

# The Relevance of Neuroscience to Forensic Psychiatry

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As we move further into the 21st century, few would deny the contributions made by the neurosciences to the modern world. Part of the significant progress in neuroscience is based on its notable success in merging approaches from the biological, the psychomedical and the social sciences, a development often referred to as cognitive and social neuroscience.<sup>1,2</sup>

Applied neuroscientific knowledge is finding widespread application in the medical diagnostic and treatment areas and continues to grow at an unprecedented pace. Furthermore, neuroscientific progress made during the past two decades is invigorating fields of practical endeavor, such as forensic neuropsychiatry,<sup>3</sup> developmental psychiatry,<sup>4</sup> and cultural psychiatry,<sup>5</sup> and is paving the way to new areas of knowledge, such as neuroeconomics.<sup>6</sup>

Significant progress in forensic neuropsychiatry also has affected the practice of law, in which an understanding of the complex interplay among mind, brain, and behavior is becoming increasingly desirable and even necessary. Practitioners and scholars of criminal law in particular have taken an interest in neuroscientific developments within psychiatry, forensic psychiatry, and other behavioral sciences. With respect to forensic psychiatry, this trend is not surprising, given that many topics of relevance to it, such as the neuropsychiatric basis of violent behavior,<sup>7</sup> moral decision-making, and the nature of empathy,<sup>8–10</sup> have become the object of intensive study. The success of modern neuroscience also has generated substantial debate about its relevance to the

psychiatric-legal field. The debate has led some legal scholars and neuroscientists to argue that the impressive growth in neuroscience should have little or no impact on contemporaneous developments in criminal law, such as assessments involving the nature of criminal responsibility. From this perspective, the use of new neuroscientific approaches to facilitate our understanding of criminal behaviors and psychiatric disorders that have robust neurobiological bases should have limited relevance to assessments of legal responsibility in the foreseeable future. Therefore, to engage in any consideration from a viewpoint other than a legal perspective would be likely to lead us into a never-ending spiral of category errors.

Neuroscientist Michael Gazzaniga highlights this view when he states that:

[I]n truth, neuroscience can offer very little to the understanding of responsibility. Responsibility is a human construct that exists only in the social world, where there is more than one person. It is a socially constructed rule that exists only in the context of human interaction. No pixel in the brain will ever be able to show culpability or non culpability [Ref. 11, p 100].

To Gazzaniga the intrinsic social nature of the legal construct of criminal responsibility can only be relevantly, and therefore effectively, discussed within a universe of discourse in which the unit of analysis is the world of persons. Gazzaniga's position makes great sense only if we are willing to adopt a highly decontextualized view of human nature. Fortunately, a perspective that decontextualizes minds, pixels, and brains is not the only open avenue for relevant discourse and research. That this is true is made clear by the rise of social neuroscience, an active field of study that seeks to integrate cognitive, emotional, and social aspects of human nature.<sup>9,10,12</sup>

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Legal scholar Stephen Morse<sup>13,14</sup> provides us with a similar but equally relevant view to that of Gazzaniga, in his discussions of the nature of criminal responsibility. To him, an indispensable quantum of discourse regarding criminal responsibility lies in his conceptualization of free will and causation. He makes a seemingly reasonable assumption in that, “For the purposes of the free will debate, a cause is just a cause, whether it is biological, psychological, sociological or astrological” (Ref. 13, p 172). He concludes that “. . . all behavior is caused, but not all behavior is excused, because causation *per se* (emphasis added) has nothing to do with responsibility” (Ref. 13, p 177). Morse’s comment on the relation of self control to human responsibility is further clarified when he states:

Although neuroscientific evidence may surely provide assistance in performing this evaluation, neuroscience could never tell us how much control ability is required for responsibility. That question is normative, moral and, ultimately, legal [Ref. 13, p 179].

I am inclined to agree with Morse,<sup>13</sup> and the neuroscientists Greene and Cohen,<sup>15</sup> in that current neuroscientific knowledge is not likely to bring about fundamental changes in current legal doctrine. However, Morse and like-minded scholars also believe that failure to follow his reasoning lies at the root of confusing the cause and the rational thought leading to the relevant criminal behavior, which is what ultimately and decisively drives the legal concept of criminal responsibility. He terms this problem the “fundamental psycho-legal error” (Ref. 13, p 180). It is difficult to agree fully with this view because practical real-world explorations of psychiatric-based disability do matter. Locating a relevant spatiotemporal context can be very helpful in determining the objective likelihood of a reported disability. Second, understanding the nature of cause is intuitively important, because it can inform us about the proportionate role that a biological deficit or a person’s choices may have had in generating a behavior. For example, people are inclined to ascribe a greater degree of responsibility to a man who commits an assault if he did it in association with alcohol intoxication than to a man with a similar degree of disability whose dysfunction dates to an orbitofrontal brain injury from a stroke.

Finally, the contention of Morse<sup>13,14</sup> that criteria for legal responsibility are behavioral, moral, and normative and that therefore “neuroscience could never tell us how much control is required for responsibility,” appears overstated. The idea that criteria, which are the result of a specific viewpoint, can determine what is normative, whether the relevant factors are behavioral, moral, or otherwise sounds unrealistic and is ultimately counterproductive. This is especially true in discussions involving questions of social responsibility, whether they are legal, neuroscientific, psychiatric, practical, or theoretical. Therefore, I sense that this debate regarding the applicability of the neurosciences to forensic psychiatric questions is partially driven by concerns involving the ability to influence relevant discourse. These include the power to promote the dissemination of knowledge and the ability to influence important issues and real-world outcomes such as the implementation of social policy.<sup>16,17</sup> Moreover, if we were to confine our inquiries to the realm of educating others, it is important to emphasize that substantial progress has already taken place in key relevant areas such as the functional neuroanatomic basis of morality and empathy,<sup>8,10</sup> a finding which at the very least suggests that society, including juries, may benefit from considering this knowledge in some cases.

Modern psychiatry, with its longstanding tradition of reliance on the biopsychosocial model,<sup>18</sup> provides us with a potentially broad and more inclusive view of human responsibility. From a psychiatric-legal perspective, this would mean that the nature of human responsibility should be recognized for its basis in the interdependence of psychological and social factors, but also in the diversity of biological structures, which may be normally functioning or be within the abnormal domain of known neuropsychiatric disorders. If this is true, we would expect that issues of a neuroscientific (including those of a forensic neuropsychiatric) nature would receive adequate attention in forensic psychiatry. This is an important consideration, given the increasing saliency of neuroscientific progress and the high likelihood that this knowledge will affect the practice of psychiatry in general, including forensic psychiatry.

Arguably, forensic neuropsychiatry will culminate in the development of more clearly articulated algorithms necessary to interconnect, both conceptually and practically, multiple levels of organization, such as the relation between functional brain anatomy and

psychological function. The resultant paradigms will facilitate the practical integration of relevant neuropsychiatric knowledge and psychiatric-legal issues such as those involving the nature of criminal responsibility and other legally important phenomena, such as the nature of remorse.

However, we should also consider that the debate about the utility of neuroscientific paradigms in psychiatric-legal settings may be crucially determined by promoting professional environments within forensic psychiatry that facilitate the introduction and dissemination of relevant neuroscientific knowledge within the field. There are encouraging indications of an increasing neuroscientific interest within forensic psychiatry. This is highlighted by the creation of forensic neuropsychiatric committees in forensic psychiatric organizations,<sup>3</sup> symposia that focus on the interface between neuroscience and the law,<sup>19</sup> the implementation of forensic neuropsychiatric courses in forensic psychiatric conventions,<sup>20</sup> and publications that highlight an increasing interest and sophistication of relevant knowledge, both practical and theoretical.<sup>11,21,22</sup>

However, despite increasing interest in neuroscientific knowledge within forensic psychiatry, there is still a noticeable gap in the field between that interest and functional implementation of its practice. Several points may have to be more formally addressed: One potential area involves teaching of neuropsychiatric approaches to general psychiatrists. For example, a basic level of education and training in neuroimaging appears to be emerging as a potential necessity in psychiatry. Neuropsychiatric disorders that may be of legal interest, such as the dementias or head injuries, may require a basic understanding of neuroimaging methods.<sup>22-24</sup> Also, numerous functional neuroimaging studies, as well as other neuropsychiatric technologies, have shown that major psychiatric disorders such as major depression and schizophrenia also have strong biological bases.<sup>25</sup> These disorders can present with complications of a serious psychiatric-legal nature. Despite this, there appears to be a noteworthy need for integrating neuroscientific knowledge in forensic psychiatry. Therefore, more concerted efforts within forensic psychiatry are needed to help promote education about subjects with a forensic-neuropsychiatric dimension, as well as to explore ways to make practitioners of forensic psychiatry more proficient in the practical application of neuroscientific knowledge.

An area of needed improvement concerns forensic neuropsychiatric report writing. While information and expertise exist for preparing effective forensic neuropsychiatric reports,<sup>22</sup> there is nonetheless a visible need for improvement in this area. This problem is exemplified by the use of neuroimaging experts in criminal cases. Not infrequently, in these contexts, experts provide testimony without preparing adequately written accounts of their findings and reasoning in the form of a psychiatric-legal report. While the dearth of effective psychiatric-legal reports in these situations may be explicable as effective legal strategy or may be due to fiscal limitations within the legal system, the outcome may result in a lost opportunity for developing effective forensic neuropsychiatric reports and related algorithms.

Another area in need of attention is highlighted by the current emphasis on forensic neuropsychiatric evaluation for cognitive dysfunctions and a lack of methodological applications for effective assessments of affective and social deficits with neurobiological bases. To a significant extent, this situation is explicable by an inherent historical bias in the development of neuropsychological and neuropsychiatric tools that focus on cognitive rather than affective functions. Nonetheless, recent advances in the area of affective and social neuroscience have provided a sufficient informational base to begin addressing these concerns in a more concerted manner.<sup>1,9,10,12</sup>

We should also recognize that constraints in current neuroscientific knowledge, both practical and theoretical, will continue to impose substantial limitations on the application of neuroscientific methods, such as in the area of functional brain imaging.<sup>21,26,27</sup> Nonetheless, the dissemination of information derived from neurosciences and forensic neuropsychiatry may constitute important avenues for improved education of juries, mental health professionals, and society at large.

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