

Neurolaw and Neuroethics

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Abstract: This short article proposes a conceptual structure for “neurolaw,” modeled loosely on the bipartite division of the sister field of neuroethics by Adina Roskies into the “ethics of neuroscience” and the “neuroscience of ethics.” As normative fields addressing the implications of scientific discoveries and expanding technological capacities affecting the brain, “neurolaw” and neuroethics have followed parallel paths. Similar foundational questions arise for both about the validity and utility of recognizing them as distinct sub-fields of law and ethics, respectively. In both, a useful distinction can be drawn between a self-reflexive inquiry (the neuroscience of ethics and law) and an inquiry into the development and use of brain science and technologies (the ethics and law of neuroscience). In both fields, these two forms of inquiry interact in interesting ways. In addition to a proposed conceptual structure for neurolaw, the article also addresses the neurolegal versions of the critiques made against neuroethics, including charges of reductionism, fact/value confusion, and biological essentialism.

Keywords: neurolaw; law and neuroscience; neuroethics; responsibility

Introduction

The purpose of this short article is to propose a conceptual structure for “neurolaw” modeled loosely on the common division of the sister field of neuroethics into the “ethics of neuroscience” and the “neuroscience of ethics.”¹ Neuroethics is more firmly established as a field than neurolaw. Neuroethics, unlike neurolaw, is supported by dedicated journals, degree programs, and scholarly societies. It is not clear that neurolaw has achieved or will achieve the status of a legal field, but this is not an essential question or problem. There is still value in creating a label for an area of inquiry like “neurolaw” around which those interested in a common set of issues can coalesce and can find the relevant scholarship. There is also value in describing the shape or scope of the area of inquiry. A sense of the issues being considered, their relationships to one another, and the methods adopted is useful for identifying gaps and weaknesses. The article closes by considering some of the critiques levelled against neurolaw, which parallel those levelled against neuroethics. The continued utility of these fascinating areas of inquiry requires that these cautionary notes be considered carefully.

Emergence of Neurolaw

The term “neurolaw” was coined by J. Sherrod Taylor in the early 1990s to capture the set of issues involved in civil litigation involving brain injury, including the neuropsychological expertise needed.^{2,3} Of course, legal interest in the brain and brain science (and pseudoscience) was older and broader than this. For example, the law has engaged with emerging technological and clinical developments such as the emergence of electroencephalography (EEG) and psychosurgery in the mid-twentieth century.⁴ Another important piece of twentieth century neurolaw was the adoption of the legal concept of brain death. Earlier, now discredited, theories

such as phrenology were also discussed in the nineteenth century in the context of the criminal justice system.^{5,6} This was also the era of Lombrosian biological criminology, which sought to understand crime in neurobiological and other physiological terms.⁷

The current and broader use of the term “neurolaw” developed in line with the recent explosion in the use of the “neuro” prefix, including terms such as “neuroethics,” “neuroaesthetics,” “neurotheology,” “neuropolitics,” and “neuroeconomics,” to name only a few.⁸ This lexical creativity reflects the increased societal attention to neuroscience, driven in part by technological advances such as functional MRI (fMRI) and by rapidly expanding research and publication in the field.⁹

An important effort to develop the field of neurolaw was conducted through the MacArthur Foundation Law and Neuroscience Project, launched in 2007.^{10,11} The Project’s “Law and Neuroscience Bibliography” reveals a rapid and increasing growth since 2000 in the publication of articles focusing on how neuroscientific research might be relevant to the law.^{12,13,14}

Is Neurolaw a Field of Law?

The recognition of new academic fields is a recurrent and reliable source of disagreement, and the law is no exception. The dispute over “cyberlaw,” another field organized around technoscientific change, offers a useful precedent for neurolaw. A debate well known to law and science enthusiasts was launched by Judge Frank Easterbrook in his article criticizing cyberlaw as a kind of “law of the horse.”¹⁵ “[T]he best way to learn the law applicable to specialized endeavors is to study general rules. Lots of cases deal with the sale of horses; others deal with people kicked by horses; still more deal with the licensing and racing of horses, or with the care veterinarians give to horses, or with prizes at horse shows. Any effort to collect these strands into a course on “the law of the horse” is doomed to be shallow and to miss unifying principles.”¹⁶

Many responses can and have been made to this argument. Larry Lessig responded to Easterbrook by pointing out that the focus on cyberspace allows us to reach insights about the nature of the law and regulation that apply well beyond cyberspace.¹⁷ For example, he pointed out how the technological architecture of cyberspace—the software and hardware with which it is built—constitutes a system of law in itself, containing embedded values and constraints on behavior. The study of cyberlaw thus focuses attention on deeper theoretical issues such as the nature of law and regulation, the source and legitimacy of legal rules, as well as cross-cutting theoretical and practical problems posed by conflicting systems of behavioral regulation. In other words, attention to certain specialized fields may offer insights of broader application in the law. Whether or not there is such a thing as a practicing “cyberlawyer” is not the essential point.

Ultimately, legal taxonomy is always somewhat arbitrary. The objective of the taxonomic exercise may vary, but the idea is to identify significant patterns in the law that serve the objective.¹⁸ A label like neurolaw or “law and neuroscience” is justified if and while it is useful. For now at least, it seems likely that neurolaw, like cyberlaw, will serve a useful nucleating function at the social and intellectual levels. It offers a label around which people interested in a similar set of questions and issues that cut across multiple classical domains of the law can

organize themselves. At the intellectual level, the types of theoretical insights offered by cyberlaw are also likely to occur with neurolaw. Not only are legal questions organized differently and in association with other disciplines (i.e., the brain sciences), but neurolaw also encourages the type of self-reflexive focus described by Lessig.¹⁹ Neurolaw encourages the law to examine its own fundamental concepts and procedures in a potentially productive way.

A Proposed Structure for Neurolaw

The question remains how best to organize the burgeoning field of neurolaw. Leaders in the field have proposed several helpful conceptual structures.^{20,21,22,23,24} These structures together highlight a number of features: novel legal problems related to brain research and interventions, novel ways to solve existing legal problems such as detecting mental states or improving forensic risk assessment, the potential reevaluation of fundamental legal concepts, and the study of the neurobiology of moral and legal decisionmaking.

The structure proposed here builds on these ideas, translating the bipartite structure that Roskies proposed early on for the developing field of neuroethics, namely the “ethics of neuroscience” and the “neuroscience of ethics” into the “law of neuroscience” and the “neuroscience of law.”²⁵ This remains an appealing organizational structure, and is reflected in the organization of major recent anthologies in the field.²⁶ One of the reasons it is appealing is that it brings together two domains of inquiry that might otherwise remain separate, and invites one to look for feedback links or possible interactions between the two. One interesting possibility is that scientific understanding of moral or legal reasoning might lead to calls to modify moral or legal reasoning (“moral bioenhancement”) to make people more willing to sacrifice individual liberties for the common good. If these modifications were to be adopted widely, we might change the general character of moral or legal reasoning in ways that would make society more receptive to further changes of this type.

In neuroethics, there are some supplementary topics that could perhaps be placed within the bipartite division, but they may cut across it or they may be sufficiently important to justify independent identification as subdivisions. For example, Eric Racine identifies “public and cultural neuroethics,” which addresses policy issues such as resource allocation, public understanding and engagement with neuroscience, and cultural representations of mental illness.²⁷ Liana Buniak and colleagues identify a subdivision that they call “neuroethics and society/international neuroethics,” which includes among other things multicultural issues and perspectives in neuroethics, as well as certain cross-cutting issues such as neuroethics education.^{28,29} In addition, the project of “critical neuroscience” focuses on the bidirectional relationship between society and the behavioral and brain sciences.³⁰ However, critical neuroscience is distinguished from neuroethics, as it includes neuroethics as an object of study and critique as a social and cultural phenomenon.³¹

In the legal context, similar cross-cutting issues or independently important topics or approaches exist. There are flourishing schools of legal sociology and critical legal studies, and scholars are already offering critical examinations of neurolaw itself or are taking critical (e.g., feminist or disability) perspectives on the use of neuroscience in the law.^{32,33,34,35}

These categories are meant to be broad and to cut across classic divisions of law such as criminal, tort, employment, human rights, or evidence law. This does not

Table 1. Proposed Structure for Neurolaw

Division of neurolaw	Subdivision	Examples
(1) Law of neuroscience	(a) Legal response to brain interventions	Regulation of brain interventions <ul style="list-style-type: none"> • Coercing use or protecting against coercive use • Enabling or requiring access • Restricting or prohibiting use • Assigning responsibility in relation to side effects of brain interventions (e.g., brain-computer interfaces) • Property rights in brain-related technologies
	(b) Legal response to brain injury or impairment	Legal or regulatory measures aimed at <ul style="list-style-type: none"> • Prevention • Compensation • Protection of people with brain injuries or impairments.
	(c) Legal response to the collection and use of brain-related information	The growing collection of brain-related information will increasingly raise legal issues <ul style="list-style-type: none"> • Collection • Use • Disclosure • Security and integrity of information
(2) Neuroscience of law	(a) Impact of brain sciences on legal concepts and categories	Impact of neuroscience on legal definitions and tests <ul style="list-style-type: none"> • Capacity • Responsibility • Death • Disability • Harm These issues may in future arise in different ways as a result of broader technological changes allowing for artificial or modified human “brains” <ul style="list-style-type: none"> • Artificial intelligence • Brain organoids • Neuroprostheses and brain-computer interfaces.
	(b) Impact of brain sciences on policy and practices within the broader justice system	Use of brain science to evaluate and reform practices <ul style="list-style-type: none"> • Solitary confinement • Capital punishment • Approaches to criminal rehabilitation
	(c) Understanding and improving decisionmaking by actors in the legal system	Use of brain science to understand and address decisionmaking problems (e.g., bias, empathy fatigue, post-traumatic stress disorder) <ul style="list-style-type: none"> • Juries • Judges • Policing Use of brain science to improve legal decisionmaking by parties <ul style="list-style-type: none"> • Dispute resolution procedures such as mediation • Supported decisionmaking procedures

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Table 1. Continued

Division of neurolaw	Subdivision	Examples
	(d) Detecting and predicting legally relevant mental states and behavior	Use of neuroimaging to detect mental states. <ul style="list-style-type: none"> • Pain • Memory • Deception • Sexual interests Use of neurogenetics or neuroimaging to predict future behavior <ul style="list-style-type: none"> • Monoamine oxidase (MAOA) A allele • Impulse control³⁶
(3) Self-reflexive issues and critical legal studies	(a) Self-reflexive issues	Issues related to the practice of law <ul style="list-style-type: none"> • Professional responsibility and ethics • Regulation of the legal profession • Legal education (students, lawyers, judges)
	(b) Critical neurolaw	Critical studies (e.g., from a race, gender, disability, class, or other perspective) <ul style="list-style-type: none"> • Critiques of neurolaw scholarship • Critiques of the use of neuroscience in legal practice

mean that they are not prominent features of neurolaw. For example, even though the admissibility of neuroscientific evidence is widely discussed in neurolaw, the law of evidence is not explicitly mentioned here. Rather, it will likely have an important role in many of the areas of neurolaw discussed here. The categorization is also provisional, and will need to adapt as the neuroscience and technology changes, and also as moral and legal concepts evolve (e.g., Francis Shen predicts a neuroscience-driven shift in the legal response to animal rights³⁷).

Critiques of Neurolaw

Healthy neurolaw scholarship will depend on careful engagement with the lines of critique that have been made about neurolaw, as well as those made about neuroethics, to the extent that they translate to neurolaw.³⁸ A partial list of critiques of neurolaw is presented in Table 2.

Table 2. Possible Critiques of Neurolaw

General critique	Discussion
Reductionism	<ul style="list-style-type: none"> • Neurolaw prioritizes the brain in its attempts to understand and address human behavior. This runs the risk of using an overly simplistic and incomplete picture.^{39,40} • The incorporation of multidisciplinary (e.g., psychological and social scientific) approaches to the human mind and behavior may help to offer a more comprehensive and effective understanding.⁴¹

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Table 2. Continued

General critique	Discussion
Essentialism	<ul style="list-style-type: none"> • Neurolaw encourages the view that neurobiology is an important and defining characteristic of classes of people. This may have dangerous social implications, and may also encourage self-fulfilling prophecies as people see themselves and are treated differently according to their class.⁴²
Neurohype or neuromania	<ul style="list-style-type: none"> • There is a risk of “irrational neurolaw exuberance.”⁴³ In other words, neuroscience and technologies may be applied in ways that are unjustified conceptually or by the state of the science. This may be driven by a desire for major reform in criminal justice, or by the desire for simple answers to difficult legal problems.^{44,45}
Naturalistic fallacy or abdicating to science the role of making legal policy	<ul style="list-style-type: none"> • Neuroethics is sometimes said to be at risk of the naturalistic fallacy of deriving ethical positions (the “ought”) from natural facts (the “is”). The relationship between law and morality is not straightforward. In short, natural law theories regard laws as valid if they are morally justified, but legal positivism views laws as valid if made according to specified social conventions. A formulation of the naturalistic fallacy for the positivist legal context would perhaps point to the risk that neurolaw will abdicate its role of reaching legal policy positions by adopting what appear to be policies entailed by neuroscience. There are ample historical precedents of the dangers of deriving social and legal policy from scientific propositions (e.g., eugenic laws).^{46,47,48}
Lack of independence	<ul style="list-style-type: none"> • One of the concerns about neuroethics is that it may be captured by a neuroscience research agenda, and function more to support continuing research than to independently evaluate it.⁴⁹ • A slightly different point can be made about the law, which tends to incorporate and normalize efficient technological innovations (i.e., those that most efficiently resolve a social problem).⁵⁰ In so doing, moral values and legal policies are shifted. • Awareness of the various potential pressures on normative evaluation of neuroscience and technology is essential for making deliberate and informed ethical or legal decisions.
Dilettantism	<ul style="list-style-type: none"> • There is a risk that lawyers and judges will have an inadequate understanding of neuroscience and technology, leading to benignly naïve or dangerous use of neuroscience. Similarly, some scientists have been criticized for taking normative stances insufficiently informed by ethical theories and legal knowledge. • This is a general concern with interdisciplinarity that should be taken seriously, through education and training as well as through collaboration among experts.⁵¹

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General critique	Discussion
Over-breadth	<ul style="list-style-type: none"> The law is concerned with human behavior, and the brain is relevant to all human behavior. Wolf warns that there is a risk that neurolaw could expand to be about everything, and that it will become difficult to see what is distinctive about the field, what core challenges it poses, and how to organize our thinking.⁵²

Conclusion

Neurolaw is a young but very promising field of inquiry. It is most unlikely that there will be such a thing as a practicing “neurolawyer,” just as there are no lawyers specifically practicing in many other well-established fields of law, such as contract law or evidence law. However, this does not detract from the value of examining the law and legal system from the perspective of how they might intersect with the brain sciences. The law has in the past had to respond to new information and theories about the brain and behavior, as well as to techniques to intervene in the brain, and will probably have to grapple with these at an increasing rate in the future. Of particular interest in neurolaw will be the impact of brain sciences on legal concepts. Whether or not brain sciences *should* affect attributions of criminal responsibility, there will be a question of whether and how they *do* affect these judgments. At the same time, there are risks associated with the use of brain sciences in the law, as past episodes of enthusiasm for using science in social and legal policy have demonstrated. A self-critical perspective will, therefore, be an important part of the field.

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