On the diagnosis of maledgered pain-related disability: lessons from cognitive malingering research

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Abstract

BACKGROUND CONTEXT: Pain-related disability is a complex phenomenon. Malingering is a potential factor in the management of patients with pain. Methodological problems and inappropriate expectations regarding diagnostic accuracy have hampered the study of malingering detection in pain. In contrast, the study of cognitive malingering in neuropsychology has led to the development of many highly accurate and reliable detection techniques. This paper applies the methods and logic that have been successful for identifying cognitive malingering to the problem of malingering in patients with pain.

PURPOSE: Outline the logic of a research methodology for studying malingering detection in pain and introduce a system for the diagnosis of malingering in pain.

STUDY DESIGN: Literature review and conceptual synthesis.

METHODS: Examination of the research methodology and diagnostic scheme used in the study of cognitive malingering; adaptation of these methods to the problem of malingering in pain.

RESULTS: Lessons derived from the study of cognitive malingering were used to generate recommendations to enhance research into detection and diagnosis of malingered pain-related disability. A comprehensive, multidimensional system for diagnosing malingering in pain-related disability was proposed.

CONCLUSIONS: Pain-related disability is a multifaceted phenomenon, therefore malingering can occur in different and sometimes multiple dimensions. It is presently possible to accurately detect and diagnose malingering in some patients with pain. More work is needed for some detection techniques to be appropriately calibrated in pain populations. This work must focus on controlling the false positive error rate.

Keywords: Chronic pain; Pain-related disability; Malingering; Symptom magnification; Sincerity of effort

Introduction

It is currently well accepted that the pathophysiology of spinal pain is not entirely or clearly understood \cite{1} and physical/diagnostic characteristics of injuries associated with pain do not fully explain symptomatic or functional outcomes \cite{2,3}. This has led to the investigation of psychological factors in search of an explanation for some of this unexplained variance. Recent research has confirmed that certain psychological factors are related to outcome, particularly in the transition between acute and chronic pain \cite{4-6}. Financial incentive is also known to influence outcome \cite{7} and its presence introduces the potential for malingering. Even if conservative estimates \cite{8} are accurate, malingering in pain is potentially responsible for the diversion of a substantial amount of scarce health care resources. Because pain management is projected to be one of the most under-served health care areas, this is a potentially serious problem. At the same time, malingering to obtain medications complicates the medical management of pain patients. The absence of a reliable method of detecting malingering in pain patients may result in physicians’ overly cautious prescribing, denying valuable medication to some patients who might benefit from proper analgesia \cite{9,10}. Therefore
the detection of malingering is practically important from both an economic and patient care standpoint. Yet the issue of exaggeration and malingering in pain has been a controversial topic.

Although there do exist a large number of techniques which are reportedly sensitive to malingering in pain, their accuracy has been questioned [8,11]. In fact, Fishbain et al. [8] concluded that “there are currently no reliable methods to identify malingering [in pain patients]” (p. 270). As this paper will demonstrate, this purported lack of reliability is not because malingering cannot be reliably or accurately detected, but because, for the most part, the indicators have not been appropriately developed and calibrated. The detection and diagnosis of malingered cognitive impairment is a problem that has been addressed by clinical neuropsychology over the past 10 to 15 years [12,13]. This paper attempts to apply the methods and logic that have been successful for identifying malingering in patients with primary neurocognitive symptoms related to brain injury to the problem of malingering in pain patients. Specifically, we will describe the conceptual and empirical lessons that have enabled neuropsychology to develop an effective, empirically based approach to the problem of malingered cognitive dysfunction. These lessons will then be applied to malingering of pain symptoms in a manner that generates an empirically based clinical approach to pain malingering detection and diagnosis and a systematic program of research for advancing the empirical understanding of this phenomenon.

Complexity of pain as a symptom

The pathophysiology and psychological factors underlying pain-related disability are complex individually and in combination, and an understanding of both is important in the clinical management of the pain patient. Herniated nucleus pulposus, foraminal stenosis, and nerve root impingement are all associated with pain generation [14]. However, cervical and lumbar disc abnormalities, including some that would be considered surgical lesions, have been found in the cervical and lumbar spines of asymptomatic patients [3,4]. Moreover, the presence of an identifiable abnormality of the disc or spinal canal in the lumbar spine of asymptomatic patients does not predict subsequent low back pain 7 years later [15]. The complexity goes beyond mere spinal disc pathology. For example, facet and sacroiliac joint pathology have been found to respond to specific treatments, suggesting a role of these pathologies in pain generation [16]. So called “soft-tissue pathologies” such as complex regional pain syndrome [17–19] and fibromyalgia [20] have been associated with serious, debilitating, and possibly even progressive injury syndromes. These conditions are also frequently associated with psychological co-morbidity or even potential causality [21–23]. Because of the complex relationship between physical pathology and pain, all reasonable physical explanations need to be actively considered in the course of a medical pain evaluation. At the same time, physical explanations may not fully or even partly account for the patient’s symptom presentation, therefore psychological factors will often need consideration because in some cases they better predict outcome than the physical characteristics of the pathology [6,24].

The discrepancy between physical findings and physical disability in some patients may be termed “excess disability.” While potentially including some persons whose physical pathology is not visible to current medical diagnostic technology, those patients with excess disability could be reasonably divided in two groups: 1) those whose excess disability is related to unconscious psychological factors (ie, somatization); and, 2) those whose excess disability is the result of intentional fabrication or exaggeration. Patients may have reactive psychological problems/disorders (eg, depression, anxiety) in response to physical pain. Somatization is one unconscious psychological process that directly affects pain symptom presentation [25]; it is the characteristic psychological process of somatoform disorders [26]. Conscious mechanisms include intentional attempts to appear impaired to achieve some psychological goal (Factitious Disorder) or to achieve some external incentive (malingering) [26]. Psychological mechanisms, including conscious ones, can coexist with documented physical pathology [27]. Similarly, conscious and unconscious psychological mechanisms are not mutually exclusive [28]. Discriminating between unconscious and intentional mechanisms (eg, hysterical conversion reaction vs. malingering) is one of the central questions that must be addressed. There are existing methods for understanding relevant physical parameters (although not completely) and some aspects of the psychological processes, particularly somatization [24]. What is needed is a system for detecting and diagnosing the intentional or conscious mechanisms in pain.

Lessons from cognitive malingering research

In the past two decades, neuropsychology has addressed many of the methodological and conceptual problems associated with the detection of malingered cognitive deficits in the context of brain injury. The evolution of forced-choice symptom validity testing provides a good example of how such difficult concepts as “intention” can be operationalized and then applied in a way that meets current standards of admissibility in court [29]. The study of malingered neurocognitive dysfunction can guide the study of malingering in the context of pain and facilitate the development of reliable detection techniques. Four of the lessons learned in the study of cognitive malingering are summarized below.

First, research on malingering requires that malingering be clearly operationalized and that malingering groups be defined on the basis of external criteria derived from a systematic analysis and integration of multiple sources of clinical information encompassing behavior in multiple domains
[29]. Greiffenstein et al. [30,31] were among the first to make use of structured systems for classifying litigating patients into malingering versus nonmalingering groups. In 1999, Slick et al. [32] published comprehensive and well thought-out criteria for the diagnosis of Malingered Neurocognitive Dysfunction. The Slick et al. criteria now serve as the basis of classification in an increasing number of studies of malingering in the neuropsychological literature (eg, 33–36). The Slick et al. criteria have also been applied in pain cases (eg, 27,37,38) but are limited to complaints of cognitive impairment. Therefore, they must be adapted to include broader criteria encompassing all the behavioral domains in which pain-related disability is manifested. This is a primary focus of this paper.

Second, empirical data concerning the accuracy of detection techniques are essential for their ongoing development, clinical application, and admissibility in legal proceedings. The relevant indices of classification accuracy are sensitivity, specificity, and predictive value [39,40]. Sensitivity and specificity are characteristics of the test or indicator and are dependent on the decision rule or cutoff examined. Predictive value is a measure of confidence in the meaning of a test result and is dependent on sensitivity and specificity as well as the base rate of the target condition in a given population. To contribute to an empirical science of malingering detection, the classification accuracy of malingering detection techniques must be clearly stated in terms of sensitivity, specificity, and predictive value. This has been a significant shortcoming of many studies of effort and malingering in pain.

Third, it is important to recognize that in the detection of malingering, specificity and positive predictive value are the critical indices of classification accuracy. Positive predictive value reflects the degree of confidence that a given score correctly indicates the presence of the target condition and depends most on specificity. The sensitivity of all individual indicators designed to detect malingering will always be less than perfect if one wishes to guard against excessive false positive errors. Perfect sensitivity is practically impossible for three reasons. First, for some tests (eg, forced-choice symptom validity tests) the means of detecting negative response bias may be easily recognized by patients; the more obvious the detection strategy, the less likely a malingering is to be detected by the task [29]. Second, different persons who malar are use different approaches to appearing impaired and no indicators or tests are capable of detecting all approaches [34,41]. Third, if a patient is provided with information about specific malingering tests (ie, coaching), then they may be more likely to avoid detection [42,43]. Thus, attempts to set cutoffs that detect all true malingers will inevitably result in an unacceptably high number of false positive errors. Even attempts to establish cutoffs that maximize overall classification accuracy must compromise specificity. In contrast, it is possible to identify performance levels associated with perfect or near perfect specificity. This means that one can likely be confident that the score reflects a suspect behavior pattern. Practically, it is better to detect some malingers with few false positives than to try to achieve the impossible goal of complete discrimination of groups. The use of multiple indicators should result in greater sensitivity while still limiting false positive errors. The main conceptual point is that, given the importance of specificity and the inherent limitations of sensitivity, the empirical validation of measures to detect malingered pain-related disability should focus on maximizing specificity. It would be an error to make value judgments about the utility of a given indicator on the basis of its sensitivity or on overall classification accuracy without controlling for specificity. Unfortunately, this has been a common practice in the pain literature (eg, [8,11]).

Finally, accurate estimates of sensitivity and specificity require accurate group assignment. At minimum, there must be two criterion samples in any complete examination of a malingering test or indicator: a suspected malingering sample (index) and a nonmalingering (control) group. Sensitivity and specificity are a function of the performance of the individuals in these two groups. In order to accurately determine sensitivity, one must be very confident that only persons who are malingering have been included in the malingering group. Therefore, the use of multiple external criteria (eg, those of Slick et al. [32]) for assignment to the malingering group is essential for accurately determining sensitivity [12] as has been clearly illustrated [44]. Although simulators (eg, college students asked to fake cognitive deficits) are often used in the preliminary development of malingering detection techniques, “sensitivity” data derived from simulators cannot be reliably applied in clinical settings except under certain circumstances (see Diminished Physical Effort/Capacity, below). At the same time, simulator studies can provide valuable convergent data supporting empirical findings with clinically diagnosed malingerers. In evaluating specificity, the nonmalingering control group must, at least, be comprised of persons who are similar to the index sample in terms of etiology as well as the usual demographic characteristics. Patients should be excluded from this group if they evidence suspect behavior even if it is not otherwise sufficient for inclusion in the malingering group. The major point is that in developing empirical cutoffs, the purity of the control and malingering groups is critical to the validity of the cutoffs, and this requires a systematic method for operationalizing malingering.

The preceding paragraphs describe an approach to the empirical study of malingering detection and diagnosis that has evolved over the past decade in neuropsychology. Four lessons derived from this research were outlined and can be summarized as follows: 1) proper research on malingering requires a method for operationalizing malingering; 2) to be clinically useful, summaries of malingering research must report sensitivity, specificity, and predictive power; 3) specificity is more important than sensitivity or overall classification rate in developing malingering detection techniques;
4) the validity of estimates of classification accuracy depends on the purity of the criterion (malingering and control) groups. These lessons provide guidelines for the development of an empirical science of malingering in pain and are consistent with the recommendations of Sackett and Haynes [45] regarding diagnostic research. A central part of this science of malingering is the development of a diagnostic system for the classification of behavioral problems attributed to pain. Such a system would be an integrated method for organizing observations of suspect behavior and would allow the initial group assignments needed to empirically validate techniques for malingering detection. When techniques are validated, they can then be used to fine tune group assignment which then allows the development of more sensitive and precise techniques for detection. The remainder of this paper will discuss the conceptual issues related to the development of a system for the diagnosis of malingering in pain and then detail a proposal for such a system.

Conceptual issues

Multidimensional presentation of disability

Clinically, pain patients may report symptoms in a variety of dimensions [46,47]. In addition to physical complaints and limitations, some pain patients report emotional symptoms [48,49] and cognitive problems [50,51], all of which may be important in the disability claims of patients in litigation. Ultimately, the relevant question to both clinical practitioners and the justice system is not only “how much pain is this person experiencing” but “to what degree is this person disabled by their pain?” Therefore, we offer the concept of Pain Related Disability (PRD). PRD refers to the altered capacity to care for oneself or others, or altered capacity to work that results from the physical, emotional, behavioral, and/or cognitive symptoms that arise from or are described in terms of tissue damage. In this view, the question of interest in addressing malingering in pain, is not just about the veracity of the pain complaint itself, but of the degree of disability that is attributed to the pain. Put another way, the question of malingering in PRD is not whether a person is truly injured or malingering; truly injured persons can and do mangle [35,37,52–54]. The question is whether the nature and severity of disability attributed to the injury is inconsistent with what would be expected given the physical parameters of the injury. Therefore, we formally define Malingered Pain-Related Disability (MPRD) as the intentional exaggeration or fabrication of cognitive, emotional, behavioral, or physical dysfunction attributed to pain for the purposes of obtaining financial gain, to avoid work, or to obtain drugs (incentive). Typically, it is not difficult to identify the presence and nature of external incentives in a given case. An evaluation initiated as part of a worker’s compensation claim, personal injury lawsuit, or other disability claim is done in the presence of external incentive. Narcotics or other drugs of abuse can serve as an incentive to fabricate or exaggerate symptoms. The nature of the incentive may be closely related to the clinical symptom presentation.

For example, clinically, we have noted patients who were released to a modified physical demand level by the physicians treating their physical problems, who then manifested disabling new emotional or cognitive symptoms. In the case of malingered PRD, the development of this kind of multidimensional disability may be related to the structure of civil litigation awards. Specifically, one element in the valuation of damages involves loss of future wages. This is generally determined by calculating the difference between the pre-injury wage and the presumably lower post-injury wage, multiplied by the number of years the patient is expected to work after the injury. The lower the post-injury wage, the greater the award. Therefore, a patient who is physically able to work at medium or light demand levels (down from heavy demand) but is unable to work at all because of the emotional or cognitive consequences of his injury will potentially garner a larger award settlement than if he were to return to work at the reduced demand level. The same logic applies to the issue of self-care, because patients may demand awards to cover lost capacity for self-care, regardless of the modality of the disability. In short, the presence of cognitive and emotional symptoms in the overall picture of disability can result in greater financial awards. Because multidimensional disability is potentially more “valuable” in the litigation context, there would be greater incentive to malinger disability in multiple modalities. Therefore, a system to diagnose MPRD should take into account all the modalities in which malingering may occur. A diagnostic system that does not take into account multiple modalities of disability presentation (ie, focuses only on physical manifestations) would likely miss important information.

Identifying intentional symptom production/exaggeration

A diagnosis of MPRD requires evidence of external incentive and intentional symptom production [26]. Incentive is usually readily identified, as noted above. Determination of intent is a more difficult task. At the heart of the issue of malingering is the question, “Is the patient intentionally performing below their true capacity or manifesting more disability/symptoms than is actually the case?” Intent is something that generally has to be inferred from the facts of the case in the form of the quantity, magnitude, and pattern of inconsistencies in a patient’s presentation. “Inconsistency” is one of the central concepts in the diagnosis of malingering. The basic notion is that if one is intentionally producing or magnifying symptoms, it is harder to do so consistently than it would be for someone who is simply manifesting their true physical symptoms or diminished capacities. Inconsistencies occur across multiple dimensions. A patient’s behavior can be inconsistent between and within examinations, inconsistent with what is known about normal function and abnormal function, and inconsistent across behaviors. A fundamental assumption in malingering research
is that the more inconsistencies a patient presents across multiple or relatively independent domains, the more likely it is that their performance reflects deliberate efforts to misrepresent their true capabilities or symptomology. In the literature on malingered neurocognitive dysfunction, empirically meaningful incidents or observations of inconsistency are referred to as response bias. The concept of response bias also applies to clinical aspects of MPRD such as cognitive symptoms and emotional complaints. In terms of physical effort measures, an analogous concept may be effort bias, which we define as empirical evidence of intentional submaximal effort on a measure of physical capacity. Intention, inferred from evidence of bias, in the presence of external incentive separates malingerers from disorders that feature unconscious exaggeration of symptoms or disabilities. Therefore, methods of malingering detection should demonstrate response or effort bias with a high degree of specificity.

Fishbain et al. [8] have questioned the empirical basis for using inconsistencies to diagnose malingering in patients with pain. Their criticism arises, at least in part, because truly injured patients with pain do present with some inconsistencies. Thus, their criticism is really not about whether malingerers are inconsistent, but how much inconsistency is more than should be seen in persons who are not malingering. When phrased in this way, the question can be answered empirically. Confidence in one’s inference regarding intent, and therefore the diagnosis of malingering, is based on the pattern and magnitude of unusual or suspicious findings (inconsistencies) and whether or not alternative explanations for these findings have been ruled out. The specificity (and the related concept of positive predictive power; discussed above) of the various indicators provides the empirical index for this degree of confidence.

Critical to inferring intent is that other reasonable hypotheses (eg, somatization) except a conscious and purposeful effort to misrepresent one’s current status be ruled out as an explanation of the magnitude of inconsistency observed. That is, if MPRD is to be diagnosed, other conditions cannot fully account for the magnitude of inconsistency. “Definitive” evidence of intent is seen in behaviors which in and of themselves eliminate the possibility that the person was unaware that the report of their disability is a misrepresentation of their true status. Evidence of “probable” intent would exist when a behavior pattern could be reasonably explained by other nonintentional causes but those causes have been ruled out empirically. In this case, quantitative evidence that a particular finding is rare or nonexistent in nonmalingering pain patients is particularly strong. The following section describes behavior that may be considered “definitive” evidence of intent and briefly reviews the status of the literature regarding evidence of “probable” intent.

“Definitive” evidence of intent

Below-chance symptom validity test (SVT) performance

One important source of “definitive” evidence of intent comes from forced-choice symptom validity tests (SVTs). The SVT has reached its highest level of development in the detection of feigned memory impairment [29] though the approach originated as a technique for detecting suspicious sensory-perceptual deficits [55–59]. The use of a tactile sensory SVT to detect malingering in several cases of PRD has recently been reported [27]. The general procedure requires that the patient select the correct answer from a fixed number of response options (usually two) after the presentation of a stimulus. In the absence of knowledge about the stimulus, a patient should respond correctly on about 50% of the trials by chance alone in a two-choice procedure. A result that is significantly worse than a 50% (statistically below-chance) result “is not a random or chance occurrence but represents a purposive distortion by the examinee” [60] (p. 272; italics added). Thus, a statistically below-chance finding on an SVT is definitive evidence of intent.

Compelling inconsistencies

Another source of “definitive” evidence may be referred to as a “compelling inconsistency.” This occurs when the difference in the way a patient presents when being evaluated compared with when they are not aware of being evaluated is such that it is not reasonable to believe the patient is not purposely controlling the difference. For example, a patient claims in clinical evaluation or deposition to be unable to work because of physical injury/symptoms but is subsequently demonstrated to be working via witness testimony, videography, paycheck stubs, or other such evidence. This patient would reasonably be diagnosed as malingering. It is simply not believable that the patient can present as disabled in the clinic while concurrently working and not be aware that the report of their disability is a misrepresentation of their true status. This pattern of behavior is often the basis of fraud claims or for dismissing claims for disability in courts throughout the United States.

The scenario described above is an extreme example along a continuum of inconsistency. The core question in evaluating the meaning of such findings is whether nonconscious factors could reasonably explain the observed inconsistency. An argument cannot reasonably be made that the individual in the case sketched above was unaware of the differences in his behavior in the two contexts. More often, however, the inconsistencies or misrepresentations of facts are more ambiguous. Thus, unlike a statistically below-chance SVT finding, determination that a behavior represents a “compelling” inconsistency and therefore definitive evidence of intent requires a degree of judgment. This behavior pattern itself should therefore be the subject of study in a science of MPRD. Clear, objective standards for the evaluation of inconsistencies between clinical presentation and evidence of capacities outside the clinical setting should be established. In the absence of such standards, determination of the “compellingness” of such inconsistencies should be cautious and conservative and in some cases may be left to the trier of fact rather than the clinician.
“Probable” evidence of intent

In the majority of cases, definitive evidence of intent will be absent. Intent might still be inferred in a given case on the basis of inconsistencies in the patient’s behavior and presentation. However, it is necessary to have a means of identifying inconsistencies that are meaningful in that they are extremely rare in the nonmalingering patients. Inconsistencies can occur in cognitive, emotional, and physical dimensions, and the vector of the symptom dimension that represents malingering will vary depending on whether capacity or symptom complaints are measured. Regarding symptom reports of emotional or cognitive complaints, or the intensity of physical pain, over-reporting is the concern. When the measurement involves physical or cognitive capacity such that some effort on the part of the patient is required, purposeful under-performance is the issue. Malingering can occur in any of these dimensions, thus all areas may be part of the clinical assessment that includes consideration of malingering or symptom magnification. Simply put, increased disability, the “goal” in malingering, involves more symptoms or less capacity, or both. An important emphasis of this paper is that the empirical or clinical approach to understanding disability exaggeration/malingering in pain patients that looks simply at the singular symptom of the sensation of pain, or even submaximal physical effort, likely misses other important symptom dimensions. Tools exist which offer the possibility of detecting the diverse behavioral patterns associated with malingering in pain. What, then, is the status of research regarding the detection of malingered pain-related disability? The following section briefly reviews the current status of those techniques.

Cognitive symptoms

Cognitive complaints are relatively common in patients with pain [50] and are sometimes worse than in patients with neurological injury [51]. It has recently been demonstrated [61] that the presence of cognitive deficits may be under voluntary control in a high percentage of patients with pain. Specifically, chronic pain patients undergoing disability assessment were given the Computerized Assessment of Response Bias [62], a computerized forced choice symptom validity test designed to detect malingered memory deficits. Instructions as to the meaning of the Computerized Assessment of Response Bias were manipulated, with one group of subjects being instructed that it was a measure of effort, whereas the other two groups were not provided this instruction. The failure rate was substantially lower in the group that understood that it was an effort measure. These results suggest that the presence or absence of cognitive deficits was largely a function of the pain patients’ perception of the purpose of the test rather than a consequence of pain. Meyers and Diep [46] compared chronic pain patients involved in disability litigation with matched patients not involved in litigation on validity indicators derived from six standard neuropsychological tests. These validity markers had previously been found to be indicative of malingered neurocognitive dysfunction in patients claiming brain injury–related neurocognitive impairment. Of litigating chronic pain patients, 29% failed two or more of the six validity checks, compared with none of the nonlitigating chronic pain patients. In a recent paper [37], Bianchini et al. demonstrated the sensitivity of these methods in pain patients, while at the same time illustrating the application of Slick et al.’s criteria [32] for Malingered Neurocognitive Dysfunction in patients with pain. Overall, these studies demonstrate that there may be an element of cognitive disability in some patients with pain and that these cognitive deficits can be malingered. Moreover, they demonstrate that techniques designed to detect malingered neurocognitive deficits in brain-injured patients are also capable of detecting intentional efforts of patients with pain to appear cognitively impaired. Thus, current science supports the use of some cognitive malingering indicators in patients with pain.

Emotional symptoms

As noted previously, emotional complaints are a common consequence of physical injury and may be an additional source of pain-related disability. There exists a well-developed empirical literature regarding the detection of exaggerated or malingered emotional complaints using the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) [63,64]. Other instruments also have methods for assessing exaggeration of emotional symptoms (eg, Personality Assessment Inventory [65]; Millon Clinical Multiaxial Inventory-III [66]) but their ability to reliably detect intentional symptom exaggeration is not well established. In contrast, MMPI detection strategies have been tested in known comparison groups and simulators [67]. Different strategies for malingering detection, such as the presence of infrequent symptoms (symptoms endorsed by the patient’s malingering emotional/mental illness but not by patients with true clinical problems), yield indices for which sensitivity and specificity can be, and in some cases have been, determined. However, more comprehensive studies using the methodology described above may well improve the accuracy of the various indicators derived from self-report measures of emotional distress.

Physical symptoms

MPRD patients may intentionally exaggerate physical problems in at least two ways: 1) exaggerated physical symptom complaints (eg, very high scores on visual analog pain scale ratings); and 2) diminished physical capacity (eg, an intentionally diminished capacity to lift, bend, stoop, etc.). The detection of these different approaches to malingering of PRD requires different strategies.

Physical Symptom Complaints are the patient’s verbal description (subjective self-report) of problems. In the case of MPRD some aspect of this communication may be exaggerated. Some self-report pain questionnaires (eg, Dallas
Pain Questionnaire [68]) have established score cutoffs indicative of exaggeration but currently do not differentiate between unconscious and intentional exaggeration. Elevated physical symptom complaints, referred to as “pain sensitivity,” are associated with poor outcome from lumbar disc surgery [22]. Again, although this research clearly implies the involvement of psychological factors in the pain presentation, it does not differentiate intentional from non-intentional forms of psychological causality. However, some progress has recently been made in understanding how the physical symptom reports of pain patients who are likely malingering differ from patients who are not malingering.

The MMPI-2 Fake Bad Scale (FBS) [69] was developed based on observations that many personal injury malingers present with a mixed fake-good / fake-bad presentation. Specifically, the scale is sensitive to a response set that is goal-directed and designed to: 1) appear honest and present a plausible degree of injury or disability; 2) appear psychologically normal except for the influence of the alleged injury; 3) minimize pre-injury psychopathology and antisocial behavior. Larrabee [70] modified the use of FBS by combining it with MMPI scales 1 (Hysteria; Hs) and 3 (Hypochondriasis; Hy) as an index of “Somatic Malinger-ing.” FBS has been studied extensively, and there are published specificity and sensitivity data on the FBS that have been derived from methodologically sound studies. For example, Iverson et al. [71] demonstrated a false positive rate of between 8% and 24% using the revised cutoffs [70] but without considering Larrabee’s entire “Somatic Malinger-ing” complex. More recently, Meyers et al. [63] reported 100% specificity associated with FBS scores above 29 in pain litigants. Larrabee [36], using clearly delineated groups with malingers defined according to the Slick criteria [32], presented sensitivity and specificity for a broad range of FBS scores. He found that FBS scores greater than 29 were 100% specific to malingers. This finding has also been replicated in other well-designed studies [72,73].

Larrabee [38] has specifically addressed the exaggeration of pain complaints and pain-related disability by probable malingers. He reported cutoffs, sensitivity, and predictive power associated with specificity of .90, .95, and .99 on the McGill Pain Questionnaire [74], the Pain Disability Index [75], and the Modified Somatic Perception Questionnaire [76]. The patients in the malingering group met the Slick et al. criteria [32] for Probable Malingered Neurocognitive Dysfunction, and none had objective medical findings that could account for their pain complaints. Results demonstrated that the McGill Pain Questionnaire was unable to accurately identify malingering at acceptable levels of specificity. The Pain Disability Index performed better, identifying 38% of malingers at .95 specificity. The Modified Somatic Perception Questionnaire, in contrast, was extremely accurate. It identified 69% of the malingering groups with only a 1% false positive error rate.

Diminished Physical Effort/Capacity is the other important physical dimension of PRD. When the extent of disability from physical injury is in question, it is now common practice to measure these physical abilities in a variety of ways that are relevant for future work and which thus contribute to an understanding of level of disability. Clinically, these physical effort measures are commonly included in a comprehensive assessment of physical capacities referred to as a Functional Capacity Evaluation. Accurate assessment of physical capacity (eg, ability to lift, reach, bend, etc.), however, requires that the individual exert their maximum level of effort. These measures will overestimate disability if patients intentionally under-perform. Attempts to detect under-performance have led to the development of a large literature [8,11] on the detection of “sincere” effort on physical measures. Many of these studies are limited in that they use simulator designs rather than clinical malingering samples, report only group statistics (eg, mean comparisons), and do not describe individual classification accuracy. When classification accuracy is reported, there has often been a misplaced emphasis on sensitivity which has led to rejection of techniques that might otherwise be of value. For example, Robinson et al. [77], using the Jamar hand dynamometer, concluded that “the ‘false negative’ rate in using this method is unacceptably high for practical application.” However, 39% of submaximal effort trials were correctly detected. Unfortunately, the more important false positive error rate was not reported, so the value/importance of the reported sensitivity level could not be determined.

Interestingly, when cutoffs are established using an approach like that recommended in this paper, the Jamar demonstrates excellent classification accuracy. For example, Smith and colleagues [78,79] established their cutoffs based on specificity: “the criterion values for the sincere and faking categorization, were determined to be at the 95% levels of the sincere trials of the injured and non-injured hands” [79] (p. 151; italics added). They were able to correctly identify between 23% and 85% of the “True Fakers” (sensitivity) depending on the particular variable or combination of variables and the gender of the subject, even when the false positive error rate was held to 5%. Studies of physical effort measures in clinically diagnosed malingering are very rare. However, in one such study using finger tapping, Larrabee [80] demonstrated specificity of .95 (false positive error rate = 5%) and sensitivity of .40 for a combined bilateral raw score of less than 63. No nonmalingering traumatic brain injury control subject scored less than 39 (compared with 12% of definite malingers), and only one scored less than 62 (compared with 36% of definite malingers).

In the absence of reported classification accuracy, sensitivity and specificity for a range of cutoffs can be estimated from published means and standard deviations using methods described by Greve and Bianchini [81]. The group statistics reported by Chengalur et al. [79] allowed the calculation of cutoffs associated with 100% specificity (no false positive
errors). Sensitivity varied widely as a function of the variable examined, but was as high as 60% for some variables (eg, peak-average root difference). This means that as many as two-thirds of simulated malingerers were detected at a cutoff that produced no false positive errors. This kind of accuracy is not limited to measures of grip strength. In simulator studies, Divr [82–84] demonstrated excellent sensitivity (ie, greater than .50 and as high as 1.00) in the context of 100% specificity using elbow flexion and trunk extension measures. These rates of classification accuracy are comparable to those of some of the best cognitive malingering measures [29].

Thus, Fishbain et al.’s [8] conclusion that “the Jamar was demonstrated not to be consistently reliable in discriminating a faked effort from a real effort. Therefore, the Jamar should not be used to identify malingering patients” (p. 265) is contrary to the data. The Jamar is capable of accurately detecting submaximal effort with a low probability of incorrectly concluding that someone producing a valid effort is malingered and, when properly examined, other measures may demonstrate good accuracy as well. However, because most of these are simulator studies, their clinical application is limited (eg, to cases in which a noninjured body part is tested) since they have not been demonstrated to differentiate between intentionally poor effort and actual clinical deficits among clinical patients with pain. In contrast, Larrabee’s [80] and Chengalur et al.’s [79] results can be appropriately applied because his data are based on the performance of clinical patients with pain in all of whom it is reasonable to suspect malingering [45].

The approach reflected in Robinson et al. [77] and accepted by Fishbain et al. [8] assumes, incorrectly, that a given method should detect all who malinger. However, the point has already been made that because detection methods not only do not, but cannot, detect all malingers, sensitivity may be low. This focus on sensitivity has led Fishbain et al. [8] and Lechner et al. [11] to incorrectly conclude that most of the currently used methods for identifying submaximal effort do not reliably discriminate exaggerating from nonexaggerating performances. In contrast, the preceding paragraphs clearly indicate that accurate physical effort measures do exist. The practical relevance is that, given the incidence of pain-related disability and the estimated incidence of malingered PRD among pain patients, a single measure with sensitivity as low as 30% and with high specificity has the potential to make a significant clinical contribution to the identification of suspect behavioral patterns or “effort bias.”

Thus, using the methodology described in this paper, physical effort measures with good classification accuracy can be, and in some cases have been, identified in simulator studies. It will be important to demonstrate the accuracy of such detection techniques in relevant clinical populations and with clinically diagnosed, likely malingering pain patients [45]. At the same time, because a comprehensive Functional Capacity Evaluation will commonly include measures of physical capacity involving noninjured body parts or physical functions, if a patient has no objective physical pathology in a given anatomical region, then results of simulator studies (ie, persons with no injury who are pretending to have an injury) may be properly but cautiously applied to the results of physical capacity testing involving the uninjured body part or function. Statistical estimation of classification accuracy is a reasonable short-term approach for generating specificity and sensitivity data. However, in the long term, researchers must begin to explicitly report the empirical sensitivity and specificity of their indicators. In conclusion, the problem in the physical effort literature is not, as has been argued [8,11], that the physical effort measures are unable to discriminate “sincere” from “submaximal” effort, but that the studies often simply do not tell us how well the measures discriminate.

Proposed diagnostic system

The preceding discussion has laid out the rationale and methodology for quantifying inconsistencies in a way that can lead to the development of accurate methods for detecting MPRD. The remainder of this paper describes a method for systematically organizing this evidence. Two points are relevant to this discussion: 1) it is not possible to identify all malingerers with one method; and, 2) malingering can occur in one or more functional domains. Thus, the diagnosis of MPRD will require a systematic, multi-method, multidimensional approach. Table 1 lists the proposed criteria, and Table 2 indicates how those criteria would be used to generate a diagnosis.

The primary dimension of the matrix reflects the presentation of the patient during evaluation. These data are referred to as index data and include: 1) data regarding the patient’s physical capacity, disability, or limitations as expressed by the patient via behavior during physical examination (including medical physical examination/treatment, physical or occupation therapy evaluation/treatment, and Functional Capacity Evaluation); 2) data regarding the patient’s cognitive capacity, disability, or limitations as expressed in terms of test scores which would normally be produced as part of a neuropsychological or psychological pain evaluation; and 3) data from patient self-report regarding any aspect of their disability including physical, cognitive, and emotional/psychological deficits and impairment (including analog pain scale ratings). These data can include scores on formal self-report questionnaires that are normally produced as part of formal psychological evaluations or in the course of psychological treatment of pain-related problems and which may also be produced by other clinicians who commonly work with pain patients (eq, pain disability questionnaires are commonly used in physical therapy settings and by physicians who treat pain). Broadly, index data are what patients say their problems are and how they actually perform (ie, their disability presentation).

In the context of malingering, the disability presentation is at least partially a misrepresentation which may take the
Table 1

Proposed criteria for the diagnosis of Malingered Pain-Related Disability

**Criterion A:** Evidence of significant external incentive. At least one clearly identified and substantial external incentive for exaggeration or fabrication of symptoms is present at the time of examination (eg, personal injury settlement, disability pension, evasion of criminal prosecution, release from military service, obtaining drugs).

**Criterion B:** Evidence from physical evaluation. Evidence that the patient’s physical abilities, capacities, and/or limitations as demonstrated in formal physical evaluation (eg, medical physical examination, physical therapy/occupational therapy examination, Functional Capacity Evaluation) are consistent with exaggeration or feigning of physical disability.

1) Probable effort bias. Performance on one or more well-validated measures of physical capacity (eg, Jamar Grip Test) is consistent with exaggeration of diminished physical capacity.

2) Discrepancy between subjective report of pain and physiological reactivity (eg, no heart-rate increase with significant change in subjective pain report).

3) Nonorganic findings. The presence on physical examination or functional capacity evaluation of signs or symptoms not consistent with known physiological mechanisms (eg, Waddell’s signs). Reported symptoms/complaints are substantially different than would be expected given the medical findings (clear nonorganic findings).

4) Discrepancy between the patient’s physical presentation during formal evaluation and their physical capacities documented when they are not aware of being observed. Such observation may occur in the context of formal evaluation, be documented via surveillance videography, or derive from the report of reliable collateral informants (eg, friends or relatives).

**Criterion C:** Evidence from cognitive/perceptual (neuropsychological) testing. Evidence that patient’s cognitive capacities as indicated by formal cognitive testing (eg, in the context of psychological or neuropsychological evaluation) are consistent with exaggeration or feigning of cognitive disability.

1) Definite negative response bias. Below chance performance (p <.05) on one or more forced choice measures of cognitive or perceptual function.

2) Probable response bias. Performance on one or more well-validated tests designed to measure exaggeration or fabrication of cognitive or perceptual symptoms is consistent with exaggeration of diminished cognitive capacity.

3) Discrepancy between cognitive/neuropsychological test data and known patterns of brain functioning. A pattern of neuropsychological test performance is present that is discrepant from currently accepted models of normal and abnormal central nervous system function and the documented history of the patient (eg, no head injury associated with the injury in question; exceptions may include cervical injury patients with concussions or use of narcotic analgesics or other sedating medications). The discrepancy is consistent with an attempt to feign or exaggerate cognitive deficit.

4) Discrepancy between test data and observed behavior. Performance on two or more neuropsychological tests is discrepant with observed levels of cognitive function in a way that suggests exaggeration of cognitive dysfunction (eg, well-educated patient with no apparent expressive language deficit who scores in moderate or severely impaired range on measures of verbal fluency; patient who presents as globally impaired but drove self to the evaluation). Such observations may occur in the context of formal evaluation, be documented via surveillance videography, or derive from the report of reliable collateral informants (eg, patient’s friends or relatives).

**Criterion D:** Evidence from self-report. Evidence that the patient’s self-reported symptoms, complaints, or limitations are consistent with exaggeration or feigning of physical, cognitive, or emotional/psychological disability.

1) Compelling inconsistency. Compelling inconsistencies occur when the difference in the way a patient presents when being evaluated compared with when they are not aware of being evaluated is such that it is not reasonable to believe the patient is not purposely controlling the difference. (Note that it may be possible to document compelling inconsistencies related to physical examination or cognitive test data; such circumstances would meet this criterion. However, conservative application of these criteria suggests that many, if not most, of these inconsistencies would be best used to meet other criteria).

2) Self-reported history is discrepant with documented history. For example, minimization or denial of concurrent or prior illness/injury (broadly defined) in a manner that emphasizes the injury for which compensation is sought. Also included would be overstatement of academic, vocational, or other achievement in a way that exaggerates the magnitude of loss due to the injury in question.

3) Self-reported symptoms are discrepant with known patterns of physiological or neurological functioning (eg, whole body pain in a patient with small right-sided cervical disc bulge with no evidence of nerve root irritation; complaints of remote memory loss).

4) Self-reported symptoms are discrepant with observations of behavior. Reported symptoms in a given behavioral domain (ie, physical, cognitive, emotional) are markedly inconsistent with behavioral observations (eg, patient complains that he is unable to move extremity and is observed to do so when distracted). Such observation may occur in the context of formal evaluation, be documented via surveillance videography, or derive from the report of reliable collateral informants (eg, patient’s friends or relatives).

5) Evidence from formal psychological evaluation that the person has significantly misrepresented their current status (eg, exaggerated physical symptoms or exaggerated or minimized psychological symptoms/distress) in a manner that emphasizes the injury for which compensation is sought. For example, responses during interview or on self-report measures of psychological or physical function suggest impairment in the context of elevations on well-validated validity scales or indices consistent with exaggeration of physical (eg, MMPI-2 FBS) or emotional symptoms (eg, MMPI-2 F, Fb, or Fp) or evidence of vehement denial of psychological problems in a manner consistent with extreme defensiveness regarding psychological symptoms in order to further emphasize physical complaints (eg, MMPI-2 L or K).

**Criterion E:** Behavior meeting necessary criteria from groups B, C, and D are not fully accounted for by psychiatric, neurologic, or developmental factors. The behaviors meeting the above criteria represent a likely volitional act aimed at achieving some secondary gain and cannot be fully accounted for by other disorders that result in significantly diminished capacity to appreciate laws or mores against malingering or inability to conform behavior to such standards. The simple presence of objectively documented pathology, illness, or injury (including psychiatric illness) expressly does not preclude a diagnosis of MPD.

MMPI FBS = Minnesota Multiphasic Personality Inventory-2 Fake Bad Scale; MPD = Malingered Pain-Related Disability.
Table 2
Diagnostic categories for the diagnosis of Malingered Pain-Related Disability

I. Definite MPRD
1. Presence of substantial external incentive [Criterion A]
2. "Definitive" evidence of intent [Criterion C1 or D1]
3. Behaviors meeting the criteria for "definitive" intent [C1 or D1] are not fully accounted for by psychiatric, neurologic, or developmental factors. [Criterion E]

II. Probable MPRD
1. Evidence of significant external incentive [Criterion A]
2. Two or more types of "probable" evidence of intent from Criterion B [B1–B5], Criterion C [C2–C5] and/or Criterion D [D2–D6]. This evidence must be well-validated and have a known error rate.
3. Behavior meeting necessary criteria from groups B, C, and D are not fully accounted for by psychiatric, neurologic, or developmental factors. [Criterion E]

III. Possible MPRD
1. Evidence of significant external incentive [Criterion A]
2. Evidence does not rise to the level sufficient for a diagnosis of Probable MPRD.

OR
<Only one type of quantitative "probable" evidence of intent from Criterion B [B1–B5], Criterion C [C2–C5] and/or Criterion D [D2–D6].

OR
<One or more forms of qualitative evidence of intent from Criterion B [B1–B5], Criterion C [C2–C5] and/or Criterion D [D2–D6].

OR
<Evidence sufficient for a diagnosis of MPRD is present BUT Criterion E is not met.

MPRD = Malingered Pain-Related Disability.

form of more symptoms (self-report) or less capacity (physical and cognitive performance). The primary question to be addressed is, “Is the disability presentation meaningfully inconsistent?” Consistency is evaluated via three types of comparisons: 1) within-subject; 2) between-subject; and, 3) within-subject, across time. That is, inconsistency can be documented via a range of comparisons and across a number of behavioral response domains (see Table 1 for the specific criteria and evidence to be addressed when considering a diagnosis of MPRD).

1) In the within-subject comparison, the disability presentation is compared with the functioning of known physiological/anatomical mechanisms. Within-subject evidence would include a range of appropriately validated “nonorganic” findings (eg, Waddell signs) as well as indicators from effort measures such as reports of extreme pain without evidence of physiological reactivity.

2) In the between-subject comparisons, the disability presentation is compared with the capacities of persons with known pathology of comparable type and severity. Comparisons would also be made with other persons with potentially relevant conditions which might be alternative explanations of their limited capacity. Formal measures of effort bias, response bias, and self-report exaggeration (like those described above) would be used to meet these criteria if they have been appropriately validated. This comparison may be, but is not necessarily, a formal statistical comparison. For example, the nature, magnitude, or persistence of a patient’s complaints may be inconsistent with the objective findings of a thorough and competent physical examination given the current status of medical science.

3) In the within-subject, across-time comparison, the patient’s disability presentation is compared with his/her own behavior in other contexts during which he/she may not know he/she is being observed. For example, a patient who presents to a clinician (eg, physician or physical therapist) with severe and disabling balance problems is incidentally observed by the same clinician exiting the parking garage driving a motorcycle. Or a patient who presents on cognitive testing with global cognitive impairment is able to provide a good history of his injury and drove himself to the evaluation. Similar evidence may come from reliable collateral informants (eg, spouse, roommate) or from video surveillance.

The diagnostic system described here incorporates information that is available in typical clinical evaluations of patients claiming PRD in the presence of external incentive: medical evaluation, psychological evaluation (interview, record review, psychological testing, and symptom validity testing), functional capacity evaluations (which contain many of the physical effort measures), and video surveillance. The principles of analysis of information can be employed in evaluations that include review of records from other disciplines. For example, the psychological evaluation may include a review of the medical records, whereas the medical evaluation can incorporate a review of psychological evaluations and Functional Capacity Evaluations. In short, the proposed system, which borrows heavily from Slick et al. [32], integrates the methods of detection described above along with evidence from clinical observation. The proposed system expands on Slick et al. [32] with the inclusion of additional sources of evidence that are related to the multidimensional nature of PRD. Also like Slick et al. [32], this proposed system grades the malingering diagnosis
in terms of level of confidence: Definite, Probable, and Possible (see Table 2).

A diagnosis of Definite MPRD is made when there is incontrovertible evidence of conscious intent or awareness of a major inconsistency. Evidence includes statistically below-chance performance on a symptom validity test or what is referred to above as a “compelling inconsistency.” At the other end of the continuum is a diagnosis of Possible MPRD. This is made when there is evidence of bias on properly validated detection measures or via other defined criteria but the evidence is insufficient to meet the full criteria for Probable MPRD. Alternatively, there may be sufficient evidence for a diagnosis of Probable MPRD but some other psychiatric condition fully accounts for the intentional misrepresentation (see Criterion E in Table 1).

A diagnosis of Possible MPRD would be most appropriate when there is only one finding with a high degree of specificity, particularly when the objectively documented physical pathology could explain the diagnosis. Qualitative evidence insufficient for a higher probability diagnosis (see below) would be sufficient for a diagnosis of Possible MPRD. Note that the absence of positive indicators consistent with malingering would suggest that the probability of malingering is low but technically does not rule out malingering [60]; however, Possible MPRD should not be used as a default category that relies solely on this fact in the absence of positive evidence of malingering. Some form of positive evidence consistent with malingering (as described above) must be present to make a diagnosis of Possible MPRD.

A diagnosis of Probable MPRD is made on the basis of a combination of suspect behavior patterns that together imply conscious intent or awareness of inconsistency. At the same time, there will be an absence of other factors that could reasonably account for the observed suspect behaviors. In general, “reasonable alternative explanations” are ruled out using the research methodology already described in this paper. Concretely, at least two forms of metric evidence (defined as evidence with known classification accuracy) must be present to support a diagnosis of Probable MPRD. That is, the diagnosis requires evidence from well-validated (eg, with documented accuracy) quantitative indicators of intentional effort/response bias or symptom exaggeration. Qualitative indicators of intentional effort or response bias provide potentially useful information but are insufficient for a diagnosis of Probable MPRD [53].

A minimum of two quantitative or metric findings consistent with malingering is required in this system for several reasons. First, requiring only one positive indicator increases the risk of a false positive error because of chance. Second, conceptually, the more inconsistencies present, the less likely the patient is unaware of being inconsistent. “As clinicians find incongruities in the patient’s total presentation (history, presentation, progress in recovery, and so on), the probability of malingering likewise increases” [60] (p. 281). Third, it has been the convention in the study of cognitive malingering to require two positive findings for a diagnosis of malingering [30,32,85,86]. The Slick system [32], in particular, is receiving increasing empirical support. Finally, when a patient has positive findings on two relatively independent indicators with good specificity, the false positive rate drops dramatically. For example, when two uncorrelated indicators each have specificity of .95, their individual false positive rates are .05. However, their combined false positive rate is the product of the two independent rates: .05 x .05, or .0025. That is, the probability of someone who is not malingering being positive on two indicators with specificity of .95 is approximately 3 in 1,000. See Larrabee [87] for additional statistical proofs regarding correlated indicators. Thus, both of two metric indicators is justified logically, clinically, and statistically and is sufficient to support the conclusion, at the level of “more probable than not,” that a person is malingering. Further, the requirement of two positive findings on metric indicators means that the diagnosis of probable malingering cannot be made based on qualitative inconsistencies, other than “compelling inconsistencies,” alone.

Examination of evidence from so many sources would also tend to increase the sensitivity of the system to a variety of malingering strategies. However, there is a concomitant risk of false positive errors simply because of the number of criteria considered. The use of well-validated indicators with high specificity will enhance overall diagnostic specificity as noted above. Obviously, given the negative consequences of a false positive malingering diagnosis, clinicians should be conservative in applying the criteria without known classification accuracy. However, it is for this very reason that we have required two “hits” on positive indicators with known classification accuracy (metrics), relegating more “clinical” criteria to a lower level of importance in the diagnostic system.

As has been noted previously, there is still a need to empirically validate a number of indicators of MPRD and that this validation process should follow the guidelines described in this paper and by Sackett and Haynes [45]. As a result of this type of research, qualitative indicators of intentional effort or response bias which are currently not sufficient to contribute to a diagnosis of MPRD may become quantified and statistically validated. For example, Waddell signs, which are now considered questionable markers of malingering [88], may upon further study demonstrate sufficient specificity to allow their use as a primary criterion. At the same time, some indicators, particularly those related to cognitive and emotional function, and possibly some physical effort measures (see previous discussion of physical effort measures), can presently be used in pain populations.

Although there are metrics for each domain, the fact that there may not yet be metric indicators to support all of the individual criteria in this system is not a weakness of the system for two reasons. First, those currently unsupported criteria can be validated in the future. Second, because certain criteria cannot yet be applied to pain, the actual...
diagnosis of MPRD using this system will necessarily be applied to a more circumscribed set of findings and therefore be more conservative. An additional strength of the proposed system is that it will also provide a foundation for future research on malingered PRD. Thus, this system provides a rational framework for organizing evidence indicative of negative effort or response bias and for further developing techniques for accurately detecting MPRD. The clinical use of the diagnostic system proposed here should be done with caution because the application of specific detection techniques depends on their appropriate empirical validation [45] which is currently established only for a limited set of indicators (eg, cognitive malingering markers).

Summary

Even by conservative estimates, MPRD is a large public health problem. Therefore, the ability to detect even a small proportion of MPRD cases is clinically important. There have been problems with the validation of techniques designed to detect MPRD. However, this is not necessarily a problem with the techniques themselves, but with the methods and logic with which they have been studied, interpreted, and applied. This paper outlines a rationale and methodology which will allow the proper validation of techniques to detect malingering in persons claiming pain-related disability and proposes a comprehensive multidimensional system for organizing the inconsistencies associated with malingering in pain. The system proposed here borrows heavily from that of Slick et al. [32]. The Slick et al. [32] diagnostic system and the rationale upon which it is based [42,43] have been an important part of the success of neuropsychology in developing accurate and reliable techniques for detecting cognitive malingering. It is our hope that the system described here will provide a similar framework and serve a similar purpose in the study of MPRD.

References


**References**