Neuroscientific Evidence in Determining Criminal Responsibility and Predicting Future Re-Arrests

I. Introduction

The field of neuroscience is often referred to as the 'final frontier' of medicine. The last true hurdle to understanding human behavior. Behavior that, if properly examined, can prove a powerful tool in diagnosing the behavior which motivates human activity and in predicting the likelihood of criminal re-arrest. The newest, arguably most complex of the life sciences, neuroscience could be considered too juvenile for matters as important as the law. The weight of dealing with the futures and the lives of our population is a valid one - especially when mixing the two fields of science and the law. Though youth need not necessitate naivety. And neuroscience as a practice, as does law, recognizes and values the importance of human life. Just as precedent is set as new issues arise in law, new fields of science should not be disregarded due to their novelty. It is the groundbreaking nature of neuroscientific evidence that allows a court to examine behavior in ways that were not done previously. A method that is backed by the reliability of the scientific method.

Neuroscientific evidence is already well-established for many, more conventional medical court cases. This medical reliance is evident in cases such as *Radford v. Colvin*[2], where the deservedness of a conclusive presumption relies upon the proper diagnosis of nerve root compression. Years ago, the understanding of dorsal root ganglion and nerve root compression was simply not there. Though the field of neuroscience soon progressed to the point of utility and has since proved useful in the eyes of the law. Less concrete, visibly physical components of neuroscience should be treated no differently. Though the field of neuroscience is still in its developmental stages, the science is both beneficial and sound enough that courtrooms should consider the application of neuroscientific evidence a valid tool in determining criminal responsibility and in predicting future re-arrests.

This paper will discuss the use of neuroscientific evidence in the courtroom through the lens of determining criminal responsibility and the prediction of re-arrests. The paper will not venture into the use of neuroscientific evidence in determining the ability to stand trial. The issues of witness reliability or in choosing jury members by means of neurological evaluation are also not within the scope of this paper.

II. Determining Criminal Responsibility

From a legal standpoint, criminal responsibility considers two main factors regarding mental status: intention and sanity[1]. Both factors, on the surface, can be fleeting and difficult to determine. Though both factors which can be accurately examined through the lens of neuroscience. There are a vast collection of neural circuits. Many of which are completely understood today. Those circuits involving the frontal lobe and executive control and sense of self, the basal ganglia and empathy, of various cortical areas and intelligence, have been explored sufficiently enough to warrant scientific and legal reliability. Concrete knowledge and examination of these brain areas should be applied as frequently as possible when attempting to determine criminal responsibility.

The field of neuroscience has been particularly useful in determining the intent behind criminal actions. Of exemplary note is the case of *Miller v. Alabama*. In this suit, two fourteen year olds ‘were convicted of murder and sentenced to life imprisonment without the possibility

of parole'[3]. Consideration of the frontal lobe, which governs the executive control over behavior was paramount to the fate of these teens. Front-brain development proved that there are indeed 'fundamental differences between juvenile and adult minds' that should also be considered during sentencing[3]. In fact, these differences were found to be so severe that the court ruled sentencing of minors (who maintain diminished frontal lobe development) to life without the possibility of parole is unconstitutional - in violation of the Eighth Amendment[4]. Their underdeveloped brains can simply not be held to the same standard of responsibility as those of adults. This now basic tenet of neuroscience, minors having decreased executive capacity, and its associated case have served as important legal precedent as of 2012. Precedent that, without the assistance of the field of neuroscience would not have been realized. Cases such as *Graham v. Florida* have set the stage for this decision, validating the science used to back the law[5].

Additional cases surround both the topics of intent and sanity concerning criminal responsibility. Take, for example, the application of *Atkins v. Virginia*[6]. Here, Daryl Atkins, a mentally retarded defendant, was convicted of several crimes, including abduction, armed robbery, and capital murder. Reversing the court's decision, which cited *Penry v. Lynaugh*[7] as precedent, a certiorari was issued noting that the death penalty is unconstitutional when applied to mentally retarded prisoners[4]. This was largely due to the fact that the brains of those who border mental retardation lack many of the frontal lobe capabilities of normal functioning adults and are to be considered less culpable than ordinary defendants. This rule of law is continued in other notable cases, as with *People v. Weinstein*, in which PET scans aided in determining that criminal responsibility decreases in accordance with decreased mental faculties[8]. Here, frontal lobe lesions resulted in decreased frontal lobe capacity, inducing a sort of mental-retardation in line with the abilities of a child. Without these neuro-scientific guidelines aiding in the determination of intent and sanity (and hence criminal responsibility), the associated legal cases would have been significantly less clear.

Concerning solely states of sanity, further cases have been paramount in setting neuroscientific precedent. Such cases include that of *People v. Adams*[10]. Here, the newly identified MAOA gene was used to exemplify predisposition towards aggression. The gene was noted to cause aggressive fits that are often likened to mild bouts of insanity. While in the case, it was the defendant that brought forward evidence of his neurological state (by inclusion of expert testimony that discussed his ADD tendencies and possession of the MAOA gene), the prosecution advised that this information should not be used to evoke compassion, but as an example of a lifelong pattern of behavior that was controllable and did not lead to lack of understanding. Hence further supporting the recommended penalty of death[10]. Genetic material is evidence that can be very clearly tested for, and vastly useful in determining levels of sanity. Such tests of insanity have also been utilized in reference to schizophrenic defendants. Through brain scans, it is possible to determine whether schizophrenic tendencies are in remission at the time of a given crime[11]. As with *People v. Goldstein*, what would normally be considered speculation (whether a schizophrenic is in remission) can now be scientifically measured and used to conclude whether an illness is being used as an excuse, or should be a valid consideration in determining criminal responsibility.

III. Prediction of Re-Arrest

Unlike minors, who are assumed able to move past their incomplete neurological development and into a level of higher understanding (hence decreasing their likelihood of repeated behavior), there are many neurological conditions that indicate a lack of reformability. Conditions such as these, as they are able to be concretely determined with neuroscientific evidence, strongly aid in predicting the likelihood of re-arrest. Take, for example, Marcus Adams in the aforementioned *People v. Adams* case[10]. Consideration of his MAOA gene aided in guiding the jury to believe that the aggressive behavior associated with Adams constituted a lifelong pattern that, due to the gene, would have little likelihood of changing. Without the ability to become reformed, a death penalty or lifelong sentence without the possibility of parole is much more appropriate than other reduced sentences[9].

This idea is furthered in the case of *Stanley v. Litscher*[12]. Here, Jon Litscher could not be considered a candidate a rehabilitation program he hoped to enter in order to increase his likelihood for release. To his dissatisfaction, a clinical diagnosis of psychopathy disqualified him for such a program. Clear, clinical determination of psychopathy proved a tool in preventing entry to a program that could have led to the release of a prisoner who was not, in fact, reformed and who had a higher likelihood of repeated behavior[12]. As with determination of criminal responsibility, prediction of future re-arrests are significantly less objective with the aid of neuroscientific evidence.

IV. Limitations

Every practice, neuroscience included maintains certain limitations. Though those associated with neuroscience are not to be taken as reason to abandon the inclusion of neuroscientific evidence. For example, many novel neuroscientific methods are currently not considered as admissible in court until generally accepted by the scientific community. This is the case with *Daubert v. Merrell Dow Pharmaceuticals*[13]. Further, some methods prove inconclusive. And do not aid in providing the clarity sought by the use of neuroscientific evidence, as with the failure of PET scans to prove incompetency for the *Jackson v. Calderon* case[14] or the failure of fMRIs to pinpoint lies concerning wrongdoing in the *United States v. Semrau* case[16]. Though at one point in time, it was thought that minors possess the same mental capacity as adults. At one point in time, genetic testing was not advanced enough to acknowledge the presence of the MAOA gene prior to death. And these techniques, as are many others, are widely practiced today. The youth and novelty of a method now should in no way deter the courts from the application of those methods indefinitely.

Some types of neuroscientific evidence, as other types of evidence are open to misinterpretation by jurors. As in the *United States v. Mezvinsky*, some methods are simply too complex to present without some confusion[14]. Though this limitation can be easily remedied with appropriate training of neuroscientists. More than ever, today's scientists are taught not only to think at the higher, complex level that allows them to complete their work, but are also taught to be able to present that wealth of knowledge at a layman's level appropriate for any given situation. Proper training to expand these communication skills is a simple, yet effective way to alleviate this concern.

Finally, it is sometimes considered incorrectly that the existence of a neuroscientific fact also implies application of that fact in a given situation. This is the issue at hand in *Bryson v. Diocese of Camden*[16]. Here, the plaintiff contended that PTSD triggered by childhood molestation by the defendant successfully repressed his memories of the crime until later in life.

The plaintiff attempted to use the fact that memory repression is common in PTSD patients as proof that the phenomenon applied in his case. Unfortunately, the expert witness was unable to confirm this claim, only indicate that the type of repression was common[16].

V. Conclusion

The youthful field of neuroscience has many powerful potential applications, from determining various levels of criminal responsibility, to predicting the likelihood of re-arrests. Insights into the brain are insights into humanity itself and can provide a degree of certainty to what are normally quite ambiguous situations. Such certainty is not only desirable when dealing with the law, but essential. Why rely on speculation or other similar fields such as psychology, when neuroscientific evidence can provide subjective proof? Even with the pitfalls surrounding the field, the benefits in utilizing neurological tools greatly outweigh any potential negatives. It is evident from the numerous cases already citing neuro-practices that neuroscientific evidence should continue to be used in the courtroom whenever reasonably possible.

[1] Aharoni, Eyal, "Can Neurological Evidence Help Courts Assess Criminal Responsibility? Lessons from Law and Neuroscience," http://people.psych.ucsb.edu/gazzaniga/PDF/Can%20Neurological%20Evidence%20Help%20Courts%20Assess%20Criminal%20Responsibility.%20Lessons%20from%20Law%20and%20Neuroscience.pdf.

[2] Radford v. Colvin. 734 F.3d 288 (4th Cir. 2013).

[3] Miller v. Alabama. 567 US_(2012).

[4] U.S. Const. Am. 8.

[5] Graham v. Florida. 560 US 48 (2010).

[6] Atkins v. Virginia. 536 US 304 (2002).

[7] Penry v. Lynaugh. 492 U.S. 302, 109 S. Ct. 2934, 106 L. Ed. 2d 256 (1989).

[8] People v. Weinstein. 156 Misc. 2d (1992).

[9] Farahany, Nita, "Neuroscience and behavioral genetics in US criminal law: an empirical analysis", J Law Biosci, November 2015, 485 - 509, http://jlb.oxfordjournals.org/content/2/3/485.full.

[10] People v. Adams. 952 N.E.2d 1094, 17 N.Y.3d 791, 929 N.Y.S.2d 99 (2011).

[11] People v. Goldstein. 843 NE 2d 727 (2005).

[12] Stanley v. Litscher. 213 F.3d 340 (7th Cir. 2000).

[13] Daubert v. Merrell Dow Pharmaceuticals, Inc. 509 US 579 (1993).

[14] Jackson v. Calderon. 211 F. 3d 1148 (2000).

[15] United States v. Mezvinsky. 206 F. Supp. 2d 661 (EDPA 2002).

[16] United States v. Semrau. 693 F.3d 510 (6th Cir. 2012).

[17] Bryson v. Diocese of Camden. Civil Action No. 12-499 (JBS-KMW) (D.N.Y. July 26, 2013).