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Brain Damage Caused by Collision with Forensic Neuropsychologists

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Introduction

The forensic application of neuropsychological data is becoming increasingly popular, though it seems that the empirical basis of impressions and conclusions that are rendered in forensic settings is relatively meager. This seminar is intended to explore issues regarding conclusions that are rendered about neuropsychological data in forensic settings. In particular, this seminar is concerned with conclusions which lead to testimony that the patient, for whatever reason, is "brain damaged" as a result of a specific accident that is the subject of litigation.

The professional neuropsychologist is often called upon to render an opinion regarding the cognitive status of individual patients vis a vis a particular event in time. Attorneys typically request (or demand) that some statement be made about the nature, severity, and origin of the patient's cognitive deficits, if they exist at all. To what extent can the patient's problems be attributed to a specific event, like an accident? What is the magnitude of impairment the patient has suffered relative to a situation in which the accident did not occur? These are serious questions, often carrying with them significant implications about the patient's current self-esteem, the patient's legal status, and the patient's future financial well-being.

The Problem Defined

I give this seminar because I have seen too many patients in litigation whose so-called "impairments" represent either false positive errors or flagrant misuse of neuropsychological data. I believe that most practicing neuropsychologists have encountered at least one of these cases, and that such errors have potentially serious consequences for both patients and neuropsychologists. First, patients who are falsely labeled as "impaired" are sometimes done a potentially serious disservice by their treating neropsychologists because such labels often engender self-fulfilling prophecies. Patients may be led to believe that they are incapable of getting better; that they are permanently disabled, and that they lack control over their present and future status. Further, by virtue of being inappropriately diagnosed, patients may be referred for expensive and labor-intensive treatment or management services that they either don't need or which is downright detrimental to their post-accident recovery. Second, if these errors exist with any prevalence in litigation settings, then appropriate and reasoned professional activity within the neuropsychological community is undermined. We are ill-served if we do not confront and discuss this problem directly.

Why do such errors occur? I believe they occur for at least two reasons. First, some practicing neuropsychologists form a belief system that, through terminal soft-

heartedness, purposeful ignorance or busy schedules, begins to deviate from mainstream neuropsychology and begins to support a "disability mentality". Regarding any neuropsychological abnormality as an indication of "brain damage", and taking a "strict localizationist" approach to interpreting neuropsychological deficits are two symptoms of this belief system. More diagnostic features of this syndrome will be discussed later. Second, some practicing 'forensic neuropsychologists' appear to succumb to economic forces, and develop rigid reputations as "plaintiff-friendly". ("Defense friendly" neuropsychologists exist, too, but I'll leave it for someone else to bash *them*). Neuropsychologists who tend to find impairments and who tend to diagnose "brain damage" encourage, either implicitly or explicitly, referrals from plaintiff's attorneys. If it is conceded that such referrals carry with them complex demand characteristics, then a vicious cycle (find disability - get more referrals...) is potentially in place. It is important to realize that these neuropsychologists are mostly not inherently "evil" or "mainpulators"; they are merely trying to make their living in a difficult world.

These forces conspire to affect the way that neuropsychologists behave in forensic settings, and the resulting picture does little to dissuade the method skeptics. A significant amount of professional activity by neuropsychologists is spent coping with this problem. Whether this represents a major disease within professional neuropsychology, or just a pesky skin rash, is something we will discuss. This seminar attempts to chronicle symptoms of this process. The major symptoms come in the form of several recognizable and repeating interpretive errors. I will focus on recent cases I have encountered in my practice in order to raise awareness of such activity. To facilitate discussion and exposition, I have collated the interpretive errors into what might be called the "deadly sins" of forensic neuropsychological practice. I will first outline each of these and will then illustrate them with several case examples.

Representative Case Scenario

Here's the basic case scenario that ties most of the presented cases together. A patient is involved in an automobile or industrial accident. There is usually no, or very brief, loss of consciousness, and practically no indication of a head injury at the scene. Glasgow Coma Scale at the scene is 15. The patient is brought to the emergency room, is examined, and is released later that same day on pain medications with a follow-up appointment. The patient's complaints are largely referable to orthopedic injuries (e.g., knee, back) which are the initial focus of treatment. Some time later, cognitive complaints begin to surface, including problems in attention-concentration, memory, and organization. Emotional symptoms, most frequently including depression and/or anxiety, are also reported. The patient is eventually referred, either by another physician or (perhaps importantly) by their personal attorney, to a neuropsychologist, who performs an evaluation and concludes that the patient has suffered "brain damage" or "head injury" in the accident. In many cases, the neuropsychologist works closely with a neurological group, and one of the physicians in the group also examines the patient. MRI, CT, and neurologic exam are normal, but there may be abnormal QEEG findings. Review of records indicates no convincing evidence, other than the neuropsychological findings, of brain injury or neurologic impairment. The neurologist takes the neuropsychological

findings and the complaints of the patient into account when rendering a diagnosis of "post-concussion syndrome" or "closed head injury with post-traumatic memory impairment". If the patient suffers headaches, the diagnosis of "post-traumatic headache" will surely follow.

On False Positives vs. Superior Sensitivity: Issues for the Reasonable Neuropsychologist

The obvious question about these neuropsychological findings is whether they reflect a "true" injury that escaped detection by other neurodiagnostic technologies or whether it represents a "false positive". Regarding the former possibility, most of us would believe that neuropsychological assessment, if conducted properly using sensitive instruments, is capable of detecting subtle brain impairment that does not result in abnormalities on neuroimaging or elementary neurologic exam. If we believe this, then we must concede the possibility that such positive neuropsychological findings are valid indicators of the patient's status, and that, in fact, a subtle head injury has occurred. The question we then must ask is, "how likely, given all of what I know about this case, how likely is this possibility? Regarding the latter possibility, the neuropsychologist can be confronted with two kinds of "false positives" in forensic practice. In the first kind, neuropsychological findings are, in fact, abnormal in a patterned sense, and the question that then arises is whether such abnormalities are specifically attributable to a head injury. It is known that many factors, in addition to brain damage, can influence performance on neuropsychological tests, including (but not limited to): motivation, educational background, familiarity with testing formats or materials, psychiatric/emotional factors, distractibility (e.g., due to pain), effort, etc. Thus, in the case of abnormal findings, the question arises as to whether any of these other factors might account, in whole or in part, for the pattern of impairment which is observed. As we shall see, one of the signature characteristics of "sinful" neuropsychologists is that these factors are practically never considered as rival hypotheses in explaining or interpreting abnormalities in neuropsychological function.

In the second type of "false positive", neuropsychological finding are not, for the most part, abnormal at all, but are interpreted as if they were abnormal. The primary characteristics of this type of error are: (a) the degree of abnormality indicated by the finding is typically mild or restricted, and (b) the 'abnormal' finding takes place in the context of other completely normal data which would, if considered, be generally unfavorable to the "brain damage" interpretation. Two examples are relevant. In the first, a low average performance on a test of memory or attention might be interpreted as indicative of "decline" or impairment if the neuropsychologist forms the expectation that such a performance "should have been better" given a cursory examination of the patient's background. Another example occurs when one test is abnormal or borderline, while others are not. This is sometimes seen when an overall score (e.g., the Wechsler Memory Scale Delayed Memory Index) is normal but a single subtest (e.g., Logical Memory II) is in the impaired range, or when performance on a difficult test of verbal memory (e.g., CVLT) is normal while performance on a less difficult test (e.g., WMS-R

Logical Memory) is not. In these case, the normal findings might be ignored in favor of a focus on the one or two abnormal findings.

Before leaving this section, I return briefly to the possibility that neuropsychological tests can, in fact, disclose bonafide abnormality when neurologic and neuroradiologic findings are normal. Although the **sensitivity** of individual tests is usually known or can be derived from available validity statistics, less is known about the combined sensitivity of groups of tests, particularly when a flexible battery is used. Further, knowing the sensitivity of tests is not enough for dealing with the issues I have posed; we also need to be able to estimate the **positive and negative predictive power** of the tests (Retzlaff & Gibertini, 1994). Sensitivity deals with the degree to which a disease, if present, will manifest itself in an abnormal test score. In contrast, positive and negative predictive power deal with the likelihood, given a positive (abnormal) or negative (normal) test result, that a disease (in this case, a neurocognitive deficit) is present or absent, respectively. In the cases we discuss in this seminar, **positive predictive power** is the most important. (Defense-oriented neuropsychologists need to worry about negative predictive power).

The "Deadly Sins" of Forensic Neuropsychology

In this section, I highlight several significant and pesky (in the sense that they are seen over and over again in forensic neuropsychology reports) errors made by unwitting neuropsychologists who render forensic services. It should be noted that many of these errors probably occur in nonforensic settings, though perhaps with less frequency. Some of these errors result from faulty reasoning or peculiar belief systems, while others result from using inappropriate or inaccurate procedures.

1. ***It's elementary***. **Neuropsychological tests are tests of "brain damage". Therefore, when a test result is abnormal, the patient must have "brain damage".** Miller (1983) and Larrabee (1990) discuss logical problems in the interpretation of neuropsychological tests, the latter of which deals specifically with applications to forensic practice. Miller notes "if damage to structure X is known to produce a decline on test T, it is tempting to argue that any new subject...having relatively poor performance on test T must have a lesion at X. In fact the logical status of this argument is the same as reasoning that because a horse meets the test of being a large animal with four legs then any newly encountered large animal with four legs must be a horse. The newly encountered specimen could of course be a cow or a hippopotamus and still meet the same test. Similarly new subjects who do badly on T may do so for reasons other than having a lesion at X" (1983, p. 131). Larrabee (1990) reviews data suggesting that neuropsychological impairment may result from psychiatric impairment, intentional distortion, and other factors of relevance to the forensic setting. Readers should also consult Lezak (1995) for an extensive review. Case examples all utilize the "it's elementary" strategy to perfection.

2. ***What you see is what you get.*** **Neuropsychological complaints are valid indicators of real-life neuropsychological deficit.** Neuropsychological testimony in

legal cases frequently is utilized to explain, or predict, real-life problems in memory, concentration, or other neuropsychological functions putatively important for the performance of certain daily activities. In fact, the ecological validity of most neuropsychological test procedures is not known. Most neuropsychological evaluations presented as case examples make the assumption that a poor score on a neuropsychological test translates directly into a real-life deficit, and, in fact, many such real-life examples (even some that have not been reported by the patient) are provided or predicted.

3. ***Two deficits are worse than one.*** **Each test is an independent sample of behavior; correlations can be ignored (the Box Score approach).** Here, neuropsychological test data is evaluated test-by-test and the number of abnormal findings are tabulated. The patient with four deficient performances is seen as twice as impaired as the patient with two. Most neuropsychologists will recognize this as a seriously flawed interpretive method, since (a) it neglects the fact that certain findings are more important than others depending upon the nature and etiology of the patient's problem, and (b) it fails to account for the inherent intercorrelation between sets of tests. Defending against this kind of strategy is relatively easy when the resulting pattern of impairments does not correspond with that expected, say, after closed head injury, but can be more difficult when the observed test impairments correspond with the patient's complaints.

4. ***All people are created equal.*** **All functions should be normal or above average in the intact individual.** Here, the assumption is made that all patients are average or better to start with, such that any below average or impaired performance reflects a decline from pre-injury performance. This reasoning is obviously fallacious since any well-validated test with reasonable score dispersion will (by definition) generate some below average scores in a non-brain-injured population. This line of reasoning is typically accompanied by two additional symptoms. First, there is a characteristic failure to obtain prior data which might be used to support or refute the underlying assumption. Second, measures of pre-injury ability typically follow a method (e.g., Lezak's [1995] "best performance", Wechsler's [1958] "hold-don't hold" distinction) which would tend to yield higher estimates of pre-injury performance levels. This line of reasoning also makes fuzzy the criteria that should be used when invoking terms like "significantly impaired". What, quantitatively, constitutes an impaired performance (-1 SD? 5th percentile?). Often, making the assumption that all pre-injury abilities are average results in conclusions that a patient is impaired once s/he scores anywhere in the below average range. None of the case examples provided any indication about what cutoffs were used for impairment conclusions.

5. ***The proof is in the pudding*****. It is possible for neuropsychological results to reveal effects of subtle brain injuries not seen on neuroradiologic examination. Thus, neuropsychological abnormalities that exist in the absence of neuroradiologic confirmation further affirm the superior sensitivity of neuropsychological examination in these cases.** The issue of whether a neuropsychological abnormality represents a false positive or whether it represents superior sensitivity of

neuropsychological testing over other technologies cannot be resolved with the current data base. Resolving such an issue would require identifying a population of patients with normal neurologic and neuroradiological findings who had abnormal neuropsychological test results and then confirming by some other method (e.g., post-mortem analysis of brain tissue) that latent brain injury did occur. This, of course, carries with it significant complexities; I know of no data which is relevant to this question. Some neuroradiologic data attest to the superior sensitivity of MRI over CT in documenting subtle injury-related lesions (Mittl et al., 1994), but no large-scale comparative studies utilizing neuropsychological data have been performed. Nearly all case examples assume that, if a neuropsychological deficit exists, it must signal the excellent sensitivity of the evaluation. This is not surprising, because it is this kind of conclusion that is helpful to a personal injury plaintiff.

6..***One man's ceiling is another man's floor*.** **All neuropsychological data is subject to interpretation by the professional. What one sees as normal may in fact be seen as abnormal by a discerning neuropsychologist.** This is, in part, true, probably because some neuropsychologists are more knowledgeable than others! The issue of "subjectivity" in neuropsychological test interpretation comes up often in forensic settings where the meaning of a patient's test results are being debated. One problem is that it is often used in an intellectually dishonest way to "explain away" any substantive disagreement that exists in interpretation between neuropsychologists working with plaintiff and defense attorneys. In practice, clinical applications of neuropsychology are a mixture of science and art, but this does not mean that inter-observer agreement in interpretation of neuropsychological test protocols is necessarily unreliable. What is often at the crux of differences in interpretation is that different standards of interpretation or different impairment "cut-offs" are being applied. Recent efforts by the profession to articulate basic standards of education and training may have some impact on this, or at least may make it easier to identify the sources of such disagreement. One issue is whether a reasonable goal of research and training in neuropsychology is to maximize inter-observer agreement in neuropsychological test interpretation. That is, should we aspire to perfect inter-professional agreement in protocol interpretation? Different issues emerge when each neuropsychologist involved in a legal case performs an independent neuropsychological examination. An excellent discussion of problems and paradoxes in inter-observer agreement in this situation is given by Cicchetti (1988).

7. ***You can use a wedge to putt from the fringe, as long as you blade it correctly*.** **Neuropsychological tests are multifunction instruments that can be applied in all settings, and will work equally well in all situations provided they are in skilled hands.** The assumption here is that neuropsychological test instruments validated in one setting can be imported willy-nilly into other settings without much trouble. In fact, the degree to which many neuropsychological tests produce comparable results in different base rate settings has been widely discussed in the literature (Duncan & Snow, 1987). Other factors which may limit the generalizability of many neuropsychological tests to the forensic setting include the possible presence of motivational issues and the prevalence of emotional or psychiatric disturbance in forensic

evaluations. Also, the population of patients who present for evaluation of closed head injury may differ from the normative population for the individual test in important ways.

8. ***If the patient complains, it must hurt*.** **Patient complaints obtained through self-report are an important and reliable source of information about the nature of cognitive deficits.** There is a long tradition of reliance on interview data to document the nature and impact of a patient's cognitive deficits on everyday life. However, there is increasing recognition of the fact that such complaints are subject to a host of distortions. Some distortions are a product of the patient's emotional/motivational state, while others are probably iatrogenic, produced either by the communicated expectations of the neuropsychological examiner, or abetted by the measurement instrument. A recent study by Mittenberg, D'Attilio, Perrin, & Bass (1992) provides some sobering data on the value of complaints as evidence of neuropsychological injury. Subjects with no experience or knowledge of closed head injury were given a symptom checklist containing affective, somatic, and cognitive symptoms of closed head injury and were asked to (a) indicate their current experiences of symptoms, and (b) endorse symptoms they thought would be present six months after mild head trauma. "Imaginary concussion" produced a coherent cluster of symptoms that was practically identical to that produced by a group of patients with mild head trauma. Of equal importance, head trauma patients consistently *under-estimated* the pre-injury occurrence of these same symptoms relative to controls. Mittenberg et al (1992) conclude that "symptom expectations appear to share as much variance with postconcussion syndrome as head injury itself", and suggest that such expectations may actually play an etiologic role in producing symptom complaints. Neuropsychological reports contained in the case examples rely heavily on patient complaints to define the areas of likely impairment on neuropsychological evaluation. Not surprisingly, the evaluations often bear out these complaints.

9. ***What I don't know won't hurt me*.** **Neuropsychological data and patient interview is sufficient in itself in inferring past health, cognitive performance, and psychological/psychiatric history.** Many neuropsychologists apparently believe that procurement of past medical, school, military, or vocational records is of little value to their overall opinion, and instead, rely on patient reports and a few indirect methods of performance-standard calculation in making judgments about pre-injury status. Patient reports are subject to various distortions (see 8 above), and the indirect methods of premorbid ability estimation are imperfect (Karzmark, Heaton, Grant, & Matthews, 1985) or downright problematic (Vogt & Heaton, 1977). Although problems of determining pre-injury cognitive status cannot be completely solved by obtaining prior records, such data do have the advantage of providing performance-based measures in real-life settings that can be used to supplement data obtained from the assessment proper. Occasionally, intellectual testing data directly comparable to that obtained in the current assessment will have been performed in the past, and can be used in relatively straightforward fashion to assess change. Most evaluations presented in the case examples did not contain *any* reference to pre-injury data, even though such data was readily available in nearly every case.

10) ***It's all in the name*. You can tell what a test measures by looking at its name.** Many neuropsychologists appear to place a lot of faith in face validity. Thus, the California Verbal Learning Test measures (only) "verbal memory", the Speech Sounds Perception Test measures (only) the "perception of speech sounds", and the Boston Naming Test measures (only) "naming". By this logic, the Wechsler Memory Scale measures "Wechsler's memory"! Face-valid test interpretation tends to be a characteristic of those neuropsychologists who use a box-score method. Obviously, a more tenable approach is to base test interpretation on the input, processing, and output requirements of a test viewed from an information-processing point of view.

11) ***Three words to remember: Localization, localization, localization*. Every test has its own special location in the brain (forensic phrenology).** Some neuropsychologists appear to believe in a modern-day phrenology whereby each test is presumed to have a particular location in the brain. Thus, if a patient does poorly on the California Verbal Learning Test, they have "left temporal lobe damage", or if they have trouble with the Wisconsin Card Sort, they have "frontal damage". Refuting or qualifying each of these simplistic interpretations is beyond my scope, but the extreme localizationist position implied by this approach is fraught with serious problems and can lead to remarkably awkward conclusions. This approach will be heavily represented in the case examples.

Case Examples

Several case examples are utilized to illustrate the "deadly sins" in practice. Participants are encouraged to discuss their own observations and to supplement the list of interpretive errors. Humor is used as a compensatory strategy designed to ward off the frustration and concern that these examples generate. Other compensatory strategies and proactive plans of action will be the subject of discussion at the end of the seminar.

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