Toward the Development of a Motivational Model of Pain Self-Management

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Abstract: Adaptive management of chronic pain depends to a large degree on how patients choose to cope with pain and its impact. Consequently, patient motivation is an important factor in determining how well patients learn to manage pain. However, the role of patient motivation in altering coping behavior and maintaining those changes is seldom discussed, and theoretically based research on motivation for pain treatment is lacking. This article reviews theories that have a direct application to understanding motivational issues in pain coping and presents a preliminary motivational model of pain self-management. The implications of this model for enhancing engagement in and adherence to chronic pain treatment programs are then discussed. The article ends with a call for research to better understand motivation as it applies to chronic pain self-management. In particular, there is a need to determine whether (and which) motivation enhancement interventions increase active participation in self-management treatment programs for chronic pain.

Key words: *Pain coping, motivation, self-management.*

The only way to keep your health is
to eat what you don't want,
drink what you don't like,
and do what you'd rather not
—*Mark Twain*

A great deal of research now supports the conclusion that how well patients manage chronic pain depends more on what they do than on what is done to them; most of the "work" of chronic pain management is done by the patient. For example, in cognitive-behavioral and multidisciplinary pain treatment, patients learn and then use self-management skills to control pain and its effects on their lives.[14,49,94] Inevitably, this involves asking patients to make significant changes in their behavior. Patients are taught to remain active, to exercise regularly, and to increase activity tolerance, even when they experience short-term increases in pain. Typically, they acquire and are expected to apply multiple pain coping skills, such as activity pacing, relaxation, and cognitive restructuring. Other behavioral changes are also sometimes required. For example, those for whom excess weight contributes to pain and disability (eg, obese patients with knee osteoarthritis or low back pain) might also be asked to change long-established eating habits.

Anyone who has made an effort to change even one habit or behavior knows how difficult behavior change is. Maintaining behavior change can be even more difficult. In self-management–based pain treatment, patients are expected to make many such changes, often simultaneously. Because learning and then practicing chronic pain self-management is very challenging, the changes necessary for adaptive pain management are unlikely to occur in the absence of significant patient motivation.

However, the importance of patient motivation for making lifestyle changes and for maintaining those changes has not yet been adequately emphasized in the pain management literature. It might be assumed that patients begin treatment with adequate motivation for participating in cognitive-behavioral or multidisciplinary pain treatment, and that patients with significant pain are already motivated enough (perhaps in part by the pain they experience) to make significant behavioral changes when told by knowledgeable health care pro-

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viders that such behavior change will make them feel better. But clinicians working in these programs recognize wide individual differences in commitment to change and motivation for treatment.[30,39,41] Patients who are judged to be inadequately motivated might be denied treatment. Others might decline treatment or drop out of treatment because of their reluctance or ambivalence. Unfortunately, in the absence of knowledge concerning motivational processes and of techniques to specifically enhance motivation, many patients who might otherwise benefit from self-management programs might not have that opportunity.

The thesis of this review is that patient motivation for pain self-management should be acknowledged, understood better, and more carefully considered by pain clinicians and researchers. Moreover, we believe that patient motivation is amenable to change, and that interventions to enhance patient motivation for pain self-management can be developed and their efficacy tested. If found to be effective, these interventions can then be incorporated into pain management treatments, ultimately making these treatments more effective and applicable to a larger proportion of patients.

The review begins with a discussion of existing concepts of motivation and presents a definition of motivation that will be used for the purposes of this article. We then review theories that have a direct application for understanding motivational issues in pain coping and self-management. A preliminary model for understanding motivation for chronic pain self-management will then be presented, as will be the implications of this model for enhancing engagement in and adherence to chronic pain treatment programs. The review ends with a call for research to determine whether motivation enhancement interventions increase active participation in chronic pain treatment and, if so, to identify the most effective approaches.

What Is Motivation?

More than 20 years ago Kleinginna and Kleinginna[42] listed 98 definitions and concepts of motivation that had been used in the literature up to that time, classifying them into 9 categories (phenomenological, physiological, energizing, directional/functional, energy arousal and direction, temporal, process, broad, and all-inclusive). It is likely that many more definitions could be added to this list since it was developed. Notwithstanding the multitude of definitions, it is generally agreed that all theories of motivation seek to explain the initiation, direction, persistence, intensity, and termination of behavior.[43] For the purposes of this review we are interested in understanding the motivational factors that explain or influence the initiation, maintenance, or discontinuation of pain self-management and related coping behaviors.

Along these lines, motivation can be viewed as a process that involves all of the factors that influence behavior. As will be described, the majority of theories and models of human behavior, including the motivational model we are proposing for understanding pain self-management, view behavior change as influenced primarily by 2 factors: (1) the perceived importance of behavior change and (2) the belief that behavior change is possible (ie, self-efficacy). These 2 factors are thought to contribute to motivation, which then influences behavior.

Importantly, we view motivation (or "readiness to change," see below) as a state that is amenable to change rather than a trait that is constant. This view opens up the possibility that motivation can be enhanced to improve outcomes for patients. Also, because motivation is influenced by both patient (learning history, knowledge, skills, beliefs) and environmental (current contingencies and cues such as family members' and clinician responses to patient coping behaviors) factors, theories that explain how these factors interact to influence coping behavior might be applied to understanding motivation for coping. Finally, and perhaps most importantly for purposes of applying motivational principles to improving patient adherence to pain self-management, clinicians can have a significant influence on patients' knowledge, skills, and beliefs. Hence, motivation can be influenced by how the clinician chooses to interact with the patient.[54,62,77] A model of motivation that is consistent with the idea that clinicians can influence patient motivation should yield testable hypotheses concerning the specific clinician responses and behaviors that might increase patient motivation for adaptive coping.

Theories of Health Behavior and Behavior Change

A number of theories that have been applied to understanding health behaviors contain implicit or sometimes explicit ideas about motivation. Each of these models comes from 1 of 3 traditions or views of human behavior and behavior change. The Operant Learning Theory of chronic pain[23] has behaviorism as its foundation.[28,99] Social Cognitive Theory,[4] the Health Belief Model,[27,29] and Protection Motivation Theory[74,75] stem from cognitive theories of human behavior, in particular expectancy-value theories.[45,90] Cognitive-Behavioral Theory[50,53] represents an integration of both the operant and cognitive theories. The Transtheoretical Model,[67] Motivational Interviewing,[54] and the Patient-Centered Counseling Model[62,79] all grew out of clinical practice and attempts to identify the most effective therapeutic responses that contribute to adaptive patient behavior change. In this section we briefly review these theories and approaches and discuss their implications for understanding and predicting pain-related coping and self-management responses to pain.

Operant Learning Theory

A discussion of motivational issues related to chronic pain should begin with the pioneering work of W. E. Fordyce. More than 3 decades ago, Fordyce et al[24] proposed that pain-related behavior and coping responses such as exercise behavior, guarded movements, and use of medications are subject to the same environmental contingencies as all other behavior. Specifically, Operant

Learning Theory (OLT) argues that the frequency of occurrence of any behavior is determined by the consequences of that behavior. Behaviors followed by reinforcing events increase in frequency, and those followed by punishing events decrease in frequency. When a behavior is learned through reinforcement, it is termed an *operant*; the driving force behind operants is to elicit a reward or reinforcement. In a strict operant view, "mental" events (such as patient beliefs, attributions, or emotions), while they might occur, are irrelevant for understanding and predicting patient behavior. Merely knowing the behaviors displayed and the historical consequences to those behaviors should allow for the prediction of future behaviors. This information is also sufficient for developing an intervention that will alter that behavior.

Within OLT, reinforcing consequences can be inherent or primary (eg, food, water, reduction of pain) or conditioned (events linked to primary reinforcers, eg, money, attention, social approval). Motivation is conceptualized in terms of a deprivation-satiation continuum, with a state of relative deprivation associated with a higher reinforcement value for a given consequence. Complex schedules of reinforcement and related mechanisms[65] have been hypothesized to explain and alter maladaptive behaviors.

For persons with chronic pain, there exist many potential sources of reinforcement and punishment for pain coping behaviors. These include changes in pain (a decrease in pain is a potential negative reinforcer, and an increase in pain is a potential punisher of behavior) and responses of family or friends, responses of health care providers, or even responses of the social system (eg, reinforcers in the form of disability payments, punishers in the form of aversive responses such as ignoring or expressing anger toward the patient). According to an operant model of chronic pain, patients learn to use, and continue to use, specific coping responses not because these coping responses are maladaptive or adaptive in the long run, but because these coping responses are followed by reinforcers in the short run. Family members or health care providers might also encourage and reinforce the use of maladaptive coping responses, inadvertently contributing to the patient's long-term disability.[23,93]

Operant-based treatment strategies involve altering environmental contingencies so that "adaptive" coping behaviors, such as activity pacing and exercise, are reinforced and "maladaptive" pain behaviors, such as pain-contingent rest and guarding, are extinguished. Systematic reviews have shown that pain treatments based on OLT are effective in improving function.[58] There is also evidence that operant learning mechanisms occur outside the clinical situation, providing further support for an operant model of chronic pain.[64,78]

However, the operant model of chronic pain, or at least a strict interpretation of this model, does have its critics. For example, Turk and Flor[92] have questioned some of the underlying assumptions of this model including (1) questionable support for the construct of "pain behavior," (2) the lack of specificity of the model, (3) the potential for harm to patients if pain is operationalized only as behavior, so that felt pain might go unreported and untreated, (4) potential disagreement by some patients with the goals of OLT interventions, (5) a focus on directly observable behavior to the exclusion of a patient's subjective experience, and (6) problems associated with maintenance of treatment effects with OLT treatments. Sharp[83] has similarly characterized the operant model of chronic pain as involving "problematic concepts" and suggests that many of the studies that are cited as supporting this model are subject to alternative interpretation by using a reformulated cognitive model.

Cognitive-Behavioral Theory

Having evolved in response to widely recognized limitations of OLT,[7,51] Cognitive-Behavioral Theory addresses the range of cognitive structures (eg, expectations, beliefs, values, schemas) and ongoing cognitive processes (internal dialogue or self-statements) that are thought to drive behavior and most emotional experience. Cognitive-Behavioral Theory views behavior as a complex interaction of cognitive structures, processes, and their consequences. Thus Cognitive-Behavioral Theory is similar to Social Cognitive Theory (see below), inasmuch as individuals are seen as active information processors who filter experiential information and respond behaviorally and emotionally on the basis of these cognitions.

Turk et al[94,95] have developed a cognitive-behavioral model of chronic pain that, during the past 20 years, has become the most cogent and widely applied psychologically based approach to chronic pain. Cognitive Behavior Therapy (CBT), which is based in large part on Cognitive-Behavioral Theory, is inherently a self-management approach in which a collaborative therapeutic relationship forms the basis for modifying maladaptive cognitions that contribute to both pain and suffering. But CBT for chronic pain also integrates many other techniques that have different theoretical origins (eg, positive reinforcement, biofeedback, self-control techniques).[14] It is fair to say that most self-management programs for chronic pain are either based on CBT or have CBT as an essential component.

Although standard CBT does not explicitly address motivational issues, patient motivation is clearly a key to successful application of CBT techniques, and techniques for enhancing treatment compliance to CBT have been developed.[91] As Turk[95] has recently stated: "Patient motivation and willingness to become an active participant are critical to successful outcomes. . . Thus the therapist must assess patient motivation and when necessary help foster motivation. . . ." Development of a strong therapeutic alliance, positive reinforcement of behavior change, and provision of information to reduce defensiveness are components of CBT that can influence motivation. Although recognized as important, the issue of motivation in CBT for chronic pain has yet to be developed further.

However, in the broader field of Cognitive-Behavioral Theory and practice, there is an emerging emphasis on the role of patient resistance.[44] Resistance is a clinical construct that arose from psychoanalytic models of psychotherapy that emphasize defense mechanisms such as repression, denial, intellectualization, and projection that are thought to underlie resistance to therapy (eg, lateness for appointments, avoidance of important topics) but can be construed as lack of treatment-related motivation. Such resistance is often a result of fear, misinterpretation, or negative expectations that, once identified, can be resolved by directly addressing them. Practical strategies such as positive reinforcement for small changes, challenging distorted thoughts, use of a Socratic dialogue and role-reversal are thought to decrease resistance and hence enhance patients' motivation for treatment.[44]

These strategies have direct applicability to chronic pain treatment. For example, by noting and praising gradual increases in activity level, clinicians can help to shape patient behavior in the direction of increased activity. Challenging and facilitating changes in distorted thinking in patients with chronic pain can reduce the negative influence of "catastrophizing" cognitions (eg, "This pain is horrible and there is nothing I can do to make it better") that interfere with motivation for coping efforts. Finally, encouraging patients with chronic pain to consider their options, problem-solve solutions, and even to take on the clinician role in a role-play and "advise" a clinician playing the role of a patient can support motivation for making positive change.

Social Cognitive Theory

Social Cognitive Theory (SCT)[4] and its predecessor, Social Learning Theory,[5] hold that motivation for behavior is determined by beliefs (expectancies) and incentives (values). As such, SCT is a member of a family of expectancy-value models that emphasize the role of patient values, beliefs, and expectations for understanding behavior.[11,21,43,90,98]

According to SCT, the 2 most important beliefs that determine behavior are beliefs about the consequences of one's behavior (outcome expectancies) and beliefs about one's ability to perform specific behaviors (self-efficacy expectancies). Incentives are the values placed on the possible outcomes of action (or inaction). Like OLT, SCT argues that behavior is regulated in part by valued outcomes (reinforcers). However, according to SCT, outcomes are not reinforcing or punishing in and of themselves but only influence subsequent behavior to the extent that they alter outcome expectancies. In other words, outcomes produce a change in behavior only when the individual becomes aware of what actions are being rewarded or punished. According to SCT, it is the beliefs about the consequences of behavior that impact behavior, not the actual consequences themselves.

SCT emphasizes the role that self-efficacy beliefs, in particular, play in determining behavior, especially behavior that requires complex skills and competencies.[3,4] According to SCT, efficacy expectations can be altered by personal experience ("enactive attainment"), vicarious experience (observation), verbal persuasion, and the physiologic state of the person or organism.[3,4] Bandura[3,4] emphasized the power of personal experience for building self-efficacy beliefs because such experience provides immediate proof that a person is (or is not) capable of performing a specific behavior. Watching others successfully complete difficult tasks or being told (encouraged) that success is possible can also provide initial increases in self-efficacy beliefs, at least until the person actually performs the behavior, at which point more solid evidence concerning self-efficacy is obtained. Events that produce fear or other emotional arousal can decrease self-efficacy beliefs unless they are dealt with effectively, in which case they result in an increase in perceived self-efficacy.

Research in chronic pain supports the hypothesized association between self-efficacy and pain self-management. For example, a number of studies have identified significant concurrent associations between self-efficacy beliefs and pain coping behaviors in patients with chronic pain.[33,37,46] Self-efficacy beliefs have also been shown to predict pain coping responses up to 1 year later, even when controlling for pain severity.[82] Self-efficacy beliefs have also been shown to be associated with important outcomes in patients with chronic pain. Pain-related self-efficacy beliefs predict depression,[1,84] pain severity,[1,17,38,47,84] pain interference,[46] general disability,[1,2,17,82,85] and performance of specific physical tasks[19,33,35,70] across a wide variety of patient populations and measures. In addition, pain-related self-efficacy beliefs have predicted return to work after multidisciplinary pain treatment[72] and have been shown to mediate the relationship between exercise and stair climbing speed in a sample of patients with knee osteoarthritis.[71] In short, consistent with a SCT model of chronic pain, a great deal of research supports the potential importance of self-efficacy beliefs as playing a central role in the decisions that patients with chronic pain make concerning how they will cope with pain.

Health Belief Model

One of the most widely studied models of health behavior is the Health Belief Model (HBM).[27,29,80] There are 6 key concepts, or factors, that influence motivation according to current HBMs of health behavior: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. In brief, as the HBM would be applied to pain coping, patients would be expected to use a given coping strategy to manage pain if they (1) see themselves as having a significant pain problem (perceived susceptibility), (2) view the pain problem as having serious negative consequences (perceived severity), (3) believe that the coping strategy will reduce pain or its negative consequences (perceived benefits), (4) perceive few barriers to using the coping strategy (perceived barriers), (5) become aware of something in the environment that cues them to use the coping strategy (cues to action), and (6) believe they are capable of using the coping strategy (self-

efficacy). Like SCT, the HBM is an expectancy-value model, with perceived susceptibility, severity, benefits, and costs providing the incentive to act (value) and beliefs about one's ability to take action and perceived cues providing the person with guidance concerning how and when to respond (expectancy).

The self-efficacy belief component was not a part of early versions of the HBM. It was added to the model after Bandura[3] introduced the self-efficacy concept as being distinct from outcome expectancies and as the HBM model was expanded from the explanation of discrete and simple-to-perform health behaviors (eg, immunization, screening test) to more complex lifestyle change behaviors (eg, eating habits, problem drinking).[81,86]

Research with both concurrent correlational and prospective designs provides substantial support for the HBM as it has been applied to a large number of health-related behaviors.[8,9,29,87] However, some components of the model appear to be more powerful predictors of health behavior than others. For example, a review of the findings published before 1984 (before self-efficacy beliefs were added to the model) indicated that measures of perceived barriers, that is, the costs associated with a behavior, was the single most powerful predictor of health behavior, whereas perceived severity was the least powerful predictor.[29]

Stretcher and Rosenstock[87] reviewed HBM-related research concerning smoking behavior and acquired immune deficiency syndrome (AIDS)–protective behavior. As with research in other areas, the HBM concepts of perceived susceptibility, benefits, barriers, and self-efficacy were associated in most studies with smoking behavior and AIDS-protective behaviors. Perceived severity of AIDS has yet to be tested as a predictor of AIDS-protective behaviors. Cues to action were not examined in the smoking behavior studies reviewed and have been rarely studied in AIDS-related research. In the 2 studies in which this construct was examined, the findings were inconclusive regarding the importance of cues to action for predicting AIDS-protective behaviors.[87] No research has yet specifically tested the HBM as it might be used to understand pain coping and self-management behavior.

Protection Motivation Theory

Protection Motivation Theory (PMT) was developed to understand and predict health-related behavior in response to fear-arousing communication (eg, a health education pamphlet about the risks of smoking).[66,74,75] As currently formulated, the model identifies 2 appraisal processes that combine to form a person's level of motivation to stop using a maladaptive coping response or to begin using an adaptive coping response. The threat appraisal process consists of those cognitive processes involved with motivation concerning whether to continue engaging in a maladaptive health behavior (eg, for chronic pain, this might include resting on a pain-contingent basis). In PMT, such behaviors are hypothesized to be maintained as a function of the reinforcing consequences of the maladaptive behaviors (eg, social approval or pain relief), as well as by perceptions about the severity and likelihood of negative consequences of the behaviors. The coping appraisal process consists of cognitions that impact a decision for positive behavior change. The 3 cognitions of primary importance to such behavior change, according to PMT, are response expectancies (beliefs about the outcomes of behavior change), one's ability to engage in the coping response (self-efficacy expectancies), and perceptions concerning the costs of engaging in an adaptive behavior change.

In short, proponents of PMT would argue that protection motivation for changing from a maladaptive to an adaptive pain coping response is maximized when an individual (1) perceives few rewards associated with the maladaptive behavior, (2) believes that the maladaptive response poses a serious threat to his or her well-being (that the risks are severe and the person is vulnerable to those risks), (3) believes that an adaptive coping response will avert the threat, (4) is confident in his or her ability to use the adaptive coping response; and (5) believes that the costs associated with the adaptive coping response are small.

Research supports the potential importance of each of the individual PMT components as they relate to decreases in a variety of maladaptive health behaviors (eg, smoking, problem drinking) or increases in adaptive health behaviors (eg, having health screening tests, exercise).[22,55,66,76] However, in general, coping-appraisal variables (in particular, self-efficacy beliefs) are more strongly and consistently associated with current and subsequent health behavior than threat-appraisal variables are.[22,55] Like the HBM, PMT has yet to be tested in samples of persons with chronic pain.

The Transtheoretical Model

Prochaska and DiClemente[67] outlined a model of behavior change that seeks to integrate existing models of psychotherapy into a single model of positive change. Their transtheoretical model (TTM) incorporates the notion that behavior change involves 2 interrelated dimensions. Stage of change is based on the observation that individuals vary in the extent that they are prepared or motivated to make changes in a specifically targeted behavior. The second dimension, processes of change, focuses on activities that contribute to behavior modification by altering motivation for change.

In the most recent descriptions of the TTM, 5 stages of change are described: (1) precontemplation, referring to individuals who report a low interest in, or consideration of, changing their behavior; (2) contemplation, describing individuals who report thinking about behavior changes but are unlikely to change in the near future; (3) preparation, describing those who are actively considering attempts to change their behavior and are likely to do so in the next month; (4) action, referring to individuals currently engaged in behavior change efforts; and (5) maintenance, describing individuals engaged in maintaining their already changed health behavior.[68] Research has suggested that persons who successfully change their behavior might use different behavior

change strategies, or processes of change, to progress from one stage to the next (eg, consciousness raising, catharsis, counterconditioning).[69] This observation appears to have implications for tailoring interventions to more specifically target persons in a specific stage to promote or motivate "forward stage movement."

Kerns et al[40,41] proposed that individuals with chronic pain vary in their degree of readiness to adopt a self-management approach to their problem, and that patients' stage of change might predict both engagement in self-management therapies, such as CBT, and outcomes of these interventions. In addition to these investigators, several other groups of investigators have generally provided support for the measurement of pain stages of change and for the relevance of the model in improving our understanding of processes of engagement, adherence, and change during self-management treatments for chronic pain.[13,20,31,32,39,52]

Encouraging evidence suggests that forward stage movement (ie, decreases in scores on measures of precontemplation and increases in action and maintenance scores) might reflect increased motivation and enhanced commitment to a self-management approach and that these changes might mediate improvements in important outcomes.[25] Thus, forward stage movement might underlie and guide favorable changes in outcome variables and so might constitute a therapeutic process factor. Recent refinements in the model and its measurement suggest that readiness to adopt a self-management approach might be multidimensional in nature,[57] and that an increased commitment to the learning and application of any of several adaptive coping skills might more accurately reflect a continuum of change rather than a step-wise movement through discrete stages.[6,48,88]

Client-Centered Approaches to Motivation: Motivational Interviewing and the Patient-Centered Counseling Model

Motivational Interviewing

Motivational Interviewing (MI) is a therapeutic approach designed to help clients to address and resolve ambivalence about positive behavioral change.[54] MI is not based on a single theory or model of behavior change but rather represents a general approach to interacting with clients and a set of specific strategies that have been shown to increase motivation for positive change.

According to the MI approach, there are 3 critical components of motivation: importance, confidence, and readiness.[54] Importance is very similar to value or incentives in cognitive theories of motivation. However, in MI, importance is framed within the concept of discrepancy as it is used in self-regulation theory.[36] According to this concept, motivation to discontinue maladaptive pain coping behaviors and to engage in self-management behaviors would be increased as patients become aware of the negative consequences of maladaptive coping on their lives, and that adaptive coping (pain self-management) will help them reach valued goals. The notion of confidence in MI is similar to the concept of self-efficacy.

Whereas importance and confidence have parallel concepts in the cognitive models of motivation (SCT, HBM, and PMT), readiness appears to be a concept unique to MI. It refers to the level of motivation for behavior change relative to competing motivations. To encourage patients to change the targeted behavior specifically, the MI clinician encourages patients to keep the targeted behavior "on the radar screen" and to consider the importance of and confidence concerning the new behavior relative to other goals.[54] For example, the MI clinician might simply ask the person with pain, "How is your plan to exercise more coming along?" and "Is this still something that is important to you?"

According to MI principles, change is more likely to occur in the context of a collaborative (rather than confrontative) relationship in which importance, confidence, and readiness are elicited from the patient (rather than educated in or lectured to the patient) and in which the autonomy of the patient is maximized.[15,16] In the context of such a relationship, the MI clinician then (1) expresses empathy to establish an environment for change[73]; (2) asks questions and elicits patient statements concerning discrepancies between current maladaptive coping and personal goals, while encouraging patient statements that self-management behaviors will reduce this dissonance; (3) "rolls with resistance" by avoiding arguing with, criticizing, hurrying, or labeling the patient (all of which tend to elicit from the patient statements against change, reducing importance, confidence, and readiness[15,16]); and (4) supports self-efficacy by asking questions that will elicit statements that reflect positive self-efficacy beliefs (eg, "What do you think it will take to increase your confidence that you will be able to be more active despite pain?") and then reflecting back these statements to encourage more self-efficacy talk.[12]

A growing body of research supports the efficacy of MI strategies for changing problem behavior. A recent meta-analysis of 26 controlled studies of MI or adaptions of MI (AMI; interventions that include MI principles as the core of treatment) provided strong support for the efficacy of MI and AMI in treating problem drinking but less conclusive evidence for the treatment of smoking, drug addiction, human immunodeficiency virus risk behaviors, and psychiatric treatment adherence.[18] Of 5 clinical trials for diet, exercise, and other health behaviors, 4 showed positive effects for MI or AMI relative to the control condition.[18] However, although clinical applications of MI for enhancing motivation among persons with chronic pain have been described,[30] no study has yet directly tested the efficacy of MI-based treatments for enhancing the efficacy of chronic pain treatment.

Patient-Centered Counseling Model

The Patient-Centered Counseling Model (PCCM), developed by Ockene et al[62] and Rosal et al,[79] is a brief (5 to

10 minutes) intervention that can be used by physicians to motivate their patients to make positive health-related behavioral change. Like MI, it is based on a number of different models or theories of change and consists of a number of specific skills or practices whose objectives are to (1) increase the patient's awareness of the risks of the problem behavior, (2) increase the patient's knowledge concerning the health problem, (3) increase patient self-efficacy concerning his/her ability to change the health behavior, and (4) enhance patient skills for long-term adherence to a behavior change plan. To reach these objectives, the PCCM clinician working with a patient with chronic pain would (1) perform a thorough assessment of the patient's knowledge and concerns about pain; (2) provide specific and personalized advice to encourage pain self-management; (3) provide stage-specific information and feedback (eg, patients who are not considering pain self-management would be given information about risks about current [maladaptive] coping efforts, validation for ambivalence about making significant changes in coping, respect and support for making change, and statements that convey realistic optimism that pain self-management is possible; patients planning to make significant changes in coping would be encouraged to set specific goals and develop a plan for meeting these goals); and (4) develop, with the patient, a behavioral contract for planned changes.

A growing body of research supports the efficacy of PCCM for changing a number of important health-related behaviors, including alcohol consumption,[59] diet,[26,60] and smoking.[61,63] Because PCCM was developed specifically to help physicians provide effective motivation enhancement in the context of a busy practice, PCCM could potentially be particularly helpful and effective in this setting for helping enhance motivation for pain self-management and the use of adaptive coping strategies in the context of primary care. However, as with MI, PCCM has yet to be tested for enhancing motivation in persons with chronic pain.

Similarities and Differences Among the Models of Health Behavior and Behavior Change

The models of health behavior and behavior change briefly reviewed above differ in a number of important ways. With its emphasis on behavior and the environmental consequences of behavior, OLT provides an important explanation for the value (importance) of behavior from the perspective of the person, but this model does not include the concept of motivation as an aspect of self-regulation (as do most of the other theories). In addition, some of the theories (Cognitive-Behavioral Theory, SCT) are more general models of behavior regulation and motivation that have subsequently been applied to understanding health-related behavior, whereas others, such as the HBM and PMT, were developed specifically to explain health-related behaviors. Finally, although the approaches that come from the clinical tradition (TTM, MI, PCCM) contain theoretically driven hypotheses about the factors that lead to behavior change (usually derived from a number of other theories or models of behavior change incorporated into these approaches), they tend to focus on specific strategies and techniques that facilitate behavior change.

Despite the differences in the models, there is also a great deal of overlap among them. All of the models recognize that motivation is malleable and is influenced by the environment (eg, the clinician response). All of the models agree that the environmental consequences of patient behaviors influence motivation for future behaviors (although within strict OLT, consequences are the primary and perhaps only important factor, whereas cognitive models argue that consequences alter motivation indirectly through their effects on patient beliefs and cognitions).

As a group, the cognitive models (Cognitive-Behavioral Theory, SCT, TTM, MI, PCCM) argue that a variety of variables in addition to environmental consequences alter patient beliefs about the value of behavior change and therefore influence motivation for behavior change. In particular, these models place a premium on the patient's personal experience and feelings, personal incentives (for and against behavior change), and beliefs as factors that impact motivation. Each model describes environmental events that can change personal beliefs. SCT and Cognitive-Behavioral Theory argue that by observing other people make behavior changes, by hearing (and believing) information about the consequences of current coping behaviors or changes in coping behavior, or even through direct encouragement, patients might alter their beliefs about the outcomes of and abilities for behavior change. The clinical models of behavior change (TTM, MI, and PCCM) with their practical focus on "what works" have led to innovative interventions that might be incorporated into a model for understanding and enhancing motivation for pain self-management.

Because of the high degree of overlap among the models, as well as the fact that it is often possible to explain changes in motivation or behavior from the viewpoint of any one of the models, finding unequivocal support for one model over the others is quite difficult.[100] For example, the consistent finding of significant associations between self-efficacy beliefs and pain coping behavior is consistent with virtually all the cognitive models of motivation. It also supports the emphasis placed on enhancing self-efficacy beliefs in MI and PCCM. But such a finding can also be "explained" from a strict OLT viewpoint, if one considers the possibility that measures of self-efficacy might simply reflect people's ratings of the frequency of their previous behavior ("I know I can do this because I have done it frequently in the past"). Because, according to OLT, behavior that occurs frequently is behavior that has been reinforced, self-efficacy beliefs could be viewed as mere reflections of behavior and reinforcement history rather than primary causes of behavior. In short, it is very unlikely that any one of the models of motivation presented above will ultimately emerge as the single correct model that completely explains and

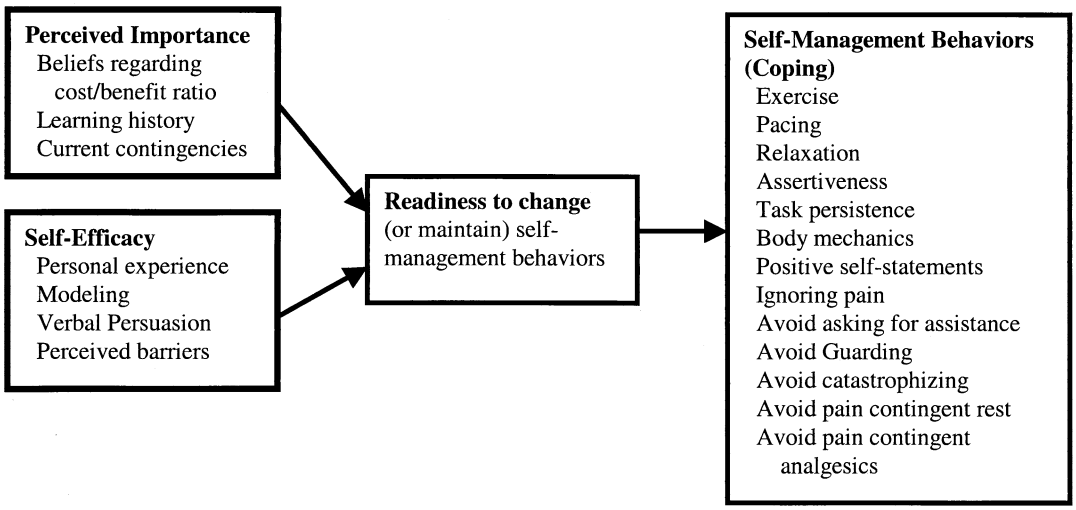

Figure 1. Preliminary Motivational Model of Pain Self-Management.

predicts motivated behavior and is universally accepted by all theoreticians and clinicians.

Toward the Development of a Model of Motivation for Pain Self-Management

Although no single model of behavior clearly stands out as the correct approach, the high degree of overlap that exists between the models might be used as a foundation for a general model of motivation for pain self-management. An initial version of such a model, the Motivational Model for Pain Self-Management is presented in Fig 1.

The primary outcome variable in this model is pain self-management coping behavior, which might be defined by a set of behaviors and cognitions that are thought to reflect adaptive pain management and avoidance of behaviors or cognitions that are thought to reflect maladaptive pain management. The specific self-management coping behaviors listed in Fig 1 were selected from our understanding of the current opinions of pain clinicians and researchers concerning the coping responses that are most closely associated with function and positive outcomes in pain treatment.[34,49,56] Although many of these coping responses might be easily recognized by the reader unfamiliar with the pain coping literature (eg, exercise, ignoring pain, avoid pain-contingent rest), others might be less familiar. Pacing refers to a strategy of maintaining a moderate level of activity, neither remaining inactive nor overdoing activities to the extent that a significant flare-up of symptoms occurs. This goal might be accomplished by taking intermittent time-contingent (as opposed to pain-contingent) rest periods while engaging in a prolonged task. Assertiveness refers to a communication strategy by which the person directly expresses what he or she thinks, feels, or wants in a way that is respectful of others. The goal with this strategy is to minimize (or manage) interpersonal stress and to increase the probability that the patient will be able to get his or her needs met. Task persistence refers to the strategy of maintaining an appropriate level of activity while experiencing pain, "pushing through" pain in order not to let pain interfere with one's plans. Body mechanics refers to the use of proper movements when lifting or carrying objects (eg, to lift moderately heavy objects with one's back straight and by using primarily leg muscles) as well as proper body positioning (eg, proper sitting posture).

We do not view the list of pain self-management behaviors presented in Fig 1 as exhaustive or even as final; they simply represent our current understanding of what constitutes appropriate pain self-management. Moreover, self-management behavior that is adaptive for one condition might be ineffective or even harmful for another condition. For example, although it might be adaptive for patients with low back pain to engage in prolonged periods of aerobic exercise, the same exercises might cause further joint damage in patients with knee or hip arthritis. As more is learned about the relative importance of specific coping behaviors and cognitions and the conditions under which these are adaptive, maladaptive, or neutral, the operational definition of pain self-management listed in Fig 1 should be modified to reflect this increased knowledge.

Central to the model presented in Fig 1 is the concept, derived from the TTM (and also a part of the MI and PCCM approaches), of readiness to change pain. This concept represents our definition of motivation. It is what can be altered (one way or another) by clinician responses, and it is what underlies patients' choices concerning which self-management behaviors to change and which to maintain. The model hypothesizes that patients will engage in specific pain self-management strategies as a function of their readiness (or motivation) to use these strategies.

Although the concept of readiness to change is viewed as a stage variable in the TTM, such that people move sequentially from one stage of readiness (eg, precontemplation) to the next (eg, contemplation) as they progress toward adaptive health behaviors, there is growing crit-

icism of the stage concept. For example, Bandura[6] pointed out that the 3 cardinal properties of a true stage theory (qualitative transformation across stages, invariant sequence of change, nonreversibility) are not met by the TTM. Concerning qualitative transformation, the stages of precontemplation and contemplation differ only with respect to relative degree of intention to change, and action and maintenance differ only with respect to the amount of time spent engaging in a new adaptive behavior; these are quantitative and not qualitative differences. Moreover, evidence does not support the conclusion that people must go through the stages of change in a specific order as hypothesized by the TTM.[48] Finally, people have been observed to move from "higher" to "lower" stages and back, sometimes within minutes.[77] Thus, although it might be useful at times to classify patients into different levels of motivation or readiness to adopt a self-management approach to pain, in the same way that clinicians need to classify patients as depressed or not depressed to make treatment decisions, we currently view motivation as a continuous as opposed to a stage variable.

In our model, readiness is influenced by 2 primary variables based on expectancy-value models of motivation: beliefs about the importance of engaging versus not engaging in pain self-management behaviors (outcome expectancies, value, importance) and beliefs about one's ability to engage in pain self-management behaviors (self-efficacy, confidence).

The factors listed in Fig 1 that influence perceived importance were drawn from one or more of the models of behavior outlined in the first section of this review. These include (1) outcome expectancies concerning the effects of pain self-management on valued outcomes (such as pain reduction, increased strength and activity tolerance, increased cognitive abilities) versus the perceived costs of pain self-management; (2) learning history; and (3) current contingencies (history and presence of reinforcers for pain self-management lead to greater value, and history and presence of punishers for pain self-management behaviors lead to less value placed on pain self-management). Again, it is important to emphasize that the elements listed under perceived importance in our model are not meant to be exhaustive but rather are examples of the variables most commonly discussed in the models of behavior and behavior change reviewed above; more factors that might impact perceived importance will likely be identified as research continues and then will be incorporated into the model. Similarly, it remains for future research to determine the relative importance of each of the individual elements of the model and the larger factor they comprise.

The importance of patient beliefs concerning the costs and benefits associated with behavior change is emphasized in Cognitive-Behavioral Theory, SCT, the HBM, PMT, MI, and PCCM. Consistent with these approaches, our model argues that patients will judge any particular pain self-management coping strategy as important when they view the potential benefits of using that strategy as being stronger than the costs associated with using that strategy. For example, for regular exercise to be seen as an important coping strategy to use, patients must believe that exercise will help them enough (eg, make them more able to tolerate activity, perhaps reduce pain in the long run) to outweigh the potential problems associated with participating in a regular exercise regimen (eg, boredom, increased pain or discomfort in the short run, fears that exercise-related pain is a sign of further physical harm or damage).

OLT emphasizes the importance of learning history (previous experience with reinforcers and punishers in response to self-management coping behaviors) and current contingencies (current reinforcers and punishers in response to self-management coping behaviors) as primary factors that influence coping behaviors. In our model these factors influence coping behaviors indirectly through their impact on the overall perceived importance of the coping response, which, with self-efficacy, influences readiness to self-manage pain. One of the important contributions of the operant model of chronic pain has been the emphasis on the consequences of behavior. These consequences, many of which might be unknown to the pain clinician unless he or she specifically assesses them, might contribute to or, alternately, sabotage efforts to help patients learn to self-manage pain.

The concept of self-efficacy is key to all of the models of behavior and behavior change introduced in the first section of this article except for OLT. As already noted, the evidence strongly supports strong associations between self-efficacy beliefs, pain coping strategy use, and important functioning variables. Several of the theories specify factors that can impact self-efficacy beliefs. Four of these factors are (1) personal experience, (2) modeling, (3) verbal persuasion, and (4) perceived barriers. Again, we do not view these 4 factors as the only variables that influence self-efficacy. Rather, they represent examples drawn from the models of behavior discussed in this article.

Bandura's SCT[3-5] represents the most thorough analysis of the importance of self-efficacy beliefs and the factors that influence self-efficacy. Bandura emphasizes 3 factors that influence self-efficacy: personal experience, modeling, and verbal persuasion. Of these 3, perhaps the most important is personal experience.[3] The more patients observe themselves engaging in a behavior, the stronger their self-efficacy beliefs will be concerning their ability to engage in that behavior. However, as Bandura[3] points out, self-efficacy beliefs can also be increased by observing others engaging in the behavior, especially if those others are perceived as being similar to oneself. But people need not view themselves or others performing behaviors to believe that they might be capable of engaging in those behaviors. Some people respond to verbal persuasion and encouragement and can therefore be convinced by others that they might be more capable than they previously thought.

The 3 variables that impact self-efficacy beliefs according to SCT are not cognitions but represent the behavior of the person or others (models, clinicians). The HBM

(and also, to some extent, CBT and MI) considers self-efficacy beliefs as important to behavior and behavior change, specifically identifying the cognitive variable of perceived barriers as a key factor that influences self-efficacy beliefs. According to the HBM, reductions in perceived barriers to pain self-management (eg, obtaining appropriate clothing to be able to walk comfortably in the rain, practicing relaxation skills that might be used instead of pain-contingent medications during pain flare-ups) can increase patients' beliefs that they will be able to change their management approach to pain.

Finally, although the model presented in Fig 1 might appear static, we view it as dynamic. Many factors, including the patient's history of using self-management behavior, clinician responses to patients, and the responses of others, influence both importance and self-efficacy. The model provides what we hope is a frame of reference for understanding patient motivation for self-management and, more importantly, for identifying ways to impact this motivation.

Treatment Implications of the Motivational Model for Pain Self-Management

On the basis of the model presented in Fig 1, clinicians should be able to act in ways that increase patient acceptance of and adherence to pain self-management treatments. Specifically, the model suggests that clinicians could increase patient perceptions of the importance of pain self-management by (1) encouraging positive outcome expectancies concerning pain self-management while also encouraging acknowledgement of the costs of not engaging in self-management strategies, (2) helping the patient identify and incorporate into his/her life positive contingencies (reinforcers) for self-management coping behaviors, and (3) providing reinforcement (eg, praise) for gradual changes in the direction of pain self-management coping responses (ie, shaping). To increase self-efficacy, the clinician could (1) encourage the patient to practice self-management strategies, (2) provide the patient with opportunities to observe other patients engaging in pain self-management strategies, (3) gently challenge distorted cognitions and provide directed active listening to encourage and support self-efficacy beliefs, and (4) address and help the patient develop a plan to address any perceived or real barriers to pain self-management.

Many of the specific strategies that might be used to achieve these aims and that are discussed below come directly from the clinical approaches (MI,[54] PCCM,[79]). This is due primarily to the fact that these approaches, in particular, were developed to impact motivation directly. However, some of these strategies (eg, helping patients alter and incorporate positive contingencies for pain self-management behaviors, provide reinforcement for gradual changes in behavior in the direction of self-management, decrease perceived barriers for pain self-management, gently challenge distorted thinking) although not specific components of these clinical approaches, are certainly consistent with an MI or PCCM approach.

Increasing Perceived Importance of Pain Self-Management

Encourage Positive Outcome Expectancies

Virtually all of the models reviewed in this article (except OLT) posit that outcome expectancies are an important determinant of motivation for change. Patients will not stop using maladaptive pain management strategies and start using adaptive self-management strategies until and unless they believe that the maladaptive strategies will result in negative outcomes and the self-management strategies will result in positive outcomes.

There are at least 2 ways that clinicians can encourage positive outcome expectancies concerning pain self-management and negative outcome expectancies concerning maladaptive coping. The first strategy, a basic strategy of MI and PCCM, involves asking questions ("I am interested in your thoughts about the effects of inactivity versus gentle exercise on your muscles") that elicit statements and discussion concerning outcome expectancies and then reflecting those statements that are consistent with positive outcome expectancies for pain self-management. By encouraging patients to express their own beliefs about the benefits of self-management, rather than lecturing patients about those benefits, the clinician provides the patient with an opportunity to hear his or her own reasons for positive change and avoids the trap of encouraging patients to argue against change.[12,15,16]

A second way to alter outcome expectancies is to encourage patients to start using self-management strategies and to monitor improvement (through graphs or regular discussion). As these strategies result in progress toward valued goals (increased activity tolerance and strength, perhaps without large increases in pain), patients will be in a position to observe, first hand, evidence that self-management strategies are beneficial. During this process, patients might also be encouraged to discuss observed benefits (by asking questions and using reflective listening) as a way to emphasize and encourage further positive outcome expectancy beliefs. Encouraging and reinforcing practice of specific self-management coping strategies in ways that lead to success (eg, starting and building slowly) are also an effective way to increase self-efficacy concerning the strategy (see below).

Because pain self-management is hard work, patients are more likely to maintain self-management efforts if they remind themselves of the reasons they are learning and practicing new skills. One of the primary reasons for learning and practicing self-management strategies, of course, is that pain can have a negative impact on a patient's life; it often interferes with one's ability to sleep, ability to participate in valued activities, and overall mood. Encouraging discussion and review of the negative impact of pain on function, while also encouraging discussion of the benefits of self-management, can help

to increase patient awareness of the importance of using adaptive coping strategies.

Reduce Negative Outcome Expectancies

Negative outcome expectations might also influence perceived importance. For example, an individual with back pain who experiences an increase in pain with exercise and also believes that this increase indicates tissue damage is unlikely to be motivated (ie, evidence low readiness to change) to engage in or maintain an exercise program. However, motivation to adopt or continue other pain self-management behaviors (eg, pacing, relaxation, positive self-statements) might be unaffected by such beliefs. It is likely that negative outcome expectations associated with a given self-management behavior will carry over to other self-management behaviors to the extent that the individual views them as similar or related. Thus, reduction of negative outcome expectations related to a given self-management behavior can be expected to reduce negative outcome expectations associated with other, similar self-management behaviors. For example, a person with longstanding back pain who associates ignoring pain with task persistence and also decreases his or her expectation that ignoring the pain will worsen the pain problem might incidentally decrease his or her expectation that task persistence is harmful. In the context of the larger model, this would increase the perceived importance of both of these coping behaviors and therefore increase readiness to try these adaptive coping strategies.

Identify and Incorporate Contingencies

One of the real strengths of the operant model of chronic pain is its acknowledgement of the powerful effect that contingencies have on behavior. By definition, according to this model, maladaptive strategies (eg, pain-contingent rest, pain-contingent analgesic use, guarding) that are being used regularly are coping strategies that are being reinforced. Perhaps they are maladaptive concerning pain and its impact, but they might also be adaptive for eliciting (potentially) powerful reinforcers.[89] If, at the same time, pain self-management behaviors are intrinsically punished (eg, if exercise and activity are consistently followed by increases in pain experience, if family members discourage pain self-management practices, or if regular use of pain self-management practices interfere with other valued activities), then maintaining pain self-management behaviors during or after treatment might be particularly challenging. Proponents of operant treatment programs have long argued for the need to incorporate changes in response contingencies to help build and maintain gains after treatment.[23] Specifically, it might be necessary to meet with family members to teach OLT principles and encourage them to provide regular reinforcers (encouragement, offers of massage) and avoid providing punishers in response to patient self-management behaviors. Similarly, patients who reward themselves for pain self-management practices (eg, allow for specific rest and relaxation periods after exercise, incorporate pleasurable activities into exercise programs such as performing exercise routines with others or while listening to enjoyable music, praising oneself for meeting self-management goals) will be more likely to maintain self-management practices than those who do not incorporate these incentives into their self-management program.

Reinforce Self-Management Coping Behaviors

The clinician should also be vigilant to observe changes in the patient's behavior in the direction of self-management and should provide reinforcement (in the form of praise and attention) for closer and closer approximations of self-management coping responses. Similarly, clinicians can collaborate with the patient in the development of a plan for change that specifically sets small, easily achievable goals that lead to adaptive self-management.[96,97] By developing a series of such goals, clinicians are given multiple opportunities to praise and reinforce patient progress, providing yet another incentive for adaptive change.

Increasing Self-Efficacy for Pain Self-Management

Encourage the Patient to Practice Self-Management Strategies

Bandura[3] pointed out that the most effective way to increase self-efficacy for performing a behavior is through experience. Clinicians can therefore help patients increase their self-efficacy beliefs concerning pain self-management by encouraging patients to practice specific self-management strategies. As already discussed, to maximize the chances for success, it would probably be best to suggest that changes be made in small steps and to praise each step toward the self-management goal. For example, a common component of operant pain treatment is the quota-based exercise regimen.[23] In this approach, patients are first asked to perform the number of repetitions (or time) of an exercise that they can comfortably perform "until pain, weakness, or fatigue" makes them want to stop. Once the level of exercise that the patient can perform comfortably is known, a quota system is established in which patients are asked to gradually increase the repetitions (or time spent engaging in the exercise) over time. Provided that the rate of increase is gradual enough, each increase, while perhaps being viewed as challenging, is usually also viewed as achievable by the patient. As repetitions increase, patients' own views of their capabilities (self-efficacy) increase as well. Asking patients to monitor, graph, and discuss their increased capacities is another way to help patients alter their view of themselves as disabled.[23]

A similar approach to treat fear of movement in persons with chronic pain has been described by Vlaeyen et al.[96,97] This approach encourages patients to select movements that produce increasing levels of fear (from no fear to extreme fear) and then asks them to perform

each movement in a hierarchical fashion, starting with the movements that produce no fear. This is another effective method for building confidence and self-efficacy beliefs.

Provide Patient With Opportunities to Observe Other Patients Engaging in Pain Self-Management Strategies

Although direct experience can be a very powerful way to increase self-efficacy beliefs, observing similar others learn and practice pain self-management strategies can also be an effective way to encourage and build self-efficacy beliefs. When possible, therefore, it is wise to consider providing pain treatment in group settings.

Gently Challenge Distorted Cognitions and Provide Directed Active Listing to Encourage and Support Self-Efficacy Beliefs

A core strategy of MI and PPCM is to listen to patients in a directed way. In both of these clinical approaches, the clinician asks open-ended questions and listens reflectively to encourage discussion about the change topic. The clinician listens specifically for "change talk," that is, patient statements that reflect positive outcome expectancies, readiness to change, and positive self-efficacy beliefs. Through reflection, the clinician encourages continued change talk statements. In this way, positive statements, including self-efficacy statements, are reinforced. These statements are hypothesized to contribute toward changes in beliefs that support positive change.[12]

Patient verbalizations that reflect resistance should not be confronted directly. Such confrontation will likely result in the patient arguing against change, effectively reducing their motivation for change.[15,16,54] A more productive approach would be to challenge resistance gently by encouraging patients to discuss the inaccuracy of any expressed distorted thinking: "You said you feel as if things are never going to change. But there are probably things you can do that will lead you to become weaker and more prone to flare-ups, and also things you can do that will make you stronger and more flexible. What might you do to become weaker? What might you do to become stronger?"

Problem-Solving Regarding Perceived Barriers

The HBM, in particular, encourages clinicians to address and reduce perceived barriers as a way to enhance motivation for change. Elicitation of perceived barriers for pain coping skills acquisition and practice (eg, potential distractions during attempts to practice relaxation skills) and engagement in discussion that leads to identification of strategies for overcoming the barriers (eg, unplugging the phone, engaging family members in a plan for practice) can be useful in encouraging skill practice. The clinician and patient should also take appropriate steps to simplify any changes needed (eg, reduce the duration or amount of behavioral change required, plan for change to occur gradually).[10] To the extent that the patient can successfully identify potential barriers and be helped in the development of a specific and personalized plan for overcoming these barriers, self-efficacy expectations, in particular, might be enhanced.

Research Recommendations and Conclusion

In this article we briefly reviewed a number of relevant theories and models of behavior and behavior change and then integrated aspects of these models into a single model of motivation for pain self-management. We hypothesize that by incorporating these ideas into current pain treatment and practice, clinicians will effectively encourage more patients to engage in treatment, adhere to treatment recommendations, and maintain treatment gains after treatment. However, although there is a great deal of evidence supporting the efficacy of at least some of these strategies for increasing adaptive behavior change in some settings[18,59,60,61] and some preliminary guidelines concerning how motivational strategies might be applied to chronic pain management,[30] to our knowledge, the efficacy of such strategies for chronic pain populations has not yet been empirically examined. Therefore, the proposed model should be considered preliminary and tentative rather than comprehensive and well established. Although it pulls together important aspects of current theory and research into what we hope will be a useful conceptual framework, it is very much a starting point.

A necessary next step is to determine whether (and by how much) motivational strategies actually enhance engagement and participation in treatment. A straightforward test of this question would be to randomly assign some patients to participate in a treatment program designed to provide a motivational enhancement intervention including, perhaps, some of the components listed above, and other patients to a control intervention that includes general (ie, not focused on importance or self-efficacy beliefs) discussion and information about pain self-management. To the extent that patients in the first condition report greater interest in pain self-management, display more willingness to participate in pain self-management training, and use a greater number of pain self-management strategies over time than patients in the second condition, support would be obtained for the model and for the potential usefulness of motivational interventions for enhancing treatment engagement and adherence.

If motivational interventions are found to be effective, then subsequent research could determine the components of the motivational enhancement intervention that contributed the greatest to positive outcomes, as well as identify other motivational enhancement components that might prove more helpful. For example, research could help determine the relative importance of patient-clinician rapport for enhancing the efficacy of verbal persuasion strategies.[73] This hypothesis could be examined through correlational research that tests for associations between patient ratings of the quality of their relationship with their treatment/health care pro-

vider and measures of engagement and participation in treatment, as well as in experimental tests examining the impact of clinician training (eg, teaching reflective listening skills) on treatment engagement and participation. The opportunity to observe other patients' use of adaptive pain coping skills (ie, modeling)[4] could similarly be correlated with short- and long-term treatment outcome, as could the causal impact of teaching and encouraging contingency management.[23] In this way, both correlational and experimental research could identify those factors most closely linked to measures of importance and self-efficacy for pain self-management, the extent to which these measures predict readiness to self-manage pain, and ultimately how well changes in measures of readiness to self-manage pain predict changes in self-management coping behavior. Such research would help identify the components of the model that are, and are not, supported.

The ability of our proposed model to unite existing concepts into a motivational model of pain self-management also remains to be determined. It would appear from other research that perceived importance and self-efficacy influence an intermediary factor, readiness to change. This factor, in turn, is hypothesized to predict engagement in self-management behaviors. This model could be formally tested by using structural equation modeling techniques, with each of the components of the model defined as latent factors. The relationships of each component and the hypothesized direction of causation can also be evaluated. One interesting question would be whether readiness to change is best understood as a general motivational state or a set of motivational states more specifically tied to related coping behaviors. Research is needed to determine whether there is incremental value in assessing specific motivations (eg, readiness to exercise, readiness to pace activities, readiness to avoid guarding) as opposed to simply assessing general readiness to self-manage pain. The findings from research testing the components of the model, as well as the model as a whole, have the potential to provide important empirical guidelines for clinicians about how to alter patient motivation for pain self-management effectively and, therefore, potentially to enhance treatment success.

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