscious counterparts that one rationally embraces and identifies with as his own. One cannot say that these subconscious counterparts are not real motivations, because without them, the conscious desire may not exist.⁸⁷ Velleman ignores these subconscious desires in the full-blooded agent-driven decision by claiming that the agent, as a mental state, stands always before and never behind desires. If we accept Velleman's agent-driven model, then we are necessarily excluding the subconscious desires as irrelevant to the agent-driven process; the agent rationalizes the decisions he makes without recognizing the subconscious motivations that he may have on his desire to act. But the important question, for both moral responsibility and for legal free will is whether these subconscious desires negate some precondition for freedom. We have already seen, the agent has no obstacles to stealing, and therefore has freedom of action. The very act of rationalizing his choice and *choosing to act* on this rationalization has produced an agent-driven action and satisfied the necessary preconditions for freedom of action. Legal free will can readily adopt this model of freedom and have a solid grounding for a presumption of freedom of action in criminal law. Under these circumstances, to say the individual acted freely in stealing the money means that he was unconstrained in his choice and his act of stealing. Legal free will allows for the attribution of stealing, then, to that individual.

This inquiry into the rationalization of subconscious desires gives us new occasion to revisit Libet's experiment. We now have an alternate hypothesis to memory prior to acting. Neural activity preceding conscious intention to act may represent subconscious desires. In the above example, the choice to steal, for example, could be preceded by the subconscious motivation to satisfy the pleasure-seeking impulse to steal. Conscious awareness may involve the rationalization of those subconscious desires, such that a fully formed choice is based on

⁸⁷ See generally *id.*

intelligible and rational decision-making, about the need to avoid foreclosure. Even then, Stephen Fleming's group reveals that the choice may be a flexible one, such that one may rationally choose otherwise. That I have subconscious influences on agency-driven actions doesn't change whether agency was involved.

Returning again to brain-machine interface, suppose that Person A is subconsciously motivated by bitterness because she feels as if she has been given a rotten lot in life. Now envision an experiment where Person A is hooked up to the BrainGate system, to enable her brain activity to be read to control the cursor on a computer screen. Two selectable options appear on opposite sides of the computer screen. The first option reads, "I believe that my choices are pre-determined. I believe in determinism." The second selectable option reads, "I believe that my choices are un-determined. I believe in contra-causal freedom." Person A is instructed to choose either option on the screen freely, using her thoughts alone. She does so, and selects the first option: "I believe in determinism." Aha, the determinist will exclaim! Even Person A believes in determinism, proving contra-causal freedom cannot pertain, even in brain-machine interface. Moreover, the determinist will point to Person A's bitterness to show that her choice was caused, and never in doubt. But the determinist is now faced with a paradox. Person A has been put into the position of freely choosing between two choices—and has freely chosen option 1.⁸⁸ Even if Person A prefers determinism, it cannot be said that *her preference chose* option 1. Additionally, Person A likely has a mental state corresponding with her choice, along the lines of—I believe that everything in life has happened for a reason and has been part of a causal chain of events; it could not have been otherwise. That is why I choose determinism as my answer. Her rationalization supports either the Velleman or Velleman/Frankfurt hybrid model for agency. Person A formed her intention to act and acted upon that intention—and she identifies with this intention. Her intention did not move the cursor, Person A did. In such a way, the brain-machine

⁸⁸ J.F. Johnston, Jr., *Human Freedom and the Limitations of Scientific Determinism*, 50 MODERN AGE 312, 317 (2008) (describing Daniel Dennett's work on freedom of choice and materialism; The materialist assumes that we are creatures of the natural order whose mental activity and decisions are entirely dependent on the physical activity of the brain, while non-materialists believe that consciousness and the ideas that result from it are not material. Thoughtful people can choose between being a materialist or a non-materialist, but this places the determinist in the awkward position of having freely chosen determinism.)

interface illustrates that preferences or desires may contribute to choice and yet that preference does not itself act, the person does.

Person A is identical to the ordinary person, at least with respect to freedom of action in moving a cursor on the computer screen. Person A and the ordinary person both are capable of agent-driven actions and have freedom of action. To point a fine point on the issue, contrast Person A (or the ordinary person), with a robot unable to will which movements it will make, and acts based only on the programming of its designer.⁸⁹ If the robot underwent the same experiment, and selected determinism on the computer scene, it cannot be said that the robot's choice was an agent-driven action. Though its decisions may have been preceded by thoughts which look or sound like reasons, it cannot be said to reason to these conclusions as Person A did, or the ordinary person does. The robot lacks control over its values, its ability to rationalize, or to know or identify with its actions. It is instead merely a vehicle for carrying out a program, rather than directing the actions of its program.⁹⁰

This notion of agency as a mental state standing before the hierarchy of preferences and ensuring reason prevails over weaker rationalizations fits with the descriptive model of the rational actor presumed by the legal system. That this model draws new support from emerging neuroscience provides legal free will not only with theoretical but also with a new scientific grounding. Criminal law can draw upon this literature to demonstrate that it has not only a consequentialist justification for its assumption of freedom, but also a theoretical one that comports with moral responsibility. By identifying action as agent-driven, it also comports with the normative goals of the system: to codify, enforce, and establish social norms of conduct for societal actors. Recognizing action as agency-driven embraces a belief that individuals can conform their conduct to existing legal norms and adapt to new ones. This enables those norms to be enforced not only on a model of deterrence, but also on a model grounded in retribution. If actions are agency-driven, and treated as such, then praise, blame and vengeance can appropriately be directed at an agent as the source of that action. With such an understanding of freedom of action and agent-driven actions, legal free will may be a thick presumption, after all.

⁸⁹ Susan Wolf, *The Importance of Free Will*, in *PERSPECTIVES ON MORAL RESPONSIBILITY* 110 (John Martin Fischer & Mark Ravizza, eds., 1993).

⁹⁰ *Id.* at 109.

CONCLUSION

Brain-machine interface illustrates that neuroscience does not inevitably lead us to conclude the truth of causal determinism. Rather, emerging neuroscience can illuminate our intuitions about the role of agency in actions, and the sense of freedom that animates conceptions of moral and legal responsibility.

That neuroscience can bolster existing theories of freedom of action and agency is an important rejoinder to the persistent attacks leveled at the presumption of legal free will underpinning the attribution of responsibility in criminal law. Legal free will has been traditionally defended using consequentialist justifications rather than substantive theories of freedom. While such justifications may be a normatively sufficient basis for attributions of criminal responsibility, this essay demonstrates that legal free will comports with a more robust theory of moral responsibility grounded in freedom of action and agent-driven actions.

Identifying the source and meaning of agent-driven actions, however, has implications well beyond the scope of legal free will. Brain-machine interface, is a particularly salient area to study the meaning and concept of agent-driven actions and identity. Scientists hope this technology will allow disabled individuals to fully interact with the external world via machine and computer technology. Scientists hope to make prosthetic devices, for example, that can be controlled via thoughts and that provide feedback to the brain, rather than just receive output from the brain. When these systems begin to become fully integrated—with implanted electrodes in the motor cortex and other regions of the brain, providing bi-directional real-time feedback to the brain, will we continue to think of these actions as agent-driven actions? If not, will it be because there are causal influences on the behavior, or in some sense the actions were preceded by some source external to the will of the individual? Alternately, will the actor continue to identify with the action itself, when the action arises from a source foreign to the body of the individual, such as via a prosthetic arm, or even remote devices lacking in immediate proximity. The answer to these difficult questions may have implications for how we think about moral responsibility for actions, and legal responsibility for those actions, as well. This essay unlocks the door to that debate.