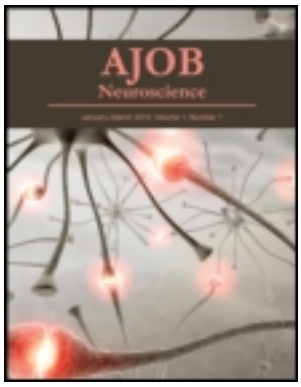

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Abstracts

Top 25 Abstracts from 2012 Annual International Neuroethics Society Meeting in New Orleans

1. Revisiting the Brian Dugan Trial: Is Evidence from Brain-Imaging Technology Ethically Relevant to Criminal Justice?

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Background

Neuroethics is an emergent subfield in bioethics that investigates the ethical implications of advances in neuroscience and brain-imaging technology, as well as their impact on the understanding of how the human brain functions, and how we view ourselves as moral agents. Given the connection between brain and behavior, advances in neuro-imaging technology do offer key breakthroughs in understanding the neurological basis of human behavior. These advances could potentially revolutionize the criminal justice system offering deeper insights into the neural and causal foundations of criminal or antisocial behavior. Critical ethical questions, nonetheless, come to bear, regarding the use of brain-scan evidence in criminal trial.

Problem Statement

Is the admissibility of neuro-imaging evidence in criminal justice proceedings ethically relevant to adjudicating culpability and gauging moral responsibility? The case of Brian Dugan, an Illinois resident, who was convicted for the rape and murder of 10-year-old Jeanine Nicarico, was a premier in the admittance of fMRI [functional magnetic resonance imaging] evidence in criminal court. Using the Dugan case as a departure point, we investigate the relevance of neuro-imaging evidence to criminal justice. In the light of key ethical principles—of justice, of autonomy and moral responsibility, and of respect for persons—we explore the law of evidence, and the federal rule of evidence undergirding the use of scientific evidence, particularly brain-imaging evidence, in criminal prosecution. From the perspective of neuro-experts, we also examine the science of brain imaging and the question of objectivity in measuring cognitive functions and determining mental capacity.

Method

Several relevant literatures, both legal and neuro-scientific, as well as court proceedings/legislations, were critically examined and analyzed. Together with the Dugan case, three other similar proceedings in which neuro-imaging evidence was admitted in criminal court were examined. Likewise, several legal documents, including the Federal Rule of Evidence and *Daubert v. Merrell Dow Pharmaceuticals*, were critically reviewed. In addition, several neuro-imaging research studies were examined to understand causative and correlative relationships between neural correlates and specific human behavior.

Results

All of the cases involved a capital crime. There was divergence among the neuro-experts regarding the relevance of neural correlates to particular kinds of behavior outside a standard behavioral assessment. Within legal circles, an fMRI could be equally used as a mitigating and aggravating factor, thus posing questions of relevance and ethical dilemma. Ideally, with a preponderance of published peer-reviewed and unchallenged research results that demonstrate a precise "causal relationship between a particular brain anomaly and a specific criminal behavior" (Nugent 2009, 1), and brain-imaging evidence that was taken within proximity to the time a crime occurs, it would be unjust and certainly unethical to impose severe penalties on a defendant not even for reason of deterrence, since the causal factor of the criminal behavior was an anatomical and physiological force that surpassed the defendant's control (Nugent 2009). In reality, however, establishing such a direct causal relationship still remains inconclusive for many reasons. While there have been significant advances in understanding the neural foundations of criminal behavior in the fields of cognitive neuroscience and forensic psychiatry, there has been a marked reluctance within certain scholarly circles in justifying behavior on biological and brain-related determinations.

Conclusion

While we observe that the import of neuro-imaging evidence could offer potential benefits to the adjudication of

this end, we propose a neuroethical framework, the Procedural Integrated Model, PIM, which can be used to assess the ethical, social, and regulatory bases of using neurotechnologies in predicting and initiating preventive measures against psychopathy, and perhaps other forms of socially aggressive/violent behaviors.

We illustrate how this model can be engaged to (1) examine if and how current iterations of assessment neurotechnologies can be used in these approaches; (2) guide a process of gap identification, gap analysis, and gap compensation (GAIC) that can be employed as an explanatory metric to address the strengths and limitations of specific neurotechnologies; (3) critically analyze the technical, clinical, ethical and legal issues, questions, and problems that arise from such uses of these technologies; and (4) develop ethical and legal standards to fortify and validate the use of various neurotechnologically based assessments to determine medical, legal, and social criteria for intervention. Using psychopathy as exemplar, we provide a case study to pose and assess the validity of the model, within both a clinical and social framework.

19. Enablement: A Neuroethical and Legal Course Between the Scylla of Treatment and Charybdis of Enhancement

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The use of neuroscience and its technologies to alter cognitive, emotional, and/or behavioral capabilities gives rise to mixed connotations about the meaning and value of treatment(s) and enhancement(s) for both the affected individuals and the societies in which they live. We opine that a more context-dependent and situational definition, which we have termed "enablement," should be applied to situations wherein neuroscience and technology are used to facilitate aspects of human capabilities within a sociolegally and ethically sanctioned silo of public activity and utility. These silos include occupations such as law enforcement officers, firefighters, and of course, at least certain factions of the military. We need not be limited to these categories, however, as this list could well include airline pilots, physicians, et al., given that the sanction refers to and reflects the responsibility (and capability) of those in these occupational silos to (acutely) care for the safety, protection, and lives of persons in their charge.

Optimization of key positive attributes (viz., enablement) of these professionals would serve to improve individual performance (i.e., incur micro level effects) as an axiomatic responsibility borne of these professions to uphold the protection, safety, and well-being of a society or public community (i.e., a macro-level effect). The professional domains, attributes, capabilities, and the types and extent of optimizations should be addressed and determined through public consensus, and would then be made available—with full, actively informed consent as a matter of autonomous choice—to constituent personnel within these professions.

Yet enablement still incurs questions of (1) who among these groups—and/or others—should and shall be enabled, (2) to what extent can/should they be enabled, and (3) what happens—and will be done—when enablement is no longer an option, that is, the individual is no longer in a sanctioned silo of use? Will we see some iteration of what our group has termed "post-enablement distress syndrome" (PEDS)? And if so, how can and should it be addressed? Does PEDS dictate "treatment"? And are such treatments merely the provision of the "enablement" after the fact, and thus medicalized "enhancements," or should we begin to develop unique and distinct approaches to PEDS? What group(s) or agencies should bear responsibility for these interventions, and what is the duration of these responsibilities? We present enablement as a potentially valid and valuable construct, and explicate possible ways that neuroscience, neuroethics, and policies may be employed to address and resolve the potentially problematic issues that may be fostered from its articulation in practice.

20. Sentient Machines and the Viability of Neuroethical Constructs in Robo-Ethics and Policy

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The notion of sentient machines is becoming a more relevant issue in ethical, legal, social, as well as policy discussions, given the rapid advancement of both autonomous hardware and artificial intelligence software. In light of this progress, there is a realistic need to preemptively consider in what form and to what extent an ethical system should be developed and articulated to guide and govern the use of, and human interactions with, such devices. We assert that commonly referenced ethical models, including Asimov's (fictional) Three Laws for Robotics or Canning's (nonfictional) Concept of Operations for Armed Autonomous Systems, are insufficient, and new models are required that more accurately reflect the potential tensions generated by the engagement of sentient machines in human society. In this respect, we posit that (1) neuroethics can and should provide a basis for the formulation of roboethics; (2) such ethics should be derived from a (neuroscientifically based)