

dant was incapable of understanding. However, there were no such indications in Mr. Garner's case. In the absence of foreknowledge of a suspect's intellect or the observation of an obvious intellectual or psychological abnormality, it would be unreasonable to expect police to question a suspect's capacity to offer a *Miranda* waiver. Such an expectation would approach a new competency assessment that would be performed by the police. Further, it would counter the presumption that an individual has the capacity to understand and waive *Miranda* rights.

This court was not the first to consider evidence of the defendant's awareness of the criminality of his conduct or his competency to stand trial as proxy evidence of his capacity to understand and waive his *Miranda* rights. Clinicians may take issue with these inferences, but the law supports them nonetheless. A strength of such proxy evidence is that it is contemporaneous, whereas information such as the Grisso test, while more specific to the capacity in question, may have been obtained much later. In this case, the court placed more confidence in contemporaneous evidence than in the results of Mr. Garner's Grisso test results six years later. This ruling suggests that the evidentiary weight of Grisso test results may be substantially devalued if the test is not administered at a point close in time to the confession.

The court considered the Grisso test's grading criteria "subjective and legally questionable." They called one specific item on the test "troubling." They noted other jurisdictions in which the Grisso test has been found inadmissible. The majority offers a reasonable critique of the Grisso test in their discussion of the fact that Mr. Garner was given his *Miranda* warning in more simple language than that used in the test. Although the dissent argued that comparison of Mr. Garner's Grisso test performance to norms still would "provide an indication of the examinee's capacities for understanding relative to other examinees . . ." (*Garner*, p 282), ultimately the only pertinent analysis is about his capacity to understand the specific version of the *Miranda* rights that he was read at the time of his waiver. These critiques focus on aspects of the Grisso test itself rather than the specifics of Mr. Garner's case, and therefore it is reasonable to expect that similar critiques may follow in future cases.

Disclosures of financial or other potential conflicts of interest: None.

Neuroimaging Studies in Diminished-Capacity Defense

Shamael Haque, DO, MPH

Fellow in Forensic Psychiatry
Center for Forensic Psychiatry

Melvin Guyer, PhD, JD

Professor of Psychology
Department of Psychiatry

University of Michigan

Ann Arbor, MI

PET Scan Expert Testimony Proffered in a Defense of Diminished Capacity Fails Frye Admissibility Test of General Acceptance to Prove Mental Disabilities

In *Zink v. State*, 278 S.W.3d 170 (Mo. 2009), David Zink appealed the overruling of his motion for post-conviction relief from his conviction of first-degree murder and his death sentence. Mr. Zink claimed that the motion court erred in denying his multiple claims of ineffective assistance of counsel and in violating his constitutional rights. Principal among his claims of ineffective assistance of counsel was the failure of his trial attorney to obtain and utilize at trial and sentencing a PET (positron emission tomography) scan that indicated a brain abnormality. The scan might have bolstered his defense of diminished capacity and mitigated the death sentence he received. The state supreme court concluded that PET scan expert testimony in support of a claim of diminished capacity did not meet the *Frye* standard of admissibility. Hence, defense counsel was not ineffective.

Facts of the Case

Mr. Zink rear-ended a woman's car and then kidnapped, raped, mutilated, and murdered her. He was soon apprehended and confessed. At the time of this violent crime, he was on parole for rape convictions. He explained the murder saying that he was afraid the victim would alert the authorities about the kidnapping. He was charged with first-degree murder and asserted a voluntary manslaughter and diminished-capacity defense. The jury found him guilty of first-degree murder and sentenced him to death on the basis of the aggravating factors of his two prior convictions for rape and that the murder was committed heinously and to avoid a lawful arrest. He subsequently filed a motion for post-conviction relief claiming ineffective assistance of counsel. The mo-

tion court denied his motion and he then appealed to the Supreme Court of Missouri.

On appeal, Mr. Zink asserted that the motion court erred in denying his claims of ineffective counsel. In particular, he noted his attorney's failure to obtain a PET scan and present expert testimony regarding the PET scan's relevance to his defense of diminished capacity. He claimed that the PET scan would have revealed to the jury that he had "organic anatomical physiological brain damage" (*Zink*, p 177) and that with such "hard science" testimony, his mental illness would be shown to be anatomically and physiologically based and not the result of volition. The jury might then have accepted his diminished-capacity defense or, if not, might have seen mitigation in the sentencing hearing to avoid the death penalty.

In his appeal, Mr. Zink argued that a defendant should be allowed to present evidence of a mental disease or defect to prove lack of the culpable mental state that is an element of the first-degree murder offense. Had he succeeded with this argument, he would have been found guilty of second-degree murder. He claimed that his trial counsel was ineffective in not ordering a PET scan, arguing that the PET scan would have strengthened his diminished-capacity defense, which relied only on the clinical opinions of his defense witness psychologists. He argued further that if, even with PET testimony introduced at trial, he were convicted of first-degree murder, the subsequent introduction of PET testimony at the sentencing phase would have allowed him to avoid the death sentence.

Following his conviction and sentencing, Mr. Zink obtained a PET scan and an expert witness, Dr. David Preston, who would testify to a certain brain abnormality. Mr. Zink's argument to the Supreme Court of Missouri was that the PET-derived medical testimony would have bolstered the "soft" psychological testimony that was used at trial that he had various personality disorders.

Ruling and Reasoning

In considering Mr. Zink's PET-based claim of ineffective assistance of counsel and having access during the appeal to the PET evidence that was not available at trial and sentencing, the state supreme court reviewed the admissibility of PET evidence as it bears on diminished capacity in the instant case, reviewing the record from the motion hearing. There,

testimony was taken from the psychologists who testified at trial and from Dr. Preston, whose proffered PET testimony was at issue. At the conclusion of the supreme court's review of the motion court's findings, the court concluded, "None of the experts enunciated any credible scientific evidence that definitely linked the PET scan findings to Zink's mental condition" (*Zink*, pp 178–179). Because the PET scan results could not demonstrate any definite link, the motion court held that the testimony and findings could not have aided Mr. Zink in establishing diminished capacity. Thus, defense counsel was not ineffective for failing to introduce inadmissible evidence.

The supreme court noted the uncertain state of scientific knowledge concerning PET scan findings, brain abnormalities, and personality disorders. It commented on the defense expert testimony as follows:

Dr. Logan, a psychiatrist, testified that there is no generally accepted scientific evidence as to what portions of the brain or brain deficits caused Mr. Zink's personality disorders because the research is not yet that advanced. Dr. Logan would "consider" PET scan results in making a diagnosis but would not rely on them. Further, Dr. Logan testified that narcissistic personality disorder and paranoid personality disorder originate in the person's childhood and social experiences. Dr. Logan stated, "One of the frontiers of our knowledge is that we don't know what degree that personality styles are inherited or maybe even influenced by things like his meningitis that may have created some brain damage" [*Zink*, p 179].

Thus, the supreme court held that Mr. Zink failed to show that there is generally accepted scientific evidence to link the PET scan results to any of his personality disorders. Holding that the PET evidence was inadmissible as proof of a physical brain basis for a volitional deficit, the supreme court concluded that defense counsel was not ineffective. As to PET evidence and death sentence mitigation, the court held that the mitigating value of the PET scan evidence is limited because, as discussed, there is no generally accepted scientific link between Mr. Zink's brain abnormalities and his diagnosed personality disorders.

Discussion

This case holds that PET scans used as evidence to establish diminished capacity do not meet the *Frye* standard for scientific evidence, as it is not "generally accepted" by the scientific community (*Frye v. United States*, 293 F. 1013 (D.C. 1923)).

PET scans are one instrument among other neuroimaging techniques (e.g., functional magnetic resonance imaging (fMRI) and single-photon emission computed tomography (SPECT)) that can be used to examine the neurological function of defendants. With the advent of companies that market neuroscientific studies for legal cases and the increasing publicity on this field (e.g., National Public Radio, *Talk of the Town*, June 29–July 1, 2010), the question that this case poses is whether any neuroimaging technique meets the *Frye* standard or the *Daubert* standard of admissibility for scientific evidence.

The Society of Nuclear Medicine Brain Imaging Council (*J Nuclear Med* 37:1256–9, 1996) stated that the “use of functional imaging in forensic situations including criminal, personal injury, product liability, medical malpractice, worker’s compensation and toxic torts remains controversial.”

In a review article by Noel Shafi (*Grad Stud J Psychol* 11:27–39, 2009), neuroimaging technology can contribute to bias in the courtroom. In fact in one study in 2008, Gurley and Marcus (*Behav Sci Law* 26:85–97, 2008) presented hypothetical case summaries of defendants in criminal trials to a group of 396 participants. The participants were asked to provide a verdict of guilty or not guilty by reason of insanity (NGRI), and the participants were found more likely to render an NGRI verdict when neuroimaging techniques were presented.

In his review, Shafi looked at each neuroimaging technique and court rulings as to admissibility and reliability. Courts have found results of MRIs and computed tomographic (CT) scans to be both admissible and reliable as evidence (e.g., *State v. Vandemark*, 2004 Del. Super. Lexis 376 (Del. Super. Ct. 2001)) as well as admissible but not reliable (e.g., *United States v. Sandoval-Mendoza*, 472 F.3d 645 (9th Cir. 2006)). In the well-known case of *United States v. Hinckley*, 525 F.Supp. 1342 (D.D.C. 1981), in which Mr. Hinckley was accused of the attempted assassination of then President Ronald Reagan, CT scans were used to show atrophy in the brain, and a psychiatrist argued that this atrophy was associated with schizophrenia. The jury found Mr. Hinckley not guilty by reason of insanity, and it is likely that the CT evidence had an influence on the verdict.

With respect to functional imaging, SPECT scans were noted to have clinical and legal limitations. Granacher (*J Am Acad Psychiatry Law* 36:323–8, 2008) commented that “the reliability of SPECT. . . when

applied forensically to mild TBI or TBI cases, will not meet all *Daubert* criteria” and that “general acceptance . . . has not been achieved.”

PET scans have faced similar limitations; however, PET and SPECT scans have high rates of admissibility. Feigenson (*Int J Law Context* 2:233–55, 2006) stated that “PET and/or SPECT evidence has been admitted in more than four-fifths of cases” and that there have been over 130 court opinions involving PET and SPECT evidence in federal and state courts.

Zink highlights the controversy over admissibility of neuroimaging evidence and shows its forensic limitations. The course of appeals in *Zink* is not over. Further appeals await decisions in the federal courts. There, the evidentiary value of neuroscientific methods will be further tested. *Zink* is one among many cases in which the influence of neuroscience in the courtroom has been challenged.

Disclosures of financial or other potential conflicts of interest: None.

Repressed Memories in a Controversial Conviction

Anthony J. Wolf, MD
Forensic Psychiatry Fellow

Melvin J. Guyer, PhD, JD
Professor of Psychology

Department of Psychiatry
University of Michigan
Ann Arbor, MI

State Supreme Court Denies Motion for a New Trial and Affirms Admissibility of Evidence Based on Memories Recovered After Dissociative Amnesia

In *Commonwealth v. Shanley*, 919 N.E.2d 1254 (Mass. 2010), the Supreme Court of Massachusetts affirmed the judgment of the superior court denying a motion for a new trial, holding that due to the evolving nature of the scientific debate on the validity of repressed memories, expert witness testimony supporting the notion of dissociative amnesia was admissible under the *Frye* test. The conviction of Paul Shanley, a Catholic priest, on the basis of the plaintiff’s recently recovered memories of childhood sexual abuse was upheld.