

Impulse control and criminal responsibility: lessons from neuroscience

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*Abstract*

Almost all of the world's legal systems recognize the "*M'Naghten*" exception to criminal responsibility: the inability to appreciate the wrongfulness of action. This exception rests on the assumption that punishment is morally justified only if the defendant was able to choose whether to do wrong. Jurists and jurisdictions differ, however, on whether to extend *M'Naghten's* logic to cases where the defendant understood the wrongfulness of an act but was incapable of resisting an impulse to commit it. In this article I ask whether contemporary neuroscience can help lawmakers to decide whether to adopt or retain this defence, known variously as the "irresistible impulse" defense or the "control" or "volitional" test for insanity. More specifically, I ask firstly, whether it is empirically true that a person can understand the wrongfulness of an act yet be powerless to refrain from committing it; and second (assuming an affirmative answer to the first), whether the law of criminal responsibility can practically accommodate this phenomenon? After canvassing the relevant neuroscientific literature, I conclude that the answer to the first question is "yes." After examining the varied treatment of the defence in the United States and other nations, I also give an affirmative answer to the second question, but only in limited circumstances. In short, the defence of irresistible impulse should be recognized, but only when it can be shown that the defendant experienced a total incapacity to control his or her conduct in the circumstances.

## 1. Introduction

Almost all of the world's legal systems recognize an exception to criminal responsibility when, as a result of mental illness, defendants fail to appreciate the wrongfulness of their actions (Heller and Dubber, 2011; Simon and Ahn-Redding, 2006). This exception, which in many jurisdictions traces its origins to the "M'Naghten Rules",<sup>1</sup> is mainly uncontroversial (Erickson, 2010, p. 69). It rests on the assumption that punishment is morally justified only if, at the time of the act, the defendant was capable of choosing whether to do wrong.<sup>2</sup> Defendants without this capacity may be confined for public protection, of course, but retributive sanctions are not warranted (Morse, 1985). Viewed from a more instrumentalist perspective, punishing such persons is wasteful because the prospect of sanctions cannot deter them (Pinker 2002, Goldstein, 1967, p. 48).

A question that has long vexed jurists, however, is whether to extend *M'Naghten's* moral and instrumental logic to other situations where the defendant was incapable of choice. In particular, there is no juristic consensus on whether to excuse mentally disordered persons who understand the wrongfulness of their actions but are incapable of resisting an impulse to commit them. Known variously as the "irresistible impulse" defense or as the "control" or "volitional" test for insanity, this defense is recognized in some jurisdictions but not others.<sup>3</sup> The question addressed in this article is whether contemporary neuroscience can help lawmakers decide whether to adopt or retain it.

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<sup>1</sup> *M'Naghten's Case* (1843), 10 Cl. & Fin. 200, 8 E.R. 718 (H.L.). "[T]o establish a defence on the ground of insanity," Chief Justice Tindal wrote (pp. 722-23, E.R.), "it must be clearly proved that, at the time of the committing of the act, the party accused was labouring under such a defect of reason, from disease of the mind, as not to know the nature and quality of the act he was doing; or, if he did know it, that he did not know he was doing what was wrong." Because it is almost impossible to understand the wrongfulness of an act without being aware of its nature, the first form of insanity is often collapsed into the second. The converse, of course, is not true.

<sup>2</sup> See *Morissette v. United States*, 342 U.S. 246 (1952); *R. v. Chaulk*, [1990] 3 S.C.R. 1303.

<sup>3</sup> There are differences in the way that the defense is formulated and applied across jurisdictions (Heller and Dubber, 2011; Simon and Ahn-Redding, 2006), but these differences are not pertinent to my analysis.

first), whether the law of criminal responsibility can practically accommodate this phenomenon? After canvassing the relevant neuroscientific literature, I conclude that the answer to the first question is “yes.” After examining the varied treatment of the defence in the United States and other nations, I also give an affirmative answer to the second question, but only in limited circumstances. In short, the defence of irresistible impulse should be recognized, but only when it can be shown that the defendant experienced a total incapacity to control his or her conduct in the circumstances.

## 2. The neuroscience of impulse control

It has long been known that there is an association between brain abnormalities, especially in the frontal lobes, and impulsivity. Case studies have suggested that lesions can cause dramatic changes in behavior, including heightened propensities for impulsivity and violent, criminal, and other anti-social conduct (Harlow, 1868; Ackerly, 1964; Burns and Swerdlow, 2003; Lavergne, 1997; Malamud, 1967; Nyffeler and Regard, 2001; Lewis et al., 2004; Farnham et al., 1997; Price, 1990; Goldberg, 2001; Bechara, Damasio and Damasio, 2000; Relkin et al., 1996). Violent and aggressive persons also report a higher incidence of brain trauma than controls (Grafman et al., 1996; Bryant et al., 1984; Pincus, 1999; Brower and Price 2001; Nyffeler and Regard 2001).

Modern neuroimaging techniques have also revealed structural differences between the brains of controls and various populations with behavioral markers of impulsivity (Antonucci et al., 2006; New et al., 2002; Volkow and Tancredi, 1987; Goyer et al., 1994; Müller, 2003; Kiehl et al., 2004). For example, impulsive persons have been shown to display reduced hippocampal and dorsolateral prefrontal cortex (dlPFC) grey matter volumes compared to controls (Zetsche et al., 2007; Brunner et al., 2010; Sala et al., 2011; Tomoda et al., 2009). Impulsivity has also been correlated with reduced volumes in the ventromedial prefrontal cortex (vmPFC) (Boes et al., 2009).

Studies have also shown functional differences between the brains of impulsive persons and controls. In an early and well-known study, Raine et al. (1998) found that, compared to controls, impulsive murderers displayed lowered prefrontal activity and heightened subcortical activity. The subcortical activity of predatory murderers was similarly elevated compared to controls; however their prefrontal activity was similar to

controls. Persons with impulse control disorders have also been shown to have diminished dlPFC activation in performing aggression control tasks compared to controls (New et al., 2009). And impulsive persons and controls have been found to display different connectivity patterns. One study found, for example, that motor planning regions in less-impulsive juveniles were correlated with dorsal attention and executive control networks; motor planning in more-impulsive subjects correlated with the default-mode network, which is associated with spontaneous, unrestrained cognition (Shannon et al., 2011).

What do these differences tell us about impulse control? The prevailing theory posits that two distinct and interconnected brain systems interact with one another and compete for behavioral outcomes (Bechara, 2005; Bechara and Van Der Linden, 2005). The impulsive system (involving the amygdala) provides an immediate signal of pain or pleasure; the reflective system (involving the vmPFC), considers the long-term consequences of behavioral alternatives (Boes et al., 2009; Cato et al., 2004). Simply put, impulsivity results from an imbalance between these systems: the latter is unable to check the push for immediate action signalled by the former (Siever, 2008; Blair et al., 2005, pp. 102-103). This imbalance may derive from many different genetic and environmental causes (Eastman and Campbell, 2006) and may be diagnosed or labeled in myriad ways (Redding, 2006; Seiden, 2004). But for present purposes the end product is the same: the subject's ability to suppress impulsive behavior is substantially diminished compared to the average person (Sapolsky, 2004).

The behavioral manifestations of this imbalance have been studied in experimental settings. For example, when confronted with a choice between smaller, immediate rewards and much larger deferred rewards, people with frontal lobe damage typically prefer the former (Yechiam et al., 2005; Lezak 1995). Remarkably, such persons usually know that their behavior is sub-optimal: they report an abstract understanding of the wrongfulness of their choices but cannot stop themselves from making them under the pull of emotion in the moment of decision (Bechara et al., 1994).

### 3. Significance for the law of criminal responsibility

The legal significance of this research is unclear. It is not surprising that people differ in their ability to control impulses. Nor is it surprising that

impulsivity correlates with structural and functional differences in people's brains. As early as 1883, the English jurist Sir James Fitzjames Stephen (1883, p. 130) noted the following:

That the brain and the nervous system are the organs by which all mental operations are conducted is now well established and generally admitted. When a man either feels, knows, believes, remembers, is conscious of motives, deliberates, wills, or carries out his determination, his brain and his nerves do something definite.

It does not follow, however, that neuroscience can tell us whether defendants are morally or legally responsible for their actions (Morse, 2006; Morse and Hoffman 2007). As Aharoni et al. (2008, p. 145), have put it, “there is not, and will never be, a brain correlate of responsibility.” While informed by empirical knowledge, responsibility is a normative standard (Waldbauer and Gazzaniga, 2000; Sasso, 2009). But science does suggest that some people, in some situations, may find it next to impossible to control their behavior, even if they know it is wrong. Given the prevailing theories of legal responsibility mentioned above, this raises the question of whether the punishment of such persons is either just or efficient (Sasso, 2009).

The legal answer to this question has varied both temporally and jurisdictionally. The history of control tests in the United States is illustrative. Before *M’Naghten*, most U.S. jurisdictions used a simple “right and wrong” test for insanity; by the 1950s, most had adopted common law or legislative versions of *M’Naghten* (Platt and Diamond, 1966). But even before *M’Naghten*, a few courts had supplemented the “right and wrong” test with control tests. These cases were referred to in *Parsons v. State*, where the Supreme Court of Alabama excused from liability a person who, a consequence of a “disease of the mind” and no other cause, had “lost the power to choose between right and wrong, and to avoid the act in question, as that his free agency was at the time destroyed.”<sup>4</sup> Over the ensuing decades, support for control tests among jurists and psychiatrists grew (Redding, 2006; Bazelon, 1976), and in 1962 the American Law Institute included one in its *Model Penal Code* (MPC) (American Law Institute, 1980). By 1980, the MPC standard had

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<sup>4</sup> 2 So. 854 (Ala. 1887).

been adopted in most jurisdictions (Perlin, 2001; Simon and Aaronson, 1988). Further, by this time some jurisdictions had adopted the even broader *Durham*<sup>5</sup> test for insanity, which excused any act caused by a mental disorder (Gerber, 1984, p. 38; Fradella, 2007).

Support for control tests began to diminish, however, soon after one was incorporated into the MPC (Fradella, 2007). Resistance to the defence became especially acute after John Hinckley was found not responsible under the MPC standard for shooting President Ronald Reagan in 1981 (Bard, 2005). Congress adopted legislation removing the control test from consideration in federal cases,<sup>6</sup> as did many states (Fradella, 2007). Currently, a minority of United States jurisdictions use control tests (Redding, 2006). The defence is also uncommon in other common law jurisdictions. Only a few such jurisdictions recognize it, including Ireland (Hanly, 2006; McAuley and McCutcheon, 2000, pp. 662-66), South Africa,<sup>7</sup> and some Australian jurisdictions (McSherry and Naylor, 2004). The defence has been rejected in England and Wales (Simester et al., 2010), Canada (Manning and Sankoff, 2009, p. 428), the Australian states of New South Wales and Victoria (McSherry and Naylor, 2004), New Zealand (New Zealand, 2001), and Hong Kong (Jackson, 2003). As mentioned, control tests are more prevalent in civilian jurisdictions, including France, Germany, Russia, Argentina, and Spain (Simon and Ahn-Redding, 2006; Heller and Dubber, 2011).

The main criticism of control tests, expressed by both courts<sup>8</sup> and commentators (Keedy, 1952; Bonnie, 1983; Slobogin, 2000), has always been that defendants who were capable of controlling their conduct will too often be excused from responsibility. Even with the assistance of expert testimony, the argument runs, it is simply too difficult for judges and juries to distinguish between the capable and the incapable (Morse, 2002). As expressed in *R. v. Byrne*, “there is no scientific measurement of the degree of difficulty which an abnormal person has in controlling his impulses.”<sup>9</sup> Indeed, it was primarily this concern that led both the American Psychiatric Association (1983) and the American Bar

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<sup>5</sup> *Durham v. United States*, 214 F.2d 862 (D.C. Cir. 1954);

<sup>6</sup> *Insanity Defence Reform Act 1984*, codified at 18 U.S.C. § 17.

<sup>7</sup> *Criminal Procedure Act* (No. 51 of 1977), s. 78(1).

<sup>8</sup> See *Cunningham v. State*, 56 Miss. 269 (1879); *U.S. v. Lyons*, 731 F.2d 243, 248 (5th Cir. 1984).

<sup>9</sup> [1960] 2 Q.B. 396, 403-404.

Association (1989) to advocate for the removal of the control test in the aftermath of the Hinckley case. Given this alleged difficulty of measuring control, it is posited, a great many defendants (including those with disorders like kleptomania, pyromania, and pedophilia) would escape punishment (Slobogin, 2003). Commentators have objected to this prospect on moral and deterrence grounds and because it would engender popular dissatisfaction and disrespect for the law (Bonnie, 1983; Waite, 1925, p. 454).

Critics of the irresistible impulse defense are probably correct that it is more difficult to assess and measure impulse control than cognitive impairment (*i.e.*, the inability to distinguish between right and wrong) (American Psychiatric Association, 1983; Hollander, 2006). It is not clear, however, that the difference between the two mental states is categorical (LaFave 2000, p. 342). Cognitive impairment typically stems from major mental illnesses (such as schizophrenia or bipolar disorder) that manifest with obvious, tangible symptoms (such as paranoid fantasies or command hallucinations) (Donohue, 2008). In the forensic context, these conditions are typically easy to diagnose and difficult to feign. That said, it may be much more difficult to assess whether defendants' mental illnesses rendered them incapable of appreciating the wrongfulness of their conduct (Slobogin, 2006, p. 46). It is possible that a significant proportion of defendants excused on this basis retained some capacity, despite their illnesses, to understand that what they were doing was wrong.

Nor is it evident that impulsivity is so clinically nebulous that courts cannot determine claims with reasonable reliability. As elaborated below, the legal standard for volitional control should be defined as a total inability to exert control in the circumstances. Given such a high threshold, and given the claimant's onus of proof, the available scientific and other information should be sufficient to allow decision makers to distinguish between deserving and undeserving claims (Redding, 2006). As we have seen, substantial progress has been made in discovering the neural correlates of impulsivity. Contemporary neuroscience has shown that volitional control can be impaired "just as unambiguously as any other aspect of brain function" (Sapolsky, 2004, p. 1794). It is true that no single diagnostic or evaluative tool (including brain imaging and neuropsychological testing) can establish whether a defendant was incapable of control at the relevant moment (Reeves et al., 2003; Mobbs et al., 2007; Blume and Paavola, 2011). But used in combination, these

techniques (along with all of the other evidence in the case) can provide an adequate basis for the court's decision (Baskin et al., 2007). As Professor Redding (2006) has detailed, the evaluative tools commonly used to assess impulse control differ little from those used to assess cognitive impairment. And while there has been a dearth of research on the question, studies have suggested that clinicians are able to measure control as accurately as cognitive impairment (Rogers, 1987).

There is also little evidence that control tests have been abused in the jurisdictions that use them. A comprehensive study in Maryland, for example, found that court-appointed evaluators only very rarely assessed defendants as being not criminally responsible (NCR) on the basis of volitional incapacity (Donohue et al., 2008). Over a four year period, 1,446 defendants were referred for in-depth evaluations, and 416 were assessed as NCR (29%). Only 11% of these (3% overall) were assessed as NCR on volitional grounds alone. The remaining 89%, in other words, would have been assessed as NCR even if Maryland did not have a control test. And of the 11% assessed as NCR on volitional grounds alone, the vast majority were diagnosed with major mental illnesses such as schizophrenia and bipolar disorder. There was no evidence that evaluators (let alone courts) were making NCR findings on the basis of impulse disorders like kleptomania or pedophilia. Similar results have been found in studies conducted elsewhere. One smaller study found that evaluators made NCR findings on volitional grounds alone in 24% of cases (Wettstein et al., 1991). A larger and more recent study found that in Virginia, only 9% of persons evaluated as insane were found to be so on volitional grounds alone (Warren et al., 2004, p. 182).

In light of recent imaging research, evaluators and courts may become receptive to a broader range of volitional impairment claims. But there is no reason to think that they will examine these cases any less rigorously than they have to date. It bears mentioning in this context that successful insanity claims are exceedingly rare (Perlin, 1994, pp. 236-47; Borum and Fulero, 1999; Valdes, 2005; Reider, 1998, Warren et al., 2004).

Some courts<sup>10</sup> and commentators (Morse 1994; Morse, 1985; Duff, 2005) take the view that deserving candidates for the irresistible impulse defense should normally be exempt from responsibility under a proper

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<sup>10</sup> *State v. Harrison*, 15 S.E. 982 (W. Va. 1892, Brannon J.)



interpretation of *M’Naghten*. If this is correct, control tests do little to thwart deserving insanity findings; they instead serve only to raise the probability of undeserving ones.<sup>11</sup>

This argument is neither empirically nor normatively convincing. As discussed, a small but significant proportion of subjects are assessed as NCR on volitional grounds alone. Psychiatrists also report that they can in many cases clearly distinguish between cognitive and volitional impairments (Wettstein et al., 1991). And as mentioned, in experiments people with frontal lobe damage often exhibit both an awareness of the wrongness of their choices and an inability to stop themselves from making them.

Further, even if it were true that only a very small proportion of defendants would be excused on volitional grounds alone, this would not be a good reason to rely exclusively on a cognitive test. However few in number, defendants who are incapable of restraint despite knowing that their conduct is wrongful are as deserving of excuse as those who lack such an appreciation (Redding, 2006; Seiden, 2004; Sapolsky, 2004).

#### 4. Limitations on the defense

As mentioned, control tests have not been abused in jurisdictions that use them. That said, the graduated nature of impulsivity demands that the defense be defined restrictively. Though it might be an obvious point, many courts have stressed that irresistible impulse cannot apply when there is evidence of planning or deliberation.<sup>12</sup> And as with other iterations of insanity, defendants should bear the burden of proving the defense with reference to expert testimony and other evidence.

Most importantly, the defense should be limited to defendants whose mental disorders rendered them totally incapable of restraint.<sup>13</sup> Many

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<sup>11</sup> It may be possible to stretch the ambit of “knowing” the wrongfulness of conduct to include defendants with no ability to control impulses. As Morse has argued (2002), such defendants could be said to be unable to truly decide between right and wrong action and thus be excused under a liberal interpretation of *M’Naghten*. But as Redding (2006, pp. 94-98) has pointed out, this approach conflicts with the common understanding of the difference between knowing right from wrong and acting in accordance with that knowledge.

<sup>12</sup> See *Snider v. Smyth* (1961), 282 F.2d (4th Cir.); *Dejarnette v. Comm.*, 75 Va. 867 (1881); *Thompson v. Comm.*, 193 Va. 704 (1952); *Bennett v. Comm.*, 511 S.E. 2d 439 (Va. Ct. App. 1999); *Reid v. True*, 349 F.3d 788, 802 (4th Cir. 2003).

<sup>13</sup> *Godley v. Comm.*, 343 S.E.2d 368, 369 (Va. Ct. App. 1986).

offenders are mentally ill (Fazel, 2002; Redding, 2004); with many of these exhibiting brain abnormalities (Pallone and Hennessy, 1998), often centered in the frontal lobes (Brower and Price, 2001; Morgan and Lilienfeld, 2000; Pincus, 1999). Further, some theorists have posited that impulse control deficits are a root cause of much criminal activity (Gottfredson and Hirschi, 1990).

This research has led some to urge the abandonment of retributive models of responsibility (Greene and Cohen, 2004; Kirchmeier, 2004; Snead, 2007). Such calls, however, are politically infeasible and likely incompatible with our (evolutionarily based and neurologically-grounded) instinct for proportional, retributive punishment (Hoffman and Goldsmith, 2004; Nichols and Knobe, 2007; Fehr and Gächter, 2002; Sanfey et al., 2003; Robinson and Darley, 2007; Erickson, 2010; Robinson et al., 2007). For the foreseeable future, the vast majority of offenders with impulse control deficits will continue to be found responsible for their actions (Mobbs et al., 2007; Goodenough, 2004). Of course, evidence of impulsivity may be relevant to other aspects of criminal liability and punishment. In many jurisdictions, deficits in impulse control may be proffered to support claims of diminished responsibility or in mitigation of punishment (Simon and Ahn-Redding, 2006). But a total exemption from responsibility should require a total incapacity to control conduct in the circumstances.

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