



Seeing Responsibility:

Can Neuroimaging Teach Us Anything about Moral and Legal Responsibility?

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As imaging technologies help us understand the structure and function of the brain, providing insight into human capabilities as basic as vision and as complex as memory, and human conditions as impairing as depression and as fraught as psychopathy, some have asked whether they can also help us understand human agency. Specifically, could neuroimaging lead us to reassess the socially significant practice of assigning and taking responsibility?

Responsibility is a complex concept,¹ and attributing responsibility is a complex human practice, both in everyday life and in the most familiar formal context in which responsibility is often at issue—the law. Embedded in our concept of responsibility are strong assumptions about how human beings make decisions. Specifically, we generally assume that a person *chose* to undertake the action or inaction that led to the outcome for which we are now holding her responsible. And we assume that this choice was undertaken, at least to some limited degree, freely, meaning that the person could have decided not to undertake the action or inaction. In this way, responsibility is closely related to, although not exactly the same as,² free will—the idea that we choose and control our actions (and sometimes even our thoughts and emotions).

While responsibility itself is not a psychological process open to investigation through neuroimaging, decision-making is. Over the past decade, different re-

searchers and scholars have sought to use neuroimaging (or the results of neuroimaging studies) to investigate what is going on in the brain when we make decisions. The results of this research raise the question of whether neuroscience—especially now that it includes neuroimaging—can and should alter our understandings of responsibility and our related practice of holding people responsible. It is this question that we investigate here.

Blaming: When Are We Responsible for Outcomes?

Notions of responsibility for action are deeply embedded and widespread; indeed, they are not limited to humans. As Oliver Wendell Holmes, Jr., famously declared, even a dog distinguishes between being stumbled over and being kicked.³ Those notions are also complex. While we generally hold individuals responsible for outcomes they caused, we don't always do so, and we sometimes hold individuals responsible for outcomes they did not directly cause because we think they are nevertheless responsible.

To help us think about responsibility, let us begin with a three-way distinction—between causal responsibility, moral responsibility, and legal responsibility. One is causally responsible when there is a link between something one did (or sometimes, did not do) and the state of affairs in question. So, if I move my foot and it hits the dog's ribs, I may be causally responsible for bruising him. Causal responsibility throws up some puzzles of its own: Is one causally responsible for consequences that are only remotely related to one's actions?⁴ Can a failure to act really constitute a "cause"?⁵ But for

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now, let us consider causation in a fairly simplistic way: I cause the glass to break if I move my body (or an extension of my body, like my sleeve) such that it knocks the glass over. Causal responsibility is usually a necessary but not sufficient condition for establishing moral and legal responsibility.

Moral responsibility is more complex. One is morally responsible for an outcome not just if one caused it to happen but if one did so in certain mental states—with full intent, knowingly, or under circumstances when one should have known that one's actions would or might cause such an outcome. The distinctions between these mental states are unclear and disputed, but they are reflected to some extent in ordinary moral judgments. To return to the earlier example, I will almost certainly be held morally responsible for breaking the glass if I knocked it over with the intention of breaking it. But I may also be morally responsible for breaking the glass if I knocked the glass over with the intention of only spilling the water, since breaking the glass was a consequence of my action that I probably should have anticipated. And I may even be held morally responsible if I broke the glass while waving my arms around in the course of telling an exciting story and standing right by the glass, if I *should* have known that doing so was likely to knock the glass over and break it, even though, in fact, the possibility never crossed my mind.

If, however, I was waving my arms in the course of a seizure that I could not control, I will not be held morally responsible even if I knew the likely outcome of my arm-waving. It is not enough, therefore, that my bodily movements caused the outcome; for individuals to be held morally responsible for outcomes, we usually require that they *intentionally act* to cause them. That is, we require that the actor in some sense choose to undertake the action or inaction. A seizure or spasm is not an action at all, let alone an intentional or chosen one.

For moral responsibility, it also matters what kind of agent I am—specifically, whether I am capable of the kind of mental state necessary for moral responsibility. An infant who knocks the glass over, causing it to break, would not be held morally responsible. We understand that the infant cannot form the requisite intention for moral responsibility, and even if she could, she won't be held to the applicable standard of care (even if we think that she did knock the glass over “on purpose,” we don't expect her to understand that this action may well cause it to break, we don't expect her to understand that breaking a glass is an undesirable outcome, or we don't expect her to refrain from doing things she knows are bad).

While moral and legal responsibility differ in some respects, the two track fairly closely, and the law draws heavily on moral responsibility in determining legal responsibility. Legal responsibility, discussed in more detail

below, also concerns intention, with terms like “with intent,” “with knowledge,” “recklessly,” or “negligently” used to refer to the various mental states that, depending on the circumstances, may suffice to make one legally responsible for an outcome.

These three basic kinds of responsibility (causal, moral, and legal) are fairly simple in the abstract, but their application can be quite sophisticated: we can hold people causally, morally, and legally responsible for outcomes, even individuals who were not direct physical causes, and we can hold people responsible to varying degrees.

Much has been written about responsibility by philosophers, lawyers, and others. The question we address here is, What impact, if any, could—and should—findings from neuroimaging studies have on how we think about responsibility?

Philosophical Puzzles: Can We Be Responsible and Causally Determined?

One answer to that question is that neuroimaging technologies can show us—can literally *illustrate*—that the whole notion of responsibility (causal, moral, and legal) is built on an unsupportable assumption—specifically, the assumption that we have free will. Philosophers have wondered for centuries, if not millennia, whether we really choose our actions or whether they are causally determined and whether the two views of action are mutually exclusive (that is, if our actions are determined, can we be held responsible?).

This isn't just a hypothetical problem. It is increasingly accepted that human beings are not the de-novo “causers” of their thoughts and actions, nor is any other agent acting outside the laws of physics. Rather, each action or event is “caused” by the cascade of events and influences that came before it, ad infinitum. Nothing originates with me. My thoughts and actions—my choice to pick up the pen or reach out to knock over the glass—are caused by electrical signals in my brain and the rest of my body, which in turn are caused by my particular body (including brain) and its reaction to this set of circumstances, which itself is the result of everything that I have ever experienced combined with the body I was born with, which developed from my genome, my various early environments, and their constant interaction, which in turn interact with the unfolding circumstances of my life. All of this was itself caused by a multitude of factors, and so on.

One implication of determinism is that everything I do is theoretically predictable—if we could identify and understand all the relevant factors that led up to this moment in time, we could predict with 100 percent accuracy what I will do next. Will I pick up the pen? Will I knock over the

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glass? Will I order cake or salad? Will I steal the diamond ring?

If determinism is true (some philosophers and quantum physicists deny that it is, although each on different grounds), then two questions immediately arise. Do I really *choose* to do anything? And if I didn't choose to undertake my actions, then can I still be held responsible for them? Can I be held responsible for my actions given that the intentions that caused my actions were themselves determined by other causes and, ultimately, by physical causes outside my brain?

In the philosophical literature, those who answer “yes” to these questions are called “compatibilists.” Compatibilists argue that we are responsible for our actions if our intentions (or beliefs and desires) cause them *in the usual ways*, even if our intentions are in turn caused by events outside ourselves. It is only when the usual causation of our actions is disrupted or superseded by interruptions like delusion, coercion, compulsion, or mania that we are not responsible for them. Compatibilists do not deny the underlying truth about determinism, but they insist that we do not reject determinism when we hold someone responsible for her actions—we simply assume that their actions were determined in the usual ways.

Those who answer “no” to these questions—who maintain that determinism completely undermines the notion of responsibility—are called “incompatibilists.” They say that to be morally responsible for our actions, we have to be the ultimate cause of our actions. Correspondingly, then, to be free, our will would have to operate outside of the laws that govern the behavior of physical objects (much as a soul has been supposed to operate). For incompatibilists, therefore, either free will is an illusion or determinism is false. Some incompatibilists, called “libertarians,” reject determinism or maintain that human agency is exempt from it (such metaphysical libertarians should not be confused with political libertarians), while others accept determinism and reject responsibility and free will.

Compatibilism—the idea that responsibility can coexist with the truth of determinism—has been the dominant view in Anglo-American philosophy for the last fifty years. A generation of compatibilists has maintained that we can take and assign responsibility even if all our actions (and inactions) are fully determined, as long as they are determined in the “right” way: by our desires, beliefs, intentions, or decisions. One of the most influential strains of com-

patibilism derives from a 1962 essay by Peter Strawson, “Freedom and Resentment.”⁶

Strawson makes two large claims. First, we *can* live with determinism. Praise, blame, and responsibility-judgments aren't undermined by the truth of determinism, and there is no need for the “panicky metaphysics” that earlier philosophers invoked to square determinism with what they took to be the truth of free will. Strawson argues that our “reactive attitudes” of blaming, praising, resentment, and gratitude (among others) require us to hold others responsible for their actions, but they do not require us to regard their actions or decisions as undetermined (that is, as exempt from the laws of physics). Holding someone responsible merely requires the absence of specific conditions that human beings have over time agreed undermine responsibility, such as ignorance, insanity, or compulsion. Our ability to justify and recognize such excusing and exempting conditions is not affected by the truth of determinism.

Second, we cannot live without responsibility-judgments. Our reactive attitudes of blame, praise, and so on are necessary for close personal relationships and social life generally. We can suspend our reactive attitudes on specific occasions, taking the “objective” stance of a scientific observer toward acts or individuals when we find an excusing or exempting condition. For instance, if we discover that the person who broke the glass was an infant or was pushed by someone else, we will not hold that person responsible. Yet while we can suspend our reactive attitudes toward some of the people all of the time (exemptions), and all of the people some of the time (excuses), we can't do so toward all of the people all of the time. Our social lives and close personal relationships compel us to take a “participant” stance toward most of the people in our community, subjecting them to our reactive attitudes and vice-versa. We praise and blame, express resentment and gratitude toward those close to us, and we expect them to do likewise to us. To treat them, or to have them treat us, with scientific or clinical detachment as acted-upon entities rather than as persons who can decide and act would cause an irreparable break in our personal relationships and undermine the fabric of our society.

To the extent that it addresses the issue, Anglo-American law is firmly compatibilist, denying responsibility only for certain kinds of disruptive causation. In the law, some actors, like infants or the criminally insane, are always exempt from legal responsibility, while others who ordinarily might

be held responsible are excused in light of the particular circumstances of the case, for instance, if they were coerced. Despite this general stance, some scholars have suggested that behavioral and cognitive neuroscience could or should cause us to change or abandon our notions of moral and legal responsibility,⁷ including specifically criminal responsibility. Those who commit bad acts might still face consequences, but those consequences would aim not to punish them but to prevent commission of more harmful acts (whether through some kind of preventative detention or compulsory rehabilitation). This provocative idea has been challenged by a number of other scholars and commentators as impractical, undesirable, unnecessary, and unlikely to occur given the nature of both morality and the law.⁸

Determinism and the Framework for Legal Responsibility

Theoretically, the evolving philosophical understandings of moral responsibility need not be closely tied to lay notions, and neither need conform to how the law understands and operationalizes responsibility. The law has its own formulations of responsibility and its own processes for determining whether an individual is responsible, to what degree she is responsible, and how she should be held accountable.⁹ Yet moral and legal responsibility are also intimately connected, at least to the extent that a legal system that too often strayed far from lay notions of moral responsibility would lose its credibility. So, at a minimum, the law needs to be aware of and somewhat congruent with lay notions of responsibility.

Within the law, the standard view is that legal responsibility requires moral responsibility insofar as legally responsible individuals usually must be both the cause of the harm or damage at issue and, except in cases of strict liability, to blame for it (truly innocent accidents are often excused).¹⁰ Under the criminal law in particular, punishment is supposed to be proportional to the offender's blameworthiness¹¹—an idea that demands an understanding of the actor's moral responsibility. The reverse is not always true, however. Individuals may be morally responsible for an adverse outcome but not legally responsible for it. For example, in a liberal-democratic society, reckless political leaders may be held morally responsible for social and economic disasters without having any legal liability for the damage they arguably caused.

In the criminal law (the domain on which we will focus), responsibility is usually determined by a two-step process. First, the judge or jury decides whether the accused committed the alleged act (or sometimes, the alleged omission). Did Mr. X fire the gun that killed Ms. Y? This is called the "*actus reus*," and it is essentially the establishment of causal responsibility. The second step requires the

judge or jury to determine whether the accused committed the alleged act or omission with the requisite intention or mental state. Did Mr. X mean to kill Ms. Y? This is called the "*mens rea*," and it is similar to the establishment of moral responsibility. *Mens rea* varies by crime or alleged legal wrongdoing—a conviction for some crimes requires full intention (a murder charge requires "intent to kill"), while lesser degrees of intention like recklessness or negligence are enough for other convictions. If Mr. X intended only to injure Ms. Y when he shot at her, he might be guilty of manslaughter rather than murder; if Mr. X killed Ms. Y completely accidentally while he was practicing his aim in his backyard, he might be guilty of a lesser crime (reckless discharge of a firearm, for example) or no crime at all.

If an accused is found legally responsible, then the judge or jury must decide on an appropriate punishment. At this stage—called "sentencing" in criminal cases—the mental state of the accused may be considered again, this time to determine whether the court should be lenient or harsh. Courts often have some leeway when determining punishments, and lawyers are allowed to introduce all sorts of evidence about the accused's personality and background that would not have been admissible in the earlier "trial" stage but that speak to the accused's blameworthiness. Sentencing in criminal cases may take account of mental illness, a difficult childhood, or other factors that might not have been considered relevant when determining guilt but that could persuade the court to be lenient or harsh. Although sentencing does provide this opportunity for modulating punishment, it is important to bear in mind that courts are often significantly constrained by sentencing guidelines, which can dictate, for instance, minimum jail terms for specific crimes.¹²

Neuroimaging's Impact on Responsibility: General Issues

What impact, if any, should neuroimaging, and fMRI in particular, have on our beliefs about responsibility and our practices of holding people morally and legally responsible? Does neuroimaging pose new challenges to the compatibilist views that have predominated in moral and legal thinking for the past fifty years? Might the capacity to observe the brain processes of people through neuroimaging tempt us to adopt a more objective attitude toward them and ourselves? That is, instead of seeing each other as subjects who choose to act and are therefore rightly held responsible for the consequences of our actions, will we come to see human beings as objects upon whom the forces of nature act?

If this understanding of persons were just an occasional temptation, it would not be cause for much concern, any more than a myriad of other events or circumstances that

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invite us to step back from our participant stance. But there are concerns that neuroimaging will have a more enduring or profound effect on our reactive attitudes, that it will become difficult if not impossible for us to ever maintain a participant stance—to ever see ourselves as subjects with control over our actions—by giving us dramatic visual evidence of the biological mechanisms underlying our decisions and behavior. One casualty of this new way of seeing ourselves could be the very notion of responsibility.

In the remaining analysis, we address these questions. As we do, it is helpful to bear in mind the difference between claims about the impact that neuroimaging *ought* to have on our beliefs and practices and the impact it is *likely* to have—between prescriptive or normative claims, on the one hand, and predictive or empirical ones, on the other.¹³ We should also note that we will construe “neuroimaging” broadly, to include not only visual displays and other indicators of brain structure and activity but also the inferences about brain function that are drawn from them.

Neuroimaging Research Relevant to Responsibility

To date, two kinds of studies have been thought especially relevant to our beliefs and practices concerning responsibility—studies that enable us to visualize decision-making processes as they take place in or between different parts of the brain and studies that seek to reveal the timing of various aspects of the decision-making processes in the brain. There is a great deal of debate about whether research in these two areas can or should have a significant impact on how we understand and assign responsibility.

Research that visualizes decision-making activity in the brain. Some scholars have called the brain a causal “bottleneck.”¹⁴ All the genetic, perinatal, and various environmental forces that affect judgment and behavior do so through their effects on the brain. In depicting some of those effects—in showing us some of what is happening in the brain when we make decisions—neuroimaging can graphically illustrate these converging forces and forcefully suggest the truth of determinism.

According to this line of argument, it is all well and good to talk about determinism, but if you can *show* it, people will no longer be able to hold onto ideas that are incompatible with it, like (according to these scholars) free will and,

indeed, responsibility. Neuroimages show that behavior is caused and so will leave no room for a “self” or its mental processes to play a causal role. As a result, we will no longer be able to maintain our current understanding of moral responsibility, and we will no longer be able to use the law to punish people because they “deserve it.”

This is the argument made by Joshua Greene and Jonathan Cohen in an influential and controversial article published in 2004. Greene and Cohen argue that although the law does not rely for its validity on mind-brain dualism, or on the notion that most individuals have free will, our intuitive sense of justice, and therefore our willingness to support the law, does rely on these ideas. In their words, “new neuroscience will undermine people’s common sense, libertarian conception of free will and the retributivist thinking that depends on it, both of which have heretofore been shielded by the inaccessibility of sophisticated thinking about the mind and its neural basis.”¹⁵ When neuroscience—and particularly neuroimaging—illustrates the truth of determinism, they argue, the public will be forced to completely abandon its retributivist understanding of the criminal law because that idea relies on a demanding (“libertarian”) conception of free will, which is not supported by neuroscience. That is, we will have to give up the idea that the law punishes people who deserve to be punished for the acts or omissions they freely choose to undertake. In fact, according to their interpretation, neuroscience shows that free will is an illusion.

The criminal law will still be justifiable, in this account, but only on entirely consequentialist grounds. According to Greene and Cohen, we can justifiably impose restraints like prison time on people because doing so reduces bad consequences, like the commission of further crimes, and increases good consequences, like a sense of security and public trust. But we cannot punish people because they deserve it—this idea, in their view, makes no sense.

It is clear from their paper that Greene and Cohen think that neuroimages not only *will* cause people to abandon many of their ideas about moral and legal responsibility but that they *should* cause everyone to do so. Yet according to their logic, neuroscience’s illustrations of determinism will (and should) subvert our basic notions of responsibility only if our notions are libertarian or incompatibilist to begin with. As we discuss below, however, some other philosophers deny this, claiming that in most contexts, laypeople

are compatibilists (as described by Strawson), who will and should be unswayed by graphic evidence of determinism.

Research on the timing of decision-making activity in the brain.

If the familiar determinist claim, that our intentions are part of a predetermined causal sequence, is threatening to our sense of ourselves as free, then the more radical idea that our intentions might play no causal role in our actions is more threatening still. Suggestive evidence that intentions lack a role in some apparently voluntary actions has come from research on the timing of brain activity. This research has raised questions about whether conscious intentions and decisions are merely “epiphenomena” of brain activity—side effects of the causal processes that yield decisions and actions to which they make no causal contribution.

This possibility was first suggested by a series of experiments performed by Benjamin Libet in the 1980s.¹⁶ In these studies, subjects wearing electroencephalogram (EEG) leads on their scalps were seated in front of a timer. They were asked to do a simple motor action—like pressing a button or flexing a finger—at whatever moment they wished and then to note the exact time when they formed the intention to perform this simple action. It turned out that subjects reported forming the intention to do the action well after the EEG detected occurrence of a neural event that was known, from previous research, always to precede the onset of such motor actions. Libet interpreted his studies as showing that “the brain ‘decided’ to initiate or, at least, to prepare to initiate, the act before there is any reportable subjective awareness that such a decision has taken place.”¹⁷

This finding, which has been frequently replicated, was seen by Libet and others as assigning conscious states and processes an even more passive, epiphenomenal role than they are assigned in standard compatibilist accounts.¹⁸ In those accounts, decisions and intentions are brought about by a variety of mental and physical causal factors. But once caused, those decisions or intentions—or their neural realizations—are themselves the cause of the resulting actions. Libet’s experiments appear to relegate conscious decisions and intentions to a spectator’s role. Although subjects believe that they are reporting the moment when they formed the intention to act, what they are actually reporting is the moment when they become aware of a causal sequence that was already in motion, a sequence that did not include any intention or decision on their part. Moral and legal responsibility become incoherent in the face of this fact, Libet argued.¹⁹

Philosophers and psychologists have responded to Libet’s challenge in a number of ways. Some deny that the experiments show that subjects are not consciously initiating the requested actions. For instance, Alfred Mele has argued that those neural events that reliably precede the

reported intention to act should be interpreted as the urges or desires that often precede and influence decisions, and not as the intention- or decision-like states themselves.²⁰

Others claim that even if Libet’s experiments showed that subjects are not consciously initiating their actions, they wouldn’t challenge compatibilist accounts of free action. For instance, Owen Flanagan concedes that Libet’s subjects, and those performing similar tasks, may not truly decide when to perform the specific action requested, but then argues that the subjects nevertheless can be said to initiate those actions by virtue of earlier, more general decisions they make, for instance, to comply with the request to perform the action.²¹ That is, they make a conscious and deliberate decision to cooperate with the experiment, and then once the experiment is in progress, they almost unconsciously perform the action they know is required.

Other critics see Libet’s and similar experiments merely as demonstrating a highly context-specific illusion, no more threatening to our freedom of will than an optical illusion is to the accuracy of our vision.²² Several more recent experiments have attempted to counter these criticisms, for example, by showing that reported intentions lag behind a variety of neural events and for a variety of requested actions. The research of John Dylan Haynes and his colleagues has utilized neuroimaging to find even longer intervals between activations and reported decisions than Libet found. They employed a task requiring subjects to decide not only when to perform a simple action but also which of two simple actions to perform.²³ Although this research makes the case for “predetermination” stronger and more robust, it is certainly open to criticism that its findings are misinterpreted or inconclusive.²⁴

Because of the lack of an agreed-upon testing method, the variety of interpretations that any test results can receive, and the “essentially contested” nature of the concept of free will, it is doubtful that there could ever be a critical experiment proving or disproving that the causal pathways leading up to the requested act in Libet-type tasks completely bypass conscious mental states.²⁵ Nevertheless, it is not unreasonable to think that our experience of and belief in agency might be threatened by Libet’s claim that our intentions, desires, and beliefs do not play a causal role at all in our actions—that they are mere side effects of the neural processes that produce those actions—and by experiments purporting to prove Libet correct. We experience ourselves as causing our own actions through our intentions, desires, and beliefs, and any claim that these mental states are inert side effects of neural processes we are not aware of makes consciousness of agency look like an “afterthought”²⁶ and our perceptions of agency look delusional.²⁷ In these ways, epiphenomenalism poses a greater threat to lay notions of agency than determinism alone, which can assign a causal

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role to our intentions, desires, and beliefs, just not the ultimate causal role.

Will Neuroscience Change Minds?

We don't yet know the impact that the kind of neuroscience research described above might have if it were widely encountered. Green and Cohen clearly expect neuroimaging to have a deeper impact on the general public than on moral philosophers. They are not claiming that philosophers who have spent their careers defending versions of compatibilism will see the error of their ways when faced with a graphic illustration of neural mechanisms. They're claiming that "the folk" were never compatibilists and so will be deeply affected if they no longer have a place "to pin their dualist and libertarian intuitions."²⁸ Other philosophers maintain that laypeople are basically compatibilist and that their implicit beliefs will not be challenged by evidence of determinism but only by evidence of Libet-type conscious "bypass."²⁹

These conflicting claims have spawned considerable empirical research into what "the folk" think. Some of that research suggests a complex picture in which people are compatibilist in some contexts and incompatibilist in others:

People are more likely to be compatibilist (more likely to see human action both as caused by outside forces and as the responsibility of the actor), when the scenario to which they are asked to react is concrete rather than abstract, especially when the concrete scenario includes details likely to elicit an emotional response. In a series of experiments with undergraduate students, Shaun Nichols and Joshua Knobe described a deterministic universe in which "everything that happens is completely caused by whatever happened before it." They then asked some students whether, in such a universe, it is possible for people to be fully morally responsible for their actions. They asked other students to envision a man in this universe, Bill, who kills his family in order to have an affair with his secretary, and asked them whether Bill would be morally responsible for his actions. The students were far more likely to ascribe responsibility when the description of determinism used a concrete and emotionally charged example than when it was merely an abstract description.³⁰

People are more compatibilist, again, when determinism is distinguished from "bypassing" and the latter is rejected. It is easier to continue to ascribe some responsibility in a deterministic universe in which people's beliefs, desires, and decisions are part of the causal chain culminating in their actions, even though those mental states are themselves fully caused, than in a deterministic universe in which people's beliefs, desires, and decisions are said to have no causal role (the universe suggested by the Libet experiments).³¹

People incline more easily toward incompatibilism when thinking about imaginary worlds than when thinking about the real world. Roskies and Nichols asked undergraduate students with no prior knowledge of the idea of determinism whether they thought moral responsibility made sense either in an alternative universe in which determinism is true or in our universe but with the stipulation that determinism is true. They found that intuitions about responsibility are hard to shake. Even though the students were told to assume that determinism is true in both universes—ours and the alternative one—they were more inclined to hold actors accountable in our universe and more likely to excuse actors in the other. Based on this finding, they concluded that "the intuition that we are in fact morally responsible is a nonnegotiable intuition."³²

At least when laypeople are judging very harmful or otherwise significant concrete actions, evidence of causal determinism will apparently not dissuade them from attributing responsibility. They will either become compatibilists (if they weren't already) to preserve moral responsibility, or they will tolerate massive inconsistency between their continuing practice of attributing responsibility and their belief in determinism.

Despite these studies, it is unclear whether we should regard Strawson's denial that we could abandon our reactive attitudes as an empirical or a normative claim. A Strawsonian could conceivably hold that even if we are able to give up our reactive attitudes in the face of overwhelming and pervasive evidence of determinism, we should not do so, because in the process we would lose our human social lives and our very humanity. But perhaps we can, contra Strawson, learn to live social lives without assigning moral responsibility, and without our reactive attitudes of blaming and praising. Some incompatibilists have denied both the psychological impossibility and the dire conse-

quences of rejecting moral responsibility and adopting a comprehensively objective attitude toward our fellow human beings. They argue that we can express disapproval, repugnance, sadness, and regret, as well as act to prevent future harms, without blaming and that attitudes like these, which do not presuppose responsibility, may be adequate to sustain our personal relationships, our social lives, and even our legal system.³³

The Uncertain Impact of Brain Visualization: Three Possibilities

As noted, experimental philosophers have explored many factors in probing what they take to be the incompatibilism of “the folk.” They have varied the abstractness or concreteness of the description of the causes and consequences, the magnitude of the harm or wrong, the language in which determinism is described, and whether determinism is described as holding in our world or in an alternative one. But there has been little research on the impact of actually visualizing the brain activity associated with decisions and actions—the impact that neuroimages themselves might have—on responsibility ascription. The only evidence is a study finding that merely telling people that harmful conduct was due to a brain dysfunction rather than a psychological disorder does not affect their judgments of responsibility.³⁴ The question remains, though, whether seeing the physical process of brain activity may do so, in either the short or long term.

Watching our brains at work is unlikely to provide any additional evidence of determinism. It would require an inferential leap to claim that visual evidence of brain activity shows causation of, rather than mere correlation with, mental states or actions, let alone that it shows the causal determination of those mental states or actions. Yet the images are compelling, and they are seemingly open to deterministic interpretation by anyone who sees them (compare a neuroimage with a genome scan, which is very difficult for a lay person to begin to understand). Conceivably, images of brain activity might help convince people of the truth of determinism even if they cannot actually offer any new evidence of it, and it would be fascinating to explore this question.

Historically, imaging technologies have been expected or feared to have a radical impact on beliefs, practices, or values, from the threat to privacy posed by x-rays and body-scanners to the psychological and normative separation of mother and fetus supposedly brought about by ultrasound.³⁵ In fact, such technologies are often not as disruptive as first thought. Yet because neuroimaging allows us to visualize the part of our bodies most central to our identities and sense of self, it might be expected to have a greater impact. We can speculate about three possibilities:

- The impact of visualizing the brain in action might be to eliminate our belief in agency and responsibility—as Greene and Cohen suggest. Regular exposure to images representing the brain at work in conscious activity could strengthen the impression of mechanism, challenging lay beliefs in agency and free will more effectively than earlier theoretical claims of determinism alone.

- On the other extreme, regular exposure may cause us to become inured to brain images, as we have become inured to x-rays, without changing our beliefs or attitudes about moral responsibility one iota. Predictions of radical conceptual change in the face of neuroimaging may prove to be as exaggerated as predictions of radical social and cultural change in the face of x-rays.³⁶

- Perhaps more likely than either extreme, we might incorporate the information shown in neuroimages into our overall understanding of ourselves in less radical but more complex ways (ways perhaps frustrating to philosophers and neuroscientists). Indeed, we think it plausible that findings from neuroimaging may both preserve and erode our beliefs in our freedom and responsibility as agents, causing us to sometimes modify and refine our existing excuses and exemptions in ways that demand more or less responsibility from various actors in various circumstances.

In the next section, we will present several examples of part of this third possibility—possible modifications and refinements to concepts of moral and legal responsibility that neuroimaging research might support that result in individuals being held less responsible than they are today. Here we mention two reasons that, in some contexts, neuroimaging research might actually preserve or enhance our sense of agency rather than diminish it.

First, visualizing the neural processes that accompany mental activity may help us learn to exercise greater control over those processes, thereby increasing our confidence in our freedom of will rather than diminishing it. There is suggestive evidence that neurofeedback can facilitate the self-regulation of brain activity. For example, a number of studies have investigated the use of neurofeedback as a therapy for attention deficit–hyperactivity disorder as well as pain management.³⁷ If this field grows in prominence, the idea that we are passive spectators to our own brain activity may be offset by the discovery that we can directly control that activity in ways we never previously thought possible. Such self-regulation may restore or even reinforce our sense of agency.

Second, even when the message from the research is that determinism is true, the language used by researchers and others reporting the research implies a preservation of agency. For example, a sentence like “The amygdala feels fear, which it conveys to the prefrontal cortex, but the cortex decides that fear is not warranted” seems to multiply agency rather than eliminate it. Although it could be claimed that

“My brain made me do it” merely seems to substitute a claim of coercion for a claim of mechanism. Yet even this kind of dualistic sentence implies a “me” and a brain, even if the brain is sometimes in control.

language evoking homunculi—little persons in the brain—is used only for ease of communication and not because the user thinks that brain regions have conscious agency, it nonetheless suggests a “conservation of agency.” Perhaps neuroimages will not dissuade laypeople from attributing agency but will instead shift its locus—from the mind or the subject to the brain or its components. Admittedly, this language may undermine rather than reinforce our sense of freedom and responsibility. Seeing my brain, or a part of my brain, as a separate agent may be a way of denying, not affirming, responsibility. “My brain made me do it” merely seems to substitute a claim of coercion for a claim of mechanism. Yet even this kind of dualistic sentence implies a “me” and a brain, even if the brain is sometimes in control.

The “Incorporate and Modify” Approach

It seems likely to us that visualizing the brain in action—and specifically comparing the brains of different persons—could, and in some cases should—lead us not to wholly abandon free will or the ascription of responsibility but to modify current practices in ways that better acknowledge the limitations on decision-making capacity in various individuals. We already expect more or less responsibility from different kinds of people—think of the baby knocking over the glass of water. Perhaps neuroimages—and advances in neuroscience generally—will broaden and deepen our appreciation of the limitations that certain people experience when making certain kinds of decisions. We have already noticed that neuroimages can be very compelling, so perhaps they will help us to appreciate, even more fully than we do today, both that no one has completely free will, even in compatibilist terms, and that some people’s ability to control their actions and make decisions is more compromised than others. Here are a few examples:

Late adolescence and early adulthood. There is wide historical variation and flux in the compromises that have been struck over the responsibility of children and adolescents, and this may be an area in which neuroscientific evidence could have a significant impact. As Jeff Blustein states, “[C]ertain features of the developmental period of adolescence—poor impulse control and confusion over identity—strongly suggest that adolescents in general are not as responsible as adults.”³⁸

The adoption of eighteen or twenty-one as the age of “majority” for different purposes suggests that the development of the capacity to make important decisions—and perhaps also brain development in general—is largely complete in that age range. But neuroscientific evidence suggests that it isn’t. Research published in the past fifteen years actually places the time of full brain maturation at around twenty-five years of age.³⁹

It isn’t just that brain maturity takes longer than previously thought but that it is also context-dependent. Research shows that certain stages of development—in particular, adolescence—are characterized by a marked lack of the specific abilities required for good decision-making under pressure. A recent review article found “evidence from empirical studies that adolescents are more likely than children and adults to make risky decisions in ‘hot’ contexts, where emotions are at stake or peers are present and social cognition is involved.”⁴⁰ As one science journalist put it, “Some are predicting those findings have the potential to redefine the meaning not only of adolescence but of adulthood too.”⁴¹ For the purposes of establishing legal responsibility, these findings raise the question of whether children and adolescents (and even what we might call young adults) should be held to the same standards of legal liability as adults, especially in situations in which we know they struggle to assess risks.⁴²

Questions about the responsibility of late adolescents came into the spotlight in 2004 when the U.S. Supreme Court heard argument about whether execution of prisoners who had committed their crimes when they were sixteen or seventeen years old was unconstitutional. The Court had already ruled in 1988 that execution of offenders who were under sixteen when they committed their crimes amounted to “cruel and unusual punishment,”⁴³ and now it was being asked whether the same is true for sixteen- and seventeen-year-olds. Among the briefs filed in the case was one from the American Medical Association, which cited numerous neuroscience studies, including studies using neuroimages, showing that adolescent brains are more active than adult brains in regions related to aggression, anger, and fear and less active in regions related to impulse control, risk assessment, and moral reasoning.⁴⁴ It was not clear, however, whether this evidence was persuasive to the Court. While it ruled in 2005 that execution of

prisoners who committed murder at this age was indeed unconstitutional, neuroscientific evidence was not explicitly cited in its judgment (in fact, the word “brain” does not appear anywhere in the judgment). The Court did note, however, that “as any parent knows and as the scientific and sociological studies respondent and his amici cite tend to confirm, “[a] lack of maturity and an underdeveloped sense of responsibility are found in youth more often than in adults and are more understandable among the young. These qualities often result in impetuous and ill-considered actions and decisions.”⁴⁵

Although *Roper v. Simmons* did not directly cite neurological evidence, its willingness to revise conventional age limits for criminal responsibility may suggest that those limits can be further revised in light of future scientific findings. An article in the *New York Times Magazine* reviewed the case for a distinct “post-adolescent, pre-adult” life stage, citing a welter of psychological, neurobiological, and sociological evidence and noting that adolescence only became a recognized life stage about a century ago.⁴⁶ Together with other data and analysis, neuroscience studies can be used to argue for this new category, to which we might, in turn, decide to attach particular expectations regarding responsibility.

Sudden causes of “out-of-character” actions. Neuroscience may offer supporting evidence that an action ought not be fully attributed to the agent by identifying discrete physical abnormalities—especially those of recent onset—that appear to play a significant causal role in behavior that would independently seem out of character, compulsive, or otherwise alien to the individual. This possibility is suggested by the case of tumor-associated pedophilia. A forty-year-old schoolteacher had never before shown sexual inclinations toward children, but the growth of a frontal-lobe tumor correlated with the onset of those desires. When the tumor was removed, the desires and inappropriate actions subsided, but when it grew back, they returned.⁴⁷

The appearance of a tumor at roughly the same time that the agent began to have pedophilic cravings, or the (hypothetical) discovery of a congenital abnormality in neural structure or wiring associated with kleptomania, would not necessarily show that the agent acted involuntarily, or under “irresistible impulse.” It might, however, help to establish that the agent acted on desires or impulses that were in some sense alien to him, that he did not identify with or endorse, that did not cohere with his character, and that imposed an onerous burden of self-control on him.⁴⁸

While in one interpretation, such discoveries act to free the agent from moral—and perhaps even legal—responsibility, their effect may in fact be double-edged from the offender’s perspective. If the brain abnormality is understood as removing an inhibition rather than implanting a

desire, its presence could be interpreted to mean that the desire was less alien than it at first appeared—that it was in fact present the whole time and arguably part of the agent’s character, even if he never endorsed or identified with it until now. Further, it is possible that evidence of brain disease or dysfunction could lead judges or juries to punish offenders more harshly—not because they think the offender is more blameworthy but because they think he is unable to change (that is, they might see him as having very little agency and being, essentially, immutably bad). If this happens, the same brain-based arguments that succeed in showing that the offender has diminished decision-making capacity and therefore ought to be understood as having diminished legal culpability might also be used at the sentencing phase to justify what amount to harsher punishments (in particular, longer detention). Of course, such a change might still be fairer, insofar as it acknowledges limits on decision-making capacity, even if it does not result in lighter sentences for offenders.

At the level of moral responsibility, cases like the pedophilic tumor raise a number of other questions. Is there a moral difference between the causal contribution of a tumor that implants desires and one that merely “disinhibits” the agent’s experience of them? Between a tumor of either type that is congenital and one that emerges in adulthood? Does the identification of the tumor just lend symbolic or metaphorical support to claims that the agent disavows and tries to resist these desires? We do not pretend to have the answers to such questions. We do think it plausible, though, that cases such as the pedophilic tumor (or any neuroscience studies showing something similar regarding the impact of brain abnormalities on decision-making) could have an impact on lay and possibly also judicial ideas about moral and legal responsibility.

Mental illness and other limitations on capacity to make good choices. On a related note, might neuroscience show us that many of the people we currently hold legally accountable are actually incapable of exercising the degree of control over their actions that we expect from them, even if this same research doesn’t cause us to abandon the notion of free will entirely? This is a question not about the basis of the moral and legal responsibility but about the way these ideas are applied in individual cases. We already acknowledge that some individuals (for example, minors and the floridly mentally ill) are not to be held to the same standards as others, including at law. But what if neuroscience shows us that many more people than we currently acknowledge are operating with impaired or compromised or immature decision-making capacity?

One response to this possibility is that the law and to some extent lay psychology have fairly minimal standards to begin with, and very few people will fall below those standards. Indeed, law professor Stephen Morse has argued

Even if neuroscience does not rule out free will entirely, could it show that many people now held legally accountable are actually incapable of exercising the degree of control expected from them?

that the law does not require that we always behave rationally but just that we “are capable of minimal rationality according to predominantly conventional, socially constructed standards.”⁴⁹ That is, the law sets the bar pretty low. At the stage of determining guilt or innocence, the law does not usually excuse those who fail to exercise this very low assumed level of capacity for choice. At the sentencing stage, abilities and limitations may be taken into account—but by then, guilt has already been determined, and what remains is to decide on punishment.

Morse is quite right that the law seems to have quite minimal standards, even for those with mental illnesses. Although the defense of insanity is available to all defendants and where successful provides a complete excuse from legal responsibility (one is “not guilty”), this defense is notoriously difficult to mount successfully, even for defendants experiencing psychosis.⁵⁰

That is the position of the law today—but many question whether it is fair to hold mentally ill persons to the same standards of conduct as the rest of us.⁵² We know that mental illness can have a dramatic effect on rationality, impulse control, and the ability to think through consequences and identify alternative responses. Currently, outside of the insanity defense and the defense of diminished responsibility (available in some jurisdictions and for some crimes only), the law usually ignores that knowledge when determining guilt, but is it right to do so? If neuroscience can increase our willingness to give full or partial exemptions to some individuals, might it also increase our willingness to recognize full or partial excuses for a much wider range?⁵²

In law, this acknowledgement could involve further developing the concept of diminished responsibility,⁵³ such that a defendant is understood to have had some but not complete responsibility for her actions, an understanding that will affect how much the defendant is punished and whether (and what) additional steps are taken to rehabilitate the defendant or prevent future wrongdoing. Such an adjustment would allow the law to better reflect what we know about just how free a person likely was at the time she committed the crime (or just how much ability a person likely had to choose otherwise or to reason her way to a noncriminal response) and to focus less on punishing offenders and more on rehabilitating them and preventing them from reoffending.

From Punishment to Prevention

The suggestion that notions of moral and legal responsibility could be modulated rather than discarded in the face of evidence from neuroscience about determinism may be unsatisfying to many, since it represents a partial change in beliefs where the evidence seems to demand a full revision. However, given the complex nature of our moral and legal systems, as well as their value to the ordering of society, it might be both a realistic suggestion and one that possesses its own logic. If you cannot discard a concept, then you should try to modify it, especially if doing so makes your society more compassionate and understanding. The idea is not novel. Beliefs and practices have in the past also been influenced by developments in science. For example, the belief that people with epilepsy were possessed by demons has been dispelled in large part as a result of educating the public about the biology of the disorder,⁵⁴ and beliefs about how and when the earth was created have been influenced (although admittedly not completely shaped) by scientific research into the origins of the universe.⁵⁵

This is not to suggest, however, that every atypical feature revealed by neuroimaging will or should be regarded as mitigating. First, as neuroscientists find, as they likely will, more and more structural and functional differences between the brains of violent and destructive individuals and the rest of us, those differences will be subject to conflicting interpretations. Some will see them as at least presumptively mitigating. Others will see them as irrelevant for responsibility, at least without a fuller causal story—it’s hardly surprising that we can find neurological differences between people disposed and not disposed to violent acts, they may say. Still others may see those differences as aggravating—either in deterrent terms, because they make the offenders appear hardwired and more likely to “recidivate,” or in retributive terms, because those differences provide “evidence” of bad character. At best, we think, neuroscience will be one factor leading to a more nuanced and compassionate understanding of destructive and antisocial behavior and perhaps thereby to finer gradations in moral or criminal responsibility or at least more options for dealing with offenders that recognize and perhaps try to address the various causes of their behavior.

The biggest threat to our taking seriously the idea that many who commit bad, even criminal acts, are less free,

less rational, less responsible, and less blameworthy than we have been thinking all along may be the following: if we take seriously that these individuals are impeded in nontrivial ways in their ability to make good choices and therefore don't *deserve* to be punished as harshly as they have been up until now, then what do we do with them? One answer is that we stop using the criminal justice system solely to levy punishment on wrongdoers and use it more to prevent subsequent harm from occurring. That is, we could take seriously the deterrence, prevention, and rehabilitation goals of criminal justice. Taking these goals seriously may require significant changes, including to the prison system, which will be hard to achieve. Nevertheless, reorienting our ideas about moral and legal responsibility to focus more on changing behavior to prevent future harm and less on exacting retribution could help reduce incarceration rates and improve mental health and well-being. If neuroimaging can help make that goal vivid, so much the better.

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