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On the Potential of Neuroscience: A Comment on Greene and Cohen's  
*For the Law, Neuroscience Changes Nothing and Everything*

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In a recent article, Joshua Greene and Jonathan Cohen add welcome voices to an emerging discussion about the place of neuroscience in law and social policy.<sup>1</sup> They argue convincingly that new data from the developing neurosciences will dramatically and helpfully change our legal system by forcing it to take cognizance of developments in our understanding of human capacities, a process that will move it and us away from our retributive urges and toward a more compassionate consequentialist form of punishment in the future. I agree with their empirical prediction: The more we learn about we actually function as human animals, the more we will tend to accommodate and partially (educationally) forgive those who suffer under these genuine (if non-pathological) functional deficiencies. On that we agree completely. Where we part ways is in our relative commitments to a kind of neuroscientific determinism or essentialism. I think their view of the future of neuroscience and its influence is overstated and, from a contemporary jurisprudential view, unnecessary to defend.

In my effort to both propagate their view and its dampen fervidness, I want to put the larger issues in a jurisprudential context. First, I set the stage by discussing the commitment of our legal system to compatibilism, which permits our jurisprudence to both accept the truth of determinism and insist on individual free will at the same time. Then I situate the Greene and Cohen article within the debate about free will and highlight the positive contribution it makes, namely, forecasting the potential shift away from retributivism and toward a greater understanding of our neurobiology and the distribution of capacities among “normal” individuals. Next, I discuss the path-breaking work of Benjamin Libet, who

has shown decisively that some of our freely-willed actions are preceded by neurobiological processing of which we are unaware. This work, and similar efforts, is central to the thesis, to which Greene and Cohen subscribe, that free will is an illusion – a trick our neural processors play on us (unwitting dupes). Finally, I suggest why their commitment to neurobiological determinism overstates the data and is unnecessary to fulfill their desire and mine that we move toward a less primitive theory of punishment and toward one that truly respects individual capacities.

## I

There is a deeply held presumption in Anglo-American jurisprudence according to which conduct is worthy of praise or blame only if it reflects an actor's intentions.<sup>2</sup> HAdam Smith, in his celebrated explanation of the "irregularity of the sentiments," begins by asserting that the judgments we make about moral accounting – conduct we judge as worthy of merit or demerit – seem to turn on three elements; (a) the actor's intention, (b) the *action* thereby produced, and (c) the unwelcome *consequences* that the action delivers.<sup>3</sup> Smith, like latter day subjectivists,<sup>4</sup> argues that elements (b) and (c) – actions and consequences – are logically unrelated to our assessments of blame (or praise).<sup>5</sup> The consequences, he asserts, are "indifferent either to praise or blame;" only the "intention or affection of the heart" should matter.<sup>6</sup> More recently, the late British scholar H. L. A. Hart proposed that we "[c]onsider the law not as a system of stimuli [but as] what might be termed a *choosing* system," designed to induce or deter certain conduct, "in which individuals can find out, in general terms at least, the costs they have to pay if they act in certain ways."<sup>7</sup> The basic point is that unless the actor whose conduct is under scrutiny "could have done otherwise," that is, unless we can (formally) conceive that he had the capacity, opportunity, and ability to

choose among options, then it is unfair to saddle him or her with either legal or moral responsibility.<sup>8</sup> From this conventional perspective in our jurisprudence, choice – both the capacity and opportunity to choose – is key.<sup>9</sup>

The existence of choice, at the level of metaphysics, presupposes a compatibilist view of free will, one in which we enjoy the freedom to effect alternative courses of action despite the existence of determinist forces;<sup>10</sup> that is to say, despite the belief that “for any given time, a complete statement of facts about that time, together with a complete statement of the laws of nature, entails every truth as to what happens after that time,”<sup>11</sup> individuals retain the freedom to choose. This position is essentially Kantian, although its roots are much older.<sup>12</sup> Kant distinguished between practical reasoning, which is the capacity to make the right decisions when we must, and theoretical reasoning, which permits us to forego the abstractions necessary to make an immediate decision and see the full universe from an “objective,” third-person perspective.<sup>13</sup> In the *Metaphysics of Morals*, for example, Kant writes that the “[f]reedom of the act of volitional Choice [pure reason] is its independence of being *determined* by sensuous impulses or stimuli.”<sup>14</sup> On a view of the world through such intuitive lenses, the reality of determinism is ever-present. Notwithstanding the ineradicability of nature, we rational human possess the power to choose: Kant asserted confidently that it is “just as impossible for the most subtle philosophy as the most common human reason to argue freedom away;” philosophy “must therefore assume that no true contradiction will be found between freedom and natural necessity in the very same human actions, for it cannot give up *the concept of nature any more than that of freedom.*”<sup>15</sup>

While the basic Kantian approach to the metaphysics of law and morality remains in place,<sup>16</sup> a debate viewed as oppositional continues to brew between devotees of choice and

those who favor character as grand explanations of moral philosophy and criminal jurisprudence. The debate is, on the view offered here, misdirected in many respects.<sup>17</sup> For example, at the elemental level of ontology – how we categorize our many expressions of “human-ness” – the dispute is fixed on a conception of the mind-body problem in which both choice and character are binary issues: One either can or cannot make good choices; that is, one acts or does not act within a scheme of shifting understandings of reasonableness, on the one hand;<sup>18</sup> and, on the other, one’s character either is or is not flawed. On the conventional view, every actor is deemed to be at least potentially liable for all “chosen” wrongdoing, absent “gross and verifiable” psychopathology.<sup>19</sup> The problem with this view is that it assumes the existence of a neurobiological on-off switch, a view that is not reflected in how we actually go about decision-making. Our decision-making is not an all-or-nothing phenomenon.

Among the problems engendered by the conventional, outdated approach is a moral psychology that generates a social and legal practice of blame attribution that eliminates serious discussion about the biography of the actor whose conduct aroused our ire in the first place.<sup>20</sup> Moreover, the all-or-nothing criterion of cognitive and volitional competency is measured against a minimalist measure that makes the tests of capacity practically meaningless.<sup>21</sup> Contemporary legal doctrine need not and should not be explained in an either-or fashion, as Greene and Cohen realize: These aren’t questions of choosing or not choosing, of having good character or not. Much like political decision-making strategies that refuse to recognize the existence of nuance, the settled view is not merely mistaken descriptions of human behavior. Worse, it tends to neglect relevant data from reliable normative sources that lie outside this very conservative paradigm.<sup>22</sup>

## II

I have suggested elsewhere that the traditional view of the intentionality of wrongdoing is neurobiologically naive.<sup>23</sup> In their article, Greene and Cohen conclude that the normative jurisprudential component of law can accommodate emerging scientific knowledge that will effect changes to our moral intuitions – to our folk psychological beliefs about blameworthiness, for example.<sup>24</sup> In fact, as they well understand, our legal system has always accommodated such changes and is doing so presently.<sup>25</sup> In this regard, Greene and Cohen rightly gauge that those who predict that neuroscientific discoveries will effect no major changes in law are half right.<sup>26</sup> The jurisprudential component of our law is incredibly rich; it is capable of embracing nuances of semantics and moral theory along with epistemology, theology and social and economic developments.<sup>27</sup> Greene and Cohen are also on point when they write that this movement should, over some period of time, shift us away from retribution toward a compassionate consequentialism, which by its nature calculates the benefits of new scientific knowledge. (Hence legislators purport to use some version of aggregate utility routinely.<sup>28</sup>) As we learn more about the standard distribution of normatively preferred cognitive and volitional capacities, with the understanding that some members of society not *now* deemed grossly psychopathologically deficient are nonetheless incapable of meeting our standards, we will soften our approach to punishment. My disagreement with their ideas then is small but it bears directly on any discussion about neurobiological essentialism, a position that is not scientifically warranted and, in my view, politically exceptionable, at least until such a warrant arrives, if it ever does.

My concern stems from a biological claim they make for which we simply do not have sufficient data. This disquiet arises from their “fantastical” description of a future reality

made possible by neuroscience. Greene and Cohen imagine an internal mental struggle over a mundane choice, “Do I want soup or a salad for lunch today?” They hypothesize a neuronal convergence (what they call a “tipping-point moment”) at which point experts will be able to isolate the precise neural circuits in conflict, color code them for inspection by means of a future, readily available incarnation of *fmri*,<sup>29</sup> and then map the precise millisecond that corresponds to our articulated choice. That tipping point moment, they assert, is the cause of the choice we make. In their storytelling, the blue-dyed neurons defeat the red-dyed neurons and cause this imaginary person to choose A over B, salad over soup. Because our neurons forced the choice, and because the reigning commitment to compatibilism insists on a choice to do otherwise as a necessary condition for a quantum of autonomy and rationality sufficient to attribute fault, there can be no blameworthiness.<sup>30</sup> Determinism wins.

This outlook on potential developments gives too much ground to a view of science that instantiates a radically disengaged materialism, a neurobiological essentialism according to which everything – *everything* – is neurobiologically determined. From this perspective, free will is illusory – a creature of our neurobiological processes. How we might govern ourselves under such a regime is obviously problematic; and the politics of such a forlorn occasion, in which only the scientific elect are in the know, are sufficiently chilling that I cannot join them, at least until the data say that I must. And the data don’t now say that I must. The available neurobiological research data permit this viewpoint but they do not require it.<sup>31</sup> What they have done, I think, is an example of post hoc reasoning, which contains an enticing kernel of truth. I have a different view of our future social epistemology than they,<sup>32</sup> and I think we can and will corral this unnecessary essentialist tendency.

Their mistake is one of reasoning from a proposed real time neuronal snapshot backwards (yes, backwards) to a causal explanation. As I explain in some detail in the next section, our neuronal processing doesn't work as quickly as they hypothesize; there is always going to be a gap between neuronal processing and action. But before I reach that point, let set the table a bit further by putting this quarrel into the narrower jurisprudential context of punishment theory, which they describe accurately.

The authors are on solid ground when they predict that the important question we do and should ask as we make judgments about the blameworthiness of others is not the simplistic question—“Is he rational?”—although many remain wedded to this settled view.<sup>33</sup>

As I suggested earlier, this question has little meaning under the current descriptions of what constitutes competency, namely, the ability to effect a simple syllogism.<sup>34</sup> Rather, the important question is the one that Alan Gibbard asks. It's not a simple question of “Who did this?” Rather, to avoid the non-productive glee that follows retribution—“Who did it so we can heap scorn on him as the target of our ire?”<sup>35</sup>—it includes crucial biographical elements: “Who is the *person* who did this?”

Here the contrast between the agenda of retributivists and that of utilitarian pragmatists is quite clear. Retributivists of all stripes are interested in answering only one question: “Is he a criminal who deserves what he asked for?”<sup>36</sup> This primitive question embodies an untenable view of the composition of cognitive and volitional competency. (And on its own terms, it assumes that we can make even reasonably determinate allocations of fault based on “deserved” punishment.<sup>37</sup>) Instead, in every case of wrongdoing the pragmatists asks more elucidating questions up front: “What combination of genetic and environmental factors came together such that this wrongdoer has become what he is now?”

How did he get here?” “What can we do to make things better for him and us?” As Greene and Cohen note, the “he” in this question deserves our compassion even if, as necessary, we segregate him from society. These richer more hopeful and merciful questions recognize implicitly that each of us is in fact the product of the singular mixture of genes and environment that determines who we are. And when we recognize and accept this as a humane social policy for the entire body politic, we cannot help but realize that “There but for the grace of God go I.”<sup>38</sup> Compassion follows.

On a neurobiological view of humankind, each of us is literally a work-in-progress, so that *who* the actor is at any moment in time, and the choices he or she then *can* effect, depend on the actual circumstances and experiences he or she encounters. The neurologist Antonio Damasio makes this point:

[A]s we develop from infancy to adulthood, the design of the brain circuitries that represent our evolving body and its interaction with the world seem to depend on the activities in which the organism engages, and on the action of the innate bioregulatory circuitries, *as the latter react to such activities*.<sup>39</sup>

What is it that causes some genes to switch other genes (and our unique neurobiological responses thereto) on or off? Put simply but with complete accuracy, the environment: that is, all the unique, non-genetic experiences each individual encounters.<sup>40</sup> Experiences, as they trigger genetic and then neurobiological responses, produce who we are, and they act to bring about every one of our individual motivational sets: how we act in the many and various situations we encounter. Our unique motivational sets (or states) include (at least) our “desires, evaluations, attitudes, projects, and so on:”<sup>41</sup> what philosophers refer to as “intentionality.”<sup>42</sup> The question facing law is how this genetic and neurobiological data effectuates a new normative view.

### III

In Greene and Cohen’s envisaging of neurobiology’s future, we will some day close the gap completely between neuronal firing, the “tipping point moment,” and action. When we do, we will achieve a complete neurobiological explanation of the relationship between material cause and observed effect. At this point, they overstate the data in favor of hard determinism.<sup>43</sup> On their view, neuroscience, as a factor in our social epistemology – those “common sense” everyday thoughts we take as given, will push ever outward toward pure mechanism or determinism. Perhaps, but that conclusion simply is not clear, and in the absence of clarity those of us who are as committed as they to a more compassionate model of human behavior and punishment theory should not encourage it. An alternative view, which comports with neuroscience, confesses the limitations on our understanding of free actions but suggests that some of us, by virtue of our own actual environments, may be freer than others.

What I develop next, however, is the case favoring their hard deterministic view, beginning with the unique work of Benjamin Libet and those whose work seems to support a hard deterministic explanation of human behavior. I conclude that the data do not support this view. In the last section, I propose an alternative view that advances compassion in punishment, and is consistent with what we know about evolutionary theory.

Libet’s work provides support for a hard-determinist position, according to which all of our behavior is neurobiologically determined; we have no free will. (Libet, ironically perhaps, rejects this view, as I explain shortly.) Greene and Cohen stake out a hard determinist view. Libet’s ingenious work divides heuristically into two parts. The first addresses the neurobiological composition of apparently freely-willed motor actions, the

second puts a clock on our subjective perceptions of free will. Both issues speak to staples of our folk psychology and the legal culture we base thereon, where both free will and our perceptions of free will are assumed to be consistent with Kantian compatibilist theory. Although both assumptions need revision because our biology won't permit certainty, the data don't yet permit the leap to hard determinism.

A. Freely willed actions.

Our intuition tells us that voluntary actions follow a certain pattern and a necessary timing sequence. Our conventional folk psychology tells us that the progression from preliminary cognition to voluntary action follows a minimally instrumental conception of rationality: (i) ***Desire*** + (ii) ***Belief*** → (iii) ***Action***. In fact, our neurobiology is far more attenuated. It can be segmented into at least five conceptual steps (and doubtless more).

It runs as follows:

(i) *Desire*: From somewhere, a conscious intention arises, for example, a desire to obtain food or money or good works; “I *want* X.”

(ii) *Desirable passion* (an occurrent psychological state): We experience some sort of favorable or pro-mental representation plus a corresponding desirable or pro-preparatory state; together these states engage us in further thoughts about what conduct we *should* engage in to reach the *desired* end. (From a pragmatic view, we distinguish between the desirable and the desired.<sup>44</sup>) In technical terms, these patterns are culled from neuronal groups mapped on our cortical laminae in memory/knowledge sites that ordinarily produce a belief: It begins with the thought, “I *know* how to get it.”

(iii) *Beliefcenters activated* (value centers triggered): At some point we move from desire to action, although how we do so – how we sustain a desired action over time – is beyond current knowledge; hence it marks one of the gaps in time/intentions that current neurobiology cannot answer. Next an internal mental event occurs (millions or billions of neurons firing) that reflects our belief about how to obtain it; signals are sent to some part (or parts) of our neurobiological anatomy, our hedonic centers, and then to the periphery – our hands, our legs, our fingers, and so on).

(iv) *Belief engaged*: The commands sent to our hedonic and motor (value) centers, which are now fully involved.

(v) *Act (and will)*: The commands for movement are sent from our internal images and plans and set our hands or legs or fingers in motion.<sup>45</sup>

From this complex sequence, the conventional wisdom finds a simple, practical syllogism that explains “free will.” From this naive perspective, free will is executed when the conscious *I* decides it commences, and not before. *I* am in control: “*I* desire (or not) to reach a goal, *I* believe based on accessible knowledge, *I* act based on my choice.”<sup>46</sup> No one doubts that “we experience something like will. The *experience* is not the question; the question is: what does this experience entail?”<sup>47</sup> There is also no doubt that even the five-part attenuated scheme I’ve drafted has huge gaps in it. Libet’s work tells us it doesn’t operate the way we intuit it; it doesn’t tell us, however, how it does work.

The questions raised are many and are particularly important for substantive criminal law: Who is the *I* whose agential capacities we suppose and celebrate? And if he’s not (always) the volitional *I* of our simple intuitions, what are we to make of this state of affairs? Does one “choose” criminal activity and, if so, how did he get to the choice as a means of satisfying a hedonic desire? Why not honest conduct? When is the will engaged? And, most importantly for now, what changes to our default expectations should we consider in light of this new state of affairs?

Libet’s interest in consciousness and volition apparently began fortuitously as he watched neurosurgeons operating on epilepsy patients nearly a half century ago.<sup>48</sup> Conventional neurosurgical procedures often required surgical stimulation of areas of the brain while the patients were awake and under local anaesthesia; this technique helped surgeons figure out which areas of the brain were damaged and which were not. Libet’s

genius was at least in part in recognizing fairly quickly that these procedures presented an opportunity to ask a fascinating question: How much time transpires between the onset of the cortical stimulation and our articulable conscious awareness of that stimulation?<sup>49</sup> Libet found that subjects reported awareness of a stimulus roughly 1/2 second *after* its onset.<sup>50</sup> We process the world.

His curiosity piqued, Libet asked a second question: Do the phenomena we perceive as a “voluntary” begin with a conscious determination to act? His interest was shared with others. By the mid-1960s, Libet was familiar with the work of two European neurologists who had discovered that an electrical change in the scalp – a “readiness potential” or “RP” – precedes the performance of “self-paced’ voluntary acts” by up to one full second.<sup>51</sup> In a series of observations and experiments that continue to this day, Libet and his research group have tested this finding. For example, they gave instructions to their subjects that readers can follow and implement if they wish ( a process any reader of this manuscript can fairly easily accomplish):

Hold out your arm in front of you. Whenever you feel like it, of your own free will, flex your wrist. Repeat this . . . [40 times in his experimental regimen], making sure you do it as consciously as you can. You’ll probably experience some kind of decision process, in which you hold back from doing anything and then decide to act.<sup>52</sup>

In a word, Libet instructed his subjects to flex their wrists “freely and capriciously” whenever they felt the urge. Libet theorized that the brain began processes that we view as volitional acts before the muscles actually moved. He wanted to answer the following question: “[W]hen does the *conscious* wish or intention (to perform the act) appear?”<sup>53</sup> Recognizing that, according to the conventional view of (our intuitions about) free will, consciousness of an action should precede the command to the brain to perform an intended act, he

understood that if the conscious will *followed* the onset of this electrical charge – the RP – he would have to reevaluate his (and our) fundamental beliefs about free will.<sup>54</sup>

To test his hypothesis, Libet also asked subjects to report the time they first became aware of the urge to act. He used a “clock” whose dial was divided into 40 msec units.<sup>55</sup> Libet found that for each group of subjects run through 40 trials, the onset of cerebral activity *preceded* “voluntary” muscle movement by an average of 550 msec: Conscious, deliberate action began non-consciously. Of equal importance, Libet’s team discovered that their subjects first became *aware* of the wish to move their wrists about 350 msec later (that is, about 1/3 second *after* the onset of cerebral activity), and 200 msec before actual muscle movement began. (These figures remained consistent, moreover, even when the subjects reported some preplanning before the muscle movement.) Correcting for timing biases, the results indicated that the subjects’ brain processing, their RPs, began approximately 400 msec before the appearance of a conscious will to move, with an additional 150 msec elapsing between subjective awareness and palpable muscle contraction.<sup>56</sup> As Libet notes, the actual pre-awareness processing probably begins earlier in an unknown area that activates the supplementary motor area of the cerebral cortex.<sup>57</sup> In other words, the standard folk-psychological model, in which the mental processing of intention leads to and *must precede* the action it purports to direct, appears wrong! Volition begins, if it does not end, in the non-conscious mind. The figure below reveals the time line.

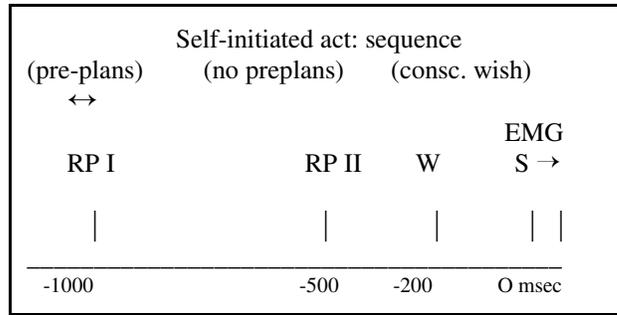


Diagram of sequence of events, cerebral and subjective, that precede a fully self-initiated voluntary act. Relative to 0 time, detected in the electromyogram (EMG) of the suddenly activated muscle, the readiness potential (RP) (an indicator of related cerebral neuronal activities) begins first, at about 1050 ms. when some preplanning is reported (RP I) or about 550 ms. with spontaneous acts lacking immediate pre-planning (RP II). Subjective awareness of the wish to move (W) appears at about 200 ms., some 350 ms. after onset of RP II; however, W does appear well before the act (EMG). Subjective timings reported for awareness of the randomly delivered S (skin) stimulus average about -50 ms. relative to the actual delivery.<sup>58</sup>

Note that there are three important time frames involved in this process: (a) the time between onset of RP II and movement (0 sec), (b) the time between onset of RP II and awareness of pending movement (W), and (c) the time between onset of awareness (W) and movement (o).<sup>59</sup> As the next section suggests, the subjective perception of awareness implicates another way in which neurobiology shakes confidence in our trusted intuitions.

B. Subjective perceptions – Libet and his research team also pursued a second project, closely related to the first: namely, the temporal lag in the subjective perception of the onset of discernible physical stimuli.<sup>60</sup> Based on his early observations of epilepsy surgery, Libet knew that it took roughly 500 milliseconds between the onset of direct cortical stimulation and the individual’s actual awareness of the stimulation. That is to say, patients reported a peripheral body sensation, an “evoked response,” about 1/2 second after stimulation had occurred.<sup>61</sup> Libet’s work suggested, however, that we tend to experience the onset of stimulation – say, touching a hot stove or stubbing your toe – well less than 1/2 second after its origin.

In contrast to the freely-willed movement condition, this research setting implicates two timing issues: (a) the time lapse between onset of stimulus and movement, and (b) the time lapse between stimulation and the subject's reported awareness thereof. Libet knew from earlier research that it takes approximately 20 msec for a stimulus on an individual's periphery (a burn or pin prick or stub of a toe, for instance) to reach the cortex; but then it takes the same 500 msec after processing the stimulus in the nervous system for the sensation to travel back to the stimulated periphery as a burn to the hand.<sup>62</sup> In fact, based on work with patients suffering from dyskinesia, a complex of involuntary movements related to Parkinson's disease,<sup>63</sup> Libet also found that we *believe* we are aware of the stimulation before the 1/2 second transpires. Libet's experimental design to test his hypothesis was elegantly simple. First, he applied a stimulus directly to the cortex, knowing that it took 1/2 second to generate an evoked response. Four hundred milliseconds after the onset of the cortical stimulus (one-tenth of a second before the subjects perceived the evoked response), he applied a single impulse on the periphery, in this case the skin. As he predicted, all of the subjects experienced the second skin stimulus *instead of* the cortical stimulus. In fact, despite the neurochemical and electrical processes involved, the subjects perceived *no* subjective delay between direct skin stimulation and response, despite measurable delays that "should have" produced an evoked response from the cortical stimulus.

What does this phantom reaction indicate? When one adds these experimental data to his work on freely willed movements, Libet's research suggests that our brain is not only at work *before* we're aware of it, but it seems to trick us into perceiving conscious participation in experiential processing only *after* the brain's work is done. What is clear is

that our brain doesn't "use the timing of its own firing to represent timing in the real world."<sup>64</sup> The disconnect between the onset of action and our perception thereof is evident and warranted. Michael Gazzaniga elaborates and summarizes:

Major events associated with mental processing go on, measurably so, in our brain before we are aware of them. At the same time these done deals do not leave us feeling we are only watching a movie of our life. Because of temporal referral mechanisms, we believe we are engaged in effecting these deals.<sup>65</sup>

Whether our belief in our own engagement is warranted is a distinct and, to date, unanswered question; nonetheless, the phenomena Libet describes exist. (It would also be terribly distracting, as Gazzaniga notes, if we were required to participate consciously in all of our cerebral processing. And we don't.) And if we cannot determine how to interpret the fact that consciousness begins in the non-conscious, and that we experience phantom reactions to stimuli, then what? What are our best practicable alternatives?

C. What it means. One can interpret Libet's findings in several ways, but even those who hope to reconcile the problematic nature of the timing of certain "volitional activities" with the conventional account of free will acknowledge the integrity of Libet's experimental results.<sup>66</sup> For example, the Brazilian neurologist Gilberto Gomes, a soft compatibilist, acknowledges that conscious actions begin non-consciously, a conclusion he reaches for three reasons. First, he notes, the time gap between the beginning of RPII and the onset of muscle contraction (approximately 500 msec) is well replicated. Second, he cites the fact that our conscious awareness of the act itself begins only *after* muscle contraction begins (or, at the earliest, he believes, *after* the last motor command directing muscle contraction occurs). The act and our awareness of it, in Gomes' reckoning, occur virtually (if not actually) simultaneously.<sup>67</sup> Third, he notes the fact that we lack awareness of the time gap

between the process that causes the act and the act itself, (or, with respect to “deliberated” acts, between the intention to “act now” – instantly – and the act.)<sup>68</sup> Thus, he concludes, “the onset of the RP cannot be the correlate of the conscious intention to act now . . . . [and] the first part of the RP manifests neural processes that are not reflected in conscious experience.”<sup>69</sup> In other words, what we experience and describe as an intentional act begins in non-conscious processes.

(i) Dualism’s death . . . again – Although there is wide variation among dualist ontologies, all share one basic doctrinal feature: the belief that “the essential nature of conscious intelligence resides in something *nonphysical*, in something forever beyond the range of science like physics, neurophysiology, and computer science.”<sup>70</sup> Conceived of as an impenetrable subjective *qualia* (a descriptively irreducible qualitative state like color), the argument for dualism is that our mind (our consciousness) subsists as a “separate, mysterious kind of phenomenon, distinct from material or physical reality.”<sup>71</sup> Why this might be so rests on two erroneous folk psychological assumptions: first, that consciousness and subjectivity cannot be products of the body,<sup>72</sup> and second, that if consciousness and choice are embodied, our actions must be the product of causal determinism, and thus are not our own.<sup>73</sup> Libet’s research challenges these intuitions, which rebel against the notion that our actions are determined exogenously. “Reason and choice seem as different from chance as from [external] causes.”<sup>74</sup> Dualism provides one way out of this dilemma by distinguishing between purely physical events and phenomenal events that connect with our minds. The dualist views the mind as independent of the body and thus capable of acting outside the limitations of causal determinism, a conclusion that seems to follow in part from the fact that we claim ownership only to that which we receive in our consciousness. On this

view, our thoughts seem to come from somewhere else. But where is that somewhere else?<sup>75</sup>

That notion of “somewhere else” produces obvious problems.<sup>76</sup> Libet’s research establishes that even “voluntary” actions begin in measurable but non-conscious neurobiological processes, perhaps in the fronto-basal ganglia.<sup>77</sup> In fact, “[b]y the time we think we know something – it is part of our consciousness – the brain has already done its work.”<sup>78</sup> That what we experience something as *voluntariness* that begins in the physical brain should come as no surprise. Where else *could* it come from? Psychiatrists, for example, have long known that schizophrenics report that actions to which they are subject not only occur outside their control, but seem to be controlled by foreign actors. Treated with neuroleptic drugs that effect the brain, however, many regain their sense of control.<sup>79</sup> We also know, of course, that the consumption of alcohol, the use of certain drugs, and the occurrence of head trauma effect the brain – facts that unquestionably underscore the idea that consciousness is associated with brain functions.<sup>80</sup> The unmistakable inference is that the brain controls voluntariness and not some mysterious unidentifiable outside force.

This conclusion is fortified morphologically by the absence of any single locus *within* the brain from which our intellectual functions emanate. The reasoning process does *not* occur in any single structure, what Daniel Dennett wryly dubbed the “Cartesian Theater,” which projects a unified picture in our mind before we act.<sup>81</sup> There is no single region in the brain in which this occurs.<sup>82</sup> Rather, to the extent that our mind appears to be a single integrated entity – to the extent that it “binds”<sup>83</sup> experience together – it apparently occurs due to “the concerted action of large-scale systems by synchronizing sets of neural activity in separate brain regions, in effect a trick of timing.”<sup>84</sup> No lurking Homunculus thinking about and organizing responses prior to their occurrence lurks inside or our brains, or

outside for that matter. What we have instead is a “perpetually re-created neurobiological state.” We don’t even store whole pictures of events, etc. as memories; memory is itself “selectional” in that it is “dynamically *generated* from the activity of certain selected . . . circuits” and, accordingly, is “reconstructive.”<sup>85</sup> Our brains, it turns out, are “a collection of systems . . . each with different functions.”<sup>86</sup> And each is affected by our unique environments.

(ii) Libet and volition – There are at least three approaches to Libet’s work, although they are not cabined neatly. One, an “illusionist’ view to which Greene and Cohen apparently subscribe, finds within evolutionary theory a plausible (but normatively unacceptable and unnecessary) explanation of the “illusion of the self” (where normativity clearly still has ample room for various expressions.) A second, an “evolutionary compatibilist” view, subdivides into a variety of positions running from the traditionally rationalist (and impressive) perspective of Gomes, to the even more traditional beliefs of Libet. Rationality, on these views, has adapted to its environment in rich fashion. A third assessment, which follows in the discussion of folk psychology, divides the issues, acknowledging that neither broad view is unassailable. It fully embraces the seriousness and difficulty of the questions asked and the challenge of those that remain. It asks a more pragmatic question instead: Notwithstanding the existence of unanswered questions,<sup>87</sup> what norms should we embrace in light of what we do know about the answers to these questions? The standards we adopt for testing the existing norms follow from observations about how we treat nature’s least fortunate among us, a process that provides some clues for a prescription that might permit all of us to carry on with as much chance for selectional and cultural mastery as one might reasonably hope for, all the premises considered.

(A) “The illusionist view” and the fictional nature of self – The most radical interpretation of Libet’s work posits the absence of a genuine, controlling self. The basic argument is set out by Michael Gazzaniga. Because awareness follows brain function, as Libet has shown, Gazzaniga argues, that we create the illusion of control; that is to say, we become aware of data after we have processed it and then adaptively trick ourselves into believing that we exercise control.<sup>88</sup> In this view, timing is everything. Two British neuroscientists, (mostly) consistently with Gazzaniga, recognize the adaptive usefulness of feeling responsible for our actions. They move beyond Libet’s research data (and anyone else’s, for that matter) to the conclusion that “all the thoughts, ideas, feelings, attitudes and beliefs traditionally considered to be the contents of consciousness are produced by unconscious processes – just like actions and perceptions.”<sup>89</sup> Consciousness, in this view, “occurs too late to affect the outcome of mental processes that it is apparently linked to.”<sup>90</sup> We are, in effect, duped into believing that we exercise volitional control.

There is a substantial body of research that provides some support for concluding that we lack a consciousness-non-consciousness bipolar switch that puts us into one condition when we sleep and another when we wake. In fact, the two states are remarkably complicated. For example, well rehearsed research on optical illusions implies that under some circumstances, the non-conscious mind is *not* fooled under circumstances in which the conscious mind is.<sup>91</sup> Work with split brain patients, those who have suffered a rupture between the left and right hemispheres of the brain such that they lose communication with each other,<sup>92</sup> indicates that some mental processing takes place of which we are unaware.<sup>93</sup> Howard Shevrin, for example, has followed up Libet’s work by measuring perceptual processing that occurs below the level of consciousness.<sup>94</sup> In a typical experiment, the

subjects are shown two visual stimuli for a period of time too brief to register in our conscious awareness. One picture has a meaningful content, such as a person holding a pen in his hand resting on a knee, and the second, although similar, is considerably more abstract. Although the subjects are unable to identify either image on follow up tests, the “meaningful” images produce far more brain wave activity than do the abstract images. These results suggest that the more identifiable stimulus effects more attention and mentation, even though the subjects are not consciously aware of any message.<sup>95</sup> (It seems that we learn even when the message is more contextual than advertent.<sup>96</sup>) To appreciate the force of this research, take a minute – *right now* – and ask yourself about the next thought in your mind or the next words that come out of your mouth or the next sentence that emerges from the end of your finger tips and becomes visible on the computer screen in front of you: Where did they come from? How did that lost thought or word become an immediate feature of your universe? In truth, we don’t know!

A second, more far-reaching but normatively plausible illusionist interpretation of Libet’s data (and others) comes from Professor Susan Blackmore. Building on a suggestion by Richard Dawkins in his book *THE SELFISH GENE*,<sup>97</sup> Blackmore has postulated a more social function for evolution, which rests on the idea of ubiquitous “memes.”<sup>98</sup> Blackmore moves from a position that seems at first more abstract than Gazzaniga’s. On this view, the basic idea of human evolution is *replication*: the human capacity for and proclivity to imitate our environment as a means of transmitting not just biological data in the form of genes but language and culture as well. She suggests that the basic Darwinian idea of selection applies to a “competition between memes [replicators, writ large] to get into human brains and be passed on again.”<sup>99</sup> Language in all its forms, including literature, music, religion, and so

on, as well as behavior reflected in child rearing, sexual conduct and the like: all begin in large part as imitation. Unlike our genetic progenitors, however, these ubiquitous memes contain “instructions for carrying out human behavior, stored in brains (or other objects) and passed on by imitation.”<sup>100</sup> In an article in the *NEW SCIENTIST*, Blackmore explains:

Memes are the ideas, skills, habits, stories, songs or inventions that are passed from person to person by imitation. They have shaped our minds, leading to the evolution of big brains and language because these serve to spread the memes. But the memes with the cleverest trick are those that persuade us that our ‘selves’ really exist.<sup>101</sup>

Blackmore’s cites Libet’s work in support of her theory that “[t]here is no separate self jumping into the synapses and starting things off. My brain doesn’t need me.”<sup>102</sup>

Such conclusions are radical, but they don’t undermine either the existence of something like free will or the normative value of *believing* we exercise free will, even if, on this understanding, the conscious *I* doesn’t do anything explicitly except tell me “what it is like to be me now.”<sup>103</sup> Consciousness and the experience of free will, Blackmore argues, provide us with a belief in “self-ness.” Blackmore surmises that “the illusion of continuity and separateness” play valuable roles in our lives.<sup>104</sup> This non-conscious processing “is responsible for creating and maintaining . . . consistent self-representation.” It provides a picture of us and our world which is necessary for survival. As she puts it, our mind “enabl[es] us to feel the need to take responsibility by inventing plausible explanations based on our biographical memory.”<sup>105</sup> Although I am far less clear than she about self-control, I agree that the self is an adaptive idea that permits us to occupy our own space within the community, which helps in planning and strategizing, and is especially useful with respect to our social interactions. “The individual can form a model of what it is like to be another person, . . . [which] can be used with great advantage to predict the desires and behaviors

of others.”<sup>106</sup> Consciousness provides purpose in the world, even though our thoughts and feelings are (largely) orchestrated non-consciously.<sup>107</sup>

Although Greene and Cohen do not discuss or even cite Libet’s work, they unabashedly subscribe to the illusionist view. Discussing Daniel Wegner’s book, *THE ILLUSION OF CONSCIOUS WILL*,<sup>108</sup> they concur with Wegner’s view that “we feel as if we are uncaused causers, and therefore granted a degree of independence from the deterministic flow of the universe, because we are unaware of the deterministic processes that operate in our own heads.”<sup>109</sup> As the next section suggests, this conclusion is permissible but not established.

(B) Evolutionary Compatibilists – Gilberto Gomes approaches the question of free will from a neo-Kantian perspective, distinguishing between first person and third person standpoints on free will.<sup>110</sup> When an actor feels subjectively as if she determined her acts by virtue of a conscious decision (where “conscious” describes an internal state according to which we attend to a choice *before* making it), Gomes describes the experience from a *first person* perspective. Based on appearances, moreover, he affirms that we can judge the actions of another as voluntary from a *third person* perspective; given the appropriate evidence, we come to believe that the actor determined her own conscious decision.<sup>111</sup> This distinction is necessary for Gomes to address our perception that the voluntariness of our own actions seems to conflict with causal determinism. Choice, he acknowledges, implies the ability to do otherwise. We know, according to quantum theory, that the classical view of physical theory is incorrect, at least at the quantum level. Events at that level are probabilistic and hence undetermined. Moreover, at this level random events *can* serve as causal initiators. These observations, however, don’t implicate our first person view of the

world.<sup>112</sup> Dualism provides one way out of this dilemma by disjoining the mind from the body, but Gomes rejects it for most of the reasons suggested earlier.<sup>113</sup>

In contrast to the dualist resolution, the materialist monist or epiphenomenalist argues that *because* our actions are causally determined by random probabilistic events, we have no reason for concern. They argue that consciousness, a product of brain mechanisms, cannot *for that very reason* be the “cause” of anything else.<sup>114</sup> If this is correct, Gomes argues, issues of right and wrong are irrelevant because we cannot control anything and are, therefore, responsible for nothing. We *should*, according to Gomes’ description of the epiphenomenalist injunction, just let things happen. The representation of mind as synonymous with brain states is based on a third person (theoretical) perspective; but, according to Gomes, the epiphenomenalist conception of mind is internally inconsistent. If there is no place for prescriptive analysis, saying that we “*should*” simply let things “*be*” is incoherent; there is no “*should*” in a fully determined world. On this view, the materialist monist is hoisted on his own petard.<sup>115</sup>

Although his dismissal of epiphenomenalism is a bit facile (because his hypothesized use of ‘should’ does not seem to reflect a prescription about individual responsibility but a default conclusion respecting our tendency to worry – or not – about this problem), Gomes’ hopes to reconcile the traditional first person concept of voluntariness – *I could have done otherwise* – with the third person perspective. What we need to “*suppose*,” he writes, is that we humans possess

a decision system that can represent actions and action sequences before their performance, that can select among them, and the output of which is not fully determined by its input, but also by its internal state, by representations of aims to be achieved, by internal criteria that affect its activity (moral and other values), and also by a certain degree of randomness (which gives the arbitrary

character that our choices often have).<sup>116</sup>

Note that whereas some philosophers analyze the question of what the phrase “free will” means in the statement “I have free will,”<sup>117</sup> Gomes asks what composes the “*I*” in the same statement. If we define *I* to include this partially non-conscious decision system – that is, one in which consciousness is absent at the onset of the decision process – the actions that follow are, in Gomes’ view, determined by ourselves: “It is when we consider our *self* to be pure spontaneity – a being that is not subject to causality – that we are in illusion.”<sup>118</sup> In this account, the choosing *I* includes those parts of the brain system that process information before we are conscious of it, thus avoid the question of whether or not we possess conscious control. The crucial processing seems to reflect the appearance (at some point in time) of internal representations guided in some way by internal criteria of which we are not initially conscious.

How, then, should we interpret Libet’s findings? On Gomes’ view, we could consider free will to include activity of the brain system, namely, structures that begin to fire just prior to awareness. This comports with the brain as part of a material system.<sup>119</sup> After parsing the word “intention,” and distinguishing among three different meanings – the intention to act now, the intention to act sometime time in the future, and the irrevocable decision to act now – he argues that “we should admit that every voluntary action is preceded by an intention to act now, in the sense of a representation of the action that precedes its performance. But I argue that this intention does not always become conscious as a separate event.” Instead, he hypothesizes that often the conscious decision to act voluntarily *now* might be “integrated into the experience of the movement itself.”<sup>120</sup> In other words, we act voluntarily, despite the non-conscious origins of those acts, because our

awareness of the decision to move and the movement often occur simultaneously.

The challenge with Gomes' account, although it may be correct, is that it seems to ask us to "suppose" the answer to the very question he poses: What intentions precede apparently freely willed actions? Not surprisingly, Libet disavows Gomes' approach, that is, one which embodies within the concept of "volition" a process over which we rather clearly exercise no conscious control.<sup>121</sup> Moving from a "common sense" definition of free will, which may itself be problematic inasmuch as it incorporates in its definition the solution it seeks to reach, he sought to assure endogenous decision-making by controlling for the absence of external controls or cues "to affect the occurrence or emergence of the voluntary act under study."<sup>122</sup> Libet attempted to create a testing climate in which the subjects would perceive their movements as ones they wanted to execute on their own initiative and under their own control.<sup>123</sup> Libet thus rejects Gomes' stance. Following the traditional analytic approach, he distinguishes between a non-conscious choice that becomes a conscious casual event *before* the event occurs, and a choice of which we become conscious but over which we have no conscious control. Libet hopes thereby to make sense of the 350 msec period preceding awareness of *anything*. Libet's understanding of free will requires some conscious responsibility for an action *before* it occurs, and fully supports the law's understanding of intentional conduct:

$$\textit{Intention} = \textit{Desire} + \textit{Belief} \Rightarrow \textit{Action}$$

"We do not hold people responsible for actions performed unconsciously, without the possibility of conscious control."<sup>124</sup>

Libet proposes, instead, that the time lapse *after* the onset of RPII – which precedes awareness by approximately 350 msec – and the beginning of muscle movement

(approximately –150 msec) is sufficient to permit the willing subject to *veto* the on-going process that would, if left uninterrupted, produce deliberate activity. “Processes associated with individual responsibility and free will . . . operate not to initiate a voluntary act but to select and control volitional outcomes.”<sup>125</sup>

The most obvious objection to the veto is the question of why the veto itself doesn’t begin 500 msec before the action; that is, why doesn’t the veto, like the action it prevents, begin non-consciously? If that is the case, the choice to prevent an action would also lie outside conscious control and could not be a conscious causal event. Libet struggles with this objection, noting that the veto “may *not* require or be the direct result of preceding unconscious processes.”<sup>126</sup> Libet proposes, instead, a neurobiological distinction between control and initiation functions, stating that there is “no logical imperative in any mind-brain theory, even identity theory, that requires specific neural activity to precede and determine the nature of a conscious control function.”<sup>127</sup>

Libet acknowledges that the veto power requires conscious awareness of the event about to begin; he suggests that we may need to redefine our understanding of “awareness,” its relation to the content of awareness, and the neurobiological processes that generate awareness and the contents of awareness.<sup>128</sup> Note the distinction with Gomes’ explanation: whereas Gomes attempts to redefine the first person *I* for purposes of determining free will, Libet wants to redefine the concept of “awareness” along neurobiological lines. Some earlier research had suggested that *awareness* and the *content of awareness* involve different timing sensations.<sup>129</sup> “One need not think of awareness of an event as restricted to one detailed item of content in the whole event.”<sup>130</sup> Thus, an individual could be faced with a whole mental representation within this 350-400 msec period and then decide what to do.

As others have noted, free will, from Libet's perspective, becomes free *won't*.<sup>131</sup>

Libet's most recent views raise almost as many questions as they hope to answer. First, there is little evidence to support the veto and its ability to avoid non-conscious preprocessing. In fact, Libet had written earlier that nothing in his work intimated that the conscious veto was not itself preceded by non-conscious cerebral processes.<sup>132</sup> Of Libet's theory that the veto arises without prior initiation reflected in an RP, Gomes inquires: "But what about what we are conscious of as being a free decision that really *initiates* the voluntary actions? . . . What about our feeling of being the true causes of our actions?"<sup>133</sup> Libet's explanation seems to deny the intuition that we really initiate, and don't just manage, our voluntary actions. Our intuition seems to tell us not that we censor our voluntary actions, but that we fully control them *ex ante*. Moreover, support for Libet's interpretation is, by his own admission, slight. Libet writes only that "there is no experimental evidence against" the veto and his explanation of it.<sup>134</sup> Finally, Libet's explanation drifts toward dualism: If voluntary activity begins in non-conscious processing, a view consistent with causal determinism, there is no reason to suppose that the non-conscious processing that precedes volition doesn't precede it all the way down. By hypothesizing the existence of a fully conscious veto, Libet may either have stumbled into determinism or fallen prey to his own compatibilist bias, which he achieves by separating the origins of volition from conduct viewed as reflecting it.

#### IV.

Pa'ce Greene and Cohen, the data do not permit a dispositive affirmation of radical reductionism. Libet's data, which present the strongest case, do not account for gaps in the process from intentionality. I want to suggest, however, that we do not need to answer these

metaphysical questions to achieve the normative goals that Greene, Cohen and I, among others, would like to achieve.<sup>135</sup> The important normative questions rest on answers that are incontrovertible. My questioning begins by asking what we know about the distribution of our genetic inheritance, and how should we use that knowledge to effect changes in our norms.<sup>136</sup> For one thing, we know that half of the chromosomes in your body and mine and some six billion or so others come from our mothers and the other half from our fathers. That's a brute physical fact about human genetic variation that goes as far back as we can go in history; that's Darwin. And, obviously, there's a strong sense of genetic luck involved in all this. Just ask any parent who has raised 2 or more children and they'll tell you: "Yes, they're the same in some ways but they're really, really different too." Similarly, the environments in which each of us (often even siblings) is raised varies over a vast number of variables and social scales – sometimes the scales are spaced on linear planes, sometimes on curvilinear ones, and sometimes, I suspect, on both. Those compounds of variation lead to a conclusion that I find irresistible. While determinism at some level may be inescapable, it doesn't operate uniformly: Some people have better luck than others, including the moral component of our neurobiological luck.<sup>137</sup> If that's right, then we are at least permitted to infer that some people are far better equipped to deal with the settled and changing ethical and criminal norms of our culture than are countless unlucky others.

The implication of this point is that some of us are better adapted to the norms required of civilized people than others, some of us, therefore, should know better, and some of us, in consequence, more culpable conduct when we make poor decisions than others, notwithstanding the necessary result that some, by virtue of their dangerousness, will require incapacitation for some indefinite periods of time despite the lack of a moral

capacity. That conclusion, however, neither requires nor even permits us to treat them like criminals. I reach this conclusion because, contrary to the imaginative future produced by Greene and Cohen, Libet's work shows that there are temporal gaps between intention and action. Moreover, there are other gaps that we cannot fill, such as those that occur between (a) the initial thought about possible future action and the decision to follow through with it; (b) that decision point and the actual movement toward action; and (c) the point of action and, for example, pulling the trigger that kills an innocent victim. At this point in time (at least), we still have to intuit what fills these gaps and, more importantly, what may transform the neuronal firings that produced the idea into the neuronal firings that sustained the idea to the moment of action and, finally, into the neurons that took over as our decision is verbalized and acted upon: "The salad, please." We need not take sides on the data to conclude that some people seem to have some choice, at least some of the time.

The important point here is that the basics of neuroscience and genetics should effect a more robust and compassionate model of human behavior for law, and the model need not lead to a brand of radical reductionism posits the complete and always unencumbered individual choice. Reasonably imaginative and foreseeable neuroscientific data may put our folk psychological intuitions about compatibilism on a collision course with our physicalist intuitions about the nature of determinism, but whether it does so or not, we should move us toward a critical mass that affects our moral and legal intuitions for the better.

## V.

There is an apparent retrospective magic about making good decisions when they're necessary, even when making tough decisions causes you to hold your breath and hope or pray for a good outcome. But, of course, that's part of moral luck too. The gift of good and

reasoned decision-making is, like everything else in human behavior, a product of genes and environment. Some of us have been lucky, some not. Those whose selectional opportunities have been impoverished often should not be punished although they may need restraint; those of use whose selectional opportunities have been rich should be held fully accountable.

## Footnotes

1. Joshua Greene and Jonathan Cohen, *For the Law, Neuroscience Changes Nothing and Everything*, 359 PHIL. TRANS. SOC. LOND. 1775-85 (2004).
2. I am using the *intention* here to refer to the narrow, statutory requirements of culpability: for example, conduct that is undertaken with either the purpose (the “conscious object”) that an illegal result occur, or when the actor is “practically certain” that an illegal result will occur. See Model Penal Code §§2.02 (2) (a & b).
3. Adam Smith, THE THEORY OF MORAL SENTIMENTS 133 (Prometheus Books 2000).
4. By “subjectivist,” I mean simply that punishment should be based solely on the actor’s subjective evil intent. See, e.g., Joshua Dressler, UNDERSTANDING CRIMINAL LAW 352-4 (2d ed. 1995) (distinguishing between “subjectivist” and “objectivist” approaches to attempts).
5. Smith, *supra* note # –, at 133.
6. *Id.* at 134. He spent the rest of the section indicating how, and attempting to explain why, consequences *do* matter.
7. Hart, *supra* note # –, at – (defending the compatibilist approach to law).
8. The seminal work in this area was done by Harry G. Frankfurt. See, e.g., *Three Concepts of Free Action: II*, in John Martin Fischer, *Introduction: Responsibility and Freedom*, MORAL RESPONSIBILITY 113 (ed. by John Martin Fischer; Cornell U. Press 1986).
9. There are at least two aspects to “free will,” although neither is sufficient to explain free will. The first is *freedom of action*, the second is *freedom of choice*. Freedom of action speaks to capacity: An actor could lack free will simply because he or she lacks a certain capacity to act freely. For example, a person with profound cerebral palsy lacks the capacity to undertake certain freely chosen activities, such as knitting or house painting. Freedom of choice, in contrast, speaks to opportunity. A person may have the evident capacity to choose, but lack the opportunity at the relevant time. See John Martin Fischer, *Introduction: Responsibility and Freedom*, in MORAL RESPONSIBILITY *supra* at 9, 10-15.
10. For a discussion of the distinction between “hard” determinism, according to which freedom is an illusion because *all* of our conduct is *always* determined, and “soft” determinism, according to which one can acknowledge that events have antecedent causes, but maintain nonetheless that in an important sense agents control their own mental states, even though those states are themselves causally determined, see P. S. Greenspan, *Behavior Control and Freedom of Action*, in MORAL RESPONSIBILITY *supra* note # –, at 191, 191 n. 1.
11. John Martin Fischer and Mark Ravizza, RESPONSIBILITY AND CONTROL: A THEORY OF MORAL RESPONSIBILITY 14 (Cambridge 1998) (arguing, generally, that causal determinism, whether true or not, does not subvert our common sense understanding of moral responsibility).

12. The “choice” to do evil has roots in Hebrew Scriptures. *See, e.g.,* Nahum M. Sarna, UNDERSTANDING GENESIS: THE WORLD OF THE BIBLE IN THE LIGHT OF HISTORY 24, 27 (Schocken Books 1966) (holding that the “Garden of Eden story [is] that evil is a product of human behavior, not a principle inherent in the cosmos”) *Compare* Jack Miles, GOD: A BIOGRAPHY 32 (Alfred A. Knopf, 1995) (describing the “classic theological interpretation of ‘the fall of man’” as humankind suffering a spiritual death with the consumption of the fruit of the tree of knowledge); Dietrich Bonhoeffer, CREATION AND FALL: A THEOLOGICAL INTERPRETATION OF GENESIS 1-3, at 76 (Collier Books 1959) (“[T]his act of man whom God created as man and woman is a deed of mankind from which no man can absolve himself.”)

13. Those who approach the metaphysics of free will on the basis of alternative “standpoints,” practical and theoretical, usually take one of two approaches to avoid the conclusion that free will and determinism violate the law of non-contradiction, according to which believing *p* and *not-p* concurrently defines irrationality. *See* David Wiggins, *Towards a Reasonable Libertarianism*, in ESSAYS ON FREEDOM OF ACTION 48 (ed. by Ted Honderich (1973) (quoted in Hilary Bok, FREEDOM AND RESPONSIBILITY 69 (Princeton 1998). One group follows Kant and justifies free will by dividing subjects (roughly) into noumenal and phenomenal accounts, while others, e.g., Thomas Nagel, THE VIEW FROM NOWHERE (Oxford 1987), distinguish free will and determinism on the basis of different aspects of a single account, for example, objective and subjective aspects. *See* Dana K. Nelkin, *Two Standpoints and the Belief in Freedom*, 97 J. PHILOS. 564 (2000).

14. Immanuel Kant, *Metaphysics of Morals* in THE PHILOSOPHY OF LAW 13 (trans. by W. Hastie; Edinburgh, Augustus M. Kelley, 1974 ed.) (emphasis and capitalization in the original).

15. Immanuel Kant, GROUNDWORK OF THE METAPHYSICS OF MORALS 60 (trans. and ed. by Mary Gregor; Cambridge: Cambridge, 1997) (emphasis in the original). Kant described the incompatibility of freedom and nature as a dialectic of reason, “since, with respect to the will, the freedom ascribed to it seems to be in contradiction with natural necessity.” *Id.* The prohibition on assuming a contradiction did not compel overlooking the contradiction; in fact, Kant attempted to reconcile the antinomy created by freedom and the law of nature “in the same subject” without losing either. Kant embraced the antinomy of practical reason which, famously, he reconciled through the fiction of the inaccessible “thing . . . in itself.” Immanuel Kant, CRITIQUE OF PRACTICAL REASON 138-45 (trans by T. K. Abbott; Prometheus Books 1996).

16. The Model Penal Code’s drafters take the firm position generally that “questions about determinism and free will” have no place in its description of substantive crimes. *See* M.P.C. § 2.01, cmt at 215 (requiring a voluntary act and embracing a compatibilist view).

17. *See, e.g.,* R. A. Duff, *Do We Want an Aristotelian Criminal Law?*, 6 BUFF. CRIM. L. REV. 147 (2002) (arguing that our current criminal law doesn’t comport with any grand theory of criminal law – that actors are liable only for the choices they make or the risks they create or the character flaws they reveal – and we shouldn’t expect law to reflect any grand theory; and that Aristotelian accounts, while valuable to our understanding of moral life and goodness, should play no role in our criminal law).

18. On the shifting nature of legal categories, *see* Mark Kelman, *Interpretive Construction in the Substantive Criminal Law*, 33 STAN. L. REV. 591 (1981).

19. *See, e.g.*, Model Penal Code § 2.09, cmt 2 at 374 (American Law Institute 1985). The “at least” limitation in the text simply recognizes the existence of non-cognitively based excuses (duress, for example), and the whole panoply of justifications.

20. *See* Garth Williams, *Blame and Responsibility*, 6 ETHICAL THEORY AND PRACTICE 427 (2003) (noting that our practice of blaming is counter-productive and altogether alienating). It is worth noting that until *United States v. Booker*, 125 S. Ct. 738 (2005) (holding that the Federal Sentencing Guidelines violate the Sixth Amendment’s jury trial right), sentencing courts generally were prohibited from even considering the conditions in which wrongdoers, through accidents of birth alone, are raised and receive – or do not receive – a moral education. *See, e.g.*, Thomas W. Hutchison, David Yellen, Deborah Young, and Matthew R. Kipp, FEDERAL SENTENCING LAW AND PRACTICE, Ch. 5, Pt. H (St. Paul: West, 1999).

21. The wrongdoer possesses minimal instrumental rationality if he possesses the capacity to effect a simple syllogism. *See, e.g.*, Michael Moore, *The Moral and Metaphysical Sources of Criminal Law* in J. Roland Pennock and John W. Chapman, eds. NOMOS XXVII: CRIMINAL JUSTICE 20 (New York: N.Y.U. Press, 1985). If he does, the presumption is that he *chooses* wrongdoing when he commits a crime. *See* Model Penal Code § 4.01, cmt at 166 (stating that an actor lacks competency when he “believes he is squeezing lemons as he chokes his wife”).

22. *See, e.g.*, Sanford H. Kadish, *Forward: The Criminal Law and the Luck of the Draw*, 84 J. CRIM. L & CRIMINOLOGY 679, 690 (1994) (dismissing moral luck with very little discussion).

23.

24. Joshua Greene and Jonathan Cohen, *For the Law, Neuroscience Changes Nothing and Everything*, 359 PHIL. TRANS. SOC. LOND. 1775-85 (2004).

25. In *Roper v. Simmons*, 125 S. Ct. 1183 (2005), the United States Supreme Court held that the Eighth Amendment’s prohibition on cruel and unusual punishment prohibits the execution of minors – those who committed what are otherwise “death-worthy” crimes before their eighteenth birthday. It based its holding, in part, on the fact that juvenile brain development is immature with respect to decision-making and impulse control. There is ample evidence to support that conclusion. I thank the Gruter Institute for Law and Behavioral Research for its invitation to discuss this case and, more generally, to participate in an interdisciplinary discussion on the interface of neuroscience and law at its Squaw Valley Conference on Law, Brain, and Human Behavior (May 22-5, 2005).

26. *See, e.g.*, Stephen J. Morse, *New Neuroscience, Old Problems*, in NEUROSCIENCE AND THE LAW: BRAIN, MIND, AND THE SCALES OF JUSTICE 157 (ed. by B. Garland; New York: Dana Press 2004).

27. *See, e.g.*, Edward H. Levi, AN INTRODUCTION TO LEGAL REASONING (Chicago: U. Of Chicago Press. 1972).

28. Whether they actually are moved by aggregate utility is, of course, questionable. *See, e.g.*, Richard Posner, *What Has Pragmatism to Offer Law?*, 63 S. CAL. L. REV. 1653, 1665 (1990) (noting that social choice theory underscores the difficulties with aggregating preferences and that interest-group theories suggest that legislatures often do the bidding of narrow interest groups).

29. Functional Magnetic Resonance Imaging is a non-invasive technology that permits real time images of a subject's brain are taken. For a brief description, *see, e.g.*, Steve Smith, *Brief Introduction to FMRI*, [http://www.fmrib.ox.ac.uk/fmri\\_intro/brief.html](http://www.fmrib.ox.ac.uk/fmri_intro/brief.html).

30. There is a phenomenon lawyers describe as concurrent or multiple causation and philosophers describe as causal over-determination: a situation in which multiple causative agencies produce the same indivisible harm. In theory, this leaves us unclear whether or not choice is a necessary condition for free action. The seminal work in this area has been done by Harry G. Frankfurt. *See, e.g.*, *Three Concepts of Free Action: II*, in *MORAL RESPONSIBILITY* 113 (ed. by John M. Fischer; Cornell U. Press 1986) (originally published in 49 *PROC. ARIST. SOC'Y.* 113 (supp. 1975)).) Examples and an explanation of the phenomenon of over-determined events are contained in John Martin Fischer, *Introduction*, in *MORAL RESPONSIBILITY*, *supra* at 9, 40-51. *See also* Donald Davidson, *Freedom to Act*, in *Actions, Reasons, and Causes*, in *ESSAYS ON ACTIONS & EVENTS* 63 (Oxford 1980). Professor Bok rightly questions how deeply one should take Frankfurt's very clever thought experiments in accounting for practical reasoning, precisely because their cleverness tends to undermine their relevance to actually occurring causative instances. Hilary Bok, *FREEDOM AND RESPONSIBILITY* 20 (Princeton 1998).

31. It should be noted that their forecast appears as almost a bit of whimsy following a discussion about a routine philosophers' debate over the culpability (or lack thereof) of "Puppet" killer, a man who has been precisely programmed to kill fellow humans by a neuro-programmer with a 95% success rate.

32. For a rich description of how social epistemology operates, *see* Allen Buchanan, *Political Liberalism and Social Epistemology*, 32 *PHIL. & PUB. AFF.* 96 (2004).

33. Kadish, *supra* note # –; and Sanford H. Kadish, *Moral Excess in the Criminal Law*, 32 *McGeorge L. Rev.* 63, 72-6 (2000); Morse, *supra* note –.

34. *See* note – *supra*.

35. On the well studied tendency to over-attribute blameworthiness to character rather than situation, *see, e.g.*, Mark D. Alicke, *Culpable Control and the Psychology of Blame*, 126 *PSYCHOL. BULL.* 126 (2000); Jonathan Haidt and Jonathan Baron, *Social Roles and the Moral Judgement of Acts and Omissions*, 26 *EUROPEAN J. SOC. PSYCH* 201 (1996).

36. On the commonalities among all retributivists *see, e.g.*, John L. Mackie, *Morality and the Emotions*, 1 *CRIM. JUSTICE ETHICS* 4 (1982); Jami L. Anderson, *Annulment Retributivism: A Hegelian Theory of Punishment*, 5 *LEGAL THEORY* 363 (1999).

37.

38. *See* Gary Watson, *Responsibility and the Limits of Evil*, in *RESPONSIBILITY, CHARACTER, AND THE EMOTIONS* 265, 276-77 (ed. by Ferdinand Schoeman; Cambridge 1987).

39. Antonio R. Damasio, *DESCARTES' ERROR: EMOTION, REASON, AND THE HUMAN BRAIN* 11 (HarperCollins 1994) (emphasis added).

40. *See id.* at 109 (noting that the modern brain works “under the influence of environmental circumstances complemented and constrained by the influence of the innately and precisely set circuits concerned with biological regulation”).

Gerald M. Edelman describes this selectional process as the “continual adaptive matching or fitting of elements in one physical domain [generally, the frontal lobe of the cerebral cortex] to novelty occurring in elements of another [the world around us].” Gerald Edelman, *BRIGHT AIR, BRILLIANT FIRE: ON THE MATTER OF THE MIND* 74 (Basic Books 1992). One way to explain the operation of selection is by reference to a more familiar physical process, our immune system. When an infection or disease or some forms of invasive trauma assault us, our immune systems move into action. They immediately identify products in the body that are not *us*; the system *recognizes* invading objects that are foreign. When these “non-self” invaders arrive, a biochemical process springs into action as lymphocytes recognize and bind to the molecular non-selves, targeting them for removal and destruction. The mystery is that the encroaching molecules don’t have to instruct or pass information to the immune system about their novel qualities; it is the magic of our immune system that it *recognizes* the non-self molecules without an information exchange. In other words, the immune system exists within us and arrives at problems ready to recognize and react against foreign invaders. This system of selection is pervasive; it operates within every sphere of our lives. *Id.* at 75-9; *see also id.* at, at 78 (noting that the immune system is a “recognizing system [that] *first* generates a diverse population of antibody molecules and then selects *ex post facto* those that fit or match. It does this continually and, for the most part, adaptively.”) Edelman won the 1972 Nobel Prize in medicine for this discovery.

41. Bernard Williams, *Internal Reasons and the Obscurity of Blaming*, in *MAKING SENSE OF HUMANITY AND OTHER PHILOSOPHICAL PAPERS*, 35 (Cambridge 1995). No doubt that the task of describing the composition of a *state* is itself a complex task. *Cf.* David C. Rowe and Kristen C. Jacobsen, *In the Mainstream: Research in Behavioral Genetics* 23-4, in Ronald A. Carson and Mark A. Rothman, *BEHAVIORAL GENETICS: THE CLASH OF CULTURE AND BIOLOGY* (Johns Hopkins 1999) (describing *state dependence* as a part of a developmental model according to which “past behavior affects future behavior,” such that the commission of a crime, for example, increases the likelihood of future criminality).

42. In *NATURALIZING THE MIND* 28-34 (MIT 1995), Fred Dretske cabins the characteristics of intentions as thoughts about the power of misrepresentation, of “aboutness,” of “aspectual shape,” and of “directedness.”

43. Much of what follows in the text is from John R. Searle, *RATIONALITY IN ACTION* Ch. 3, (New York: M.I.T 2001).

44. *See, e.g.*, John Dewey, *Human Nature and Conduct*, in *7 COLLECTED WORKS : THE MIDDLE WORKS* (SIU Press 1989).

45. The basic paradigm is from Moore, *Metaphysical Sources*, *supra*, note # –, at 19-20. He would doubtless disagree with how I am using it. *See* Michael S. Moore, *Causation and the Excuses*, 73 *CAL. L. REV.* 1091, 1092 (1985) (arguing that “moral responsibility for an action should be ascribed to an actor even when that action was caused by factors over which he has no control”).

46. For the view that this perspective is epistemologically incoherent, *see, e.g.*, Thomas Nagel, *THE VIEW FROM NOWHERE* 120 (Oxford 1986) (“To praise or blame is not to judge merely that what happened was a good or bad thing, but to judge the person for having done it, in view of the circumstances under which it was done. The difficulty is to explain how this is possible.”); Galen Strawson, *Consciousness, Free Will, and the Unimportance of Determinism*, 32 *INQUIRY* 3, 10 (1989) (stating that “to be truly deserving of praise or blame for our actions, . . . we must be truly responsible for how we are mentally [for our intentions;] and doubting that such circumstances are possible); Rachel J. Littman, *Adequate Provocation, Individual Responsibility, and the Deconstruction of Free Will*, 60 *ALB. L. REV.* 1127, 1132 (1997)

47. Jonathan Bricklin, *A Variety of Religious Experience: William James and the Non-Reality of Free Will*, in *THE VOLITIONAL BRAIN: TOWARDS A NEUROSCIENCE OF FREE WILL* 77, 80 (Benjamin Libet, Anthony Freeman & Keith Sutherland, eds.; Imprint Academic, 1999) (hereafter “Libet et al., *VOLITIONAL BRAIN*”).

48. John McCrone, *Seconds Away From Reality*, *NEW SCIENTIST*, May 14, 1994, at 44 (page cites unavailable on line). McCrone notes that Libet first made his discovery by chance when he was working with epilepsy. Most scientists refused to grapple with Libet’s findings when they first appeared 30 years ago, in part because the testing needed to go further appeared too invasive. Today, the technology is not nearly as invasive as it once was, at least physically. *See note – supra*.

49. This story is told by Gazzaniga, *supra* note # –, at 69-70.

50. Libet, *Do We Have Free Will*, in Libet et al., *VOLITIONAL BRAIN supra*, note # –, at 49 (hereafter, Libet, “*Free Will*”); Gazzaniga, *supra* note # –, at 70; Edelman and Tononi, *supra* note # –, at 68; Huntley Ingalls, *Consciousness as a Valid Subject for Scientific Investigation*, *SKEPTICAL INQUIRER*, Sept. 19, 1995, at 22 (page cites unavailable on line).

51. Hans Kornhuber and Luder Deecke, *Hirnpotentialänderungen bei Willkurbewegungen und Passiven Bewegungen des Menschen: Bereitschaftspotential und Reafferente Potentiale*, 284 *PFLUEGERS ARCH GESAMTE PHYSIOL MENSCHEN TIERRE* 1 (1985) (reported by Libet, *Have Free Will?*, *supra* note # –, at 49; and Gomes, *supra* note # –, at 59). RP refers to “a specific event-related potential”—neuro-chemical reactions—recorded from the human scalp” that precedes motor activity. Edelman and Tononi, *supra* note # –, at 69.

52. The quote is from Blackmore, *supra* note # –. *See* Libet, *Free Will*, *supra* note # –, at 49-51.

53. Libet, *Free Will*, *supra* note # –, at 49.

54. *Id.* *See* Libet, et al., *Time of Conscious Intention to Act in Relation to Onset of Cerebral Activity (Readiness Potential)*,” 106 *BRAIN* 623 (1983).

55. “Clock” is placed in cautionary marks to draw attention to the fact that what Libet used was not a traditional clock at all, but a spot of light from a cathode ray oscilloscope that revolved around a face divided into 40 millisecond units and traveling at a speed approximately 25 times faster than a normal second hand on a clock. Libet, *Free Will*, *supra* note # –, at 49.

56. *Id.* at 50-1.

57. *Id.* at 51.

58. *Id.* (Figure 3). Reprinted with permission. World Copyright © Imprint Academic, 1999. The careful reader will note that the times reported in the explanation are not identical to the times reported in the text, although the differences are not significant. The former were first compiled in 1999 as part of a summary essay by Libet; the data in the text is a combination of original research findings and the summaries of Libet and others.

59. Several subjects reported experiencing some “loose preplanning” in some of the trials; those sensations are recorded as “RP I.” *Id.* at 48. RP I and its effect on the overall process are not otherwise discussed in any of the literature I have reviewed.

60. The “S” scale in Figure 3 above reflects the data I am about to discuss. Unless otherwise specifically indicated, the description that follows is from Gazzaniga, *supra* note # –, at 69-74.

61. It seem worthwhile pointing out that we don’t *feel* direct cortical stimulation at the cortex. It has few pain receptors. Rather, the stimulation is experienced as a sensation somewhere on the periphery, depending upon which cortical area is stimulated.

62. I should caution about what this indicates. It *doesn’t* mean we wait ½ second to take our hand off the stove because we don’t; antecedent signals from the stimulus “begin to recruit other neural processes [vision, perhaps] that might organize a motor response” before the full 500 msec elapses. Gazzaniga, *supra* note # –, at 71.

63. See J. Thomas Hutton, *Motor Fluctuations: On, Off and Dyskinesias*, on-line at <http://www.parkinson.org/motor.htm>.

64. Michael S. Gazzaniga, *THE MIND’S PAST* 71 (California 1998).

65. *Id.* at 73-4.

66. It should be noted that the onset or RP does *not* guarantee that a movement will occur; the movement may be aborted. See Libet, *Free Will*, *supra* note # –, at 51-3; Gomes, *supra* note –, at 68. Whether such aborted actions themselves follow 500 msec *after* non-conscious processes is unclear, as I will explain shortly.

67. Interestingly, although it is not clear that Wittgenstein ever made piece with the place of the will in the world, he did conclude at one point that “The act of the will is not the cause of the action but is the action itself.” Ludwig Wittgenstein, *NOTEBOOKS, 1914-1916*, 87 (ed. by G. H. von Wright & G. E. M. Anscombe and trans. by G. E. M. Anscombe; U. Chicago Press 2d ed. 1979).

68. Gomes, *supra* note # –, at 70-1. Gomes distinguishes among “act[s] of which we are conscious,” acts which we contemplate before acting (“deliberate acts”), and an “intention to act now,” which may or may not be deliberated but which occurs immediately or, in Gomes’ view, where the deciding is an integral part of the act itself. *Id.* at 66-69. Gomes’ perceptions are discussed in the text accompanying

note — *infra*.

69. *Id.* at 71.

70. Paul M. Churchland, *MATTER AND CONSCIOUSNESS* 7 (M.I.T. Rev. ed. 1994) (surveying various types of dualism); John R. Searle, *MIND, LANGUAGE AND SOCIETY: PHILOSOPHY IN THE REAL WORLD* 45-50 (Basic Books 1998) (same).

71. Searle, “MIND, LANGUAGE, AND SOCIETY,” *supra* note # –, at 45.

72. *Id.* at 50-1.

73. Gomes, *supra* note # –, at 60.

74. *Id.*

75. Where that “somewhere” lies presupposes the existence of *a* specific location, which seems to be wrong. There is considerable speculation that consciousness, like space-time, mass, gravity and perhaps a few other phenomena, are irreducible features of the universe. For example, no one will ever know what it’s *like* to be a beam of light, although we can describe its properties in detail. Edelman, *BRIGHT AIR*, *supra* note # –, at 137-41, notes that as a neuroscientist, he can explain the processes and properties which give rise to consciousness, but rejects the objection that he hasn’t “*really explained*” it; that is, he hasn’t *really* described what it is *like*. But Einstein’s genius wasn’t in telling us what it was *like* to be a light beam, although as a thought experiment riding on a light beam was nonpareil. See Ronald W. Clark, *EINSTEIN: THE LIFE AND TIMES* 83-4 (World Publ. 1971). Edelman and others acknowledge that they haven’t explained how *I*, the individual, experiences consciousness. Science, he insists, can’t describe individual subjective histories; it assumes that individuals are conscious because consciousness is an individual personal process. As he points out, there is no celestial view of consciousness, because each person’s consciousness has its own unique history. Cf. David J. Chalmers, *The Puzzle of Conscious Experience*, in *SCIENTIFIC AMERICAN*, *supra* note # –, at 287. That’s the beauty of selection; and, it’s worth noting, it’s not anti-God.

76. To say nothing of “How”?, as in, how does the connection between outside and inside – the body and the mind – operate? which leads to equally evident questions like “Where?” (does this occur); “What?” (conditions make it possible); and so on.

77. See Wolfram Schultz, *The Primate Basal Ganglia and the Voluntary Control of Behavior*, in Libet et al., *VOLITIONAL BRAIN*, *supra* note # –, at 31; LeDoux, *THE EMOTIONAL BRAIN*, *supra* note # –, at 177.

78. Gazzaniga, *supra* note # –, at 63.

79. Gomes, *supra* note # –, at 60-1.

80. Huntley Ingalls, *Consciousness as a Valid Subject for Scientific Investigation*, *SKEPTICAL INQUIRER*, Sept. 19, 1995, at 22 (page cites unavailable on-line).

81. Daniel Dennett, *CONSCIOUSNESS EXPLAINED* 253 (Little Brown 1991) (stating that there is “no Cartesian Theater where . . . all [thought] comes together for the perusal of a Central Meaner”).
82. *See, e. g.*, Abigali A. Baird and Jonathan A. Fugelsang, *The Emergence of Consequential Thought: Evidence From Neuroscience*, 359 *PHIL. TRANS. R. SOC. LONDON* 1797, 1798-1800 (2004); Patricia A. Carpenter, Marcel Adam Just and Erik D. Reichle, *Working Memory and Executive Function: Evidence From Neuroimaging*, 10 *CURRENT OPIN. NEUROBIOL.* 195 (2000).
83. For a description of what neuroscientists described as the “binding problem,” that is, the fact that we experience reality as a single unified phenomenon, *see, e. g.*, John R. Searle, *THE MYSTERY OF CONSCIOUSNESS* 33-4 (New York Rev. Bks. 1997).
84. Damasio, *supra* note # –, at 94-5; Blackmore, *supra* note # –, at – (noting that there is no central location for processing intentions and impressions).
85. Quoting, respectively, from Edleman and Tononi, *supra* note # –, at 98 (emphasis in the original) and Damasio, *supra* note # –, at 99-100.
86. *See, e. g.*, LeDoux, *EMOTIONAL BRAIN*, *supra* note # –, at 105; B. J. Casey, Jay N. Giedd, and Kathleen M. Thomas, *Structural and Functional Brain Development and its Relation to Cognitive Development*, 54 *BIOL. PSYCHOL.* 241, 251-53 (2000) (noting that multiple locations of control over capacities for attention and inhibition).
87. *See* Adina Roskies, *Neuroethics for the New Millenium*, 35 *NEURON* 21, 22 (2002) (speculating that neuroscience “is unlikely to answer metaphysical questions about determinism).
88. Gazzaniga, *supra* note # –, at 1. Interestingly, he has also concluded that neuroscience will not influence the direction of legal developments. Michael S. Gazzaniga and Megan S. Steven, *Free Will in the Twentieth Century: A Discussion of Neuroscience and the Law*, in *NEUROSCIENCE AND THE LAW*, *supra* note # –, at 51-70.
89. Peter W. Halligan and David A. Oakley, *Greatest Myth of All*, *NEW SCIENTIST*, Nov. 18, 2000, at 34 (page cites unavailable on line).
90. *Id.*
91. *See, e. g.*, Bob Holmes, *Irresistible Illusions*, *NEW SCIENTIST*, Sept. 5, 1998, at 32 (page cites unavailable on line) (discussing optical illusions which fool us into think that poker-like chips of identical size are unequal in size, depending upon the size of the surrounding chips).
92. *See, e. g.*, Gazzaniga, *supra* note # –, at 25-6; LeDoux, *supra* note # –, at 13-14.
93. Gazzaniga, *supra* note # –, at 130-41; Bruce Hinrichs, *Brain Research and Folk Psychology*, *THE HUMANIST*, March 13, 1997, at 26 (page cites unavailable on line).
94. Laurence Miller, *In Search of the Conscious*, *PSYCHOLOGY TODAY*, Dec. 1986, at 60 (page cites unavailable on line).

95. *Id.*
96. LeDoux, *THE EMOTIONAL BRAIN*, *supra*, note # – , at Ch. 6.
97. Richard Dawkins, *THE SELFISH GENE* (Oxford rev. ed. 1989).
98. *See* Richard Dawkins, *Forward* to Blackmore, *THE MEME MACHINE*, *supra* note # – , at xiv-xvii. The term “meme” is a shortened form of “mimeme,” which has its origins in Greek” and is used to convey the idea of imitation or replication. Blackmore, *supra* at 6.
99. *Id.* at 9.
100. *Id.* at 17.
101. Blackmore, *Meme, Myself, I*, *supra* note # – .
102. Blackmore, *THE MEME MACHINE*, *supra* note # – , at 226.
103. Susan Blackmore, quoted in Halligan Oakley, *supra* note # – .
104. Blackmore, *THE MEME MACHINE*, *supra* note # – , at 228.
105. Halligan Oakley, *supra* note # – . *Accord* Sean A. Spence and Chris D. Frith, *Towards a Functional Anatomy of Volition*, in “Libet et al., *VOLITIONAL BRAIN*,” *supra* note # – , at 11, 27 (noting the possible advantages of experiencing free choice to include the capacity to distinguish among humans as agents, to recognize others as agents, and to achieve some understanding of the bases for their decisions, the source of our uniqueness is a complex world).
106. Huntley Ingalls, *Consciousness as a Valid Subject for Scientific Investigation*, *SKEPTICAL INQUIRER*, Sept. 19, 1995, at 22 (page cites unavailable on line). *See* Rose, *supra* note # – (describing consciousness as a “dynamic process, part of a continuous dialectic between an individual and the social and physical worlds in which we live”).
107. Bower, *supra* note # – .
108. Daniel Wegner, *THE ILLUSION OF CONSCIOUS WILL* (MIT Press 2002). In a preview of the book, Wegner cites Libet for the proposition that “people can experience conscious will quite independent of an actual causal connection between thoughts and actions.” Daniel M. Wegner and Thalia Wheatley, *Apparent Mental Causation: Sources of the Experience of Will*, 54 *AMERICAN PSYCHOLOGIST* 480, 480 (1999). The authors also summarize Libet’s findings, *id.* at 481, and cite to his work on several occasions.
109. Greene and Cohen, *supra* note 3 – , at 1781.
110. Generally, those who approach free will on the basis of alternative standpoints take one of two approaches to avoid the conclusion that free will and determinism violate the law of non-contradiction, according to which believing *p* and *not-p* concurrently defines irrationality. *See* David Wiggins, *Towards*

*a Reasonable Libertarianism*, in *ESSAYS ON FREEDOM OF ACTION* 48 (ed. by Ted Honderich (1973) (quoted in Bok, *supra* note # –, at 69). One group follows Kant and justifies free will by dividing subjects (roughly) into noumenal and phenomenal accounts, while others, e.g., Nagel, distinguish free will and determinism on the basis of different aspects of a single account, for example, objective and subjective aspects. See Dana K. Nelkin, *Two Standpoints and the Belief in Freedom*, 97 *J. PHILOS.* 564 (2000).

111. Gomes, *supra* note # –, at 60.

112. *Id.*

113. See text accompanying notes ----- *supra*.

114. Searle, “MIND, LANGUAGE, AND SOCIETY,” *supra* note # –, at 58.

115. Gomes, *supra* note # –, at 60-1. For a biting critique of the eliminative reductionist program, according to which consciousness is nothing but brain process, see Searle, *MYSTERY OF CONSCIOUSNESS*, *supra* note # –, at 30-2.

116. *Id.* at 61.

117. See text accompanying notes — *supra*.

118. Gomes, *supra* note # –, at 62.

119. Alternatively, we could conceive of free will as an activity of an immaterial mind. He styles this theory “the interactionist dualist theory of the mind-brain relation,” according to which the free agent is not part of a brain system, but a property or something external to the brain that acts upon it create freedom of decision-making. In this case, the something else external to the brain must precede it because we know that RP precedes consciousness of decisions to act voluntarily. This latter explanation, however, which sounds dualistic, violates our basic intuition that conscious decisions precede voluntary acts. *Id.* at 62.

120. *Id.* at 65. For a similar interpretation by a philosopher of science, see Searle, *THE MYSTERY OF CONSCIOUSNESS*, *supra* note # –, at –.

121. Libet, *Free Will*, in *VOLITIONAL BRAIN*,” *supra* note # –, at 52, does not refer specifically to Gomes. Instead, he alludes to the work of M. Velmans, *Is Human Information Processing Conscious?*, 3 *BEHAVIORAL AND BRAIN SCI.* 651 (1991), which suggests that even an unconsciously generated *veto* process would be an individual’s choice, no different on principle from the initiation and appearance of a conscious will.

122. Questions have been raised about unintended biases that might be present in the timing devices Libet’s team used. Patrick Haggard, Chris Newman and Elena Magno, *On the Perceived Time of Voluntary Actions*, 90 *BRIT. J. PSYCHOL.* 291 (1999) (page cites unavailable on line), theorize that the fact that subjects *perceived* their awareness of actual movement to coincide with the 100 or msec of cortical response that precedes such awareness suggests that we anticipate our awareness of movement.

There is a question of whether this view is logically coherent. How one might anticipate that which is measurably non-conscious is not clear? Even if it is coherent, however, the researchers haven't answered the question what to do with the *preceding* 350 msec.

123. Libet ,*Free Will*, in VOLITIONAL BRAIN," *supra* note # –, at 47.

124. *Id.* at 52.

125. Benjamin Libet, *Unconscious Cerebral Initiative and the Role of Conscious Will in Voluntary Action*, 8 BEHAVIORAL & BRAIN SCI. 529, 538 (1985).

126. Libet ,*Free Will*, in VOLITIONAL BRAIN," *supra* note # –, at 53.

127. *Id.* at 53.

128. *Id.*

129. *Id.* at 53 (discussing Libet et al., *Subjective Referral of the Timing for a Conscious Experience: A Functional Role for the Somatosensory Specific Projection System in Man*, 102 BRAIN 191 (1979)).

130. Libet ,*Free Will*, in VOLITIONAL BRAIN," *supra* note # –, at 53.

131. Bob Holmes, *Irresistible Illusions*, NEW SCIENTIST, Sept. 5, 1998, at 32 (page cites unavailable on line).

132. Benjamin Libet, *Unconscious Cerebral Initiative and the Role of Conscious Will in Voluntary Action*, 8 BEHAV. AND BRAIN SCIENCES 529, 563 (1985).

133. Gomes, in Libet et al., VOLITIONAL BRAIN," *supra* note # –, at 64-5.

134. Libet ,*Free Will*, in VOLITIONAL BRAIN," *supra* note # –, at 53.

135. *See, e.g.*, Oliver R. Goodenough, *Responsibility and Punishment: Whose Mind? A Response*, 359 PHIL. TRANS. SOC. LOND. 1805 (2004) (suggesting that punishment theory is critically flawed in its folk psychological assumptions about the "freely willed" activities of many criminals).

136. Two wonderful and accessible texts on this question are Robert Plomin's NATURE AND NURTURE: AN INTRODUCTION TO BEHAVIORAL GENETICS (Pacific Grove, CA: Brooks/Cole Publ. Co. 1990), a dated but still useful introduction, and Matt Ridley, NATURE VIA NURTURE: GENES, EXPERIENCE & WHAT MAKES US HUMAN (New York: HarperCollins 2003), an excellent and well reasoned summary of recent findings in genetics,

137. Thomas Nagel, *Moral Luck*, in MORTAL QUESTIONS 24, 34 (Cambridge 1979); Bernard Williams, *Moral Luck*, in MORAL LUCK: PHILOSOPHICAL PAPERS, 1973-1980, 29 (Cambridge 1981) (rejecting the Kantian hypothesis that good or bad will is "unconditioned" [or] . . . free from external contingency").

### Shielded Footnotes

n. 6: I have examined this phenomenon in *Some Thoughts on the Aesthetics of Retribution*, 17 CAN. J. L. & JURIS. 233, 239-43 (2004) (discussing Smith's effort to naturalize harm).

n. 20 I have elaborated on this idea in an article titled, *The Problems with Blaming*, and in a book length work titled, Blaming Angry Men: The Paardox of Evil and the Limits of American Jurisprudence; both mss in author's possession.

n. 23 *See, e.g.*, Theodore Y. Blumoff, *A Jurisprudence for Punishing Attempts Asymmetrically*, 6 BUFF. CRIM. L. REV. 951 (2003) .

n.37 On the problematic nature of determining dessert, *see* Theodore Y. Blumoff, *Justifying Punishment*, 14 CAN. J. L. & JURIS. 161, 185-92 (2001).