

NEUROLAW

Brain Waves in the Courtroom

BY ALISON K. BENNETT AND JASON BLOOM

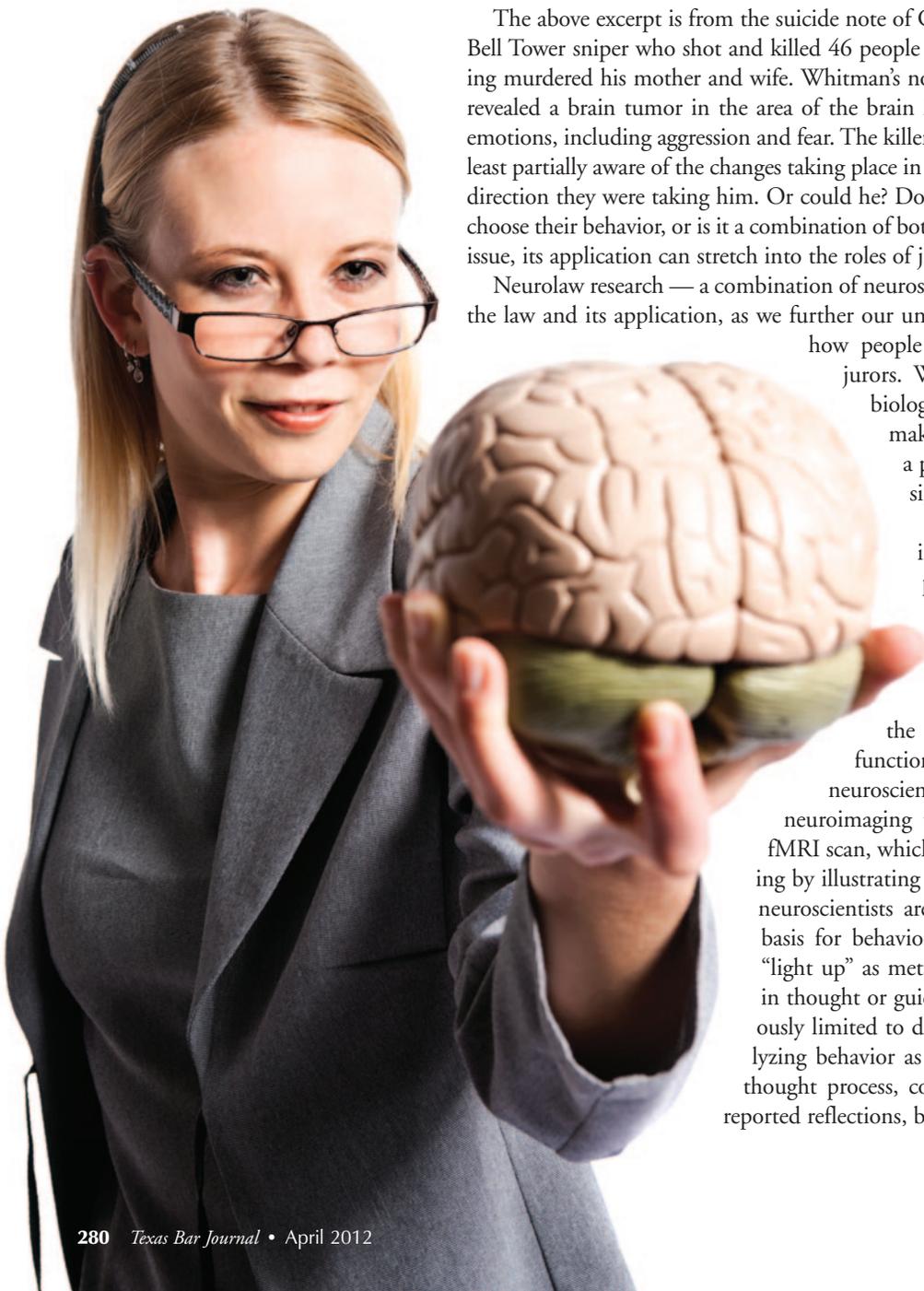
It was after much thought that I decided to kill my wife, Kathy, tonight ... I love her dearly, and she has been as fine a wife to me as any man could ever hope to have. I cannot rational[ly] pinpoint any specific reason for doing this ...”¹

The above excerpt is from the suicide note of Charles Whitman, the University of Texas Bell Tower sniper who shot and killed 46 people in cold blood in August 1966, after having murdered his mother and wife. Whitman’s note went on to request an autopsy, which revealed a brain tumor in the area of the brain known as the amygdala, which regulates emotions, including aggression and fear. The killer’s journal and suicide note show a man at least partially aware of the changes taking place in his brain, even if he could not change the direction they were taking him. Or could he? Does biology determine behavior, do people choose their behavior, or is it a combination of both? While scientists are grappling with this issue, its application can stretch into the roles of jurors and judges in the courtroom.

Neurolaw research — a combination of neuroscience and law — is positioned to change the law and its application, as we further our understanding of what drives behavior and how people make decisions, including judges and jurors. With new technologies illuminating the biological basis for behavior and the decision-making process, neurolaw research is creating a paradigm shift that could be a catalyst for significant changes in law.

Until the recent advent of neuroimaging technology, scientists were unable to peer into the mind while it was engaged in thought, or observe behavior from the perspective of the brain’s biology.

Now, cognitive neuroscience is “a fully established field of study, marrying the insights of traditional psychology with a functional analysis of brain activity,” according to neuroscientist Oliver Goodenough.² The current neuroimaging tool of choice for neuroscientists is the fMRI scan, which produces a view of information processing by illustrating blood flow in the brain. With the fMRI, neuroscientists are afforded a glimpse into the biological basis for behavior, by observing what areas of the brain “light up” as metabolism occurs when people are engaged in thought or guided behavior. Social scientists were previously limited to developing theories by observing and analyzing behavior as the outward manifestation of a person’s thought process, combined with research participants’ self-reported reflections, but this limitation is drawing to an end.



IMPLICATIONS FOR JUROR DECISION-MAKING IN CRIMINAL LAW

Psychologists Joshua Greene and Jonathan Cohen³ propose advances in neuroscience will show that “free will as we ordinarily understand it is an illusion.” This theory highlights a possible, dramatic application of neurolaw research to courtroom deliberations as to guilt or innocence. Leading neuroscientist, Dr. David Eagleman of Baylor College of Medicine, wrote in his *New York Times* bestseller, *Incognito: The Secret Lives of the Brain*,⁴ “The question of free will matters quite a bit when we turn to culpability. When a criminal stands in front of the judge’s bench having recently committed a crime, the legal system wants to know whether he is blameworthy. After all, whether he is fundamentally responsible for his actions navigates the way we punish.”

Neuroscientific data has been admitted as evidence in more than 100 criminal trials now and has been cited in at least one U.S. Supreme Court case. In the criminal trials, neuroscientific evidence has been offered to mitigate sentencing by presenting neuroimaging highlighting brain damage, which arguably diminished the perpetrator’s capacity and ability to make rational decisions. In *Brown v. Entertainment Merchants Association*,⁵ the U.S. Supreme Court found a statute containing age restrictions for video sales to be unconstitutional on First Amendment grounds; however, in his dissent, Justice Stephen Breyer discussed at length functional neuroimaging research showing a relationship between violent video games and violent behavior.

Despite the increase in the use of neuroscientific evidence in the courtroom, research by neuroscientists at Yale point out its limitations, noting: “The scientific reliability and validity of what the scans show is very different from the state of the reliability and validity of what the scans mean in terms of legally relevant behavior. It is one thing to state that brain structures are damaged (MRI) or small (MRI volumetrics) or use less glucose (PET) or receive more blood flow (SPECT). It is another thing entirely to link such anomalies reliably to cognition, behavior, and psychiatric diagnoses, much less to impulsivity, poor judgment, aggression, or violent criminal behavior.”⁶ In other words, neurolaw research is still controversial, and its wide-ranging implications for the future in terms of the deliberation of guilt or innocence and sentencing is yet to be seen.

IMPLICATIONS FOR JUROR DECISION-MAKING IN CIVIL LAW

New developments in neuroscience research could have a material impact on juror decision-making with respect to tort law. Neuroimaging is being used today in courtrooms to demonstrate the realities of brain damage in support of tort claims, but in the future it might be possible to confirm the existence of pain and emotional distress, and possibly even quantify it by showing its biological impact on the brain. Law professor Adam J. Kolber⁷ has hypothesized functional neuroimaging may be able to play a role in substantiating subjec-

tively reported pain, particularly in cases in which more traditional neuroimaging does not offer evidence. This would transfer the abstract concept of pain and suffering from something that is self-reported to biological in nature, giving jurors a more objective measurement to use in deliberating claims for intangible harm that historically has relied on soft science.

Traditionally, a juror’s perception of whether a plaintiff is really experiencing mental anguish as alleged has been a product of how they feel about the plaintiff, as well as their application of the plaintiff’s predicament to their own life experiences. These dynamics are born from subjective data. Now neuroimaging could possibly demystify pain and provide more tangible proof. Since pain is an element of physical harm and pain and suffering often generates the largest category of damages, such evidence could hold strong sway with jurors. Neuroimaging could also conceivably demonstrate a physical basis for emotional distress in support of a claim for emotional distress, which would be similarly persuasive with jurors. In fact, the increasing sophistication of the jury pool may one day command this type of objective proof to replace otherwise subjective data and self-reporting.

Some neuroscientists propose it might be possible to provide neuroscientific evidence of mental states that existed at the time of a tort, including intent, knowledge, or consent. However, mental states would be difficult to measure without a pre-trial — or pre-tort — basis of comparison, which lessens the likelihood of being able to quantify them. Another possibility is the use of fMRI technology to study regions in the brain that control a person’s ability to take responsibility for actions or apply reason and moral judgment, although such data would be difficult to quantify given an emerging theory purporting different regions of the brain work together disproportionately to process information.

Eagleman likens the brain to a “team of rivals” competing for dominance in decision-making. For example, if a person is presented with a piece of chocolate cake, one region of the brain may “argue” to consume it to satisfy hunger, while another argues against consuming it for health reasons. In other words, different regions of the brain battle for dominance in the outcome of the decision, a process that varies from person to person. Eagleman’s “team of rivals” theory is supported by Dr. Owen Jones,⁸ among others, with research indicating that one area of the brain can affect multiple behaviors, a given behavior arises from multiple areas of the brain, and different individuals can use different parts of the brain in different ways on the same cognitive tasks. This theory marks a change from cognitive psychology theories postulating single regions of the brain are responsible for specific functions, such as the pre-frontal lobe being responsible for executive function and decision-making. It also highlights the difficulties facing neuroscientists who might attempt to quantify a person’s ability to take responsibility for actions or apply reason and moral judgment.

IMPLICATIONS FOR JURY SELECTION

Neuroscience is yielding new insights into the underlying neural signatures of bias and decision-making, with provocative implications for the determination of bias during jury selection. A number of studies since the 1950s have confirmed evidence that people — including jurors — experience great difficulty when trying to weigh information inconsistent with previously held beliefs, and are more likely to attend to, seek out, and consider evidence consistent with prior beliefs. Additionally, recent research⁹ shows jurors are not only unable to set aside their beliefs and expectations when making judgments, but they are also unable to accurately gauge their lack of ability to do so. While this information is not a revelation to trial lawyers, the presence and possible effect of these biases can be difficult to prove to a judge when making a challenge for cause, especially if decisions to remove venirepersons are dependent on the uttering of specific words with little consideration as to

PRACTICAL APPLICATIONS IN THE COURTROOM

On a practical level, recent neuroscientific research has offered insights into how the brain functions that can be used by trial lawyers to engage jurors and help them focus on the most important issues at trial. Dr. John Medina, a developmental molecular biologist and research consultant who authored the *New York Times* bestseller, *Brain Rules*,¹¹ offers several tips in his book that can be applied to courtroom psychology.

For example, people are better at seeing patterns and abstracting the meaning of an event than they are at recording detail. According to Medina, the questions of “Have I seen this before?” or “Have I not seen this before?” must be answered before a person can pay attention to details. Applying this to the courtroom suggests jurors offer commonsense justice as decision-makers, applying their own experiences and dispositions to the dispute. Trial lawyers who want jurors to be able to pay attention to and process details must first offer them the

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whether bias can actually be set aside when deciding cases. Recent findings could potentially help evaluate biased jurors by providing scientific proof of a general biological inability (independent of desire) to set aside prior beliefs and previous experiences in an effort to exercise reason as a fair and impartial juror. The ability to table bias may be contested by neuroscience and the understanding of cognitive functioning.

Neuroscientists Jonathan A. Fugelsang and Kevin N. Dunbar¹⁰ found that when people reasoned with evidence consistent with their beliefs, a distinct network of brain regions widely associated with learning and memory were significantly activated. By contrast, when the evidence was inconsistent with their beliefs, a *different* pattern of activation occurred in different parts of the brain that are widely associated with error detection and conflict resolution. In other words, there is now physical evidence that people are open to learning information consistent with their beliefs, but evaluate evidence inconsistent with their beliefs through a biological filter of error detection mechanisms. This important finding, when combined with prior research showing people are not able to accurately recognize and admit to the inherent challenge of setting aside personal bias from previously held beliefs and experiences, substantially undermines any juror’s claim to or promise of being a fair and impartial juror. According to neuroscience, it’s just not that easy.

big picture messages, then fill in the detail. This approach can be a change for lawyers who have been trained to logically build their cases, one witness at a time, but it is a strategy that must be considered in the unique learning environment of the courtroom. Within our practice, we often teach trial lawyers and witnesses to speak in headlines in order to connect with jurors, and then focus on the details. The headline frames the ensuing perceptions of the details, prompting jurors to attend.

Also, people are hard-wired to pay more attention to items that affect their well being, so they will typically listen for about 30 seconds before deciding whether or not to pay attention to what follows. In a courtroom, jurors tend to listen long enough to determine if the evidence being discussed will help them make an important decision at the end of trial. If jurors decide information is not useful, or if they do not capture its significance because it does not fit into a pattern, they will likely stop paying attention.

Finally, emotional arousal helps the brain learn and inspires jury decision-making, so narratives and descriptions of events rich in emotion are necessary to maintain a juror’s interest. According to Medina, “Neuroscience suggests that at a functional level, the processes we label as emotion act as a kind of emphazier and highlighter in the brain, an indicator of importance and urgency. Emotional states direct our attention; our cognition gravitates towards phenomena that have emotional

valance.” Additionally, in the realm of memory, events accompanied by emotional states are more likely to be transferred from working memory to long-term recollection. Our experience studying jury behavior suggests jurors are not black boxes to be filled with information, but rather malleable groups that require inspiration to render justice. This inspiration comes from how the fact pattern made them feel, and not from the details. Therefore, trial attorneys who want to capture a juror’s interest long enough for the juror to be persuaded by information and commit it to memory should embed an emotional component in the trial story.

PROCEED WITH CAUTION

The study of cognition and behavior in neuroscience offers answers about the biological basis for behavior that could impact legal proceedings in the future. Neuroscience can offer answers about how to best use emerging insights into the human brain to ultimately accomplish the goals of law and as a tool to aid jurors in their capacity as decision-makers.

The neurolaw movement is significant and well funded, with multidisciplinary initiatives springing up all over the country at universities such as Vanderbilt, Cornell, the University of Virginia, the University of Southern California, Stanford, Columbia, Penn State, and Baylor. More than 700 academic papers have been written on the topic, with more than 600 published after 2004. Vanderbilt and the University of Wisconsin-Madison now offer joint neuroscience and law (Ph.D./J.D.) programs, and Penn State sponsors an annual Neuroscience Boot Camp to give lawyers, educators, economists, and businesspeople, as well as scholars of sociology, philosophy, applied ethics, and policy, a basic foundation in neuroscience research.

It should be noted, however, that the promises of neurolaw research are accompanied by a caution to handle neuroscientific evidence with care in the courtroom due to its significant potential to exert undue influence on CSI-conditioned jurors. This problem was illustrated by an ingenious study by researchers at Yale,¹² who were able to demonstrate even irrele-

vant neuroscience information in an explanation of a psychological phenomenon may interfere with people’s abilities to critically consider the underlying logic of the explanation. Their research suggests people are more likely to be convinced by “bad,” logically irrelevant explanations for behavior if these explanations are simply couched in terms of neuroscientific “evidence,” a phenomenon that could have an impact on how juries decide cases.

NOTES

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