

Impact of Psychological Factors in the Experience of Pain

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This article reviews the role of psychological factors in the development of persistent pain and disability, with a focus on how basic psychological processes have been incorporated into theoretical models that have implications for physical therapy. To this end, the key psychological factors associated with the experience of pain are summarized, and an overview of how they have been integrated into the major models of pain and disability in the scientific literature is presented. Pain has clear emotional and behavioral consequences that influence the development of persistent problems and the outcome of treatment. Yet, these psychological factors are not routinely assessed in physical therapy clinics, nor are they sufficiently utilized to enhance treatment. Based on a review of the scientific evidence, a set of 10 principles that have likely implications for clinical practice is offered. Because psychological processes have an influence on both the experience of pain and the treatment outcome, the integration of psychological principles into physical therapy treatment would seem to have potential to enhance outcomes.



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The experience of pain is shaped by a host of psychological factors. Choosing to attend to a noxious stimulus and interpreting it as painful are examples of 2 factors involving normal psychological processes. To be sure, pain is a subjective experience, and although it is certainly related to physiological processes, how individuals react to a new episode of pain is shaped and influenced by previous experience. Indeed, without learning from experience, it would be difficult to cope with pain and maintain good health. Thus, these psychological processes have tremendous value for survival.¹ Yet, psychological factors are not completely understood, and the translation of their use to the clinic remains a challenge. Therefore, in this article, we focus on the most important psychological factors that have been incorporated into theoretical models of pain that may explain pain perception and treatment benefits. In our view, awareness of these factors is crucial for understanding patients in pain and is a prerequisite for integrating them into clinical practice.

Applying psychological knowledge in the clinical practice of physical therapy, however, has been quite a challenge. A majority of physical therapists are aware of the importance of psychological factors and attempt to utilize this awareness in their practice.^{2,3} The application of psychological knowledge in physical therapy might range from providing reassurance to setting goals or inquiring about the functional consequences of pain. However, there is an apparent lack of knowledge and tools to adequately apply this knowledge. For example, although 63% of physical therapists in a primary care setting were aware of the importance of psychological factors, only 47% reported knowledge of utilizing them clinically.³ Furthermore, when asked to specify which psychologi-

cal factors are of importance, most therapists listed some evidence-based factors but also a host of non-evidence-based factors.² Indeed, many of the factors listed by clinicians were difficult for them to address (eg, economic, drug abuse, or marital issues) in the clinic and did not match the evidence-based factors included in that article.² Thus, a key to the problem appears to be a lack of clear guidelines for applying the knowledge. We acknowledge that there is currently a lack of clear information as to how psychological factors should be utilized by physical therapists and other clinicians.

One area that is particularly relevant is how early physical therapy treatments might prevent the development of chronic musculoskeletal pain. Although many acute low back pain (LBP) problems resolve, a minority of people (~10%) directly develop a persistent problem that disables them for a long period of time.^{4,5} The transition from acute to chronic pain problems is known to be catalyzed by psychological processes (see article by Nicholas et al⁶ in this issue). As a review of psychological interventions designed to prevent chronicity has shown positive effects when the psychological techniques are appropriately administered,⁶ competent application appears to be vital. In our view, an understanding of the basic psychological processes is, therefore, an essential base for competent application of psychological principles in the clinic.

To date, there has been broad recognition of the importance of a biopsychosocial view of pain, but a lack of clarity in how the psychological factors actually fit in, not least in clinical situations. How might psychology be utilized to improve care? To this end, we will focus on the central psychological factors and highlight the psychological processes that

affect the pain experience over time. Indeed, we emphasize how psychological factors may contribute not only to the experience of acute pain but also to the development of chronic pain and disability over time. What might be quite a normal and appropriate response in the acute phase paradoxically may be a poor method of coping with persistent pain. Accordingly, we will highlight how psychological factors affect the development of persistent disability and illustrate the processes by describing pertinent theoretical models.

Psychological Processes

In this section, we provide an overview of fundamental psychological processes that are involved in most types of pain problems and highlight how these processes may contribute to the development of a persistent pain problem. A basic theme is that the psychological processes are highly intertwined and function together as a system. We consider them individually as a means of presentation. Note that these processes also form the basis of the models presented in the next section.



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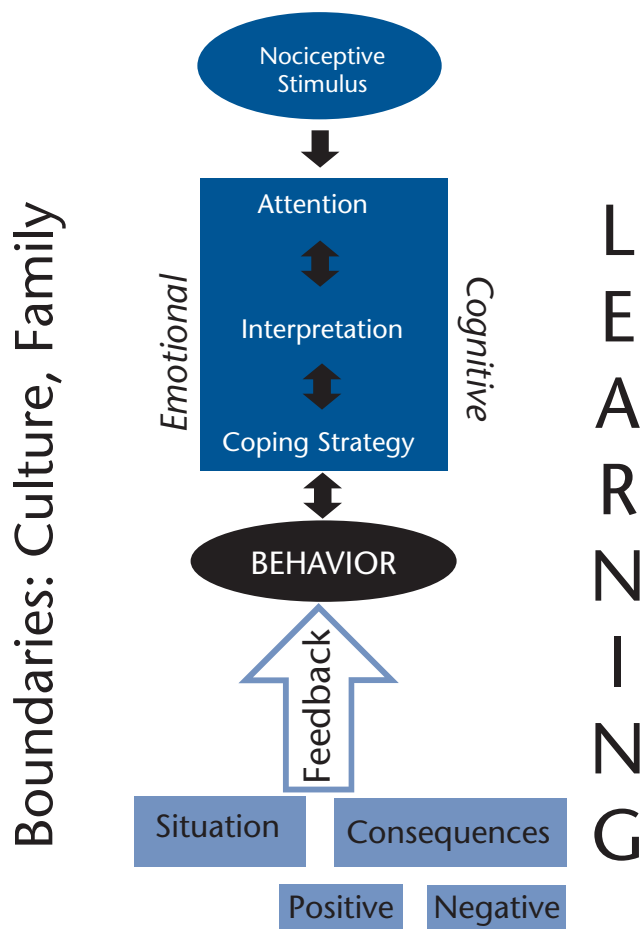


Figure 1. A modern view of pain perception from a psychological view according to Linton.⁷

There are different ways in which we might group psychological factors. In our presentation, we attempt to portray the influence of psychological factors, as illustrated in Figure 1, as a sequence of processes, starting with initial awareness of the noxious stimulus, then cognitive processing, appraisal, and interpretation that leads people to act on their pain (ie, their pain behavior).⁷ These processes are influenced by their consequences and are limited by the environment (eg, cultural and social values). Although we present this as a sequence for understanding, we are aware that this is a model, and much more work is needed to fully describe these processes. In addition to the model, Table 1 provides an overview of the main factors and

their possible consequences for the experience of pain.

Attention

An obvious prerequisite for pain perception is that our attention is directed toward the noxious stimulus. In fact, one function of pain is to demand attention.⁸ Viewed as a warning signal, pain is helpful because this attention should lead to appropriate responses in dealing with the injury. This view also underscores why it is difficult to simply ignore pain, particularly if it has alarming characteristics (eg, being very intense, sharp, or unusual).

The dilemma is that we sometimes pay attention to pain when there is little we can do to alleviate it (eg,

having chronic musculoskeletal pain), but do not attend to it when it may be a useful warning signal (eg, during an accident). Although attention is under the control of some basic brain processes, its psychological function is to motivate behavior. If pain is considered a “threat,” then the threat value of the (noxious) stimulus helps to steer awareness: the greater the threat, the more attention given. Attention to pain then may be linked to fear and anxiety and the need to take action (eg, escaping or avoiding it). *Vigilance* refers to an abnormal focus on possible signals of pain or injury⁹ that might help explain why a seemingly small injury results in intense pain. This mechanism also underscores the close link between emotional and cognitive processes and attention.^{7,10} Attentional factors are quite pertinent in the clinic because there are techniques that address them. Distraction techniques teach patients to shift their attention to stimuli other than the pain (eg, by imagining the sounds of waves hitting the shore), whereas interceptive exposure shifts attention toward the pain so that the signal will habituate.¹¹

Interpretation

Once the noxious stimulus has been attended to, cognitive processes are used to interpret what they mean. This process is highly intertwined with emotional processes, and it sets the stage for behaving.⁷ How we think about a noxious stimulus is shaped by our previous experiences, which explains why the simple directive “think about something else” often is impossible to accomplish. Indeed, the paradox is that attempting to suppress thoughts about pain actually increases the pain experience.¹² Cognitive processes are central in explaining why we sometimes may experience an insignificant stimulus, such as light pressure, as severe pain, or a serious

Table 1.
Summary of Psychological Processes

Factor	Description	Possible Effect on Pain and Disability	Example of Treatment Strategy
Attention	Pain demands our attention.	<ul style="list-style-type: none"> • Vigilance may increase pain intensity • Distraction may decrease its pain intensity 	<ul style="list-style-type: none"> • Distraction techniques • Interceptive exposure
Cognitions	How we think about our pain may influence it.	<ul style="list-style-type: none"> • Interpretations and beliefs may increase pain and disability • Catastrophizing may increase pain • Negative thoughts and beliefs may increase pain and disability • Expectations may influence pain and disability • Cognitive sets may reduce flexibility in dealing with pain and disability 	<ul style="list-style-type: none"> • Cognitive restructuring • Behavioral experiments designed, for example, to disconfirm unrealistic expectations and catastrophizing
Emotions and emotion regulation	Pain often generates negative feelings. These negative feelings may influence the pain as well as fuel cognitions, attention, and overt behaviors.	<ul style="list-style-type: none"> • Fear may increase avoidance behavior and disability • Anxiety may increase pain disability • Depression may increase pain disability • Distress, in general, fuels negative cognitions and pain disability • Positive emotions might decrease pain 	<ul style="list-style-type: none"> • Cognitive-behavioral therapy programs for anxiety and depression • Activation (to increase positive emotion) • Relaxation • Positive psychology techniques that promote well-being and positive emotions
Overt behavior	What we do to cope with our pain influences our perception.	<ul style="list-style-type: none"> • Avoidance behavior may increase disability • Unlimited activity (overactivity) may provoke pain • Pain behaviors communicate pain 	<ul style="list-style-type: none"> • Operant, graded activity training • Exposure <i>in vivo</i> • Coping strategies training

injury as little or no pain. Several basic cognitive and emotional aspects are involved in the interpretation of pain.

Beliefs and attitudes. We all hold certain assumptions about how pain works and what it probably means to feel a given stimulus.¹³ Beliefs serve the useful purpose of aiding in rapid interpretation of stimuli, and they seem to provide a shortcut that helps our brain process the enormous amount of incoming stimuli in a more efficient manner. They provide a sort of automatic interpretation of the stimuli; thus, these stimuli do not need lengthy processing in the brain. Yet, this very propensity can lead to responses that may be detrimental. Beliefs and attitudes also are influenced by the social setting we live in so that our views about what might be causing the pain (eg, work demands) and what should be done (eg, get a radiograph) reflect a broader social representation. Several attitudes and

beliefs have been found to be related to the development of persistent pain and disability.^{14,15} For example, certain beliefs that set the stage for activity restrictions are tied to the development of long-term pain and disability. These beliefs include the idea that “hurt is harm” (ie, if it hurts, something serious must be broken), that “pain is a signal to stop what you are doing” (ie, if an activity results in pain, you should stop before you injure yourself), and that “rest is the best medicine” (ie, pain is a signal you should rest to recuperate your body).

Expectations. The ideas or perceptions we have about our pain also are mirrored in our expectations and may have considerable impact on our experience of the pain.¹⁴ Normally, we have ideas about the cause of the pain, its management, and how long it should take for recovery.^{16,17} These expectations appear to drive coping behavior, even in the seeming absence of actual feedback.

Furthermore, such expectations or health perceptions are a good predictor of outcome in a host of medical conditions.^{16,17} One significant determinant of our experience of pain is *whether our expectations are fulfilled*. We may expect, for instance, that we will fully recover from a bout of neck pain in 3 or 4 days. Epidemiology tells us that this is a very optimistic expectation, and when the expectation is not fulfilled, it may generate further negative cognitions and motivate behaviors that may not be particularly helpful.^{18,19}

Cognitive sets. In the process of making sense out of incoming signals, we use various “ways of thinking” to help provide a framework. This is a normal and helpful process, but for a variety of reasons, some patients may use cognitive patterns that misrepresent actual events or probable future events. The patient may fall into a cognitive trap where the interpretation is tantalizing and well connected with the emotional

state, but where a consistent “error” in interpreting reality is made.⁷ This pattern of interpretation is like a lens that distorts one’s view of the world and appears to function as a part of our response to stress.²⁰ An example of such a thought process is *pain catastrophizing*, which can be defined as an exaggerated, negative orientation toward pain where a relatively neutral event is irrationally made into a catastrophe.²¹ In essence, the person imagines the worst possible result that could happen, but accepts it as the given result. Catastrophic thoughts usually are stated as assumptions (eg, “If the pain does not get better, I will end up in a wheelchair” or “The pain will never stop, it will only get worse and worse”). Not surprisingly, pain catastrophizing is associated with a variety of problems that hinder recovery, making treatment more difficult and increasing the risk of developing persistent pain and disability.^{6,9,22} In short, because catastrophizing is a marker of the development of long-term problems, it may be an important target for treatment.

Emotions and their regulation.

One of the most disruptive features of pain is the emotional distress. The typical emotional reaction to pain includes anxiety, fear, anger, guilt, frustration, and depression. How these emotions are regulated by the patient has implications for their impact on pain. Indeed, emotions are powerful drivers of behavior and shape our experience of the pain via direct neural connections. Negative affect is a key reason we associate pain with suffering. Thus, pain activates negative emotions that vary from tolerable to miserable.²³ It is interesting, therefore, that clinicians often focus more on the sensory aspects of pain (eg, intensity) than on the emotional aspects. Indeed, negative affect is strongly associated with poor treatment outcome, as

well as the development of disability from LBP.^{12,24}

Anxiety and worry are prevalent emotions, as pain represents an imminent threat to our welfare.²⁵ People with persistent pain typically have significantly higher rates of anxiety disorders than do those without persistent pain.²⁵ Fear, which is characterized by an extreme reaction that prepares us for “fight or flight,” is one form of anxiety that has powerful consequences (eg, for our cognitions, attention, and behavior). Fear, however, is time limited. More common is worry, which is distinguished by frequent cognitive intrusions where the person considers “what if” possibilities²⁰ that are quite negative and aversive.²⁶ Because of this nature, worry drives behavior, attention, and cognitions.

Depressed mood is a common and powerful emotional state that affects the pain experience. *Depression* is defined as a psychological problem characterized by negative mood, hopelessness, and despair, and an average of 52% of patients with pain fulfill the criteria for depression.²⁷ Even more people have a depressed mood but do not fulfill the diagnostic criteria for major depression.²⁸ The presence of depression in a pain condition is associated with higher levels of pain intensity and is a potent risk factor for disability.^{27,29} Furthermore, people who have musculoskeletal pain and are depressed have been found to have twice the sick leave duration as those who have pain but are not depressed.^{30,31} Future risk of long-term disability also is affected negatively, as is treatment outcome.^{22,27,32} Studies have shown that high levels of pretreatment depression are associated with poor rehabilitation outcomes.^{33–35}

Coping Strategies

When a painful stimulus has been attended to and interpreted as being

a threat, strategies for dealing with this threat are activated.⁷ As illustrated in Figure 1, these strategies first may be activated cognitively and involve a host of cognitive techniques (eg, ignoring, visualizing) and overt behavioral techniques (eg, relaxation, self-statements) believed to reduce the threat of the pain. Coping strategies are learned and involve an integration of emotional, cognitive, and behavioral systems. The learning experiences help to fine-tune these strategies by providing feedback as to whether they work or not. Although some situations offer the opportunity to ponder which strategy might be best, such as a relapse or flare-up, the choice of coping strategy may occur quickly without conscious thinking in acute situations, such as an acute injury (eg, cut yourself with a knife, smashed finger with a hammer). Once the strategy is activated, it is likely that this process will be reflected in actual behavioral attempts to cope with the pain.

Pain Behavior

An important step forward in understanding the psychology of pain was taken in the 1970s when Fordyce put forth the idea that pain should be analyzed as behavior.³⁶ Pain is a private event, but it can be viewed as a set of behaviors such as taking analgesics, seeking care, or resting. Furthermore, internal events such as thoughts and emotions also are considered to be forms of behavior. Although pain is a complex experience that is difficult to understand, it basically is no more so than other psychological problems such as depression or generalized anxiety that also are conceptualized in this way. Viewing pain as a set of behaviors renders analyses using learning paradigms. Most pain behaviors are learned and are influenced by emotions and cognitions, but in particular via direct environmental consequences. Thus, one learns to cope

with pain by taking various actions or thinking in a certain way. When these behaviors result in less pain, this outcome may reinforce the action and make the behavior more likely with future pain episodes, as illustrated in Figure 1.

Learning factors help explain why persistent problems sometimes develop. First, a basic tenet is that behaviors providing short-term benefits (ie, pain relief) sometimes can be detrimental in the long run. For example, Fordyce³⁶ suggested that although resting or taking analgesics may be a good coping strategy in the acute phase, these behaviors might actually facilitate the development of long-term problems. Consequently, treatment programs for people with chronic musculoskeletal pain problems have been built on gradually changing these behaviors, such as by decreasing analgesics and increasing activity levels. A second basic tenet is that learning involves the whole organism and environment; therefore, pain behaviors may be reinforced by social and environmental consequences. Learning then can be quite important in the development of chronic disability. For example, changes in life routines necessitated by the pain (eg, can no longer do the vacuuming) might be maintained by other consequences (eg, partner gladly does it instead).

Learning paradigms provide a tremendous opportunity for helping patients change (ie, to learn skills that allow them to cope better with the pain). If part of the suffering and disability are related to learned changes, it is possible to make further changes toward a more preferable goal by utilizing the principles of learning. This is why most multidimensional rehabilitation programs use some type of learning paradigm, usually in the form of cognitive-behavioral therapy.¹² It also is why early interventions designed to pre-

vent the development of persistent disability tend to focus on changing cognitions and behavior.⁴

Taken together, these processes provide insight into how psychological factors affect the experience of pain. Nevertheless, it still may be difficult to appreciate how these processes work in reality and how we might utilize them in specific ways in the clinic. To facilitate understanding and application, various models have been put forward. In the next section, we examine pertinent theoretical models of pain that have applied psychological processes to explain how pain problems develop over time and how these models might guide clinical interventions.

Models of the Development of Persistent Pain Problems

A number of theoretical models have been proposed to explain more-specific ways in which psychological factors might have a bearing on pain and disability over time. Most researchers in pain psychology subscribe to a broad, biopsychosocial formulation, but more-specific conceptual models provide a pathway whereby psychological factors affect the transition from acute to persistent pain problems. Although there are many theoretical perspectives of pain and disability, we will present the 5 theories commonly referred to in current studies of pain psychology. Three of these models (fear-avoidance, acceptance and commitment, and misdirected problem solving) are specific to the experience of chronic pain, and 2 of these models (stress-diathesis and self-efficacy) represent broader theories of health behavior that can be applied to pain.

Table 2 provides a summary of the models and examples of the basic components, the processes

involved, and some implications for treatment. The 5 models provide ways of understanding how the specific interactions and mechanisms that exist between psychological factors are interrelated. Thus, they help us to understand the development of persistent pain and disability. Moreover, each of these models highlights different mechanisms, which may help us select the most effective ways to address psychological factors in the clinical management of LBP.

Psychological Models of Chronic Pain

Fear-avoidance model. One of the most influential models to explain psychological factors in the experience of pain has been the fear-avoidance model, which was advanced to explain how patients with an acute or subacute pain condition might transition over time to a chronic state of depression, disability, and inactivity.³⁷⁻³⁹ The essential elements of the fear-avoidance model are shown in Figure 2. A specific emotion regulation factor in the model is fear. Fear of pain develops as a result of a cognitive interpretation of pain as threatening (pain catastrophizing), and this fear affects attention processes (hypervigilance) and leads to avoidance behaviors, followed by disability, disuse, and depression. Both negative affectivity (a tendency to see the cup as “half empty” rather than “half full”) and threatening types of illness information can help to fuel catastrophic thoughts about pain. The fear-avoidance model suggests that in the absence of fear-avoidance beliefs about pain, individuals are more likely to confront pain problems head-on and become more engaged in active coping to improve daily function. This model is supported by the evidence that high levels of pain-related fear are associated with distraction from normal cognitive functions, hypervigilance of pain-related

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Table 2.

Summary of Psychological Models of Pain and Disability Highlighting the Psychological Processes Involved and Examples of Treatment Interventions

Theory	Description	Psychological Processes Featured	Mechanism	Examples of Treatment Intervention Strategies
Fear-avoidance model	A painful injury may result in catastrophizing and fear, which lead to avoidance of certain movements. This behavior, in turn, leads to more avoidance, dysfunction, depression, and ultimately more pain.	<ul style="list-style-type: none"> • Cognitive interpretation featuring catastrophizing • Emotions: fear, worry, and depression • Attention: fear keys attention on internal stimuli (hypervigilance) • Behavior: avoidance of movement 	Activity avoidance leads to physical degeneration and social isolation; vicious circle	Promote physical and social activation (eg, with graded activity)
Acceptance and commitment model	Rigid beliefs (eg, that the pain must be cured) may block the pursuit of long-term life goals. Reducing futile attempts to achieve unrealistic goals (acceptance) produces flexibility and engagement in pursuing important life goals (commitment).	<ul style="list-style-type: none"> • Cognitive: flexibility in beliefs, life goals, and commitment • Emotions: anger and frustration • Behavior: commitment, pursuing goals 	Repeated (futile) attempts to control or alleviate pain lead to frustration	Provide realistic treatment goals and encourage client participation in decision making
Misdirected problem-solving model	Normal worry about pain may tune the patient into certain ways of solving this problem (eg, medical cures). When this does not actually solve the problem (eg, with chronic pain or certain forms of musculoskeletal pain), it results in more worry and an even narrower view of the nature of the problem, making it less likely to actually solve the problem.	<ul style="list-style-type: none"> • Emotions: worry as a driving force • Attention: pain demands attention • Cognitions: beliefs about cause of pain • Behavior: attempts to solve problem 	Hypervigilance to pain symptoms contributes to rumination and failed attempts to escape pain; vicious circle	Redirect problem-solving efforts toward achievement of functional goals
Self-efficacy model	The belief that a person is capable of coping with pain is directly related to self-management; low self-efficacy, with feelings that the pain is uncontrollable cause physical and psychological dysfunction.	<ul style="list-style-type: none"> • Cognitive interpretation: beliefs concerning controllability of pain • Behavior: coping skills 	Fluctuating pain reduces perceptions of control and mastery over pain	Encourage self-care and self-management strategies, reduce dependence
Stress-diathesis model	Significant psychological stress and limited coping resources predispose a person to pain and being less prepared to deal with it. Thus, pain is more likely to result in functional difficulties and emotional distress.	<ul style="list-style-type: none"> • Emotions: stress, depression, and anxiety • Behavior: coping strategies and skills 	Protective psychosocial factors buffer the emotional impact of pain, whereas distress and emotional dysregulation predispose to pain	Improve stress management skills and social support

sensations, and unwillingness to engage in physical activities.⁴⁰ Essentially, the fear-avoidance model purports that fear of pain and of injury or reinjury sometimes is more disabling than the pain itself.⁴¹ Over

time, fear of pain results in musculoskeletal deconditioning, reduced pain tolerance, and fewer attempts to overcome functional limitations.

One practical implication of this model is that patients expressing catastrophic thoughts about pain (eg, “I can’t stand it anymore”) are at greater risk of delayed recovery.²¹ These individuals may require a

higher level of support and encouragement, as well as a very gradual exposure to increasing levels of physical activity. Graded exposure to physical activity has been considered a critical aspect of treatment in order to overcome a fear of pain.^{40,42}

Acceptance and commitment model.

One relatively new model for understanding psychological factors in chronic pain is that of acceptance and commitment. This model was borrowed from a more general psychotherapeutic approach (acceptance and commitment therapy⁴³) that has been offered as a complement to cognitive-behavioral therapy. At the heart of this model is a cognitive interpretation process, namely the concept of psychological inflexibility, or the inability to persist in or change behavior patterns that might service long-term goals or values.⁴⁴ The implication of this model for chronic pain is that individuals should reduce futile attempts to avoid or control pain and focus instead on living life to the fullest, participating in valued activities, and pursuing personally relevant goals.⁴⁵ Recent studies of patients with chronic pain have suggested that pain-related acceptance leads to less emotional distress and higher physical functioning.⁴⁶⁻⁴⁸ The clinical implication is that once LBP has persisted beyond several weeks, provider advice and treatment should communicate realistic expectations and focus more on functional adaptation and daily coping than on experimenting with new curative or palliative measures.

Misdirected problem-solving model.

As shown in Figure 3, this model suggests that emotional processes in the form of worries about pain and cognitive evaluations (eg, pain catastrophizing) are the product of a human predisposition (and probably an evolutionary advantage) to solve problems (a behavioral pro-

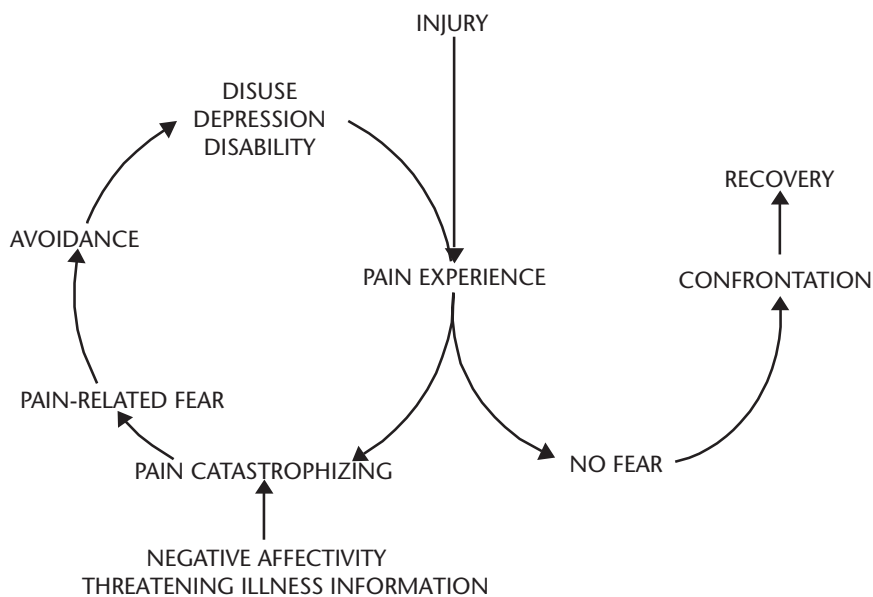


Figure 2. The fear-avoidance or pain-related fear model. Adapted from Vlaeyen and Linton.³⁹

cess) by verbally ruminating on possible negative outcomes and plotting methods of avoidance or escape.⁴⁹ Thus, worrying about pain and its

implications is part of a natural-born problem-solving strategy, but one that, at least in the case of chronic pain, can have negative long-term

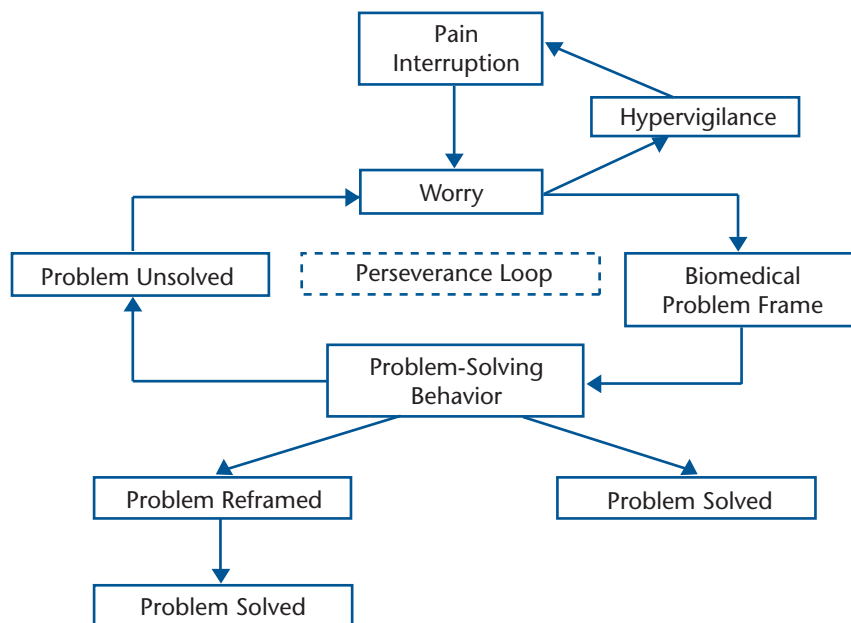


Figure 3. The misdirected problem-solving model. Adapted from: Eccleston C, Crombez G. Worry and chronic pain: a misdirected problem solving model. *Pain*. 2007;132:233-236. This figure has been reproduced with permission of the International Association for the Study of Pain (IASP). The figure may not be reproduced for any other purpose without permission.

consequences. This model explains why persistent pain repeatedly interrupts attention, fuels worries about negative consequences, produces hypervigilance to pain, and produces repeated efforts to alleviate pain, even when there is no belief that a solution exists.^{8,50,51} If pain is framed as solely a biomedical problem, problem-solving efforts inevitably will be based on strategies to remove or reduce pain. When multiple attempts to get rid of pain fail, worries are further reinforced, and patients are stuck in an endless loop of increasing worries and failed problem-solving attempts to alleviate pain. The practical implication of this model is that repeated efforts to manage LBP through pharmacological, physical, and surgical (and even psychological) treatments that are focused on pain relief may inadvertently reinforce this misdirected problem-solving strategy. Instead, a reframing of the problem toward more-functional goals and away from pain relief (or biomedical explanations of pain) may help to redirect problem-solving efforts that are more likely to be successful.⁴⁹

Psychological Models of Health and Pain

Self-efficacy model. Like people with other medical conditions, individuals with chronic or recurring LBP may need to adjust their habits and lifestyles while still trying to maintain basic physical, social, and vocational activities. This model requires that patients make efforts to understand the nature of their pain problem, plan self-care strategies for dealing with pain flare-ups, learn to overcome functional problems effectively, and utilize available supports and resources wisely. Thus, this model underscores behavioral processes (coping) as well as cognitive processes (interpretation of the problem and degree of control). A tenet of this model is that active coping promotes a sense of con-

fidence, or “self-efficacy,” for dealing with pain that is associated with improved function and well-being.^{52,53}

Self-efficacy has been defined as “the belief in one’s capabilities to organize and execute the courses of action required to produce given attainments.”^{54(p3)} It has been an important theoretical construct underlying research in arthritis and other sources of chronic pain.^{55,56} This way of thinking has contributed to the development of self-management interventions for chronic pain that focus on teaching pain coping skills, educating patients about pain, and providing social support.^{57,58} Low pain self-efficacy is characterized by a feeling that pain is uncontrollable and unmanageable, given the physical demands of daily life. In terms of clinical management of LBP, this model suggests that provider advice and treatment should be delivered in a way that takes into account individual patient preferences, involves patients in decision making, and provides useful self-management strategies for coping with pain flare-ups and functional difficulties.

Stress-diathesis model. This model suggests that when LBP befalls an individual who is already under significant psychological stress or whose coping resources are already stretched thin, pain may result in more significant functional limitations and generate higher levels of emotional distress. Thus, this model highlights the role of emotional processes focusing on stress, depression, and anxiety (distress). Although this model is probably the least formally construed, there is considerable evidence that individuals with a psychiatric history, with depressed mood, with major life adversity, or reporting high levels of stress are at greater risk of transitioning to chronic and disabling LBP.^{24,32,59,60} Although the

burden of persistent LBP obviously can contribute to emotional distress, it also is possible that pre-existing emotional distress (or perhaps the immediate emotional response to pain onset) might predispose some individuals to cope poorly with an episode of acute LBP. This model has been at the core of efforts to refocus LBP management on secondary prevention of distress and disability and away from the more-orthodox biomedical approach of uncovering physical abnormalities.⁶¹ This model also has supported the recommendation that providers interview or screen patients for possible “yellow flags” if there is no immediate resolution of LBP in the first 2 weeks after pain onset.⁶² The practical implication of this model is that more-extensive screening or history taking may be necessary to understand lifestyle, contextual, and coping factors that are important in the recovery process.

Conclusions and Implications: Guiding Principles

Psychological theories and models about pain have provided a better understanding of cognitive, emotional, and behavioral manifestations of pain, but what is their implication for the clinical management of LBP? To summarize the most significant clinical implications, we provide 10 guiding principles in Table 3 that can be synthesized from our review above of the psychological processes and models of the pain experience. Effective strategies for coping with persistent, recurrent, or chronic pain are very different from those for managing acute pain, and pain that persists beyond a few weeks can lead to emotional and behavioral consequences that are deleterious to pain recovery and functional rehabilitation.

Table 3.Ten Guiding Principles Relating Psychological Factors to the Management of Pain^a

Treatment Phase	Number	Guiding Principle	Clinical Implication
Assessment	1	Psychological factors that may affect pain outcomes are not routinely assessed by many treating clinicians.	Better methods of screening and early intervention are needed to improve feasibility and utility in usual care settings.
	2	Persistent pain naturally leads to emotional and behavioral consequences for the majority of individuals.	Psychological concepts of learning can be useful to provide empathy and support without reinforcing pain behavior.
	3	Clients who are depressed or have a history of depression may have more difficulty dealing with pain.	A brief assessment of mood symptoms should be part of routine screening and intake procedures for pain conditions.
Treatment planning	4	Persistent pain problems can lead to hypervigilance and avoidance, but simple distraction techniques are not enough to counter these behaviors.	Clinicians should avoid inadvertent messages that escape or avoidance from pain is necessary in order to preserve function.
	5	Individuals hold very different attitudes and beliefs about the origins of pain, the seriousness of pain, and how to react to pain.	Assessment and treatment planning should take into account individual differences in pain beliefs and attitudes.
	6	Personal expectations about the course of pain recovery and treatment benefits are associated with pain outcomes.	Providing realistic expectations (positive, but frank and not overly reassuring) may be a very important aspect of treatment.
	7	Catastrophic thinking about pain is an important marker for the development of long-term pain problems as well as for poor treatment outcome.	Clinicians should listen for expression of catastrophic thoughts and offer less-exaggerated beliefs as an alternative. A brief assessment might be part of routine intake procedures.
Implementation	8	Personal acceptance and commitment to self-manage pain problems are associated with better pain outcomes.	Over-attention to diagnostic details and biomedical explanations may reinforce futile searches for a cure and delay pain self-management.
	9	Psychosocial aspects of the workplace may represent barriers for returning to work while pain problems linger.	Return-to-work planning should include attention to aspects of organizational support, job stress, and workplace communication.
	10	With proper instruction and support, psychological interventions can improve pain management outcomes.	Psychological approaches can be incorporated into conventional treatment methods, but require special training and support.

^a These principles provide insight into providing a patient-centered approach, which underscores the importance of psychological responses to pain from assessment (principles 1–3), to treatment planning (principles 4–7), and to implementation (principles 8–10).

One theme that emerges from psychological theories of pain is the need for a patient-centered approach to clinical care that takes into account individual differences in lifestyle, occupational demands, social support, health habits, personal coping skills, and other contextual factors that may dramatically affect goals and expectations for treatment. Recognizing that a patient is depressed, frustrated by persisting pain, or beginning to severely limit movements and activity are reasons to adopt a more psychological or multidisciplinary approach that might offset some of the negative functional and social consequences

of a developing chronic pain problem. Among patients with persistent pain, even good problem solvers can become frustrated by repeated (futile) attempts to discover and eliminate the anatomical source of pain. Thus, once medical “red flags” have been ruled out, conducting additional diagnostic tests or searching for a specific biomechanical explanation of LBP may actually cause harm, as it can reinforce a patient’s misdirected problem-solving efforts to find a cure for pain, rather than to begin solving the functional problems associated with pain.

Another theme that emerges from psychological theories of pain is the importance of emotional responses and pain beliefs. Individuals show tremendous differences in their ability to regulate emotions as well as their attributions about pain, their judgments about the seriousness of pain, their expectations of assistance and emotional support from others, and their sense of control and mastery over pain. Three pain beliefs that have been shown to put patients at greatest risk of a poor prognosis are pain catastrophizing (an exaggerated, negative interpretation of pain), fear avoidance (a belief that all activity should be avoided to reduce

pain), and poor expectations for recovery.⁶ Assessing these patient beliefs about pain may be even more important than reaching a definitive diagnosis or explaining what set of factors actually contributed to pain onset.

Providing psychologically oriented treatment techniques or simply utilizing psychological principles involves the application of the basic processes and models presented in this article. There is a growing need to translate these ideas into useful clinical tools and interventions for widespread dissemination. Psychological interventions range from simple techniques involving communication skills to advanced methods requiring considerable training and practice under supervision. Thus, although we encourage application, we also believe that professional competency is warranted. Assessing psychological factors in patients with LBP is a critical first step, and successfully utilizing them in treatment may be a key to improving outcomes and preventing the development of chronic disability.

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