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Assessment of validity and response bias in neuropsychiatric evaluations

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Abstract.

BACKGROUND: Forensic neuropsychiatric assessment requires thorough consideration of malingering and response bias. Neuropsychiatric evaluations are complicated due to the multiple domains in which symptoms and impairment present. Moreover, symptom exaggeration in these evaluations can also present along various symptom domains (e.g., psychological, neurocognitive, somatic). Consequently, steps must be taken to ensure adequate coverage of response bias across all three domains of function.
PURPOSE: The following article reviews the conceptualization of malingering in neuropsychiatric settings, as well as various approaches and measures that can be helpful in the assessment of malingering and response bias.
CONCLUSIONS: Forensic neuropsychiatric assessment requires thorough consideration of malingering and response bias. These evaluations are complicated due to the multiple domains in which symptoms and impairment present. Performance and symptom validity measures should be routinely included in these evaluations. Collaboration between psychiatry and psychology can provide the optimal multi-method approach needed for thorough neuropsychiatric assessment in forensic cases. We illustrate our points with two case studies from forensic traumatic brain injury neuropsychiatric evaluations.

Keywords: Malingering, response bias, neuropsychiatry, forensic

1. Introduction

It is common practice to systematically review and utilize objective test data in the examination of brain injury, particularly in compensation-seeking cases of mild traumatic brain injury (mTBI) and other neuropsychiatric conditions. It is well-recognized that secondary gain and financial incentives influence clinical presentations during routine treatment and particularly in forensically-related evaluations. In a widely cited study, the base rates of malingering and symptom exaggeration were estimated by forensically-oriented diplomates of the American Board of Clinical Neuropsychology across various settings (Mittenberg, Patton, Canyock, & Condit, 2002). The estimates of malingering and

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symptom exaggeration ranged between 18% and 33% across personal injury, disability, criminal, and medical cases. Similar estimates among TBI litigants was reported by Larrabee (2003). Malingered pain symptoms were estimated to be between 20% and 50% among chronic pain patients where financial incentive is present (Greve, Ord, Bianchini, & Curtis, 2009). The issue of evaluating response bias and symptom exaggeration has been addressed in various position statements by professional organizations such as the National Academy of Neuropsychology (Bush et al., 2005), the American Academy of Clinical Neuropsychology (Heilbronner et al., 2009), and more recently by the Association for Scientific Advancement in Psychological Injury and Law (Bush, Heilbronner, & Ruff, 2014). These position statements, as well as standards in forensic psychiatry (Gutheil & Simon, 2002), all point to the necessity of thoroughly and objectively assessing response bias in forensically-related evaluations.

2. Neuropsychiatric assessment of malingering

For the physician conducting a TBI examination, the medical model of neuropsychiatric assessment and diagnosis is based upon a triad: (1) a complete medical history; (2) a face-to-face mental status and/or neurological examination; and (3) laboratory testing to confirm or refute elements of the differential diagnosis. It is the third portion of this triad which separates physician clinicians from their psychologist clinician counterparts. It has become the standard of practice for the neuropsychiatric assessment of persons with a history of TBI that the examination includes a significant neuropsychological and psychological testing component (Granacher, 2015). Thus, the neuropsychological and psychological assessment component of a neuropsychiatric assessment in TBI cases includes a collateral collaboration utilized by the physician. The neuropsychological component of the neuropsychiatric examination is to determine neurocognitive status using normed brain-based psychometrics, while the psychological portion of the neuropsychiatric TBI assessment is to determine emotional status using standardized psychological testing.

TBI cases that are evaluated within the context of a disability determination, fitness-for-duty examination, litigation in personal injury, and other medical-legal contexts require consideration of malingering. As noted earlier, exclusion of this consideration in a TBI examination falls short of practice standards (e.g., Bush et al., 2005, 2014; Heilbronner et al., 2009; Gutheil & Simon, 2002). Larrabee and Rohling (2013) have argued that the functional areas of a comprehensive neuropsychological evaluation during TBI assessment require performance validity testing (PVT) and/or symptom validity testing (SVT). Clinicians are required to practice using the best available evidence and, thus, the neurocognitive assessment component of a neuropsychiatric TBI evaluation is more likely to meet this standard if PVT and SVT measures have been applied during examination.

Recently, it has been determined that the presence of brain lesions following TBI does not obviate or negate the individual's ability to provide adequate performance on measures of symptom validity or performance validity during TBI assessment (McBride et al., 2013). Granacher and Berry (2008) have previously reported how malingerers may present to their physicians with a variety of feigned complaints. There are three basic ways to malinger a medical examination, and all three of these could arise in many various forms during a neu-

ropsychiatric assessment of persons with a history of TBI: (1) presentation of false cognitive or neuropsychological signs and symptoms; (2) presentation of false psychiatric signs and symptoms; and (3) presentations of false somatic (physical) signs and symptoms.

For physicians, it is critical to incorporate psychological symptom validity and performance validity assessment within the overall evaluation of any neuropsychiatric condition. It is argued that these psychological and neuropsychological metrics enhance the overall evaluation, put the clinician on a surer footing in formulating and evaluating a differential diagnosis, and for those cases that may come to litigation or other medical-legal disposition, the physician can be confident that the best evidence possible has been collected scientifically to ensure that the results of the examination and the diagnoses derived therefrom are of the highest sensitivity and specificity (Granacher, 2015). Thus, it is critically important that a quality neuropsychiatric examination for TBI or any other brain condition use embedded and free-standing SVT and PVT measures during the overall assessment.

Assessing the complaints of a patient who has sustained a mTBI can be particularly challenging. It is argued today that research studies attempting to delineate mTBI from a control group should always use a trauma control group (such as orthopedically injured patients) matched to the degree possible on age, education, and gender (Larrabee, 2012). The weakest research designs of symptom and performance validity involving TBI are those employing clinical samples of convenience, such as might be aggregated from a clinic that specializes in treatment of persons with persisting symptoms one to two years post-mTBI. One of the most sophisticated research designs to evaluate mTBI has been produced by Dikmen et al. (1995). These researchers have conducted what is arguably, among many, to be the best prospective outcome study of the complete range of TBI severity. They compared patients with TBI at six different levels of severity, defined by the time to follow commands (the highest level of function on the motor component of the Glasgow Coma Scale). This measure is not affected by the presence of intubation, which can negatively affect the verbal component of the GCS. In the Dikmen et al. study (1995), the mildest level of injury was represented by the group that took less than one hour to develop ability to follow commands completely, whereas the most severely injured TBI group took 29 days or more to demonstrate ability to follow commands. Dikmen et al. (1995) collected a large trauma control group as part of the data reported in

this study. They compared an mTBI group with a control sample that had been admitted to the hospital because of traumatic injuries to the body, not involving the head. By using such a control group, Dikmen and colleagues were able to adjust for socioeconomic status as well as for psychosocial factors associated with TBI, and the experience of sufficient injury to be transported to the hospital, as well as the potentially confounding effects of pain (Larrabee, 2012). There were no differences between the mTBI group and the trauma control group with regard to age, education, or gender. Both the TBI group and the trauma control subjects were examined at one month after injury and one year after injury. One year post-trauma, the mTBI group (those taking less than one hour to show ability to follow commands) did not differ significantly on a statistical basis from the trauma control group in their ability to perform a comprehensive neuropsychological test battery. Larrabee (2012) has stated in his recent work that using samples of convenience that do not control for the effects of non-head traumatic injury can cause quite different research outcomes. He critically noted that many studies in the research literature of mTBI are poorly controlled due to the absence of appropriate trauma controls. The importance of adding a psychologist to the assessment team of a neuropsychiatric condition in order to perform PVT and SVT and improve diagnostic precision, specificity, and sensitivity of diagnoses, has been outlined previously by Granacher (2003, 2008, 2015).

3. Conceptualizing malingering and response bias

As noted earlier, response bias and malingering have been conceptualized as occurring typically across three broad domains: psychopathology, cognitive impairment, and physical or medical illness (Rogers, 2008; Rogers & Granacher, 2011). The differential manifestation of malingering across these three domains has required the development of a variety of techniques for detecting when it occurs. The present article is generally focused on the detection of feigned psychopathology and emotional/behavioral problems. Carone's article in this special issue is more focused on feigned neurocognitive impairment. Nevertheless, we discuss at times when psychopathological malingering measures capture elements of neurocognitive feigning (e.g., MMPI-2-RF Response Bias Scale).

Psychopathological symptoms represent internal states experienced by the individual, which are most often revealed through the person's behavior and self-report. Rogers (2008) and Rogers and Bender (2013) have detailed the methods developed to detect the dissimulation of psychopathology. Detection strategies are generally focused around two examinee themes - an unsophisticated understanding of psychopathology and an inconsistency between reported symptoms and observed behavior. Most psychopathology malingering detection strategies are based on the notion that individuals feigning symptoms do not have a sophisticated understanding of the intricacies of psychopathology. One common strategy, the *Rare Symptoms* approach, considers the frequency of psychopathology symptoms (Rogers & Bender, 2013). Many dissimulators report symptoms that are infrequently experienced among patients with genuine illness. Those possessing an unsophisticated understanding of the genuine characteristics of mental illness might mistakenly overendorse symptoms that actually occur rarely among bona fide patients.

Another method for detecting dissimulation involves the *Symptom Combination* approach, in which dissimulators report combinations of symptoms that are either unlikely or inconsistent with common mood and psychotic disorders. This approach is utilized by two structured interview approaches, the Miller Forensic Assessment of Symptoms Test (M-FAST; Miller, 2001) and the Structured Interview of Reported Symptoms-2nd Edition (SIRS-2; Rogers, Sewell, & Gillard, 2010). For example, the test item may first ask the evaluee to affirm a particular symptom of a psychiatric condition, one that may in fact be a legitimate symptom (e.g., paranoia). If affirmed, the examiner then might ask if that particular symptom occurred within the context of another symptom (e.g., dizziness or headaches) or a particular timeframe (e.g., only on Thursdays). The feigning evaluee assumes that if the clinician is asking these questions, which have face validity for psychopathology, then a positive response *must* indicate the presence of greater symptom severity.

Another method of detecting dissimulation, the *Reported versus Observed approach,* involves comparing the evaluee's report of symptoms with behavioral observations. In the most extreme sense of this concept, insurance companies hire private investigators to follow litigants with the hopes of "catching" them engaged in activities inconsistent with their claimed disability (e.g., low back pain litigant repairing a roof). For clinicians, dissimulation can be suspected if an evaluee's report of symptoms is inconsistent with the clinician's observations of the patient.

In summary, the malingering of psychopathology often represents a naïve understanding of the genuine characteristics of disorders, which leads to over-reporting of symptoms. A particular challenge in neuropsychiatric evaluations is that litigated conditions such as TBIs often manifest themselves in psychological, somatic, and cognitive sequelae. Symptoms associated with neuropsychiatric injuries can include cognitive problems, such as loss of attention/concentration, memory loss, mental confusion, and speech impairment along with various somatic complaints, such as headaches, nausea, and pain in the head, neck, and back regions. Often, patients do not discriminate these symptoms as either cognitive or somatic, and rather report them as 'bodily' experiences. Nicholson and Martelli (2004) noted that patients often describe somatic and neurological complaints as a "unitary experience" (p. 3). These complaints may either be reported in conjunction with psychological problems, such as Posttraumatic Stress Disorder (PTSD) if the injuries were sustained in a traumatic event such as an accident or assault. Consequently, the use of employing multiple measures that utilize various detection strategies is often recommended (Rogers, 2008; Rogers & Granacher, 2011).

One conceptual link between the three domains of malingering (psychopathology, cognitive, somatic/medical) involves the notion of symptom expectancy. Expectations play a significant role in an individual's appraisal and experience of health (Hahn, 1999) and can shape health for better or worse. Exploring the role of expectancy in the area of neurological injuries, some have suggested it plays a significant role in symptom presentation. Gunstad and Suhr (2002) explored symptom expectancies for various conditions following an automobile accident. The authors presented participants with a vignette describing a car accident and one of four distinct post-accident consequences: head injury, back injury, posttraumatic stress, or depression. Participants were then asked to complete a questionnaire that described various cognitive, somatic, and emotional symptom/complaints as if they had just experienced the accident. Participants simulating head injury, posttraumatic stress, and depression expected equivalent rates of overall symptoms, memory/cognitive complaints, somatic concerns, and distracter symptoms, though head-injured individuals reported fewer affective symptoms than those portraying psychological disorders. Overall, Gunstad and Suhr's results suggest that most individuals display a relative lack of specificity in symptom expectation for various disorders. Framing these results within the context of malingering, it would be expected that individuals feigning problems following a neurological injury would malinger symptoms from all three domains of functioning. Consequently, instruments developed to detect over-reporting or misrepresentation of symptoms across all three domains (e.g., MMPI-2-RF) are recommended.

Particularly challenging in neuropsychiatric evaluations is the detection of feigned medical and physical dysfunction. In forensic neuropsychiatric settings, individuals may intentionally misrepresent physical complaints. Unlike the domains of cognitive impairment and psychopathology, the detection of somatic malingering has received much less attention, despite the frequency with which it occurs (Lanyon, 2003). The detection of somatic malingering is difficult in light of several other differential diagnoses in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association [APA], 2013), such as Somatic Symptom Disorder, Conversion Disorder, and Factitious Disorder, which present similarly during clinical evaluations. The issues of incentive and intentionality are important in differentiating between somatic malingering and somatic symptom disorders (Slick, Sherman, & Iverson, 1999). Malingering involves the conscious distortion or exaggeration of symptoms for an external incentive. The incentives of Somatic Symptom Disorder, Conversion Disorder, and Factitious Disorder are psychological, or internal in nature. The descriptions of these disorders note the incompatibility between reported symptoms and recognized neurological and medical conditions (APA, 2013).

As is the case with cognitive impairment, the detection of malingered somatic complaints is hampered by the lack of a "gold standard" for this task. In its absence, clinicians rely heavily on patients' self-report and measures developed by physicians, such as nonorganic signs of physical pain (e.g., Waddell's signs [Waddell, McCulloch, & Kummel, 1980]) and measures of physical effort on tests of isometric strength and flexibility (Bianchini et al., 2005). Elevations on self-report scales such as the Modified Somatic Perception Questionnaire (MSPQ; Main, 1983) and Pain Disability Index (PDI; Pollard, 1984) were recently found to differentiate exaggerated somatic complaints from bona fide pain patients (Crighton, Wygant, Applegate, Umlauf, & Granacher, 2014). Additionally, the MMPI-2-RF Infrequent Somatic Complaints (Fs) scale has shown some utility in detecting somatic malingering (Sellbom, Wygant, & Bagby, 2012).

Research has found that self-reported somatic complaints often occur in the presence of malingered

cognitive impairment. Studies examining the symptomatic complaints of individuals who demonstrate poor performance on neuropsychological testing (which is usually measured with SVTs), has found significant and replicated patterns of self-reported somatic complaints (as measured by the MMPI-2), including pain, paresthesia, and malaise (Berry et al., 1995; Larrabee, 1998; Wygant et al., 2007). Berry et al. (1995) reported that compensating brain-injured patients had their highest MMPI-2 Clinical scale scores on scales capturing physical malfunctioning, concern with health, and neurological complaints, including problems with attention/concentration and mental confusion. Similar results were reported by Larrabee (2003) in relation to the MMPI-2 and Portland Digit Recognition Test (PDRT; Binder & Willis, 1991). More recent research has found that the relation between feigned cognitive impairment and over-reported somatic and emotional complaints exists in non-head injury cases as well. Gervais, Wygant, Sellbom, and Ben-Porath (2011) examined substantive scales of the MMPI-2-RF (Ben-Porath & Tellegen, 2008) and performance on several cognitive malingering measures in a sample of over 1000 non-head injury disability claimants (predominantly comprised of patients with chronic pain and anxiety-related disorders). These authors found the highest effect sizes comparing those who failed no cognitive SVTs with those who failed multiple SVTs on RC1 (Somatic Complaints), RCd (Demoralization), and RC2 (Low Positive Emotions). Moreover, those who failed cognitive SVTs also over-reported on the COG (Cognitive Complaints) scale, which was similarly reported by Gervais, Ben-Porath, and Wygant (2009). Sumanti, Boone, Savodnik, and Gorsuch (2006) found similar results with the Personality Assessment Inventory (PAI; Morey, 2007). Examining a sample of non-head injury disability litigants, these authors found litigants displaying non-credible cognitive performance had elevations on the PAI Somatic Concerns, Depression, Anxiety, Anxiety-Related Disorders, and Schizophrenia scales. Similar results on the PAI were found by Whiteside and colleagues (2010) in relation to poor performance on the Test of Memory Malingering (TOMM; Tombaugh, 1996).

4. Malingering criteria

The DSM-5 (APA, 2013) defines malingering as the intentional production of false or grossly exaggerated physical or psychological symptoms, motivated by external, secondary gain, which mirrors the DSM-IV-TR with regard to diagnostic language. The DSM-5 specifies that clinicians should consider the presence of malingering in cases where the individual is involved in legal proceedings. It should also be considered when there is a discrepancy between the objective findings of an assessment and self-report, when the individual's presentation demonstrates a lack of cooperation with the evaluation, or when the evaluee displays symptoms of antisocial personality disorder. Unfortunately, despite calls for conceptual revisions to the DSM-5 in terms of aligning the diagnostic definition of malingering with emerging research in the field (Berry & Nelson, 2010), our official psychiatric manual still affords little assistance in terms of guiding the assessment of malingering and response bias. Consequently, clinicians and researchers have developed their own sets of criteria to guide the structured assessment of malingering, particularly in the areas of neurocognitive and pain malingering (Bianchini, Greve, & Glynn, 2005; Slick et al., 1999). The assessment of malingered emotional/psychological functioning and psychiatric symptoms is guided by various stand-alone measures (e.g., Structured Inventory of Reported Symptoms-2 [SIRS-2; Rogers, Sewell, & Gillard, 2010]) and embedded "validity" scales in multiscale inventories such as the Minnesota Multiphasic Personality Inventory-2 Restructured Form (MMPI-2-RF; Ben-Porath, 2008).

Slick et al. (1999) developed criteria to aid in the assessment and diagnosis of malingered neurocognitive dysfunction (MND). MND is conceptualized dimensionally into possible, probable, and definite malingering depending on the extent of supporting evidence as determined by four different criteria. Criteria A requires the presence of a substantial external incentive, criteria B includes evidence from neuropsychological testing, criteria C includes evidence from self-report measures, and criteria D states that the criteria B and C must not be fully accounted for by psychiatric, neurological, or developmental factors. These criteria incorporate various sources of data, including inconsistent responses on traditional neuropsychological measures, formal cognitive symptom validity tests, and embedded validity scales on self-report measures such as the MMPI-2-RF. The sensitivity and specificity of a neuropsychiatric examination can be improved considerably by also incorporating the Slick et al. (1999) criteria to ensure that the assessment and diagnoses have adequately addressed the possibility of malingered neurocognitive dysfunction (MND). Since physicians often note substantial discrepancies between outside medical

records, history obtained from the injured person, and their own findings and suspicions, psychological test findings incorporating the schema of Slick criteria can vastly improve the physician's diagnostic capability.

Utilizing the conceptual model established by Slick and colleagues (1999), Bianchini, Greve, and Glynn (2005) developed another set of criteria to aid in diagnosing malingered pain-related disability (MPRD). The MPRD criteria added a set of criteria that incorporated evidence from physical evaluation that were consistent with symptom feigning. Aside from this addition, the remaining structure and decision rules for the MPRD criteria are consistent with MND. Both of these criteria address previous limitations of conceptualizing malingering as a categorical phenomenon, and move it towards a dimensional construct. Utilizing neuropsychological testing, clinical interviews, self-report measures, and physical examinations, these criteria account for exaggeration of neurocognitive, psychiatric/psychological, and somatic symptoms.

5. Response bias measures

In addition to cognitive malingering measures (which are reviewed by Carone in this special issue), forensic psychologists and psychiatrists primarily rely on self-report measures to assess feigned neuropsychiatric conditions. Three such measures used quite often in forensic evaluations are the Personality Assessment Inventory (PAI; Morey, 2007), Minnesota Multiphasic Personality Inventory-2 (MMPI-2; Butcher et al., 2001), and MMPI-2-Restructured Form (MMPI-2-RF; Ben-Porath & Tellegen, 2008/2011).

The PAI remains a particularly popular instrument in forensic evaluations (Archer et al., 2006). Nevertheless, two particular challenges exist in using the PAI in neuropsychiatric settings for the detection of malingering. First, while the measure has well-validated response bias indicators (Sellbom & Bagby, 2008), they are positioned to capture exaggerated psychiatric symptoms (particularly severe psychopathology), but have limited research examining their ability to capture the types of symptoms often exaggerated in neuropsychiatric evaluations. Morey, Warner, and Hopwood (2007) noted that elevations (particularly high elevations) on the Somatic Complaints (SOM) scale (and subscales) can be used in combination with the PAI validity scales and external information to identify individuals malingering somatic problems.

Second, the number of studies examining the PAI in medico-legal (e.g., psychological injury, civil foren-

sic litigation, neuropsychiatric) settings is much less than the MMPI (Young, 2014). Two studies have found that individuals evidencing non-credible neurocognitive symptoms produced elevated scores on somatic and internalizing scales on the PAI (Sumanti et al., 2006; Whiteside et al., 2010). Hopwood, Orlando, and Clark (2010) examined the PAI validity scales' ability to discriminate between chronic pain patients and college students feigning chronic pain. While the PAI validity scales exhibited strong effect sizes discriminating the pain patients from college simulators, the authors cautioned against using the scales in clinical practice due to low sensitivity. Classification accuracy of these scales was improved by use of a discriminant function incorporating numerous PAI validity and clinical scales.

The MMPI-2 (Butcher et al., 2001) has a long history of use in medical settings. Given its vast research base and ability to measure broad aspects of personality and psychopathology, the MMPI-2 has also been used extensively in medico-legal settings. The MMPI-2 Restructured Form (MMPI-2-RF) was developed by Ben-Porath and Tellegen in 2008 as a revised version of the MMPI-2, in line with contemporary conceptualizations of personality and psychopathology. The substantive scales of the MMPI-2-RF provide useful clinical impressions in neurorehabilitation settings, with regard to chronic pain treatment (e.g., Aguerrevere, Greve, & Bianchini, 2013), spinal-cord stimulator implants (Block, Ben-Porath, & Marek, 2013), assessment of epilepsy (e.g., Locke et al., 2010), neuropsychiatric disease (Granieri et al., 2013), and neurocognitive functioning (e.g., Stroescu, Salinas, Nahab, & Stringer, 2011), among others.

While the MMPI-2 remains very popular among clinicians, the MMPI-2-RF may actually show more utility in forensic neuropsychiatric evaluations. First of all, it is considerably shorter than the MMPI-2 (338 vs. 567 items). Second, and perhaps most relevant to the current article, the MMPI-2-RF validity scales offer distinct measures of symptom exaggeration of three domains of functioning discussed earlier. In addition to capturing response consistency and under-reporting, the 5 over-reporting scales can capture emotional over-reporting (F-r: Infrequent Responses), exaggerated severe psychopathology (e.g., psychosis) (Fp-r: Infrequent Psychopathology Responses), non-credible somatic complaints (Fs: Infrequent Somatic Responses), non-credible neurocognitive and somatic complaints (FBS-r: Symptom Validity), and symptoms associated with poor effort on performance validity tests (RBS: Response Bias Scale; Gervais et al., 2007).

Previous research has examined the MMPI-2-RF over-reporting validity scales in a variety of contexts, including exaggeration of emotional symptoms and feigned severe psychiatric disorders (Rogers, Gillard, Berry, & Granacher, 2011; Sellbom & Bagby, 2010), and in disability settings (Gervais et al., 2011; Sellbom et al., 2013; Tarescavage et al., 2013; Wygant et al., 2009, 2010, 2011; Youngjohn, Wershba, Stevenson, Sturgeon, & Thomas, 2011).

Wygant, Ben-Porath, Arbisi, Berry, Freeman, and Heilbronner (2009) showed that FBS-r and Fs differentiate between participants reporting non-credible somatic symptoms and bona fide, non-litigating medical patients. They also found that the F-r scale was useful in detecting exaggerated emotional complaints in this setting. In 2010, Wygant et al. found that RBS was associated with cognitive (SVT performance among disability claimants. Sellbom, Wygant, and Bagby (2013) examined the validity scales with individuals asked to intentionally malinger physical health problems and compared their responses to a group of somatoform patients and genuine medical patients. Fs was sensitive to somatic malingering, whereas the Fp-r scale was the most specific. Fs and Fp-r were both able to differentiate the somatic malingering group from the somatoform and medical illness groups. While FBS-r had the highest overall sensitivity differentiating non-credible somatic complaints from genuine medical illness, it could not distinguish somatic malingering from somatoform disorder.

The MMPI-2-RF validity scales have also been examined in neuropsychological settings. Youngjohn et al. (2011) utilized the MMPI-2-RF to examine traumatic brain injury (TBI) litigants who had either passed or failed effort tests. They found that although the FBS-r, Fs, and F-r scales were not significant predictors of TBI severity, FBS-r showed a significant relationship to symptom validity test performance. Exaggerated memory complaints have been examined in relationship to the MMPI-2-RF validity scales, and the RBS has exhibited success in identifying this form of response bias (Gervais et al., 2008, 2010). Using an archival sample of non-head injury disability-related referrals, RBS added incrementally to other over-reporting measures in assessing self-reported memory complaints (Gervais et al., 2010).

The MMPI-2 and MMPI-2-RF have been examined in relation to the criteria for Malingered Neurocognitive Dysfunction (MND) and Malingered Pain-Related Disability (MPRD) (Bianchini et al., 2008; Greve et al., 2006; Schroeder et al., 2012; Wygant et al., 2011).

Greve and colleagues (2006) found that FBS exhibited good classification (sensitivity and specificity) in identifying MND among 259 traumatic brain injury (TBI) patients and 133 general clinical neuropsychological patients. Utilizing a sample of simulated malingerers and chronic pain patients, Bianchini et al. (2008) found that the MMPI-2 validity scales accurately differentiated malingerers from non-malingerers based on the MPRD criteria. More recently, Wygant and colleagues (2011) examined the MMPI-2-RF over-reporting validity scales in individuals undergoing compensation-seeking evaluations for disability in relation to the MND and MPRD criteria. They found that Fs and FBS-r were good measures of non-credible neurocognitive and somatic symptoms. Schroeder et al. (2012) examined the MMPI-2-RF over-reporting scales in relation to the MND criteria among TBI patients and found that the scales exhibited excellent specificity and good sensitivity in differentiating litigating TBI patients classified as probable malingers from non-malingerers.

6. Case examples

We have selected two cases to illustrate some of the points raised in this article. Both of these cases were referred for forensic neuropsychiatric evaluation secondary to civil litigation. Both involved litigants who display evidence of symptom exaggeration and possible feigning. However, as Silver (2015, this issue) indicates, not all invalid symptom reporting is indicative of malingering.

6.1. Case 1

The first case involved a 36-year-old male being examined at the request of his employer to determine if he retained neuropsychiatric impairment as a result of an alleged workplace injury. He was working his customary occupation as a tree trimmer on the date of his injury. A large limb fell onto his head while he was wearing a hardhat and rendered him unconscious. He was transported to a level 1 trauma center by helicopter. His field *Glasgow Coma Scale* (*GCS*) score was 13 with E = 3, V = 4, and M = 6. Upon arrival to the trauma center, his *GCS* score was 15. The neurological examination was non-focal, but he perseverated and kept asking, "Where am I?" He was diagnosed in the emergency department with concussion and was admitted to hospital for a brief stay. CT of the head revealed a small left parietal scalp hematoma with no

evidence of skull fracture or other evidence of injury to brain parenchyma. He required no stitches to the head.

Upon examination by the second author (RPG) two years post injury, the examinee presented an extraordinary number of mental and neuropsychiatric symptoms known generally to be inconsistent with a concussion. For instance, he complained of depression, sadness, nervousness, poor concentration, loss of memory, confusion, irritability, difficulty with thinking, flashbacks to the accident, excessive counting of objects, fear of germs, and fear of touching doorknobs. He admitted his flashbacks were not specific to the accident, but were flashbacks of other accidents he had "imagined." Neurologically, he complained of headaches, numbness and tingling with weakness and poor balance. In his sleep review, he claimed only to sleep four hours nightly, but he required no naps whatsoever. He also reported choking during sleep and that others had observed him to stop breathing, but he denied daytime somnolence.

Regarding his past medical history, the examinee was not born prematurely and had no evidence of birth injury or neurodevelopmental delay. He was able to function in school and reported no history of attention deficit disorder or learning impairment. He had never been injured in a prior motor vehicle accident, and had never been in a coma, had a skull fracture, or undergone any surgery. He was taking an extraordinary amount of medication at the time of this examination, which included quetiapine 700 mg nightly. His prior psychiatric history was negative. His family history included no familial evidence of psychiatric, neuropsychiatric, or neurological illness. In his social history, he admitted to dropping out of school after the 10th grade to go to work and he never obtained a GED. He had been married twice and divorced once, and he had three biological children. He had been jailed once previously but claimed an inability to know the charge that caused his incarceration. He never entered military service. His wife was disabled, and he also reported that he did not plan to return to work at any time in the future.

Table 1
Case study data

	Case 1	Case 2
Gender/Age/Education	Male/36/10	Female/24/12
Neuroimaging Results	Initial CT revealed a scalp hematoma but, no evidence of parenchymal injury. Follow-up CTs were normal.	Initial CT revealed global edema with effacement of sulci. Second CT on day 1 of injury revealed ventriculostomy with subarachnoid hemorrhage. Third CT at 13 days post-injury revealed bifrontal hygromas.
Additional medical findings	Initial GCS in the field revealed confusion with E = 3, V = 4, M = 6, T = 13. At emergency department, GCS = 15 with non-focal neurologic examination.	She was pregnant at impact and lost the fetus. GCS varied from 3T to 5T during transit. She remained comatose. Follow-up MRI 6 years post-injury revealed multiple areas of chronic encephalomalacia.
MMPI-2-RF scale	T score	T score
VRIN-r	58	48
TRIN-r	58	50
F-r	120	120
Fp-r	85	85
Fs	99	115
FBS-r	89	99
RBS	120	118
L-r	57	52
K-r	28	31
TOMM Trial 2%	64%	90%
TOMM Retention %	50%	N/A
LMT %	40%	98%
VSVT Easy %	79%	96%
VSVT Difficult %	13%	58%

Note. CT = computed tomography. GCS = Glasgow Coma Scale. E = Eye. V = Verbal. M = Motor. T = Total. MMPI-2-RF = Minnesota Multiphasic Personality Inventory-2 Restructured Form. VRIN-r = Variable Response Inconsistency-Revised. TRIN-r = True Response Inconsistency-Revised. F-r = Infrequent Responses. Fp-r = Infrequent Psychopathology Response. Fs = Infrequent Somatic Responses. FBS-r = Symptom Validity. RBS = Response Bias Scale. L-r = Uncommon Virtues. K-r = Adjustment Validity. TOMM = Test of Memory Malingering. LMT = Letter Memory Test. VSVT = Victoria Symptom Validity Test.

The examinee's mental status examination revealed him to be an energetic man who was not mentally or physically slow or sluggish. He vociferously argued his case that he was unable to work and that he had been badly injured by his accident. Nevertheless, he independently completed a complex 22-page medical questionnaire. His handwriting was without evidence of tremor or other neurological findings. He did not appear to be depressed, in spite of his protestations, nor was he anxious. His language was intact for expression and reception, and he was fluent. He gave no history of delusions or hallucinations. His neurological examination was non-focal. Nevertheless, as indicated in Table 1, this individual exhibited very poor effort on three well-established performance validity measures. Despite this, he still produced average scores on intellectual and executive functions testing. However, his poor effort likely impacted the extremely low scores on various memory measures. His scores on the MMPI-2-RF were highly reflective of emotional, somatic, and neurocognitive symptom exaggeration. Diagnostic impressions included severe symptom magnification and poor cognitive effort, as well as an uncomplicated concussion. His claim of persisting significant problems resulting from a brain injury was deemed inconsistent with the medical facts and clinical observations. The evaluator concluded that he exhibited 0% neuropsychiatric impairment.

6.2. Case 2

The second case involved a 24-year-old female who was injured in an automobile accident. She was examined at the request of an attorney representing the defendant who allegedly injured this woman in the car accident. The examination took place six years after her injury. At examination and history taking, she reported complete amnesia for the facts of the accident. At the time of her accident, she was operating an SUV. Her initial *Glasgow Coma Scale* score taken by the ambulance service indicated a *GCS* of 15. However, a helicopter was dispatched to the scene, and by the time she was loaded into the aircraft, her mental state had deteriorated dramatically. She required intubation, and her *GCS* was 3T. At arrival to the level 1 trauma center after triage at a local hospital, her *GCS* was 5T. She was found to have a severe closed-head injury and a pregnancy. She lost the pregnancy due to complications from the trauma.

This patient experienced significant generalized brain edema, which required intracranial decompression by ventriculostomy. She had a complicated hospital stay,

and on day 13 of her injury, she was noted by imaging to have bilateral frontal hygromas. On the 27th hospital day, she was transferred to a rehabilitation hospital. Her admission physician judged her to be at Rancho Level V at the time of her admission. She had a gastric feeding tube in place, a tracheostomy in place, and she could follow only simple commands and did so inconsistently. She had a slight left facial droop present on neurological examination, with no other focal neurological findings.

At the time of her examination with the second author, the patient was being treated at a local mental health system near her home. She was reporting posttraumatic stress disorder and a mood disorder due to her brain injury. Her medications at the time of examination included triamterene and hydrochlorothiazide, diazepam, and loratadine. All dosages were appropriate. She also was taking an unspecified antidepressant.

After leaving the rehabilitation hospital, the patient had to relocate to her father's home. She denied any prior history of head or brain injury, and she had never been in a coma previously. She had fractured her left clavicle in the subject accident, but it required no surgical reconstruction. She denied prior pregnancies. She denied a prior psychiatric history.

The patient's neurological examination was non-focal. Her mental status examination revealed her to be pleasant and cooperative. She independently completed a complex 22-page medical questionnaire. She was fully oriented and understood the nature of the examination. She had a mildly constricted affective range without anger or irritability, even though she subjectively reported that she was quite irritable and angry at times. She showed no evidence of undue anxiety while discussing the accident, and she had absolutely no memory for it. This called into question her posttraumatic stress disorder diagnosis.

MRI of the brain was obtained and demonstrated focal areas of encephalomalacia, including the middle right parietal cortex, periventricular white matter in the right centrum semiovale, and a small focus present in the left anterior centrum semiovale. Mild diffuse atrophy of brain was present, which was inappropriate for her age. There was no shift of brain contents, and no extra-axial fluid collections were present. Laboratory testing for apolipoprotein E, $\varepsilon 4$ was negative.

As depicted in Table 1, this patient exhibited good performance on two out of three performance validity measures. Nevertheless, her scores on the MMPI-2-RF were suggestive of symptom exaggeration across all three domains of functioning. She also exhibited evidence of feigning on the SIRS. Given her overall good

performance on cognitive PVTs, her neuropsychological test scores were considered to be representative of her neurocognitive functioning. Scores on various measures of memory, intellectual, and executive functioning indicated impaired performance. Consequently, she was diagnosed with a cognitive disorder due to traumatic brain injury, as well as mood disorder and personality change secondary to traumatic brain injury. Her neuropsychiatric impairment was rated at 30%.

7. Conclusions

Forensic neuropsychiatric assessment requires thorough consideration of malingering and response bias. These evaluations are complicated due to the multiple domains in which symptoms and impairment present. Consequently, steps must be taken to ensure adequate coverage of response bias across all three domains of function. Performance and symptom validity measures should be routinely included in these evaluations. Collaboration between psychiatry and psychology can provide the optimal multi-method approach needed for thorough neuropsychiatric assessment in forensic cases. It is important to note, as illustrated in case 2, that symptom exaggeration does not always preclude genuine impairment.

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