The Psychological Assessment of Patients with Chronic Pain

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Key Points

- There is strong evidence that the biopsychosocial model does not apply only to dysfunctional patients with chronic pain, but rather represents the inherent nature of pain.
- There is strong evidence that psychological tests are scientifically as valid and reliable as medical tests with regard to diagnostics and predicting a patient's response to treatments for pain.
- As many payors and guidelines require psychological evaluations prior to authorizing certain treatments for pain, pain clinics increasingly use some form of psychological assessment.
- While there are a large number of psychometric questionnaires used to assess patients with chronic pain, only a few have undergone the rigorous process required to become standardized tests, and these are reviewed.
- Both evidence and opinion are converging on a set of psychosocial variables that should be assessed when treating patients with chronic pain, and these can all be organized within a biopsychosocial "vortex" paradigm.
- A standardized method of psychological assessment can identify patients who are at low, moderate, and high risk, and this is illustrated with three case vignettes.

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Introduction

There is strong evidence that the biopsychosocial model does not apply only to dysfunctional patients with chronic pain, but rather represents the inherent nature of pain. Research has determined that psychological tests are scientifically as valid and reliable as medical tests with regard to diagnostics and predicting a patient's response to treatments for pain. As many payers and guidelines now require psychological evaluations prior to authorizing certain treatments for pain, pain clinics increasingly use some form of psychological assessment. While there are a large number of psychometric questionnaires used to assess patients with chronic pain, only a few have undergone the rigorous process required to become standardized tests, and these are reviewed. Both evidence and opinion are converging on a set of psychosocial variables that should be assessed when treating patients with chronic pain, and these can all be organized within a biopsychosocial "vortex" paradigm. A standardized method of psychological assessment can identify patients who are at low, moderate, and high risk, and this is illustrated with three case vignettes.

A review of the research reveals strong evidence that pain is a biopsychosocial phenomena, having biological, psychological, and social components [2, 3]. In addition to biological components of pain being the product of pathophysiology, the experience and report of pain are also strongly influenced by psychosocial factors. As the IASP notes, while pain often has a physical cause, pain can also occur in the absence of any likely pathophysiological explanation. Further, since pain is a subjective, psychological state, we are dependent on the patient's report of pain to guide our treatments [1]. However, there are a variety of psychological and social variables that affect what patients say about their pain.

T.R. Deer et al. (eds.), *Treatment of Chronic Pain by Integrative Approaches: the AMERICAN ACADEMY of PAIN MEDICINE Textbook on Patient Management*, DOI 10.1007/978-1-4939-1821-8_6,

The Natural History of Biopsychosocial Pain Disorders

The biopsychosocial model does not apply only to dysfunctional patients with chronic pain, but rather represents the inherent nature of pain [2, 3]. Over the natural history of chronic pain disorders, the biological, psychological, and social aspects of these conditions interact in complex ways. Some psychosocial factors may lead to the onset of a pain condition, while others may arise as a reaction to a pain condition. The subsequent medical treatment of chronic pain may also be complicated by interactions with preexisting psychological vulnerabilities or conflicts in the social environment. Thus, complex biopsychosocial pain disorders do not simply appear, but rather tend to evolve over the course of their natural history.

Psychosocial Factors That Lead to the Onset of Pain Conditions

A variety of psychosocial factors have been associated with the onset of a variety of medical painful conditions (Fig. 6.1). Life stress has been associated with the onset of musculoskeletal pain [4, 5] and functional gastrointestinal pain [6], and one prospective study of workers found that the variable most predictive of the future report of back pain was job dissatisfaction [7].

Psychological dysfunction can also lead to the onset of painful conditions. A systematic review of the literature determined that risk-taking is influenced by mood and personality disorder, and associated with an increased chance of injury [8], while another study determined that risk-taking is influenced by personality type [9]. One study found that half of all traumatic brain injury hospitalizations were associated with alcohol intoxication [10], while another study found that patients reporting drug or alcohol abuse were more likely to sustain violent injuries [11]. Consequently, it is not surprising that some research has found that the prevalence of substance abuse disorders in patients with chronic pain is twice as high as that observed in the normal population [12]. Another study of patients being treated in an interventional pain medicine setting explored the prevalence of substance abuse problems. Of those patients with a prior history of drug abuse, 34 % of those who were being treated with controlled substances for pain were simultaneously abusing illicit drugs [13].

Overall, a multitude of psychosocial variables may influence lifestyle, risk-taking behaviors, and health habits that can act to increase or decrease the risk of onset of a medical condition.

Psychological Reactions to a Pain Condition

Serious illness and injury are often life-altering conditions, with a profound psychosocial impact (Fig. 6.1). Not surprisingly, in a study of patients with pain-related disability, 64 % reported one or more diagnosable psychiatric disorders, compared to a prevalence of 15 % in the general population. In this sample, the prevalence of major depression was 25 times higher than that seen in the general population. This finding is especially significant as even minimal levels of depression have been associated with increased rates of service utilization [14] and poorer adherence to treatment [15]. In many cases, though, the direction of the arrow of causality is not clear. For example, while in some cases, depression could be a reaction to a severe injury, in other cases, depression that preexisted an injury may increase the risk that the pain will become chronic [16].

Pain can alternately be associated with anxiety, depression, or anger, depending upon how pain is perceived [17]. Laboratory experiments in pain perception suggest that the presence of depression tends to magnify the perception of pain [18]. Additionally, affective distress combines with pain to produce suffering, and ultimately, this suffering may be more closely associated with the patient's level of functioning than is the pain itself [19]. Research also suggests that a number of other psychological variables are associated with poor treatment outcome. These include anger [20, 21], neuroticism [22], psychological distress [23–27], relationship with spouse [28, 29], positive or negative perceptions prior to treatment [30–32], maladaptive beliefs [33, 34], and fears of reinjury [31].

Psychological Vulnerability Risk Factors

A review of the literature on psychopathology and chronic pain concluded that psychological vulnerabilities of various types could both increase the risk of onset of chronic pain, plus shape how the pain disorder was manifested. This review also concluded that the dominant emerging perspective is that preexisting but dormant vulnerabilities of the individual may be activated by the stress of an illness or injury [35]. If this proves to be true, this would mean that some patients are inherently at increased risk for disability, but this vulnerability may not appear until an environmental event precipitates it. Consequently, understanding preexisting vulnerabilities is an important part of chronic pain assessment (Fig. 6.1).

If a person who is prone to chemical dependency becomes injured, any subsequent pain could become a rationalization for excessive opioid use [36, 37]. Under such circumstances, the possibility of opioid abuse must be addressed [38]. Similarly, patients may be at increased risk for excessive opioid abuse if they are pain intolerant or feel entitled to be

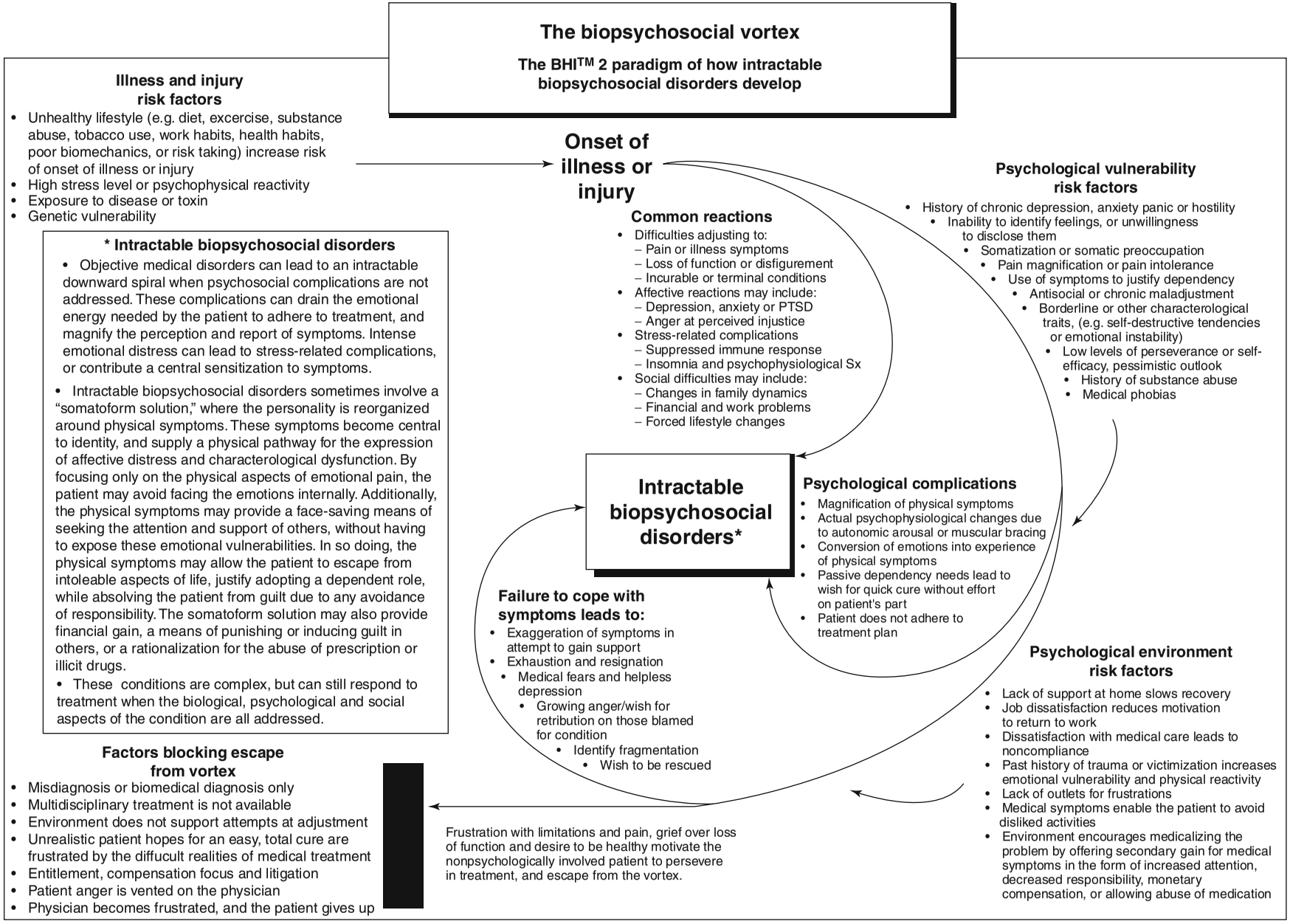

Fig. 6.1 A variety of psychosocial factors have been associated with the onset of intractable chronic pain (Biopsychosocial Vortex © 2008 by Daniel Bruns, PsyD and John Mark Disorbio, EdD. All Rights Reserved. Reprinted with permission. BHI 2 © 2003 by Pearson Assessments)

pain-free [39]. Although concerns about regulatory scrutiny can sometimes complicate the clinical decision-making process when prescribing opioids, carefully designed interdisciplinary programs can successfully treat patients at risk for addiction [38, 40]. One study found that patients with histories of substance abuse report higher levels of pain [41], and so distinguishing true pain from drug-seeking behavior becomes a matter of great importance [42]. Related to this, a review of the research determined that positive scores on substance abuse screening measures could identify patients who were at significantly higher risk for aberrant drug-related behaviors in treatment [43].

Patients with personality disorders may have an aberrant reaction to pain and may be at increased risk for chronicity. This hypothesis is supported by five studies of patients with chronic pain. These studies found the prevalence rate of personality disorders to range from 40 to 77 % [12, 16, 44–46], far higher than the estimated 5.9–13.5 % prevalence rate found in the general population [47]. However, a recent study reviewed psychological characteristics of patients with chronic pain and determined that a decrease in pain tends to produce a decrease in signs of personality disorder as well [48]. Thus, dysfunctional traits observed in patients with chronic pain may be partially attributable to the destabilizing effect of pain rather than to an enduring personality disorder. This suggests that estimates of personality disorders in patients with chronic pain could be spuriously inflated.

Non-characterological personality traits or cognitive styles can also constitute risk factors for recovery. For example, patients who are prone to catastrophizing [49, 50] have a low sense of self-efficacy [51], and who are prone to pessimism [52] are at risk for failing to make needed behavioral changes and for generally poor functioning. Conversely, positive personality traits such as perseverance have been found to be associated with favorable outcomes from pain conditions [53]. In general, a history of maladjustment [28], low educational level [54], or the presence of a personality disorder can undermine a patient's ability to cope satisfactorily with an illness or injury, increase the risk of noncompliance, and thus increase the risk of delayed recovery [47, 55]. Severe psychopathology may sometimes affect pain reports in mysterious ways. For example, patients with dissociative disorders often present with psychogenic pain symptoms [56, 57], and in patients with dissociative identity disturbance (multiple personality), each personality may manifest different pain and disability symptoms [58, 59].

Social Environment Risk Factors

Environmental stressors are known to be associated with numerous psychophysiological reactions (Fig. 6.1). A patient's social environment includes relationships with family, friends, professionals in the medical setting, and supervisors and coworkers in the workplace. The onset of a disabling condition can stress the family system [60, 61] and leads to family conflicts if the disability prevents the patient from performing expected family responsibilities [62, 63]. The problems arising from these changes can be overcome if the patient is a member of a healthy, supportive family. However, in response to disability, an overly solicitous family may reinforce patient passivity and encourage the patient to adopt a disabled role [64, 65], while a dysfunctional family may exacerbate a patient's condition.

For example, patients who have experienced adverse childhood experiences, such as childhood abuse, have been found to exhibit increased pituitary-adrenal and autonomic responses to stress compared with controls [66–71] and suppressed immunological resistance to cancer and infection [72–74]. These findings may help to explain the association between stress and poor surgical outcome [75], increased mortality [76–78], and slowed speed of wound recovery [79, 80] observed in numerous studies. Consistent with this, studies have found that psychological traumas in childhood are associated with a poor treatment outcome [75, 81].

Within the medical setting, research has found that the therapeutic alliance between the physician and the patient strongly influences the course of treatment [82, 83]. If the physician is perceived as competent and empathic, a positive relationship can develop. This can facilitate the flow of information between physician and patient and promote patient compliance. In contrast, these studies have found that a poor physician/patient relationship can complicate the recovery process and increase the risk of noncompliance. A history of physical or sexual abuse has also been found to increase the risk of delayed recovery [84, 85], as patients reporting a history of assault may feel more physically vulnerable, exhibit more stress-related symptomatology, and resist examinations that they find threatening [86].

Disability is most often considered in the context of the patient's ability to be gainfully employed. Consequently, the psychological assessment of disability needs to be especially sensitive to social aspects of the workplace that could influence disability behaviors. For example, escape from a disliked workplace environment may offer considerable secondary gain for the report of medical symptoms, and this may influence the course of recovery. In a longitudinal, prospective study of back pain, job dissatisfaction was determined to be the strongest predictor of future back pain reports [87]. This suggests that the avoidance of a disliked workplace may be a powerful negative reinforcer for both pain and disability behaviors [29].

In addition to avoidance of an aversive workplace, other types of reinforcers are also present in the social environment. Studies have shown that both litigation [88–93] and compensation play a role in treatment outcome [25, 88, 90, 92, 94–98]. In some contexts, an injury can socially empower a patient or increase the attention and support from others. Pain can cause the patient to be assigned to lighter job tasks in the

workplace or avoid undesirable chores at home. However, once disability appears, the inability of the patient to function in the workplace often leads to financial distress [99] and a continuation of a downward spiral. Overall, it is not surprising that psychosocial variables have been found to be important predictors of the cost of medical treatment [100].

The lack of English proficiency can impact treatment outcome and disability [101] in a number of ways. The inability to speak English in the USA can make it much more difficult to communicate with caregivers, understand how to fill out paperwork, or in other ways access care. In the immigrant community, though, the effects of a lack of English proficiency may be confounded by a low level of education, and low education has been found to be a separate risk factor for poor medical treatment outcome [54].

Etiologically, while some biopsychosocial disorders have their origin in biology or pathophysiology, others have psychosocial origins. Thus, the assessment of biopsychosocial conditions requires not only assessing biomedical variables but also assessing the psychosocial aspects as well. These assessments are facilitated by the use of psychometric tools.

The Psychological Assessment of Patients with Pain

In a survey performed in 1996, some type of psychological screening was performed in about 70 % of surveyed pain clinics using implantable devices [102]. Since that time, multiple evidence-based medical guidelines have recommended psychological evaluation prior to SCS [103–105], and many insurers now require psychological assessment prior to implantation. More generally, multiple evidence-based medicine guidelines now recommend psychological evaluation for all patients with chronic pain [103–105]. As a result, a similar survey in 2005 found that 100 % of surveyed clinics used some type of psychological assessment for patients being considered for implantable devices for pain [106].

The reason for the increased use of psychological tests for patients with pain is the growing evidence of their utility. A recent extensive review of the literature compared the scientific merits of psychological tests to traditional medical tests [107]. After reviewing 125 meta-analyses and 800 samples, this seminal study concluded that psychological tests are scientifically as good as medical tests and can sometimes predict the outcome of medical treatment as well as medical tests. Specifically, this study of psychological tests concluded that (a) there is strong evidence for psychological test validity, (b) the evidence for psychological test validity is comparable to that of medical tests, (c) psychological test provides a unique source of information, and (d) psychological tests supply information beyond what can be obtained by an interview.

In the assessment of patients with back pain, psychological tests are sometimes stronger predictors of treatment outcome than medical tests. For example, a recent study found that psychometric assessment was better than either MRIs or discography in predicting future back pain disability [108] while another study found that psychosocial variables predicted delayed recovery from back pain correctly 91 % of the time, without using any medical diagnostic information [109]. Multiple research studies have shown that psychosocial factors can predict the results of lumbar surgery [28, 54, 75, 90, 110, 111] or spinal cord stimulation [112] correctly over 80 % of the time, and there is evidence that protocols which integrate psychological and medical assessments can provide improved care at reduced cost [196]. Beyond back pain, research sponsored by the World Health Organization found that psychopathology was a stronger contributor to disability than was disease severity [113].

Psychological Testing Concepts

Psychological tests are developed using the science of psychometrics, which is a mathematical approach to measuring intangible human abilities (such as intelligence or memory), traits (such as personality), and subjective experiences (such as sadness or pain). Bruns and Warren have noted that the science of psychometrics is less esoteric than it would first appear:

> Although psychometrics sounds mysterious, it is a science that Western society has come to rely on heavily. Perhaps the most common example of this is that on almost every edition of the news on television, the results of a poll are reported. Scientific surveys, which employ psychometric principals, have an established ability to accurately predict the sentiments of a population, with a known degree of error. In manner analogous to the way that scientific questioning of voters can assess their subjective opinions and predict voting behavior, standardized psychometric instruments can assess subjective states in patients that predict disability [114].

To use an analogy, before a medication is ready for clinical use, rigorous scientific testing is needed to show that it is safe and effective. Similarly, before a psychological test is ready for clinical use, it should be psychometrically *standardized*. While informal questionnaires may be developed without any scientific method at all, a standardized psychological test is developed using the psychometric principles outlined in a work called the *Standards for Educational and Psychological Testing* [115]. When a questionnaire has been developed to meet the criteria listed in the *Standards*, it is said to be a *standardized test*. Standardized tests offer an efficient and scientific means of gathering information about psychological, social, and medical variables.

To illustrate the impact of a lack of standardization, consider the numerical pain rating scale. Although it may have been used in over 1,000 research studies, it is not

standardized, and the following clinical vignette illustrates the effect of this: Suppose a clinician asks a patient, "On a 1–10 scale, how would you rate your pain?" How should the clinician respond if the patient responds with the following questions:

1. What is a pain level of 10? My other doctor defines a pain level of 10 as pain like having a baby, but you say it is pain so bad I want to die. Which one is correct?
2. Rate my pain from 1 to 10? Does 1 mean no pain, or is that 0? Should I rate my pain from 0 to 10?
3. Do you mean my back pain, my leg pain, or my headaches? Or do you want the average of all three? Or maybe the highest?
4. Do you mean right this second while I am sitting? As soon as I stand up, it is worse.
5. My pain is a 5 – Is that high? What does the average patient say?

Since the numerical pain rating scale is not standardized, there is no test manual to supply the correct answer to the above questions. Consequently, the clinician could respond to the questions in any number of ways, and this would significantly influence which number the patient chooses to describe the pain. As a result, it has been noted that without a more rigorous method, scores returned by measures such as informal pain rating scales are essentially meaningless [116]. In contrast, with a standardized measure of pain like the BBHI 2, all of the above questions would have a definitive answer [117]. This illustrates the advantage of standardized tests. By imposing a carefully standardized method of asking questions, scoring the responses in a standardized way, and having a norm group to which the scores can be compared, a much more meaningful result is obtained.

Characteristics of a Standardized Test

The characteristics of standardized tests are defined in the *Standards for Educational and Psychological Testing*, which states that standardized psychological tests are characterized by having a number of features:

1. Standardized tests are developed to be used for a defined purpose and may have less applicability outside of that purpose.
2. A standardized test reduces error by having standardized testing materials, standardized administration procedures, standardized instructions, and standardized scoring and interpretation methods, and may even require a standardized type of writing instrument, such as a #2 pencil.
3. A standardized test must have evidence of validity, demonstrating that the test measures what it intends to measure (e.g., the report of medication side effects such as fatigue and weight gain can cause false-positive findings for depression on some psychological tests).
4. A standardized test must have evidence of reliability, demonstrating that if the test is administered twice in a short time frame, the results will be very similar.
5. Standardized tests use one or more reference groups called norm groups, which make it possible to have standardized scores with percentile ranks.
6. A standardized test takes steps to eliminate gender, race, age, and other biases.
7. A standardized test has an official manual that has recorded the psychometric details of the standardization process and provides the information needed to use the test appropriately.
8. The content of standardized tests is controlled by copyright and other methods and cannot be modified by end users, as this would destroy the standardization.
9. Standardized tests are subject to test security or trade secret restrictions, keeping the details of the test confidential (e.g., if the answers on an I.Q. test were made public, a test subject could appear to be a genius by studying the answers beforehand, and this would invalidate the test).

In addition to meeting the criteria specified by the *standards*, others have suggested that a standardized psychological test should also be peer reviewed, either by the Mental Measurements Yearbook [105, 118] or in a scientific journal [118].

What Psychosocial Variables Need to Be Assessed in Patients with Chronic Pain?

A recent review proposed what it termed the "convergent model" of biopsychosocial assessment. The term "convergent model" was intended to reflect that while at this time the field has yet to achieve any final determinations about how to perform biopsychosocial assessments, evidence and opinion are beginning to converge [119]. This review identified both cautionary risk factors or "yellow flags" (Table 6.1) and exclusionary risk factors or "red flags" (Table 6.2), and these risk factors were organized within the framework of a biopsychosocial paradigm (Fig. 6.1). Exclusionary risk factors were defined as extreme concerns (e.g., imminent risk of suicide or homicide, active psychosis, or intoxicated at medical appointments), any one of which could be sufficient to delay or exclude a patient from elective medical treatment. In contrast, cautionary risk factors were less extreme concerns (e.g., depression, poor pain tolerance), which, in combination, could negatively impact prognosis.

The convergent model was tested using 2264 US subjects obtained from 106 sites, and the demographics of the norm groups approximated US census data for gender, race, education, and age. The risk factors identified by the convergent model were assessed in a standardized manner, using the Battery for Health Improvement 2 [120] and the shorter Brief

Table 6.1 "Yellow flag" cautionary risk factors suggested by literature review

Type of risk	Potential cautionary factors	
Affective	Depression	
	Anger	
	Anxiety (fears, phobias, PTSD, etc.)	
Psychological vulnerability	History of substance abuse	
	Personality disorder	
	Cognitive disorder or low education	
	Poor coping	
	Diffuse somatic complaints	
Social	Conflict with physicians	
	Job dissatisfaction	
	Family dysfunction	
	History of being abused	
	Worker compensation	
	Compensation focus	
	Represented by attorney	
Biological	Pain and disability	Extreme pain
	Pain sensitivity	Dysfunctional pain cognitions
	Pain invariance	Diffuse pain
		Pain > 2 years
		Unexplained disability
	Exam	Degree to which patient does not meet medical criteria for procedure
		No medical necessity of procedure to preserve life or function
		Destructive/high-risk elective medical procedure
		Procedure specific risks: smoking, diet, attitude toward implant, etc.
	History	Similar procedure failed previously
		No response to any treatment
		History of nonadherence to conservative care
		No objective medical findings
	Science	Insufficient evidence that the proposed medical treatment would be effective

Adapted from Bruns and Disorbio [121]

Battery for Health Improvement 2 [117]. US national norms for the prevalence of these risk scores were generated for two groups: community members and patients with a variety of diagnoses being treated in a variety of treatment settings. The norms obtained from these samples allowed the calculation of a risk score percentile rank, which was used to establish empirical benchmarks. This made it possible to answer the question, at what point can the risk factors present be regarded as clinically elevated [119]? Using this method, standardized cautionary risk and exclusionary risk scores were shown to predict both work status and satisfaction with care for patients in multiple treatment groups (spinal surgery, upper extremity surgery, brain injury, work hardening, chronic pain, acute injury, and injured litigants). Repeat testing showed these risk scores demonstrated test-retest reliabilities ranging from 0.85 to 0.91, with no indications of race or gender bias.

Commonly Used Tests for Assessing Patients with Chronic Pain

There are a large number of psychometric tests and questionnaires commonly used to assess patients with chronic pain [121]. When determining what psychological tests to review here, a number of factors were taken into consideration. One evidence-based panel concluded that a psychological test battery for the evaluation of patients with chronic pain would include one or more tests designed for the assessment of medical patients with pain and one or more tests of personality and psychopathology [105]. With regard to selecting each of these types of tests, we would suggest the following criteria, which are that the tests (a) are standardized measures, (b) have been peer reviewed by the Burrows Institute of Mental Measures, (c) have been the subject of multiple empirical research articles in peer-reviewed journals, (d) have

Table 6.2 "Red flag" exclusionary risk factors suggested by literature review

Type of risk	Potential exclusionary factors	
Affective	Active suicidal urges	
	Active homicidal urges	
	Severe depression	
	Severe anxiety (generalized, panic, PTSD, medical phobia/death fears, etc.)	
	Severe anger	
	Mood elevation/mania	
Other psychological risks	Psychosis/delusions/hallucinations	
	Active substance abuse	
	Severe somatization	
	Pain-focused somatoform disorder	
	Severe personality disorder	
	Extremely poor coping	
	Severe social isolation, family dysfunction, or current severe abuse	
Social	Litigation for pain and suffering and pain-related treatment	
	Intense doctor/patient conflict	
Biological	Pain	Bizarre pain reports
		Dysfunctional pain cognitions
		Extreme, invariant pain
		Extreme pain sensitivity
	Exam	Medically impossible symptoms
		Gross inconsistencies between objective findings, symptom reports, and patient behavior
		Falsifying information, malingering, or factitious symptoms
		Inability to cooperate with treatment due to cognitive or other problems
	History	Same treatment failed multiple times in past
		Abuse of prescription medications, violation of opioid contracts
		History of gross noncompliance
	Science	Evidence that the proposed medical treatment would be injurious or ineffective given the circumstances

Adapted from Bruns and Disorbio [121]

been vetted by multiple evidence-based medicine panels reviewing the psychological assessment of chronic pain, (e) [if a pain-related measure] should have been designed and developed for pain assessment, and (f) [if a pain-related measure] should have standardized scores based on a norm group consisting of medical patients, and especially medical patients suffering from chronic pain. Reviews of other psychological tests for pain assessment are available elsewhere [105, 121, 122].

When you apply these criteria to measures of personality and psychopathology, four tests are identified. These are the MMPI-2, MMPI-2-RF, MCMI-III, and the PAI. If you apply these criteria to measures used for the assessment of medical patients and chronic pain, the tests identified are the BBHI 2, the BHI 2, the BSI-18, the MBMD, and the P-3.

The Three MMPIs

The three MMPI (Minnesota Multiphasic Personality Inventory) tests are arguably the most used and most researched psychological tests in existence. The original MMPI™ was published in 1943 and remained in use until the MMPI-2™ was published 1986, after which the original MMPI was phased out [123, 124]. Over the last several decades, the MMPI (and to a lesser degree, the MMPI-2) has been used in numerous studies related to patients with chronic pain and surgical outcome. Overall, the MMPI-2 is currently the most widely used measure of psychopathology and is also a well-researched measure of malingering. With regard to the evaluation of patients with pain and injury, the MMPI/MMPI-2 have historically been the most commonly recommended tests [28, 33, 125–129].

However, the MMPI-2 (Minnesota Multiphasic Personality Inventory-2) also has a number of significant weaknesses. First of all, the MMPI-2 scales are aging and are based on archaic psychiatric constructs dating back to the 1930s, such as hysteria, psychopathic deviate, and psychasthenia. Secondly, the MMPI was developed in a time when much less was known about psychometrics and test construction. As a result, all of the clinical scales contained items that later research concluded should not have been on the scale [130].Third, it has been noted that the MMPI-2 is a lengthy test [126], sometimes prohibitively so [125], as it commonly takes up to 90 min to administer [131], and it takes considerable skill to interpret [126]. Fourth, as the MMPI-2 is not normed or designed for patients with pain, it is prone to overpathologize them [126], especially on its

primary scales for assessing depression and somatization [127]. Fifth, despite the length of the MMPI-2, it does not assess many of the variables relevant to medical patients and must be combined with other measures for chronic pain assessment. To this end, Block et al. recommends that the MMPI-2 be used with three other tests [125], Burchiel et al. employed the MMPI-2 and five other tests [33], Doleys and Olson discussed the use of the MMPI-2 and seven other tests [126], Beltrutti et al. discussed the MMPI-2 and eight other tests [129], and Olson et al. employed the MMPI-2 and 10 other tests [128]. Given that the MMPI-2 is already a long test, this makes for a very lengthy test battery.

After much debate, the MMPI-2-RF™ (Minnesota Multiphasic Personality Inventory-2-Revised Form) was published in 2008 [130, 132]. This test has been called a radical departure from the MMPI-2 [133]. While most of the MMPI-2-RF scales were derived from MMPI-2 scales, none are identical, many are markedly different, while others are totally new [130, 132]. In addition to about 80 measures of psychopathology, the MMPI-2 has 15 "validity scales" used to detect exaggerating or concealing information. In contrast, the MMPI-2-RF has 50 scales including eight validity scales. The term "validity scale" is used to convey that these scales attempt to determine if the patient's test responses are valid representations of his or her true feelings or if the patient is attempting to "fake" or appear better or worse than he or she actually is by biasing the information that is presented [114]. The goal of the MMPI-2-RF development was to address the MMPI-2 shortcomings mentioned above and produce a shorter and more psychometrically sound test. Unfortunately, while there were 60 years of research on the original MMPI/MMPI-2 scales, the changed scales in the MMPI-2-RF mean that these decades of research have at best only moderate applicability to the MMPI-2-RF test.

The difference between the MMPI-2 and the MMPI-2-RF is illustrated in one study of 7,330 patients, which found that the "code type" (traditionally used to determine how the test was interpreted) agreed only 14.6 % of the time [134]. Additionally, research suggests that the MMPI-2 is substantially more likely to return a profile suggestive of psychopathology [134] or somatoform disorder [135] than the MMPI-2-RF. Overall, even though these two tests share the same name, it is probably better to think of the MMPI-2-RF as a distinctly different test. At the date of this writing, no published studies were found that utilized the MMPI-2-RF to assess patients with chronic pain. Further, it has been noted that the MMPI-2-RF Revised Clinical Scales were optimized for psychiatric assessment, and without consideration for use with medical patients or assessing somatic symptoms, possibly making them less useful for that purpose than the MMPI-2 [135]. Overall, while the relative merits of the MMPI-2 and the MMPI-2-RF tests remain the subject of ongoing debate [136, 137], both tests will likely remain popular measures of psychopathology.

The MCMI-III

The MCMI-III™ (Millon Clinical Multiaxial Inventory III) is another widely used measure of general psychopathology [138]. One of the MCMI-III's most distinctive features is that among its 25 scales are scales for the assessment of a variety of types of personality disorders, which is helpful for differential diagnosis. While the MCMI-III has the distinct advantage that its scales are keyed to DSM-IV diagnostic criteria, this will be less of an advantage once DSM-5 is released.

A feature of the MCMI-III that could be seen as either a strength or a weakness is its utilization of what are called "base rate" scores. These scales employ a psychometric method where a base rate score of above 75 suggests that some aspects of a syndrome are present, while base rates scores above 85 suggest that the full syndrome is present. While this represents an advantage in some respects, on the negative side, this psychometric method is not based on the normal curve and cannot be used to generate a percentile rank. This makes it somewhat more difficult to identify statistical outliers, but easier to identify the degree to which a particular syndrome might be present. Another feature is three validity scales and one measure random responding.

With regard to its applicability to patients with chronic pain, there is some research on the MCMI-III with regard to its use with chronic pain patients [139–141]. However, it was developed with and normed on psychiatric patients. Consequently, while the MCMI-III is a valuable measure of psychopathology, it must be remembered that like the MMPI-2 and MMPI-2-RF, its use with patients with objective physical disease or injury may lead to spuriously elevated scales scores, as patient reports of physical symptoms may inflate some of its measures of psychopathology.

The PAI

The PAI™ (Personality Assessment Inventory) is also a popular measure of general psychopathology. Psychometrically, the PAI is a carefully constructed measure, whose 22 scales assess a broad cross section of affective, characterlogical, and psychotic conditions. Like the MMPI-2, the PAI uses standardized T-scores based on community norms, which allows it to identify statistical outliers. The PAI, however, is substantially shorter than the MMPI-2, about the length of the MMPI-2-RF, but considerably longer than the MCMI-III. The PAI has four validity scales.

Some research has studied the applicability of the PAI to assess chronic pain patients [142, 143]. Like other psychological inventories designed for assessing psychiatric patients, it utilizes items about physical symptoms to diagnose depression, anxiety, and other conditions. Consequently, as with the MMPIs and the MCMI-III, it will tend to overestimate some forms of psychopathology in patients with chronic pain.

Psychological Measures for Medical Patients

As noted above, while the MMPIs, the MCMI-III, and the PAI are well-established measures of psychopathology, they are at risk for overestimating psychopathology when used with medical patients. One reason that this happens has been called the "psychological fallacy" [117], which is a problem that occurs when psychological measures intended for psychiatric patients are given to medical patients.

Most psychological tests of psychiatric conditions utilize items about physical symptoms. For example, a measure of depression might contain items about psychological symptoms (e.g., negative thoughts and sad feelings) and physical symptoms as well (e.g., fatigue, loss of libido, changes in weight). However, it has been noted that physical symptoms of this type can also be the product of injury, disease, or medication side effects. Thus, when patients report their medical symptoms on such measures, it can spuriously increase their scores on measures of psychiatric conditions. This is true not only of the MMPIs, MCMI-III, and PAI but also other common measures such as the Beck Depression Inventory [144]. In contrast, a few tests, such as the State Trait Anxiety Inventory [145] or the Battery for Health Improvement 2 [120], control this problem by avoiding the use of items containing physical symptoms to assess emotions. Another important difference in psychological measures designed for medical patients is that they are normed on medical patients, rather than psychiatric patients or community members. By comparing a patient to a group of other patients, it is much easier to identify the unusual, at risk patient [105].

The BHI 2

The BHI 2™ (Battery for Health Improvement 2) is a test designed for the biopsychosocial assessment of medical patients [120]. This test had its origins in a biopsychosocial paradigm (Fig. 6.1) and as such attempts to assess the medical, psychological, and social aspects of a patient's condition. A strength of the BHI 2 is its norms, which include both patient and community samples. Beyond this, however, the patient norms are broken down into a number of subcategories. About half of the BHI 2 patient norm group consisted of patients with acute injury or other conditions, while the other half consisted of patients with chronic conditions including patients with orthopedic injury, brain injury, headache, fibromyalgia, CRPS, and other conditions. Further, diagnosis-specific pain norms were developed for six groups, which were chronic pain, lower extremity injury, low back injury, upper extremity injury, neck injury, headache, and head injury. This allowed for many patients' pain reports to be compared to other patients in their own diagnostic category. While the BHI 2 uses pain norms for a variety of injury types, other aspects of the BHI 2 were designed to assess conditions unrelated to injury, such as somatic preoccupation and somatization, death fears, the perception of addiction to prescription medication, the tendency to become physically tense when under stress, the perception of disability, and negative attitudes toward physicians that have been found to be associated with thoughts of litigation [146, 147] and violence [148, 149]. Additionally, in order to avoid the psychological fallacy, the BHI 2's 18 scales and 40 subscales assess the thoughts and feelings associated with depression and anxiety separately from the physical symptoms associated with depression and anxiety. Overall, since the BHI 2 was designed to assess medical patients in general and patients with chronic pain in particular, it assesses most of the risk factors identified in the literature [119]. The BHI 2 has a measure of random responding and two bidirectional validity scales, giving it two measures of exaggerating complaints and two measures of concealing information.

Weaknesses of the BHI 2 include that while it assesses some aspects of psychopathology, especially relevant to medical patients, it was not intended to assess the breadth of psychiatric conditions assessed by inventories designed for psychiatric patients. For example, it uses only critical items to assess psychosis and makes no attempt to assess mania, obsessive-compulsive disorder, and some other types of severe psychopathology. Additionally, while there is a growing body of BHI 2 research related to chronic pain [39, 119, 146–161], its research base is not as extensive as that of the MMPI/MMPI-2.

The MBMD

The MBMD™ (Millon Behavioral Medicine Diagnostic) is a psychological test designed for use with medical patients [162]. Like the BHI 2, the MBMD is theory driven, being based in part on Millon's "Evolution-based Personality Theory" [163], with the resulting coping styles being applied to the medical setting. The MBMD could be said to be the psychometric cousin of the MCMI-III, as it adapts many of the MCMI-III scales for use in a medical setting. Like the MCMI-III, the MBMD uses base rate scores. As with the MCMI-III, the strength of this approach is that it attempts to identify patients above a certain level of symptomatology, at the expense of being unable to identify statistical outliers or generate a percentile rank. The MBMD differs from the MCMI-III, however, in that while the MCMI-III attempts to assess psychopathology, the MBMD is designed to assess less extreme aspects of the same constructs that are likely to be observed in a nonpsychiatric population. For example, while the MCMI-III has a scale measuring schizoid tendencies, a similar scale on the MBMD assesses introversive tendencies.

The MBMD is a test designed for medical patients and was constructed using patients with heart disease, diabetes, HIV, and neurological problems. However, only 9 % of patients in the original patient normative group were reported to be suffering from chronic pain. More recently, bariatric

and chronic pain norms for this test were also developed. The MBMD pain patient computerized interpretive report displays both the original general medical norm profile using *base rate* scores and a pain patient norm profile using *normative* scores. This produces a pain patient profile that is far less elevated than that produced by the original norm groups and adds a measure of complexity to the interpretation. Perhaps because of this, the pain patient interpretive report continues to be based on the original general medical norms. At the time of this writing, no research studies were found that applied the MBMD to patients with chronic pain.

The MBMD's 38 scales excel at describing the patient's coping style, health habits, potential for certain types of negative reactions to treatment, and factors which may potentiate the patient's distress. It also excels at the psychological assessment of medical patients who are more or less psychologically normal and is also unique in that it offers a brief assessment of spiritual resources for coping. The MBMD also has three validity measures for assessing a patient's test-taking attitude.

The BBHI 2

The BBHI 2™ (Brief Battery for Health Improvement 2) is a short (10-min) version of the BHI 2. The BBHI 2's six scales measure a number of concerns commonly seen in medical patients and especially those with chronic pain: depression, anxiety, somatization, pain, functioning, and utilization of the same norms as the BHI 2 [117]. With regard to pain, the BBHI 2 assesses pain preoccupation, pain tolerance, pain location, pain variability, and dysfunctional pain cognitions. Additionally, it uses critical items to screen for 15 other concerns such as satisfaction with care, home life problems, addiction, psychosis, sleep disorders, panic, compensation focus, and suicidality.

A strength of the BBHI 2 is that it assesses a wide variety of risk factors in a short amount of time [119] and it is the shortest psychological inventory to have validity measures for exaggerating, concealing information, and random responding, and a critical item for psychosis as well. In addition to being used diagnostically, the BBHI 2 can also be used in a serial fashion to track changes in pain, function, depression, anxiety, and somatic distress over the course of time in treatment. A weakness of the BBHI 2 is that outside of its core scales, it screens for a number of concerns using critical items, which is a less reliable method than that which can be obtained with a longer instrument.

The P-3

The P-3™ (Pain Patient Profile) is a short measure useful within pain practices [164]. The strength of the P-3 is its parsimony. The P-3 assesses three critically important variables: depression, anxiety, and somatization. Although the P-3 is tightly focused on these three scales, one strength is that these scales have unusually high reliability. Another strength is that the P-3 utilizes both chronic pain and community norms in interpreting these scales. The appeal of the P-3 is its elegant simplicity, the strength of its norms, and its intended use with patients with chronic pain. The P-3 also has a growing base of empirical research studies pertaining to chronic pain [141, 165–173]. The primary weakness of the P-3 is that there are many risk factors it does not assess, such as coping, pain, functioning, and substance abuse.

The BSI-18

The BSI-18® (Brief Symptom Inventory 18) [174] is an 18-item version of the much longer Brief Symptom Inventory [175], which in turn was derived from the SCL-90 test [176]. Like the P-3, the BSI-18 has three scales: depression, anxiety, and somatization. Thus, it shares the P-3's parsimonious, straightforward approach, and on the surface, the BSI-18 appears identical to the P-3. However, these tests differ in three important respects. First of all, BSI-18 is much shorter than P-3, taking only about one-third of the time to complete. Secondly, while the BSI-18 scales are shorter, they also have lower reliability than the P-3 scales.

A third difference is that while the P-3 was normed on both community members and patients with chronic pain generally, the BSI-18 was normed on patients suffering from cancer-related pain. Thus, while both tests have pain norms, the two normative groups were quite different. Overall, the meaningfulness of a patient's scores on a standardized test is influenced by the degree of similarity between the patient and the norm group to which the patient is compared. Overall, the strength of the BSI-18 is assessing the psychological distress of patients with cancer [177–180].

Other Noteworthy Pain-Related Questionnaires

There are a multitude of other questionnaires pertaining to pain [121] which did not meet all of the criteria for review here, but which are nevertheless noteworthy. Three of these are the West Haven-Yale Multidimensional Pain Inventory (WHYMPI or MPI) [181], the Chronic Pain Coping Inventory (CPCI) [182], and the Survey of Pain Attitudes (SOPA) [183]. The MPI is a well-researched questionnaire that offers scales to assess attitudes about pain, the perceived attitudes of others toward the patient's pain, and the impact of pain on functioning. Weaknesses of the test include that it is not a standardized test: It does not have a formal test manual and has multiple versions [184] with alternate instructions, which have been found to significantly alter the results [185].

Conversely, the CPCI and the SOPA are both questionnaires used in research that evolved into different, standardized versions that kept the same name. Both tests are also

similar in that they assess a number of variables directly related to pain. As aptly suggested by its name, the CPCI assesses a variety of strategies patients may use to cope with pain, which include three illness-focused coping strategies and six wellness-focused strategies. A weakness of this test is that it lacks a pain catastrophizing measure. The SOPA is also well researched and assesses a patient's beliefs about pain, which include two scales assessing adaptive beliefs and five scales assessing maladaptive beliefs. Both of the CPCI and the SOPA perform the important task of assessing attitudes, beliefs, and behaviors about pain. A weakness of both the CPCI and the SOPA is that their norms lack diversity in several respects, such as including less than 2 % African-American and Hispanic patients. Overall, the CPCI, SOPA, and MPI are all alike in that they all measure variables directly related to pain. However, none of these scales assess psychopathology or faking, and so they would probably best be paired with another measure.

Validity Assessment

Patients are sometimes motivated to falsely report pain or disability. Incentives range from primary gain (i.e., the individual finds some intrinsic satisfaction in being a patient, such as in being a suffering, tragic hero), secondary gain (i.e., the patient receives monetary, opiate, or other rewards for reporting pain), or tertiary gain (i.e., someone the patient cares about, often a family member, receives monetary or other rewards when the patient reports pain). Since pain is a subjective experience, reports of pain are easily faked [186], and false reports of pain are sometimes associated with malingering. An extensive review of pain-related malingering examined 68 studies and concluded that malingering was present in 1.25–10.4 % of patients with chronic pain [187]. Other more recent studies have suggested that there may be a 30–40 % incidence of malingering of pain or other symptoms in patients who were litigating or seeking benefits [188, 189] and that reports of symptoms increase when monetary compensation for them is present [190–192]. To detect these tendencies, psychometric measures called validity scales are used.

Validity measures are common features on major psychological inventories, and the MMPI-2, MMPI-2-RF, MCMI-III, PAI, BHI 2, and MBMD all have multiple validity scales. Of these, the MMPI-2 and MMPI-2-RF easily have the greatest number of and the most researched validity measures. With regard to brief psychological measures for pain, only the BBHI 2, P-3, and SOPA have validity measures. The BBHI 2 includes assessments of exaggerating, denial, random responding, and psychosis, while the P-3 has a measure of bizarre responding and the SOPA has a measure of inconsistent responding. Validity measures in general look for patterns of complaints that are so strange, improbable, or extreme as to be extraordinarily unlikely. This could involve claiming on a questionnaire to have never had a bad feeling or reporting a pattern of symptoms that is extraordinarily unlikely.

Relative Merits of the Tests Reviewed

In consideration of the relative merits of the tests above, the following observations are offered. While the MMPI-2-RF is shorter than the MMPI-2-RF and has improved psychometrics, the MMPI-2 has a far larger research base. In contrast, the MCMI-III has the advantage of being keyed to DSM-IV diagnoses and is only about 1/3 the length of the MMPI-2. When time is a factor, this is a considerable advantage. Lastly, the PAI is about the same length as the MMPI-2-RF, but about twice the length of the MCMI-III. The PAI is a well-designed measure of psychopathology and is a reasonable alternative to the other tests mentioned.

With regard to measures of chronic pain, the BHI 2 has the advantage of being intended for the assessments of patients with chronic pain. It includes standardized measures of pain, function, and most of the risk factors identified by the convergent model. The other major health psychology inventory reviewed here, the MBMD, has surprisingly little overlap with the BHI 2. While the MBMD was developed using a disease model and does not measure pain per se, it does measure some attitudes toward pain. If an assessment of how relatively normal patients cope with pain is desired, the MBMD is particularly strong. In contrast, the BHI 2 assesses a greater number of aberrant traits that may be problematic in treatment.

With regard to brief measures for medical patients, the P-3 offers a straightforward assessment of three factors known to play an important role in chronic pain in a manner that is easily understood. While the BBHI 2 is a test of similar length to the P-3, these two tests approach the assessment of pain patients differently. While the P-3 prefers the elegance of parsimony, the BBHI 2 assesses a much broader range of variables and paints a more detailed picture of the patient. Both of these tests can be used to track changes in treatment over time. The BSI-18 offers the same three scales as the P-3. However, the BSI-18 was developed and normed on patients with cancer, and so this measure has particular strengths if pain is associated with that condition.

It should be noted, however, that the final decision about tests should rest with the examiner, as unique features of a particular case or future research might indicate that a different set of tests would be warranted. At this point, however, given the current state of knowledge, the tests above meet the criteria specified.

Referral for Psychological Assessment

A multidisciplinary panel, following rules of evidence-based medicine, explored the question of when psychological assessments should be conducted in patients suffering from chronic pain [105]. The conclusion was that, given the biopsychosocial nature of pain, psychological assessment is

generally indicated. Beyond this, specific indications for evaluation were also identified. These were as follows:

1. When psychological dysfunction is observed or suspected
2. When there has been inadequate recovery, as indicated by the duration of symptoms beyond the usual time, failure to benefit from all treatment, or pain complaints that cannot be explained by the patient's physical findings
3. Substance abuse and/or aberrant use of prescription medication
4. Premorbid history of major psychiatric symptoms
5. Lack of adherence to medical treatment
6. When cognitive impairment is suspected, especially if related to the medical condition or adverse effect of medications
7. When a patient has been judged to have a catastrophic medical condition
8. Prior to major surgical or invasive procedures, such as spinal cord stimulation, and prior to initiation of chronic opioid treatment

Chronic Pain Case Vignettes

For heuristic purposes, in the case vignettes below, the convergent model described above is used to assess three patients, whose biopsychosocial risk levels range from mild to extreme. It should be noted that there are other psychometric assessment protocols, and these are reviewed elsewhere [119]. However, analyzing these cases with multiple protocols would add a level of complexity that goes well beyond the vision of this chapter. In each case vignette to follow, there is both a standardized assessment of the risk factors described in Tables 6.1 and 6.2 and a clinical narrative. The first two cases assess biopsychosocial risk factors using the BBHI 2 test, while the third uses the longer BHI 2.

Case History One: Neuropathic Pain with Low Biopsychosocial Risk Level

Ms. A was a 26-year-old female college graduate and sports enthusiast, who injured her back while skiing. Initially, she had been diagnosed with a lumber strain. Later, she was determined by MRI to have bulging discs at L3-L4 and L4-L5. Ms. A wished to avoid lumbar surgery and was being evaluated for alternate treatment options. As part of a comprehensive assessment, Ms. A was administered a BBHI 2 test.

Table 6.3 summarizes the results of Ms. A's standardized testing with the BBHI 2. These results show a distribution of pain that is confined to the area near the injury, with only three body areas being involved. The pain level at testing was a four, with a high of eight and a low of two in the last month. These pain complaints were judged to be consistent with her objective medical findings. Using the convergent model to summarize Ms. A's level of risk, she had none of the extreme exclusionary risk factors and only one cautionary risk factor. This produced a cautionary risk score at the 17th percentile rank or well below average. It should be noted that these risk scores are generated solely from the testing, without any interview or chart review. Following the testing, an interview identified additional information. The overall results of the evaluation are below.

On the BBHI 2 test, Ms. A's sole cautionary risk factor was that her level of depression was higher than that seen in 88 % of a national sample of patients with pain and injury, which is significantly elevated (Table 6.3). During the interview, she reported a low mood and was very concerned that she may have to give up her active lifestyle. Additionally, her score on the functional complaints scale was in the "moderately high" range. With regard to functioning, Ms A was reporting more difficulties with functioning than was 78 % of a national sample of patients and above 98 % of a national sample of

Table 6.3 Subacute low back pain: good candidate

BBHI 2 results					
Global pain complaint		*Pain complaints areas*		*Scale ratings and percentile ranks*	
Overall pain at testing:	4	Head (headache pain):	0	Defensiveness:	Average 48 %
High pain last month:	8	Jaw or face:	0	Somatic complaints:	Average 63 %
Low pain last month:	2	Neck or shoulders:	0	Pain complaints:	Average 66 %
Peak pain:	8	Arms or hands:	0	Functional complaints:	Mod high 78 %
Pain range	6	Chest:	0	Depression:	High 88 %
Max tolerable pain	5	Abdomen or stomach:	0	Anxiety:	Average 71 %
Pain tolerance index	3	Genital area:	0	*Summary*	
Number of body areas with pain	10	Middle back:	6	Exclusionary risks = 0	
Critical concerns		Lower back:	8	Cautionary risks = 1	
Sleep disorder		Legs or feet:	3	Cautionary risk rank: 17th percentile	

Table 6.4 Subacute whiplash condition: moderate risk patient

BBHI 2 results					
Global pain complaint		*Pain complaints area*		*Scale ratings and percentile ranks*	
Overall pain at testing:	9	Head (headache pain):	8	Defensiveness:	Average 42 %
High pain last month:	10	Jaw or face:	6	Somatic complaints:	Very high 96 %
Lowest pain last month:	6	Neck or shoulders:	9	Pain complaints:	High 88 %
Peak pain:	10	Arms or hands:	4	Functional complaints:	Mod high 76 %
Pain range	8	Chest:	9	Depression:	High 90 %
Max tolerable pain	6	Abdomen or stomach:	5	Anxiety:	Very high 96 %
Pain tolerance index	−4	Genital area:	0	*Summary*	
Number of body areas with pain	6	Middle back:	0	Exclusionary risks = 0	
Clinical concerns		Lower back:	0	Cautionary risks = 5	
Panic		Legs or feet:	0	*Cautionary risk rank* = 80th percentile	
PTSD/dissociation					
Perceived disability					

persons in the community. While this is at the upper end of the average range for patients who are in rehabilitation, it is far higher than that of the average healthy person. This indicates that while a significant problem exists, it is still in the average range for patients with serious injuries. Thus, with regard to perceptions of disability and functioning, Ms. A was not an unusual patient. Additionally, Ms. A's BBHI 2 results determined that her pain, somatization, and anxiety were all in the average range. The only other significant problem reported was that the patient was having difficulty sleeping.

Importantly, the BBHI 2 Pain Tolerance Index was only −3, meaning that the patient felt that her worst pain must only be reduced by three points in order to function normally. Overall, this patient was judged to have localized back pain and a relatively low level of psychosocial complications. She was started on a trial of medications for depression and insomnia and was judged to be an excellent candidate for conservative treatment.

Case History Two: Whiplash with Moderate Biopsychosocial Risk Level

Ms. B was a 52-year-old patient who had sustained a whiplash injury in a motor vehicle accident and who had been exhibiting poor attendance in treatment. This patient complained of pain in her neck, head, and mid- to upper back, and this was judged to be consistent with the whiplash injury. In contrast, other aspects of Ms. B's pain complaints, such as the facial and jaw pain, were of uncertain etiology. It was possible that the latter pain complaints were indicative of other injuries that may have been overlooked during the acute phase or may have been attributable to dental or other conditions. Given the uncertain nature of some of her pain complaints and her lack of improvement with treatment, Ms. B was referred for psychological assessment.

Table 6.4 lists the BBHI 2 tests results of Ms. B. She had no exclusionary risk factors and five cautionary risk factors, producing a cautionary risk score at the 80th percentile rank, which is somewhat elevated. The "high" rating on the BBHI 2 pain complaints scale indicates that Ms. B's overall pain reports were substantially higher (elevated more than one standard deviation) than that seen in 88 % of patients with pain and injury. These test results also showed that Ms. B was extremely anxious, somatically preoccupied, and was reporting symptoms of panic and PTSD. This gave rise to an alternate interpretation of some of these symptoms. The interview determined that the patient was having PTSD flashbacks when driving in traffic and had also developed agoraphobia secondary to panic attacks. It was discovered that her poor attendance in treatment was not attributable to low motivation, but rather to her fear of leaving the house. Additionally, her jaw and facial pain were later determined to be associated with bruxing secondary to severe anxiety.

Ms. B's Pain Tolerance Index of −4 indicates that she felt she needed to reduce her worst pain by four points to make normal functioning possible. On the positive side, given that the patient reported that pain sometimes dropped as low as a two and a pain of six could be tolerated, it would appear that at times, the pain was quite tolerable.

In cases like this, it is important to determine the physical and psychological causes of the reported symptoms and provide appropriate treatment. If the symptoms are determined to be heavily influenced by psychosocial factors, early intervention can prevent these psychosocial complications from delaying recovery. In this case, Ms. B was referred for treatment for PTSD and agoraphobia. Later, after the PTSD and anxiety symptoms were brought under control, Ms. B no longer exhibited attendance problems. Following a two-level cervical rhizotomy, her pain symptoms decreased markedly, and she began progressing in physical therapy.

Case History Three: Chronic Low Back Pain with Extreme Biopsychosocial Risk Level

Mr. C was a 44-year-old male with failed back surgery syndrome, who was being considered for spinal cord stimulation and other treatments. Mr. C presented as a patient who had injured himself 3 years earlier while working on an oil-drilling rig. The patient reported that following the injury, there was an immediate onset of severe lumbar pain, which radiated into his left leg. A subsequent MRI revealed an L5–S1 lumbar disc herniation. Mr. C was a two to three pack a day smoker and was instructed to stop smoking prior to undergoing a lumbar fusion. He reported that he had quit, but later, after the surgery, it was discovered that he had not been honest about this. Mr. C complained that his pain after the surgery was far worse, and he increased his dose of opioid pain medications without consulting his surgeon.

Mr. C was referred for physical therapy, where he attended poorly and failed to progress. He was very pain affected, exhibited a hostile attitude, and complained that none of the treatments that had been offered to him had helped. Mr. C was offered light duty at his employer's office, which he refused. By this time, his use of opioid medication was excessive, and Mr. C became belligerent when an early refill of this medication was not allowed.

Three years postinjury, and after all other treatments had failed, Mr. C was referred to an interventional pain specialist to be evaluated for spinal cord stimulation, with hopes that this would help him decrease his opioid use. Prior to trial, Mr. C was referred for a psychological evaluation, but he regarded a referral to a psychologist as an insult, saying, "My pain is real. It is not in my head!" The physician explained that behavioral health services are a standard part of interdisciplinary care and persuaded Mr. C to attend the appointment. During the psychological evaluation, the patient was administered the BHI 2, and Table 6.5 lists Mr. C's BHI 2 results. Using the convergent model, he had 18 cautionary risk factors, producing a cautionary risk score at the 99th percentile rank, which is extremely high. Further, he also had six of the extreme exclusionary risk factors, producing an exclusionary risk score at the 99th percentile rank as well.

At the time of the psychological evaluation, Mr. C was reporting a pain of 10 in the low back, mid-back, and lower extremities, and the intensity of the pain reports was judged by his physicians to exceed what was expected. More significant perhaps was the report of pain in all seven other body areas, his report that his overall pain was a constant "10," with his pain range score of 0 indicating that he was reporting totally invariant pain over the last month. More importantly, his Pain Tolerance Index score was −10, indicating that the

Table 6.5 Chronic low back pain: high-risk candidate

BHI 2 results					
Global pain complaints		*Pain complaints area*		*Scale ratings and percentile ranks*	
Overall pain at testing:	10	Headache:	10	Defensiveness:	Ext low 28 %
High pain last month:	10	Jaw/face:	6	Self-disclosure:	Mod high 80 %
Lowest pain last month:	10	Neck/shoulders:	5	Somatic complaints:	High 91 %
Peak pain:	10	Arms/hands:	2	Pain complaints:	Ext high 99 %
Pain range	0	Chest:	9	Functional complaints:	Very high 95 %
Max tolerable pain	0	Abdomen/stomach:	5	Muscular bracing	Average 58 %
Pain tolerance index	−10	Genital area:	2	Depression:	High 88 %
Number of body areas with pain	10	Middle back:	8	Anxiety:	Average 56 %
Clinical concerns		Lower back:	10	Hostility	Very high 96 %
Pain fixation		Legs or feet:	10	Borderline	Mod high 82 %
Rx addiction				Symptom dependency	Average 44 %
Violent ideation				Chronic maladjustment	Very high 95 %
Medical dissatisfaction				Substance abuse	Very high 96 %
Compensation focus				Perseverance	Average 62 %
Entitlement				Family dysfunction	Low 5 %
Cynical beliefs				Survivor of violence	Low 16 %
Aggressiveness				Doctor dissatisfaction	Ext high 99 %
Impulsiveness				Job dissatisfaction	High 84 %
Vegetative depression				*Summary*	
Autonomic anxiety				Exclusionary risks = 6	
Death anxiety				Cautionary risks = 18	
Sleep disorder				Exclusionary risk rank: 99th percentile	
Work disability				Cautionary risk rank: 99th percentile	

patient believed he needed to reduce the level of all his pains to 0 before he could function. Relative to this, he claimed that he had no pain at all before he was injured and he deserved to have no pain now. He stated that if spinal cord stimulation would reduce all of his pain to 0, he would have no need for medication. Overall, this patient reported more pain than did 99 % of a national sample of patients with pain and injury, including chest pain as high as 9. Given the fact that he was a heavy smoker, he was referred for coronary assessment, with negative findings. Overall, as there was no pathophysiological explanation for many of Mr. C's pain reports, therefore, psychophysiological reasons were explored.

The BHI 2 test results determined that Mr. C was at the 96th percentile rank for hostility and the 95th percentile for panic symptoms. This combination of anger and anxiety suggests extreme elevation of the fight-or-flight response, with the "fight" component being associated with anger and the "flight" component being associated with anxiety. Further, Mr. C's depression scale score was above that seen in 88 % of patients, and his depression appeared to manifest itself primarily in terms of anger and irritability. It was determined that Mr. C's reports of chest pain were associated with high levels of autonomic arousal and panic-like symptoms. Mr. C also reported a level of somatic preoccupation that was at the 91st percentile, and he was convinced that he had a severe heart condition, which his doctors were ignoring. Mr. C's BHI 2 profile also indicated that he was reporting more functional impairment than 95 % of patients, indicating that he saw himself as having a severe disability.

On the BHI 2, Mr. C also reported some violent thoughts, supported by a cynical view of others. He felt entitled to both special treatment and to financial compensation. With a level of job dissatisfaction at the 84th percentile, this patient was at odds with his employer, whom he blamed for his injury. He reported fantasies of harming his boss, "to make him feel pain the way I do." With a level of doctor dissatisfaction at the 99th percentile, he had even more negative attitudes toward physicians, who he accused of "working for the system." On the BHI 2, Mr. C reported an extensive history of substance abuse and chronic maladjustment. Overall, his BHI 2 test profile was one that has been found to be associated with thoughts of litigation [146, 147] and of assaultive behavior [148, 149, 155]. During the interview, he revealed that he had been in jail previously for domestic violence and in prison for drug-related charges.

Mr. C stated that because of his extreme pain, he needed more opioids and blamed his physicians for not increasing his dosage saying, "There is no reason why doctors couldn't cure my pain if they wanted to." Mr. C also demanded "natural" treatments, rationalizing that he should be prescribed morphine as it was a "natural treatment made from flowers." Paradoxically, though, Mr. C refused treatment with antidepressant medications out of a fear that they were "addictive" and because they were "unnatural." Similarly, he refused behavioral pain management training with a psychologist. Despite being off of work, he was often "too busy" to attend physical therapy, yet he never missed an appointment for an opioid prescription refill. Although multiple treatment referrals were offered to this patient, he did not accept them. Overall, Mr. C had unrealistic expectations of being totally cured through surgery and opioids, without effort on his own part and without changing his dysfunctional behaviors. Despite the warnings of his physicians, though, he continued to smoke heavily. It was later determined that he was combining his pain medications with methamphetamines and large amounts of alcohol. Mr. C claimed he was using both "medicinally." Mr. C did not take responsibility for his behavior, though. Instead, he blamed his orthopedic surgeon for his pain and was discussing a malpractice lawsuit.

The psychologist concluded the following:

1. Even if Mr. C did undergo spinal cord stimulation, he would almost certainly be dissatisfied with his outcome. The possibility that this patient's back pain would be reduced to 0 by spinal cord stimulation was judged to be extremely unlikely. Even if spinal cord stimulation did totally eliminate all low back and lower extremity pain, it was unlikely that it would alleviate his multitude of other pain complaints, and so the overall reported pain level would be unlikely to change.
2. Even if treatment with spinal cord stimulation was successful, it is unlikely that it would change Mr. C's demands for opioids. Spinal cord stimulation is not a treatment for addiction, which was what Mr. C was suffering from.
3. Mr. C hated his job and had no desire to return there. It was judged unlikely that spinal cord stimulation would alter Mr. C's motivation to return to work.
4. Given the fact that Mr. C was pursuing litigation, he may be reluctant to admit to any gains in treatment, as it might weaken his lawsuit against his surgeon. Additionally, since his expectation of a totally pain-free outcome was so unrealistic, Mr. C would be probably extremely unhappy with his spinal cord stimulation as well.
5. The psychologist suggested the following treatment plan for Mr. C. First of all, Mr. C should be referred to an inpatient drug rehabilitation program for polysubstance abuse. Once he had completed that, he could then benefit from an interdisciplinary treatment program for pain, which studies have shown can be effective, even for patients with personality disorders [193]. After consulting with the physician, it was decided that the interdisciplinary treatment should avoid opioids and include medical treatment as indicated, physical therapy with a focus on exercise and improving function, cognitive behavioral therapy for managing pain and emotional dysfunction, and other psychological treatments including relaxation, sleep hygiene, and mindfulness training.

After consulting with the psychologist, the pain physician felt she had a much deeper understanding of the scope of the problem and later met with Mr. C. She told Mr. C that spinal cord stimulation did not appear to be a viable treatment for him and that it was very likely that Mr. C would be unhappy with the results. The physician also said that she was committed to doing nothing to harm him and that given Mr. C's pattern of polysubstance abuse, treatment with opioids was dangerous and no longer an option. The physician said that instead, she was recommending the drug rehabilitation and interdisciplinary pain treatment program described above. The physician told Mr. C that this treatment program would not work unless he was fully invested in it and that if he faithfully adhered to it, they could continue working together. However, she also explained that if Mr. C refused this treatment, or did not adhere to it, he would be advised to seek treatment elsewhere, as this was the only treatment plan she thought was viable.

High-risk patients like Mr. C are challenging to treat. His initial injury was a serious one, but one which should have responded better to treatment. Unfortunately, Mr. C's entitled expectations, hostile attitude, noncompliance, and addictive behavior undermined the work of his treating professionals, and he suffered the consequences of his own dysfunctional tendencies.

If Mr. C followed through with the treatment plan above, one part of a 12-step treatment program for addiction would probably be a spiritual meditation commonly known as the Serenity Prayer: *God grant me the strength to change the things I am able to change*, *the ability to accept the things I cannot change*, *and the wisdom to know the difference*. Applying this approach to the treatment of pain generally, while the goal of changing physical pain is the domain of pain medicine, the emotional acceptance of having pain and coping with it is the domain of pain psychology. Knowing how to integrate these two approaches in the clinical setting requires a holistic understanding of how the patient's medical and psychological conditions interact. While events in life sometimes lead to pain, suffering comes from what you do to yourself. Thus, as the Buddha concluded, "Pain is inevitable. Suffering is optional."

Conclusions

Based on the studies reviewed here, it is evident that there is a growing consensus in the literature regarding the importance of assessing pain from a biopsychosocial perspective, which integrates both medical and psychological testing. At first glance, the specialties of pain medicine and pain psychology could seem worlds apart. Beneath the surface, though, they share a deep commonality, as both specialties focus on the assessment of subjective experiences and the attempt to alleviate painful feelings. While pain often has its origins in physical states, psychological forces can act either to alleviate or to compound the individual's suffering. Chronic pain may thus evolve into a complex biopsychosocial state, and depending upon the case, biological, psychological, or social factors may play the predominant causal role.

Given the complex nature of pain, success in treatment depends upon a full understanding of why the patient reports pain or requests opioids or other treatments. The dictum that "diagnosis precedes treatment" is nowhere more true than with the practice of pain medicine. While reports of pain are often the product of pathophysiology, they are sometimes the product of psychopathology. Consequently, when extreme pain is reported in the absence of any obvious pathophysiological explanation, tension can arise between patient and doctor. It has been said: "To have great pain is to have certainty. To hear that another has pain is to have doubt" [194]. Ultimately, successful assessment of chronic pain requires not only medical diagnostics but also a systematic investigation of the subjective world of the patient, which seeks to understand the origins of the pain reports.

From the perspective of patients, chronic pain often involves not just a loss of function but also a loss of one's future dreams and aspirations. The onset of a disabling condition may bring an abrupt end to a patient's assumptions about what the future holds, and the loss of this assumptive world can elicit profound grief [195]. Because of this, success in treatment cannot occur without addressing both medical and psychological concerns. Overall, the value of knowing one's patient, both medically and psychologically, cannot be overstated. To this end, and when integrated with medical diagnostics, psychological assessment can make an invaluable contribution to the understanding of the patient with chronic pain. In this manner, and through a determined blend of both science and humanity, more effective treatments may be identified.

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