Fear-Avoidance Model of Chronic Pain
The Next Generation

Geert Crombez, PhD, Christopher Eccleston, PhD,† Stefaan Van Damme, PhD,* Johan W.S. Vlaeyen, PhD,‡§ and Paul Karoly, PhD‖*

Objective: The fear-avoidance (FA) model of chronic pain describes how individuals experiencing acute pain may become trapped into a vicious circle of chronic disability and suffering. We propose to extend the FA model by adopting a motivational perspective on chronic pain and disability.

Methods: A narrative review.

Results: There is ample evidence to support the validity of the FA model as originally formulated. There are, however, some key challenges that call for a next generation of the FA model. First, the FA model has its roots in psychopathology, and investigators will have to find a way to account for findings that do not easily fit within such framework. Second, the FA model needs to address the dynamics and complexities of disability and functional recovery. Third, the FA model should incorporate the idea that pain-related fear and avoidance occurs in a context of multiple and often competing personal goals.

Discussion: To address these 3 key challenges, we argue that the next generation of the FA model needs to more explicitly adopt a motivational perspective, one that is built around the organizing powers of goals and self-regulatory processes. Using this framework, the FA model is recast as capturing the persistent but futile attempts to solve pain-related problems to protect and restore life goals.

Key Words: pain, fear, anxiety, motivation, avoidance, goals, self-regulation

(*Clin J Pain* 2012;28:475–483)

Acute intermittent pains, including headache, stomach ache, and musculoskeletal pain, are common somatic symptoms. Fortunately, most of these pains resolve quickly and daily activities are easily resumed. Yet, for a minority of people, pain persists and initiates a pattern of interference with daily life activities. Biomedical approaches to chronic pain often ignore psychosocial factors and focus on presumed structural or biomedical abnormalities. However, such approaches have proven insufficient to understand and remediate the myriad lifestyle problems that patients experience.[1] Fortunately, a biopsychosocial perspective is emerging that views the origins of pain and suffering as complex and multifactorial.[2–4] This perspective takes into consideration not only biomedical variables but also psychological (such as behavior, emotions, and beliefs) and social variables (such as cultural norms and values, social network support, socioeconomic status). An important scientific and clinical endeavour is to identify those variables that account for the initiation, exacerbation, and waning, and maintenance of pain and suffering.

One model framed within a biopsychosocial perspective is the fear-avoidance (FA) model that describes a trajectory followed by those individuals experiencing acute pain, who may subsequently become trapped into a vicious circle of chronic disability and suffering. In what follows we describe the FA model and the current status of research inspired by this model. Next, we critically appraise the model and identify some key challenges. Finally, we propose an enhanced FA model that takes account of the motivational context of pain and disability.

FA MODEL OF CHRONIC PAIN

The FA model builds on the work of many, all of whom recognized the importance of the beliefs patients hold about their pain and their role in promoting disabling fear and avoidance.[5–9] For example, Malec et al[10] crystallized some of these patient beliefs into what they termed "myths about pain." Most of these myths relate to the erroneous beliefs that pain is, first, an unambiguous signal of tissue damage that inevitably leads to disability, and second that pain-related suffering can only be treated medically. According to Philips[8] fear and avoidance result in a behavioral pattern that is not in synchrony with the underlying biomedical pathology, and that leads to an exaggerated perception of pain. Kori et al[11] stressed the phobic nature of fear of pain and avoidance. According to these investigators, patients suffer from 'kinesiophobia,' an irrational and debilitating fear of (re)injury and movement.

The most influential model in this context is the FA model of chronic back pain as originally formulated by Vlaeyen et al,[12] which has been adapted and updated.[13,14] The model takes as its starting point the experience of a pain episode, but leaves unanswered the origins of this initial episode. In doing so, the model avoids the devastating pitfall of "psychologising" pain. Whenever biomedical antecedents cannot be identified, it is a common scientific error to leap to quasipsychological explanations.[15] In the FA model, pain initiates a set of cognitive, emotional, and behavioral responses that may or may not exacerbate pain and disability.

Received for publication August 18, 2011; accepted September 17, 2011.

From the *Department of Experimental-Clinical and Health Psychology, Ghent University, Gent; ‡Research Group on Health Psychology, Department of Psychology, University of Leuven, Leuven, Belgium; †Centre for Pain Research, University of Bath, Bath, UK; §Department of Clinical Psychological Science, Maastricht University, Maastricht, The Netherlands; and ‖Arizona State University, Tempe, AZ.

Supported in part by Grant BOF/GOA2006/001 of Ghent University (G.C.), FWO project G.017807 (G.C.) and a FWO-Odysseus Grant (J.W.S.V.). The authors declare no conflict of interest.

Reprints: Geert Crombez, PhD, Department of Experimental-Clinical and Health Psychology, Ghent University, Henri Dunantlaan 2, B-9000 Gent, Belgium (e-mail: Geert.Crombez@UGent.be).

At the core of the FA model is how patients interpret pain. If the pain is interpreted as nonthreatening (eg, pain is considered a temporary nuisance), patients typically will resume physical activities and daily life, often after a period of diminished activity. They will then test and correct pain expectations, keeping them in line with their actual experiences.[16,17] Another response to pain is one in which pain is misinterpreted as a catastrophe. That is, pain is erroneously interpreted as a sign of serious injury or pathology over which one has little or no control. It is proposed that such catastrophic misinterpretation of pain typically leads to an excessive fear of pain and injury that gradually extends to a fear of physical movements such that people will avoid those physical activities that are presumed to worsen their problem. In all likelihood, because avoidance limits one's opportunity to attune expectations to actual experiences, patients will tend to overestimate their future pain and its possible negative consequences. Although not explicitly stated in the original model, it became clear early on that attentional processes were playing an equally important role. In particular, the idea that patients scan their bodies for putative signals of pain or injury has become popular.[18,19] The automatic selection of pain or pain-related information at the expense of other information in the environment is introduced in the model as "hypervigilance."

Both avoidance and hypervigilance seem to make sense in the short-term. Indeed, both may direct the individual to protect the body from further injury and to provide it with time to heal. However, although such benefits may occur in the short term, persistent avoidance and hypervigilance are dysfunctional, and in the long-term lead to more pain, disability, and suffering. As patients are less inclined to pursue their daily activities and be physically active, the risk increases that they will deteriorate both physically and mentally, making them more vulnerable to further pain and suffering. Avoidance behavior quickly leads to an inability or unwillingness to pursue valued activities, a reduction of positive experiences, and eventually to social isolation, all of which provide fertile ground for affective distress. Avoidance may substantially decrease the level of physical activity. It is assumed that the low levels of physical activity that are related to avoidance may lead to physical deconditioning, or worse, to a "disuse syndrome" that in turn may lower the threshold at which pain is experienced.[20] Thus, both depressive mood and physical deconditioning are hypothesized to further exacerbate pain and disability.

CURRENT STATE OF EVIDENCE

When originally formulated, the FA model was largely hypothetical, a model that provided guidance to drive empirical study and development. This preliminary status has changed radically over the last decade. The FA model has achieved a level of popularity unprecedented for psychological models in pain, perhaps because of its simplicity, conceptual clarity, and clinical relevance. The model enables specific hypotheses to be operationalized and empirically validated. It has inspired a number of ingeniously designed experiments (eg, 21, 22), prospective studies that enable scrutiny of sequential relationships between variables over time (eg, 23, 24), and clinical studies of therapeutic interventions aimed at populations deemed to be highly fear avoidant (eg, 25, 26). It is a process model with a natural flow from diagnostic information to interventions (such as reassurance, psychoeducation, and exposure therapy). Furthermore, it is easily adopted as a working model by different disciplines and for multidisciplinary practice because it incorporates both physical and psychological processes. Relatedly, the FA model has also been judged as credible by patients, because it offers explanations that resonate with personal experience, and avoids punitive concepts such as somatization, secondary gain, and psychogenic pain.[27,28]

There is now ample evidence to support the validity of the FA model in chronic pain populations, and several reviews have summarized the current state of evidence.[1,14,29–31] Although changes in cognitive factors (FA beliefs, catastrophizing) are not always found to be significantly associated with changes in pain intensity,[24,32] their relationship with disability has been shown repeatedly. Patients scoring high on pain-related fear tend to overpredict the intensity of pain they will experience during physical examinations.[16,17] Compared with patients low on pain-related fear, they perform poorly on physical tasks such as lifting an arm weight or engaging in trunk extension and flexion.[12,33] For low back pain patients, pain-related fear is a risk factor for the development of chronic low back pain through diminished participation in activities of daily life, for greater perceived disability, greater work loss, and more frequent sick leave and for poorer treatment performance.[14,34] Several prospective studies suggest that FA beliefs may influence the transition from acute to chronic low back pain and associated outcomes, such as disability and sick leave.[35,36]

Conversely, the FA model indicates that reducing pain-related fear may increase participation in daily life activities. Indeed, reductions in pain-related anxiety predict improvements in functioning, reduced affective distress, pain, and interference with daily activity.[3,37] One study found that reductions in FA beliefs about work and physical activity explained, together with increased perceptions of control over pain, 71% of the variance in reductions in pain-related disability.[32]

KEY CHALLENGES TO THE FA MODEL: WE ARE NOT THERE YET

The FA model was never meant to be unconditionally embraced.[38] It is open to debate, refinements, and extensions. In that spirit, several authors have expanded the model to increase its explanatory value, to propose further hypotheses and interrelationships, and to fill in gaps that were left unaddressed. To increase its explanatory value, Turk[39] introduced and integrated posttraumatic stress. Asmundson et al[40] further elaborated the model by distinguishing responses in anticipation of pain and responses to pain itself. The model also left open the question of the origins of catastrophizing about pain. Researchers have expanded the model to address this issue. In line with the literature on phobia and anxiety disorders,[41,42] catastrophizing about pain has been associated with personality dispositions such as trait anxiety and anxiety sensitivity. All these contributions have value as they help growing the FA model out of its infancy, and further our understanding of chronic pain, disability, and suffering. There remain, however, some important issues that we believe will require a further generation of research and theory development.

Before introducing these new ideas, we summarize several key challenges to the success of this development.

Key Challenge 1: Exploring Fear and Avoidance Beyond Psychopathology

A first key challenge arises from the historical roots of the FA model being in the cognitive-behavioral treatment of phobia and anxiety disorders, from which it has adopted constructs, hypotheses, and research methods. The role of catastrophizing about pain is similar to the position of catastrophizing about bodily sensations in the cognitive-behavioral model of panic disorders and hypochondriasis.[43] Inspired by models of psychopathology in anxiety disorders, researchers have focused on the role of personality differences such as trait anxiety, neuroticism, and anxiety sensitivity in the emergence of catastrophizing about pain. Research methods developed within the domain of experimental psychopathology are frequently applied when testing the FA model. The frequent use of attentional bias paradigms to test hypervigilance in patients with chronic pain exemplifies this point.[44,45] In addition, the "Tampa Scale for Kinesiophobia," the standard instrument to assess fear of (re)injury and movement, inadvertedly gave rise to the idea that the FA model is a model of phobia-based psychopathology in which patients hold "irrational and debilitating" beliefs.[11] As yet, there is no strong evidence to support such a conclusion. In fact, the following findings seem to raise doubt about this position.

First, "erroneous" beliefs about pain are common among acute and chronic pain patients, in the general population[46,47] and even among healthcare providers.[48–51] It seems that "erroneous" beliefs are normative and culturally endorsed, rather than "irrational" or idiosyncratic.

Second, the measurement of pain catastrophizing, a well-validated key player in the explanation of distress and disability among patients with chronic pain,[52] does not capture the "if-then" reasoning about alleged "catastrophes" that are common in the psychopathology.[53,54] Instead, the common approach to measurement has the item content more focused on rumination about how to be rid of pain, on feeling helpless, and unable to control pain, and on becoming attentionally focused on it. This experience is phenomenologically more similar to worrying in situations where no immediate solution is at hand.[55,56]

Third, the FA model has underplayed the role of pain intensity.[33,57] Pain is a biologically hardwired signal of bodily threat that is designed to capture attention and disrupt ongoing behavior.[58,59] In the case of chronic pain, it may be a false alarm, but unfortunately it is an alarm not easily "turned off."

In summary, FA beliefs may not be necessarily grounded in psychopathology (see also Ref. 31). Rather they seem to be normative and culturally endorsed. Instead of assuming that chronic pain is a normal situation to which patients abnormally respond (as is often the case in psychopathology), we will take as a starting point that chronic pain is an abnormal situation to which many respond in a normative, culturally dominant manner.

Key Challenge 2: Explicating the Dynamic Nature of Disability and Functional Recovery

A second key challenge concerns the fact that the FA model is an illness beliefs model and does not explicate the dynamics underlying disability and functional recovery. Illness Beliefs Models[60] explain how we perceive and make sense of bodily sensations, such as pain. Beliefs about pain influence the pain experience in a top-down manner[59] and guide our behavior in response to this experience. It is reasonable to assume that the belief that movements will cause (re)injury will direct attention toward pain and cues of (re)injury (hypervigilance) and urge actions to avoid or minimize movements that are expected to cause (re)injury (avoidance). What is missing in the FA model is how individuals try to function despite pain, or how they attempt to recover. Pain is more than a sign of bodily harm; it is an obstacle to be coped with in the daily pursuit of valued activities and goals that matter.[61–64] The FA model remains silent about this important topic.

First, it takes as a starting point the experience of pain. Research is, however, accumulating that it is not pain itself, but the extent to what pain interferes with daily life that provides patients the main motivation of to seek healthcare. In epidemiological studies, Engel et al[65] were able to show that disability was more important than pain severity in predicting analgesic use and doctor visits. In a meta-analysis, Ferreira et al[66] found that disability was the primary reason to consult healthcare providers. The extent to which pain interferes with daily life pursuits may be the key trigger of the cognitive, behavioral, and emotional responses within the FA model.[56]

Second, the FA model has mainly focused on how patients which acute pain may become trapped into a vicious circle of increasing pain and disability, but does not address how exactly a pattern of confrontation leads to "recovery." Essentially, the model suggests that a confrontational style, in which individuals with acute pain gradually resume activities despite pain, will lead to recovery. It is left unclear what is meant by recovery, and exactly what forms of "confrontation" might be adaptive.[67] In some patients, the pain may in fact resolve and patients may resume the prior pattern of their lives. However, in others recovery may imply a rescheduling of daily life, an adaptation or modification of aspirations, not the least of which will involve a search for new goals to be sought within a pain context.

In summary, the original FA model took no explicit position on disability or, the reverse, the ability to engage and pursue valued activities of daily living. This is definitely an area for further development as the extent to which pain interferes with daily life is a prime reason for seeking healthcare, and improving function despite pain should be pursued as a treatment objective in patients with chronic pain.

Key Challenge 3: Addressing Fear and Avoidance in a Context of Multiple, Competing Goals

A third key challenge concerns positioning the FA model to focus more directly on pain behavior and its underlying motivation. The significance of fear and avoidance within a broad motivational context has been largely ignored.[68] The goal of avoiding pain often emerges to crowd out other competing goals. Frequently, patients inexpertly juggle attempts to control or to avoid pain and the pursuit of normative daily tasks. Someone may typically avoid standing up for a long time, but may persevere while cooking for friends who come for dinner. A patient may have to decide between going to work and therefore running the risk of a pain exacerbation, or staying home and feeling socially isolated.

Pain and avoidance behavior should therefore be analyzed in relation to other important goals. Sometimes, the pursuit of one goal facilitates the accomplishment of another (a process termed "goal facilitation"). A commonly acknowledged case of goal facilitation is characterized by the patient who in avoiding back straining activities also avoids a stressful and unsatisfactory relationship with his/her colleagues at work. On other occasions, the pursuit of one goal may interfere or conflict with the accomplishment of another goal (a process termed "goal interference"), as in the case of white collar employees with persistent pain who reported conflict between their work and nonwork strivings.[69]

Taking a motivational perspective may offer several advantages. It expands the perspective on pain-related fear. According to the FA model, pain-related fear results from erroneous beliefs or misconceptions about pain and disability. A motivational perspective introduces the idea that pain-related fear or worry may also result from the extent to which pain directly or indirectly interferes with valued personal strivings. Furthermore, a motivational perspective calls for a dynamic analysis of avoidance and pain behavior. The 2 behavioral patterns in the FA model are often seen as habitual styles that are stable across time and across situations. From that perspective, it makes sense to label those at risk as "avoiders," and those who recover as "confronters."[18,70] However, in light of the temporal and contextual dynamics of behavior, it may well be that on some occasions avoiders become confronters and vice versa.[71,72]

In summary, the FA model has primarily focused on fear-motivated avoidance behavior. The goal to avoid pain, however, often emerges to crowd out other goals. Therefore, the FA model will have to incorporate the idea that pain-related fear and avoidance cooccur in a context of multiple and often competing goals.

Summary

Although the FA model has its strengths, several key challenges remain to be addressed. First, the FA model needs to find a way to account for findings that do not easily fit within a framework that has its roots in thinking about psychopathology. Second, the FA model needs to address the dynamics and complexities of the difficult to accomplish tasks of daily living (disability) and the processes that underlie a self-guided or therapist-guided resumption of daily tasks (functional recovery). Third, the FA model needs to incorporate the idea that the dysfunctional pattern of pain-related fear and avoidance occurs not in a motivational vacuum, but rather emerges in a context of multiple and often competing goals.

CALL FOR THE NEXT GENERATION: A MOTIVATIONAL PERSPECTIVE

Addressing the above challenges requires a reformulation and an expansion of the FA model. We introduce the idea that the FA model needs to more explicitly adopt a motivational perspective, one that is built around the organizing powers of goals and self-regulatory processes.[57,73,74] A motivational perspective on goals and self-regulation has been applied to illness behavior and psychopathology[57,75,76] and to pain management.[77–81] Moreover, the FA model has already been reformulated within a motivational perspective[56,62] such that the dysfunctional pattern previously described is recast as the persistent but futile attempt to solve pain-related problems to protect and restore life goals.

Central to any motivational account of pain behavior is the idea that pain is more than an unpleasant emotional and perceptual reaction associated with harm. It is a fundamentally disruptive experience occurring within a context of daily goal pursuit.[64,82] A painful twitch, lasting not more than a few seconds, will only temporarily interrupt ongoing activities, and except for some postural changes, may have no marked effect on goal pursuit. However, when pain does not abate, it can interfere with the efficiency and effectiveness of everyday task performance, thus becoming a profound obstacle. We may further expect that goal interruption provokes negative affect. In fact, progress toward a goal has been shown to be associated with positive feelings, whereas a movement away from a goal has been related to negative affect.[73] In line with this view, research has indicated that individuals with pain often report frequent goal frustration and goal conflicts.[69,83] These experiences are fertile ground to reappraise the situation and one's abilities to overcome the obstacle. Which type of action will be undertaken depends on both the appraisal of the obstacle and the appraisal of the interrupted goal.

Ignoring Pain and Goal Persistence

One course of action may be to ignore the pain and simply try harder to accomplish the goal (goal persistence). A temporary interruption of a goal by pain may bring about an inclination to resume action until completed. The same behavior will be attempted or, if unfeasible, alternative means to reach the goal will be sought. Often, individuals will increase their effort in the face of obstacles. Healthy volunteers performing a cognitive task while also being exposed to task-irrelevant distractors, reported applying more effort in resisting task distraction by pain than by a nonpainful stimulus.[84] Experimental research has further revealed that when individuals pursue goals they become more sensitive to information that is relevant for their goals, and tend to become less sensitive to information that is goal irrelevant.[85] We may thus expect that individuals become less sensitive to pain when pursuing valued goals.[86,87]

There is evidence that some chronic pain patients persist in their activities despite pain.[18,67] Research using a diary methodology has revealed that patients with fibromyalgia who assigned more value to their goals reported expending more daily effort to attain their goals and greater progress toward actually achieving them.[78]

Excessive task persistence despite severe pain may become dysfunctional in the long term, and may even lead to exhaustion.[67,74] Undue suppression of normal, pain-related interruption of daily activities may lead to an overuse or overload of musculoskeletal structures, thereby attenuating physical recovery. Preliminary evidence suggests that excessive task persistence might predict less successful rehabilitation (see Refs. 88, 89) and may eventually increase vulnerability for inflammatory diseases.[90] However, more systematic research on the potential effects of long-term persistence is needed. It is certainly possible that pain-resilient individuals (those who manage to pursue their life goals despite persistent pain) have found ways to balance activity and rest so as to minimize the physical toll of persistence.

FA and Misdirected Problem-Solving

In other situations, the person's focus may shift away from the pursuit of current goals toward the goal of pain relief. However, when pain relief is not easily obtained, patients will tend to ruminate and worry about the pain and its consequences. Although worry and rumination are typically considered as cognitive risk factors for anxiety and depression,[91,92] there is evidence that worry facilitates problem solving in normal situations.[93] Different means to treat pain (eg, bed rest, over-the-counter medication) will occur, depending on individual differences in general factors such as habits and skills, and in specific factors such as beliefs about the origins of pain and perceived controllability. A perceived incapability to solve the problem by themselves will stimulate some people to search for help from others (eg, medical professionals). There are many reasons why patients will not easily surrender their pursuit for pain relief, some related to the nature of motivated behavior, others related to how individuals frame the problem of pain.

When pain relief has become a salient or dominant goal, individuals will become more sensitive to information that is relevant for that goal, possibly increasing hypervigilance for pain-related information.[94] Individuals will also narrow their attention toward the problem to be solved at the cost of the pursuit of other goals.[95] Worrying and ruminating about the negative consequences about pain may also increase the discrepancy between the current situation, in which goals are blocked by pain, and the desirable end-state, in which patients continue with their lives as before.[96,97] Such a discrepancy may further increase negative effect, but may also mobilize extra effort and resources to solve the problem. This mobilization process may lead to an increase of the value of the blocked goal, and in some cases even to an idealization of their life before pain occurred.

How patients frame the problem of pain may also fuel persistence of pain relief efforts. The dysfunctional pattern of behavior that is described in the FA model can be recast within a motivational perspective as the result of a persistent search for a solution for the pain problem, a goal that is informed by a biomedical frame of reference in which pain is considered as a sign of bodily damage. Pain catastrophizing, fear of (re)injury and avoidance of potentially harmful movements can then be usefully redefined within the context of a persistent search for a solution to the problem of pain. Such problem-solving attempts may be functional in an acute stage, but can become dysfunctional when the pain problems persist. A persistent search for a solution, when no actual solution is available, may then only lead to repeated frustration and exacerbate distress and disability. We have previously labeled this pattern as "misdirected problem solving."[55,56] An intriguing question is why patients remain stuck in such a dysfunctional pattern, or why a problem-solving rigidity develops. Next, we explore some possible answers.

The belief that pain is a sign of harm and injury is the dominant understanding of pain in postindustrial societies and is not easily altered. Simply put, hurt and harm are thought to be 2 sides of the same coin, inextricably linked. Persuading someone that hurt does not mean harm is to persuade someone of something fundamentally countercultural. When left unchallenged by healthcare providers, the belief that pain has an explanatory role to play in causing harm rarely extinguishes naturally. For this reason, Linton et al[98] argued that reassurance as a therapeutic tool is undervalued and underused, but that it is also poorly understood. In this context, the cognitive-behavioral technique of activity exposure, in which patients are required to perform the physical activities or movements they fear the most, may be a useful technique, operating to disconfirm patients' misconceptions about their pain.[26,99] There are, however, other reasons that may be easily overlooked when only focusing on the tenets of the FA model, but that emerge when considering pain and disability from a motivational perspective.

Although the belief that pain is a sign of harm and injury is fundamental to the FA model, a corollary of the biomedical model is that pain inevitably leads to disability. It may well be possible that the search for a solution for pain does not critically depend on the belief that painful activities harm, but on the belief that pain has to be resolved or significantly reduced to resume daily life. Pain relief (idiosyncratically defined) is then considered as a necessary or facilitatory condition for the pursuit of other goals.[100] Empirical studies have shown that when the success of one goal facilitates the attainment of other goal(s), goal persistence is likely.[101] It may then become possible that attempts to resolve pain problems are fuelled by the value of the goals that are blocked by pain. This idea might explain why those who catastrophize about chronic pain persevere in searching for a solution for pain despite a low belief that such solution is available.[102]

Another possible reason, why "pain" problem-solving rigidity develops concerns the repeated experience of goal frustration and goal failure when pain interferes with the pursuit of valued goals. Patients are likely to develop negative anticipatory forecasts for such situations and will likely be inclined to avoid them on future occasions. Thus, the avoidance of goal failure may become an important "attractor" in the life of patients with chronic pain.[103] The active avoidance of pain-tinged goal episodes (strenuous work, going bowling with friends, or sexual activity) may well be a short-term solution to failure apprehension, but might, in the long run, lead to the formulation of an array of task avoidance goals, and enhance the likelihood that avoidance goals will come into conflict with other goals. It is hypothesized that when avoidance goals regularly override approach goals, the negative outcomes as posited by the FA model will also ensue. In line with this view are the findings of Karoly et al,[68] who reported that the experience of conflict between goals and ratings of self-efficacy were important precursors of pain-related fear in the life of individuals suffering from chronic low back pain. The varied types of compensatory goals that pain patients are prone to create have yet to be fully explored, but may represent an important new direction for motivationally inspired research. Hamilton et al,[104] for example, asked a group of patients with fibromyalgia syndrome (FMS) to rank in order of importance a set of 12 possible goals and to complete a set of adjustment measures. Overall, the goal to control symptoms was ranked as the most important. However, cluster analysis revealed 3 relatively homogeneous subtypes of fibromyalgia goals: treatment-seeking goals (ie, finding a health professional who can cure my FMS), self-sufficiency goals (ie, learning to get on with life despite FMS), and social validation goals (ie, convincing doctors and acquaintance that the FMS was a real problem). Patients ranking self-sufficiency goals at the top of their goal hierarchy reported less severe symptoms of

FMS and reported a more supportive and pleasant social environment in contrast to patients who rated social validation at the top of their hierarchy.

Acceptance and Goal Disengagement

We currently argue that the course of action that is presumed to lead to recovery according to the FA model is also best explicated within a motivational perspective. Particularly, when the pain persists and attempts to resolve the pain problem have repeatedly failed, successful rehabilitation in daily life may require an adjustment of unattainable goals.[62] Theories of self-regulation have pointed to the benefits of adjusting goals that have become unattainable in the context of aging and illness.[74,105,106] Central processes in goal adjustment are goal disengagement (the reduction of effort and commitment from unattainable goals) and goal reengagement (the identification of and commitment to alternative goals). Evidence is accumulating that the ability to adjust unattainable goals protects against the adverse effects of goal failure, and has been positively associated with quality of life.[107,108] In the context of chronic pain, goal adjustment processes might operate on 2 levels. First, when goals have become unrealistic as a result of pain, patients might need to disengage from unfruitful goal pursuit and reengage in other valuable goals less affected by pain.[62] Second, when the unsuccessful search for a solution for the pain problem chronically dominates life at the cost of other important goals, patients might need to give up the goal of pain relief.[56] This idea is particularly present in the concept of acceptance, which has been defined as halting the dominant search for a definitive cure for pain and reorientating one's attention toward positive everyday activities and other rewarding aspects of life.[109–112] An extensive body of research has demonstrated that acceptance reduces the negative effects of pain on both mental and physical well-being.[111,113] The efficacy of therapeutic approaches aimed at increasing functional ability of patients, such as activity exposure, might be further optimized by embedding them in a broad motivational approach in which the goals and values of patients are carefully assessed and taken into account.[114]

CONCLUSIONS

The FA model of chronic pain describes how individuals experiencing acute pain may become trapped into a vicious circle of chronic disability and suffering. As originally formulated, the FA model was largely hypothetical, a model that provided guidance to drive empirical study and development. Currently, there is ample evidence to support the validity of the original FA model.

There are, however, some key challenges that call for a next generation of the FA model. First, the FA model has its roots in psychopathology, and needs to find a way to account for findings that do not easily fit within such framework. Second, the FA model needs to address the dynamics and complexities of the difficulty to accomplish tasks of daily living (disability) and the processes that underlie a self-guided or therapist-guided resumption of daily tasks (functional recovery). Third, the FA model needs to address the idea that FA occurs not in a motivational vacuum, but rather emerges in a context of multiple and often competing goals.

Addressing these challenges requires, as we have argued, an understanding of fear-related cognition and avoidance in a motivational context that is centered around the organizing powers of goals and self-regulation.[57,73–80,115] Using this framework, the dysfunctional pattern that is described in the FA model is recast as the persistent but futile attempt to solve pain-related problems to protect and restore life goals. According to the FA model, this search for a solution is informed by a biomedical frame of reference in which pain is considered as a sign of bodily damage. When considering FA from a motivational perspective, other putative reasons may also come to the fore. Patients may be guided by the belief that pain inevitable leads to disability. Or, patients may become fear-avoidant because of the repeated goal failures that occur when pain interferes with the pursuit of valued goals.

A motivational analysis of FA opens new avenues that were hitherto unexplored. As yet, we have no clear picture of the content and the structure of goals that patients select and pursue in daily life. It will be important to adapt goal assessment instruments for research and clinical practice.[115,116] Furthermore, the assessment of FA beliefs should not be limited to the belief that pain is a sign of bodily harm. Preferentially, it includes a broad range of beliefs including beliefs about pain, disability, and treatment (eg,117). To validate the next generation of FA models, we call for a programmatic investigation of dysfunctional behavior in pain patients built around a motivational/self-regulatory perspective on pain and disability.

REFERENCES

1. Turk DC. The potential of treatment matching for subgroups of patients with chronic pain: lumping versus splitting. *Clin J Pain*. 2005;21:44–55.
2. Engel GL. The clinical application of the biopsychosocial model. *Am J Psychiatry*. 1980;137:535–544.
3. Turk DC, Okifuji A . Psychological factors in chronic pain: evolution and revolution. *J Consul Clin Psychol*. 2002;70:678–690.
4. Gatchel RJ, Peng YB, Peters ML, et al. The biopsychosocial approach to chronic pain: scientific advances and future directions. *Psychol Bull*. 2007;133:581–624.
5. Fordyce WE. *Behavioral Methods for Chronic Pain and Illness*. St. Louis: Mosby; 1976.
6. Lethem J, Slade PD, Troup JD, et al. Outline of a fear-avoidance model of exaggerated pain perception:I. *Behav Res Ther*. 1983;21:401–408.
7. Turk DC, Meichenbaum D, Genest M. *Pain and Behavioral Medicine A Cognitive-Behavioral Perspective*. New York: Guilford Press; 1983.
8. Philips HC. Avoidance behaviour and its role in sustaining chronic pain. *Behav Res Ther*. 1987;25:273–279.
9. Waddell G, Newton M, Henderson I, et al. A Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain*. 1993;52:157–168.
10. Malec J, Glasgow RE, Ely R, et al. Coping with pain: a self-management approach. *JSAS Catalog of Selected Documents in Psychology*. 1977;7:113.
11. Kori SH, Miller RP, Todd DD. Kinesiophobia: a new view of chronic pain behavior. *Pain Manag*. 1990;1:35–43.
12. Vlaeyen JWS, Kole-Snijders AM, Boeren RG, et al. Fear of movement/(re)injury in chronic low back pain and its relation to behavioral performance. *Pain*. 1995;62:363–372.
13. Vlaeyen JWS, Linton SJ. Fear-avoidance and its consequences in chronic musculoskeletal pain: a state of the art. *Pain*. 2000;85:317–332.

14. Leeuw M, Goossens MEJB, Linton SJ, et al. The fear-avoidance model of musculoskeletal pain: current state of scientific evidence. *Behav Med*. 2007;30:77–94.
15. Merskey H. Somatization: or another God that failed. *Pain*. 2009;145:4–5.
16. Crombez G, Eccleston C, Vlaeyen JWS, et al. Exposure to physical movements in low back pain patients: restricted effects of generalization. *Health Psychol*. 2002;21:573–578.
17. Trost Z, France CR, Thomas JS. Exposure to movement in chronic back pain: evidence of successful generalization across a reaching task. *Pain*. 2008;137:26–33.
18. Crombez G, Vervaet L, Lysens R, et al. Avoidance and confrontation of painful, back-straining movements in chronic back pain patients. *Behav Modif*. 1998;22:62–77.
19. Crombez G, Van Damme S, Eccleston C. Hypervigilance to pain: an experimental and clinical analysis. *Pain*. 2005;116: 4–7.
20. Verbunt JM, Smeets RJ, Wittink HJ. Cause or effect? Deconditioning and chronic low back pain. *Pain*. 2010;149: 428–430.
21. Trost Z, France CR, Thomas JS. Pain-related fear and avoidance of physical exertion following delayed onset muscle soreness. *Pain*. 2011;152:1540–1547.
22. Pfingsten M, Leibing E, Harter W, et al. Fear-avoidance behavior and anticipation of pain in patients with chronic low back pain: a randomized controlled study. *Pain Med*. 2001; 2:259–266.
23. Wideman TH, Adams H, Sullivan MJL. A prospective sequential analysis of the fear-avoidance model of pain. *Pain*. 2009;145:45–51.
24. Gheldof ELM, Crombez G, Van den Bussche E, et al. Pain-related fear predicts disability, but not pain severity: a path analytic approach of the fear-avoidance model. *Eur J Pain*. 2010;14:870–877.
25. de Jong JR, Vlaeyen JWS, Onghena P, et al. Fear of movement/(re)injury in chronic low back pain. Education or exposure in vivo as mediator to fear reduction? *Clin J Pain*. 2005;21:9–17.
26. Leeuw M, Goossens MEJB, Van Breukelen GJP, et al. Exposure in vivo versus operant graded activity in chronic low back patients: results of a randomized controlled trial. *Pain*. 2008;138:192–207.
27. Crombez G, Beirens K, Van Damme S, et al. The unbearable lightness of somatisation: a systematic review of the concept of somatisation in empirical studies of pain. *Pain*. 2009;145: 31–35.
28. Eccleston C, Williams AC, Rogers WS. Patients' and professionals' understandings of the causes of chronic pain: blame, responsibility and identity protection. *Soc Sci Med*. 1997;45:699–709.
29. Keefe FJ, Rumble ME, Scipio CD, et al. Psychological aspects of persistent pain: current state of the science. *J Pain*. 2004;5:195–211.
30. Pincus T, Burton AK, Vogel S, et al. A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain. *Spine*. 2002;27:E109–E120.
31. Pincus T, RJEM Smeets, Simmonds MJ, et al. The fear avoidance model disentangled: improving clinical utility of the fear avoidance model. *Clin J Pain*. 2010;26:739–746.
32. Woby SR, Watson PJ, Roach NK, et al. Are changes in fear-avoidance beliefs, catastrophizing, and appraisals of control, predictive of changes in chronic low back pain and disability? *Eur J Pain*. 2004;8:201–210.
33. Crombez G, Vlaeyen JWS, PHTG Heuts, et al. Pain-related fear is more disabling than pain itself: evidence on the role of pain-related fear in chronic back pain disability. *Pain*. 1999;80:329–339.
34. Asmundson GJG, Norton PJ, Norton GR. Beyond pain: the role of fear and avoidance in chronicity. *Clin Psychol Rev*. 1999;19:97–119.
35. Swinkels-Meewisse IE, Roelofs J, Schouten EG, et al. Fear of movement/(re)injury predicting chronic disabling low back pain: a prospective inception cohort study. *Spine*. 2006; 31:658–664.
36. Jensen JN, Karpatschof B, Labriola M, et al. Do fear-avoidance beliefs play a role on the association between low back pain and sickness absence? A prospective cohort study among female health care workers. *J Occup Environ Med*. 2010;52:85–90.
37. Wideman TH, Sullivan MJL. Differential predictors of long-term levels of pain intensity, work disability, healthcare use, and medication use in a sample of workers' compensation claimants. *Pain*. 2011;152:376–383.
38. Vlaeyen JWS, Crombez G, Linton SJ. The fear-avoidance model of pain: we are not there yet. Comment on Wideman et al (Pain 2009) and Nicholas (Pain 2009). *Pain*. 2009; 146:222–223.
39. Turk DC. A diathesis-stress model of chronic pain and disability following traumatic injury. *Pain Res Manag*. 2002;7:9–19.
40. Asmundson GJ, Norton PJ, Vlaeyen JWS. Fear-avoidance models of chronic pain: an overview. In: Asmundson GJ, Vlaeyen JWS, Crombez G, eds. *Understanding and Treating Fear of Pain*. Oxford: Oxford University Press; 2004:3–24.
41. Eysenck MW. *Anxiety: The Cognitive Perspective*. Hove: Erlbaum; 1992.
42. Reiss S, McNally RJ. The expectancy model of fear. In: Reiss S, Bootzin RR, eds. *Theoretical Issues in Behavior Therapy*. New York: Academic Press; 1985:107–121.
43. Salkovskis PM, Clark DM. Panic disorder and hypochondriasis. *Adv Behav Res Ther*. 1993;15:23–48.
44. Asmundson GJG, Kuperos JL, Norton GR. Do patients with chronic pain selectively attend to pain-related information? Preliminary evidence for the mediating role of fear. *Pain*. 1997;72:27–32.
45. Keogh E, Ellery D, Hunt C, et al. Selective attentional bias for pain-related stimuli amongst pain fearful individuals. *Pain*. 2001;91:91–100.
46. Goubert L, Crombez G, De Bourdeaudhuij I. Low back pain, disability and back pain myths in a community sample: prevalence and interrelationships. *Eur J Pain*. 2004;8:385–394.
47. Houben RM, Leeuw M, Vlaeyen JW, et al. Fear of movement/injury in the general population: factor structure and psychometric properties of an adapted version of the Tampa Scale for Kinesiophobia. *J Behav Med*. 2005;28:415–424.
48. Houben RM, Ostelo RW, Vlaeyen JW, et al. Health care providers' orientations towards common low back pain predict perceived harmfulness of physical activities and recommendations regarding return to normal activity. *Eur J Pain*. 2005;9:173–183.
49. Coudeyre E, Rannou F, Tubach F, et al. General practitioners' fear-avoidance beliefs influence their management of patients with low back pain. *Pain*. 2006;124:330–337.
50. Poiraudeau S, Rannou F, Le Henan A, et al. Outcome of subacute low back pain: influence of patients' and rheumatologists' characteristics. *Rheumatol*. 2006;45:718–723.
51. Bishop A, Foster NE, Thomas E, et al. How does the self-reported clinical management of patients with low back pain relate to the attitudes and beliefs of health care practitioners? A survey of UK general practitioners and physiotherapists. *Pain*. 2008;135:187–195.
52. Sullivan MJL, Bishop SR, Pivik J. The Pain Catastrophizing Scale: development and validation. *Psychol Assess*. 1995;7: 524–532.
53. Turner JA, Aaron LA. Pain-related catastrophizing: what is it? *Clin J Pain*. 2001;17:65–71.
54. Rode S, Salkovskis PM, Jack T. An experimental study of attention, labeling and memory in people suffering from chronic pain. *Pain*. 2001;94:193–203.
55. Aldrich S, Eccleston C, Crombez G. Worrying about chronic pain: vigilance to threat and misdirected problem solving. *Behav Res Ther*. 2000;38:457–470.
56. Eccleston C, Crombez G. Worry and chronic pain: a misdirected problem solving model. *Pain*. 2007;132:233–236.

57. Karoly P. Mechanisms of self-regulation: a systems view. *Ann Rev Psychol*. 1993;44:23–52.
58. Eccleston C, Crombez G. Pain demands attention: a cognitive-affective model of the interruptive function of pain. *Psychol Bull*. 1999;125:356–366.
59. Legrain V, Van Damme S, Eccleston C, et al. A neurocognitive model of attention to pain: behavioral and neuroimaging evidence. *Pain*. 2009;144:230–232.
60. Meyer D, Leventhal H, Gutmann M. Commonsense models of illness: the example of hypertension. *Health Psychol*. 1985;4:115–135.
61. Karoly P, Ruehlman LS. Psychosocial aspects of pain-related life task interference: an exploratory analysis in a general population sample. *Pain Med*. 2007;8:563–572.
62. Van Damme S, Crombez G, Eccleston C. Coping with pain: a motivational perspective. *Pain*. 2008;139:1–4.
63. Karsdorp PA, Vlaeyen JWS. Goals matter: both achievement and pain-avoidance goals are associated with pain severity and disability in patients with low back and upper extremity pain. *Pain*. 2011;152:1382–1390.
64. Morley S. Efficacy and effectiveness of cognitive behavior therapy for chronic pain: progress and some challenges. *Pain*. 2011;152:S99–S106.
65. Engel CC, Von Korff M, Katon WJ. Back pain in primary care: predictors of high health-care costs. *Pain*. 1996;65:197–204.
66. Ferreira ML, Machado G, Latimer J, et al. Factors defining care-seeking in low back pain: a meta-analysis of population based surveys. *Eur J Pain*. 2010;14:747.e1–747.e7.
67. Hasenbring MI, Verbunt JA. Fear-avoidance and endurance-related responses to pain: new models of behavior and their consequences for clinical practice. *Clin J Pain*. 2010;26:747–753.
68. Karoly P, Okun MA, Ruehlman LS, et al. The impact of goal cognition and pain severity on disability and depression in adults with chronic pain: an examination of direct effects and mediated effects via pain-induced fear. *Cogn Ther Res*. 2008;32:418–433.
69. Karoly P, Ruehlman LS. Motivational implications of pain: chronicity, psychological distress, and work goal construal in a national sample of adults. *Health Psychol*. 1996;383–390.
70. Hasenbring MI, Hallner D, Rusu A C. Fear-avoidance- and endurance-related responses to pain: development and validation of the Avoidance-Endurance Questionnaire (AEQ). *Eur J Pain*. 2009;13:620–628.
71. Vlaeyen JWS, Morley S. Active despite pain: the putative role of stop-rules and current mood. *Pain*. 2004;110:512–516.
72. Vlaeyen JWS, Morley S. Cognitive and behavioural factors in fibromyalgia: mood, goals, and task performance. *J Musculoskel Pain*. 2009;17:295–301.
73. Carver CS, Scheier MF. *Attention and Self-regulation: A Control Theory Approach to Human Behaviors*. New York: Springer; 1981.
74. Brandtstädter J, Renner G. Tenacious goal pursuit and flexible goal adjustment: explication and age-related analysis of assimilative and accommodative strategies of coping. *Psychol Aging*. 1990;5:58–67.
75. Karoly P. A goal systems-self-regulatory perspective on personality, psychopathology, and change. *Rev Gen Psychol*. 1999;3:264–291.
76. Maes S, Karoly P. Self-regulation assessment and intervention in physical health and illness: a review. *Appl Psychol Intern Rev*. 2005;54:267–299.
77. Affleck G, Tennen H, Urrows S, et al. Fibromyalgia and women's pursuit of personal goals: a daily process analysis. *Health Psychol*. 1998;17:40–417.
78. Affleck G, Tennen H, Zautra A, et al. Women's pursuit of personal goals in daily life with fibromyalgia: a value-expectancy analysis. *J Cons Clin Psychol*. 2001;69:587–596.
79. Jensen MP, Nielson WR, Kerns RF. Toward the development of a motivational model of pain self-management. *J Pain*. 2003;4:477–492.
80. Sauer SE, Burris J L, Carlson CR. New directions in the management of chronic pain: self-regulation theory as a model for integrative psychology practice. *Clin Psychol Rev*. 2010;30:805–814.
81. Nes LS, Roach AR, Segerstrom SC. Executive functions, self-regulation, and chronic pain: a review. *Ann Behav Med*. 2009;37:173–183.
82. Pincus T, Morley S. Cognitive-processing bias in chronic pain: a review and integration. *Psychol Bull*. 2001;127:599–617.
83. Massey EK, Garnefski N, Gebhardt WA. Goal frustration, coping and well-being in the context of adolescent headache: a self-regulation approach. *Eur J Pain*. 2009;13:977–984.
84. Crombez G, Eccleston C, Baeyens F, et al. The disruptive nature of pain: an experimental investigation. *Behav Res Ther*. 1996;34:911–918.
85. Van Damme S, Legrain V, Vogt J, et al. Keeping pain in mind: a motivational account of attention to pain. *Neurosci Biobehav Rev*. 2010;34:204–213.
86. Verhoeven K, Crombez G, Van Damme S, et al. The role of motivation in distracting attention away from pain: an experimental study. *Pain*. 2010;149:229–234.
87. Legrain V, Crombez G, Verhoeven K, et al. The role of working memory in the attentional control of pain. *Pain*. 2011;152:453–459.
88. Hasenbring M, Marienfield G, Kuhlendahl D, et al. Risk factors of chronicity in lumbar disc patients: a prospective investigation of biologic, psychologic, and social predictors of therapy outcome. *Spine*. 1994;19:2759–2765.
89. Hasenbring MI, Plaas H, Fishbein B, et al. The relationship between activity and pain in patients 6 months after lumbar disc surgery: do pain-related coping modes act as moderator variables? *Eur J Pain*. 2006;10:701–709.
90. Miller GE, Wrosch C. You've gotta know when to fold 'em. *Psychol Sci*. 2007;18:773–777.
91. Craske MG, Rapee RM, Jackel L, et al. Qualitative dimensions of worry in DSM-III-R generalized anxiety disorder subjects and non-anxious controls. *Behav Res Ther*. 1989;27:397–402.
92. Nolen-Hoeksema S. The role of rumination in depressive disorders and mixed anxiety/depression symptoms. *J Abnorm Psychol*. 2000;109:504–511.
93. Davey GCL, Tallis F. *Worrying: Perspectives on Theory, Assessment and Treatment*. Chichester: John Wiley and Sons Ltd; 1994.
94. Notebaert L, Crombez G, Vogt J, et al. Attempts to control pain prioritize attention towards signals of pain: an experimental study. *Pain*. 2011;152:1068–1073.
95. Crombez G, Eccleston C, De Vlieger P, et al. Is it better to have controlled and lost than never to have controlled at all? An experimental investigation of control over pain. *Pain*. 2008;137:631–639.
96. Kindermans HPJ, Huijnen IPJ, Goossens MEJB, et al. "Being" in pain: the role of self-discrepancies in the emotional experience and activity patterns of patients with chronic low back pain. *Pain*. 2011;152:403–409.
97. Morley S, Davies C, Barton S. Possible selves in chronic pain: self-pain enmeshment, adjustment and acceptance. *Pain*. 2005;115:84–94.
98. Linton SJ, McCracken LM, Vlaeyen JWS. Reassurance: help or hinder in the treatment of pain. *Pain*. 2008;134:5–8.
99. Vlaeyen JWS, de Jong J, Leeuw M, et al. Fear reduction in chronic pain: graded exposure in vivo with behavioral experiments. In: Asmundson GJG, Vlaeyen JWS, Crombez G, eds. *Understanding and Treating Fear of Pain*. Oxford: Oxford University Press; 2004:313–343.
100. Lauwerier E, Paemeleire K, Van Damme S, et al. Medication use in patients with migraine and medication-overuse headache: on the role of problem solving and attitudes about pain medication. *Pain*. 2011;152:1334–1339.
101. Riediger M, Freund AM. Interference and facilitation among personal goals: differential associations with subjective well-being and persistent goal pursuit. *Pers Soc Psychol Bull*. 2004;30:1511–1523.

102. De Vlieger P, Van den Bussche E, Eccleston C, et al. Finding a solution to the problem of pain: conceptual formulation and the development of the Pain Solutions Questionnaire (PaSol). *Pain*. 2006;123:285–293.
103. Morley S, Eccleston C. The object of fear in pain. In: Asmundson GJG, Vlaeyen JWS, Crombez G, eds. *Understanding and Treating Fear of Pain*. London: Oxford University Press; 2004:163–188.
104. Hamilton NA, Karoly P, Zautra AJ. Health goal cognition and adjustment in women with fibromyalgia. *J Behav Med*. 2005;28:455–466.
105. Rasmussen HN, Wrosch C, Scheier MF, et al. Self-regulation processes and health: the importance of optimism and goal adjustment. *J Personal*. 2006;74:1721–1748.
106. Heckhausen J, Wrosch C, Schulz R. A motivational theory of lifespan development. *Psychol Rev*. 2010;117:32–60.
107. Wrosch C, Scheier MF, Miller GE, et al. Adaptive self-regulation of unattainable goals: goal disengagement, goal reengagement, and subjective well-being. *Pers Soc Psychol Bull*. 2003;29:1494–1508.
108. Wrosch C, Miller GE, Scheier MF, et al. Giving up unattainable goals: benefits for health? *Person Soc Psychol Bull*. 2007;33:251–265.
109. McCracken LM, Eccleston C. Coping or acceptance: what to do about chronic pain? *Pain*. 2003;105:197–204.
110. McCracken LM, Carson JW, Eccleston C, et al. Acceptance and change in the context of chronic pain. *Pain*. 2004;109:4–7.
111. McCracken LM, Eccleston C. A prospective study of acceptance of pain and patient functioning with chronic pain. *Pain*. 2005;118:164–169.
112. Wicksell RK, Olsson GL, Hayes SC. Psychological flexibility as a mediator of improvement in Acceptance and Commitment Therapy for patients with chronic pain following whiplash. *Eur J Pain*. 2011;14:1059–1067.
113. Viane I, Crombez G, Eccleston C, et al. Acceptance of pain is an independent predictor of mental well-being in patients with chronic pain: empirical evidence and reappraisal. *Pain*. 2003;106:65–72.
114. McCracken LM, Yang S. The role of values in a contextual cognitive-behavioral approach to chronic pain. *Pain*. 2006;123:137–145.
115. Karoly P. Goal systems and self-regulation: an individual differences perspective. In: Hoyle RH, ed. *Handbook of Personality and Self-regulation*. New York: Wiley-Blackwell; 2010:218–242.
116. Little BR, Salmela-Aro K, Phillips SD. Personal Project Pursuit: Goals. *Action, and Human Flourishing*. London: Lawrence Erlbaum Associates; 2007:461p.
117. Jensen MP, Karoly P. Pain-specific beliefs, perceived symptom severity, and adjustment to chronic pain. *Clin J Pain*. 1992;8:123–130.

