

## Focus Article

# The Psychological Flexibility Model: A Basis for Integration and Progress in Psychological Approaches to Chronic Pain Management

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**Abstract:** Scientific models are like tools, and like any tool they can be evaluated according to how well they achieve the chosen goals of the task at hand. In the science of treatment development for chronic pain, we might say that a good model ought to achieve at least 3 goals: 1) integrate current knowledge, 2) organize research and treatment development activities, and 3) create progress. In the current review, we examine models underlying current cognitive behavioral approaches to chronic pain with respect to these criteria. A relatively new model is also presented as an option, and some of its features examined. This model is called the psychological flexibility model. This model fully integrates cognitive and behavioral principles and includes a process-oriented approach of treatment development. So far it appears capable of generating treatment applications that range widely with regard to conditions targeted and modes of delivery and that are increasingly supported by evidence. It has led to the generation of innovative experiential, relationship-based, and intensive treatment methods. The scientific strategy associated with this model seeks to find limitations in current models and to update them. It is assumed within this strategy that all current treatment approaches will one day appear lacking and will change.

**Perspective:** This Focus Article addresses the place of theory and models in psychological research and treatment development in chronic pain. It is argued that such models are not merely an academic issue but are highly practical. One potential model, the psychological flexibility model, is examined in further detail.

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**Key words:** Theory, psychological flexibility, cognitive behavioral therapy, acceptance and commitment therapy, chronic pain.

Chronic pain is an important, prevalent, and complex problem. It is an inherently biopsychosocial problem with an important psychological part. As such it is able to touch on every human experience and intrude on every possible human activity. It is also personal—all humans know the experience of pain, and to observe others in pain is painful for each of us. The

importance of pain as a problem, its natural complexity, its inherent psychological character, and its ability to touch us personally impose a high demand on our psychological models of pain. A proper-fitting model would need to accommodate these elements. It seems appropriate to ask periodically whether our current models are adequate for meeting the challenges of chronic pain.

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## The Role of Models and Assumptions

Theoretical models in science in general, and in psychology, are not always seen as relevant in the day-to-day delivery of treatment for chronic pain. This view is entirely understandable. After all, those involved in treatment delivery need to place a priority on learning

what to do and how to do it. Yet theoretical models can serve at least 3 highly practical purposes, if designed to do so. First, models can help to integrate research findings into a smaller number of principles or dimensions. A model that gives rise to more and more “important variables” without organizing these into a smaller number of core principles soon becomes unwieldy and impractical to follow, for treatment providers and researchers alike. Integrative models are easier to use. Second, models can include explicit philosophical assumptions and goals. These in turn provide guidance on how to look at the world, enable us to consistently follow a path of inquiry, and allow us to build incrementally a base on which to more effectively address the problem at hand. Models in which goals and assumptions are not carefully stated can lead to confusion or contradiction. Third, models can promote progress. Progress is not automatic—it must be built into the model from the start or it is less likely to happen. For example, if one’s goal in research is to prove that a particular treatment is effective, even if implicitly, this may block progress when the treatment needs to be changed. The capacity to find limits in our models and to revise them accordingly can be included as a feature of our models. Progress can take different forms, each form reflecting increasing ability to predict and influence the subject matter under study: new assessment instruments and treatment methods, more effective methods, or increasingly diverse applications. In our view, a good model should do more than achieve these once—it ought to feed these improvements continuously.

The dominant psychological approach to chronic pain today is cognitive behavioral therapy (CBT). In this review, we consider whether the models and theories underlying CBT today are optimal according to 3 criteria that summarize the typical criteria applied to evaluate theories.<sup>69</sup> We ask whether they are effectively 1) integrating current knowledge, 2) precisely organizing our research and treatment development activities, and 3) creating progress.

## The Challenge to Models in Psychology

Psychology is unique among the sciences as being the only one in which the subject matter of the science includes the behavior of the individual scientist. The challenge is that studying behavior and describing the results is itself behavior, and it can be difficult to discern whether one is doing it scientifically or not. In our day-to-day lives, we all constantly analyze, evaluate, judge, and construct “models” of why people do what they do. These typically “commonsense” explanations are compelling, but they also include biases. Psychology is often erroneously confused with common sense<sup>43</sup>; however, we know that commonsense psychology holds the capacity to mislead researchers<sup>19,40</sup> and therefore is not, by itself, an appropriate basis for treatment development. We may need to incorporate principles that are counterintuitive, and we may need to sometimes use new terms that nonspecialists do not automatically understand, all as a way to weed out unintended

hidden biases in commonsense perspectives and everyday language.

## Recent and Current Psychological Models of Chronic Pain

There is no single unifying psychological model of chronic pain—there are many.<sup>33,39,41,63</sup> During recent times, these have included the operant behavioral (OB) model, what we will call the traditional cognitive behavioral (TCB) model,<sup>a</sup> and the fear avoidance (FA) model, to name the most prominent ones. Each of these models, with varying levels of specificity, includes presumed causes and key outcomes of interest. Each attempts to provide an account of human experience and behavior and to coordinate how treatment providers and researchers look at the problem of pain, what goals are chosen, and which methods are used for achieving these. Table 1 includes a summary of some of the core features of these models.

Within the OB model of chronic pain, there is a focus on observable behavior and environmental influences on that behavior.<sup>20</sup> A key aim in the treatment approach from this model is to reduce “pain behaviors” and increase so-called well behaviors by manipulating the social situations and consequences that represent the controlling influences over these behaviors. The role of thoughts, beliefs, and emotions was not very prominent during the development of the operant approach.

In contrast to the OB model, within the TCB model there is a focus explicitly on thoughts, beliefs, emotions, and behavior. It is clear that the initial intent for the originators of CBT for chronic pain was to achieve an “integration of the clinical concerns of cognitive therapists and the technology of behavior therapy” (p 17).<sup>78</sup> At the same time, the central concept was that “affect

<sup>a</sup>Here we choose the term “traditional cognitive behavioral” for the general model underlying most of CBT research and practice. Some may say that there is no single cognitive behavioral model of this type—this is a point we address. It is clear that what is called the “cognitive behavioral perspective,” which has presented a framework for the therapy approach to chronic pain since its inception,<sup>78</sup> is regarded as a model,<sup>67</sup> and the term “cognitive behavioral model” certainly is used.<sup>34</sup> We intend TCB in this same vein. Some may say that the appropriate choice of model underlying CBT today is the biopsychosocial (BPS) model.<sup>21,79</sup> The BPS model can help integrate at a level of multidisciplinary cooperation and certainly it has great advantages over biomedical reductionism. We certainly agree that work in separate fields in the study of pain should integrate. At the same time, it seems legitimate for the psychosocial component of the BPS model to have its own theory, principles, and methods that can be different from those of biology, neurology, genetics, and others. In this sense, each of the models in focus here is designed to fit inside the BPS model, more or less. This emphasis on psychosocial models, of course, is not an attempt at psychological reductionism. A point made here is that good models ought to integrate across different fields of study into the same topic, a quality that is called the “depth” of the model.

**Table 1. Summary of Models Within CBT for Chronic Pain**

| MODEL & REFERENCE TO KEY ACCOUNT               | CORE ORGANIZING CONCEPTS  | KEY OUTCOMES (DEPENDENT VARIABLES)  | PRIMARY TREATMENT PROCESS OR TARGETED VARIABLES (INDEPENDENT VARIABLES)  | CHARACTERISTIC TREATMENT METHODS   | CRITERIA FOR GOOD MODEL*  |  |  |
|--|---|---|--|--|---|--|--|
|  |   |   |  |  | INTEGRATE   | ORGANIZE   | PROGRESS   |
| Operant behavioral <sup>19</sup>               | Operant (behavior is controlled by external situations based on past consequences)  | Behavior (including "pain behavior" and "well behavior")  | Environmental contingencies (reinforcement, avoidance-related learning, extinction)  | Manipulating external environmental influences, graded activation, medication tapering   | Does not deal with emotion and cognition  | Outcomes clear, independent variables clear, scientific assumptions can be inferred                                      | Few if any new methods generated recently  |
| Traditional cognitive behavioral <sup>73</sup> | Information processing (feelings and actions are based on how the world is construed), patient-as-active-coper  | Pain, disability, daily physical and social functioning, mood, symptoms of distress, individual goals | Negative automatic thoughts (catastrophizing), dysfunctional beliefs, attention, distressed feelings, avoidance patterns, learning-based processes, self-efficacy, coping styles | Psychoeducation, cognitive therapy (cognitive restructuring), relaxation, attention management, graded activation, goal setting, pacing, problem solving, communication skills, collaborative empiricism | Too many variables, such as types of thoughts and moods without a way to organize into fewer dimensions   | Outcomes very diverse, independent variables very diverse, scientific assumptions not usually stated and probably varied | Has produced many studies and evidence-based treatments, few new methods recently, few discarded methods   |
| Fear avoidance <sup>77</sup>                   | Fear-avoidance cycle  | Disability, mood, daily physical and social functioning   | Fear, catastrophizing, hypervigilance, avoidance   | Graded in vivo exposure, behavioral experiments (testing thoughts or interpretations)  | Too focused on one pathway of interpretation, fear and avoidance, not clear on recovery processes, not clear on motivation  | Outcomes and independent variables clear, scientific assumptions not clear   | Has led to many studies and renewed interest in exposure, has not yet moved beyond exposure as a treatment method  |
| Psychological flexibility <sup>27</sup>        | Act in context (behavior is viewed functionally and holistically as acts of the whole individual interacting with and in a context of experiences inside and outside the "mind" and skin) | Behavior (including daily physical, social, and general values- or goals-based functioning)           | Psychological flexibility (including acceptance, cognitive defusion, self-as-observer, present-focused attention, values, committed action)                                      | Exposure-based methods, experience-based methods, metaphor, any traditional behavior therapy methods, a specified therapeutic stance   | Includes key processes that reduce varied feelings, thoughts, and behavior into functional dimensions, equally pathology and therapy focused, includes "motivational" processes | Outcome variables clear, independent variables clear and specific, scientific assumptions and principles clearly stated  | Has generated an explicit "process-focus" in treatment, expansion of methods within CBT, and diverse formats of delivery, progress over time unclear as not yet tested |

\*The section on criteria for a good model represents a review of the ability of each model to organize and integrate current knowledge ("Integrate"), guide and organize researchers and treatment developers ("Organize"), and create progress particularly in new methods and applications ("Progress").

and behavior are largely determined by the ways in which the individual construes the world" (p 4).<sup>78</sup> Despite the intent at integration, however, psychological treatments continue to be divided today depending on whether they are predominantly cognitive or behavioral in focus.<sup>17,95</sup>

The FA model can be considered a more specifically focused cognitive behavioral model.<sup>83</sup> In this model, for some people, catastrophizing about pain-related movements leads to pain-related fear and hypervigilance, and these lead to avoidance, disability, and depression, in a continuing cycle. Not surprisingly, as the FA model sits within the cognitive behavioral tradition, the treatment approaches emerging from it have focused primarily on reducing fearful thoughts and feelings as mediators of avoidance and disability. As a recent review of the model clarifies, "at the core of the FA model is how patients interpret pain" (p 476),<sup>12</sup> and changing these interpretations is the key process of change within this approach.

## Current Psychological Models of Chronic Pain Under a Microscope

At the start of this review, we proposed that a useful psychological model of chronic pain ought to be able to meet 3 criteria. Such a model ought to integrate current findings, precisely guide research and treatment development, and create progress. The final 3 columns of Table 1 represent our analysis of each of the models discussed here examined in relation to our 3 criteria for a good model.

As a model, OB is clear and specific. Behavior change is the outcome of interest, manipulation of the environment is the method, and operant reinforcement a key process. However, it is not able to integrate very well, particularly as it does not deal successfully with thoughts and feelings. Although the operant model has remained alive within CBT to some extent, it probably has not by itself inspired recent treatment developments.<sup>22</sup>

The TCB model is rather broad, intending to encompass cognitive, emotional, behavioral, and social aspects of human functioning. It certainly is inclusive. It is probably not truly integrative, however, as it is too diverse. In some ways, the TCB model is less a model than a framework for interrelated models that share some features,<sup>63</sup> with thoughts and beliefs in a central role in determining feelings and actions, and a primary focus on changing the form, content, or frequency of thoughts and beliefs.<sup>3,78</sup> At the same time, these models include many different ways to approach the same problem. Although this may at first look like strength, it is also a weakness.

The TCB model is diverse in both permissible independent variables and dependent variables of interest. Nearly any behavior pattern, emotional experience, social situation, or thought seems a permissible treatment target within it. Likewise, outcomes of interest are often defined very broadly, sometimes including

symptoms or feelings, such as pain or mood; sometimes including directly measured behavior patterns, such as physical or social activities; and sometimes including loose abstract constructs that are a mix of elements, such as depression or disability.<sup>23,64</sup> A model that is too inclusive or too loose becomes difficult to follow when it comes time to apply it. Treatment for chronic pain, the case in point, becomes an aggregation of many methods, each attempting to address a separate feature included in the model. Approaches to treatment that include diverse methods and are not focused on a few core therapy processes may not be the best means for creating progress in the field.<sup>17,95</sup>

The FA model, in contrast to the TCB model, appears specific, includes measurable variables that sit in defined relations to each other, and leads to directly testable principles.<sup>83</sup> The model has led to specific approaches to treatment.<sup>1</sup> However, it was never intended to describe all cases of chronic pain and disability. Its focus on the unique pathway of catastrophizing and fear seems unlikely to yield general processes of disability or therapy that are broad enough to cover all of varied problems of chronic pain.<sup>84</sup> Hence, although it is integrative, it only integrates within a narrow range of potential problems, and it does not easily incorporate other possible routes to disability. In many ways, the FA model best meets the proposed criteria for a successful model, but even so its success is incomplete. Needs for revising this model have already been noted, and we will return to these.<sup>12</sup>

By way of evaluating current models, it seems none have been fully adequate so far, if measured according to their ability to integrate current findings or guide research and treatment development. Whether they support progress is a slightly more difficult criterion to evaluate as it requires looking at developments accrued over time. One way to consider this is to determine the rate at which new methods have been added, and old ones discarded, under the guidance of each of these models. It seems that existing models within the broadly cognitive behavioral tradition have not done this very well, so far. In fact, methods today look considerably the same as those described 30 years ago.<sup>41,78</sup> CBT as a broad approach has had considerable success; however, there have been few new treatment methods designed recently within the current models described here.

## The Psychological Flexibility Model

A model that may offer integration, effective guidance for research and treatment development, and fuel progress is the psychological flexibility (PF) model. The term *psychological flexibility* may have first appeared in 2004 in a book called *Mindfulness and Acceptance: Expanding the Cognitive Behavioral Tradition*.<sup>27</sup> It probably first appeared in an article on chronic pain in 2006<sup>48</sup> but has appeared consistently since that time,<sup>57,58,86</sup> and its principles have been investigated in studies of pain for more than 15 years, even before this term was applied.<sup>46,59,60</sup> As

with the other models being discussed here, its core features are included in Table 1.

PF can be defined as the capacity to persist or to change behavior in a way that 1) includes conscious and open contact with thoughts and feelings, 2) appreciates what the situation affords, and 3) serves one's goals and values.<sup>28,30</sup> These qualities are sometimes described as reflected in behavior that is "open, aware, and active."<sup>31</sup> In this model, 2 important sets of influences interact in how behavior is coordinated. One of these is direct experience, including our sensory experience of the world, what we see, hear, smell, taste, and feel directly. The other set of influences is based in verbal, language-based, or cognitive processes, such as rules, instructions, appraisals, expectations, judgments, stories, and products of mental analysis. Hence, this model fully integrates cognitive and environmental influence as the core process of both healthy and problem behavior.

The PF model is based on an experimental analysis of language and thought, including the notion that these verbal activities and the context in which they occur can exert control or influence over other behavior. In this model, verbally based influences, which can have great advantages in some circumstances, can create great disadvantages in others. This results in part from the normal human capacity to constantly create verbal constructions of the world "in the mind," to fail to notice that these constructions are in fact not the world itself, and then to engage in behavior insulated from the world by these constructions. When insulated from direct experience of the world, as an effect of these mental or cognitive processes, behavior is insensitive and narrow in range, and cannot persist or change as required to act according to what the world outside of these processes offers.

Compelling cognitive content, such as "This pain is terrible," "My life is hopeless," or "I am a complete failure," can have an overwhelming effect in experience, such that only behavior that follows or obeys what this content says, can occur. According to the PF model, the degree of this effect exists on a continuum and is determined by the context around the content. With thoughts, we can contact situations as if they are actually present even though we have never experienced them directly. If you want to build a skyscraper or visit the moon, the mind is a great tool, but if you want, for example, to feel happy all of the time, to face uncertainty without anxiety, lose something dear to you and not feel sad, or stop feeling intractable pain, it is an unreliable tool.

The PF model includes 6 interrelated processes (see Fig 1). These are called acceptance, cognitive defusion, flexible present-focused attention, self-as-observer, values, and committed action.<sup>29,30</sup> Briefly, acceptance is the ability to open up to unwanted experiences and not struggle with them when to do this serves one's goals. Cognitive defusion is the ability to experience a distinction between thoughts and the things they describe, and to contact experiences directly without being dominated by the meaning and influences carried in thoughts. Flexible present-focused attention

is also called moment-to-moment awareness and is like the capacity cultivated in mindfulness meditation. Self-as-observer is one way to describe the ability to experience a perspective where we are neither defined by nor harmed by our own thoughts and feelings. Values are desires or qualities that can be reflected in behavior that we define as important, are freely chosen, are ongoing, and feed into goals. Committed action is the ability to persist with a course of action guided by goals, in a way that can incorporate difficulties and keep going. These processes are described only briefly here but they are more extensively defined in numerous other sources.<sup>27-31,42,47,77</sup>

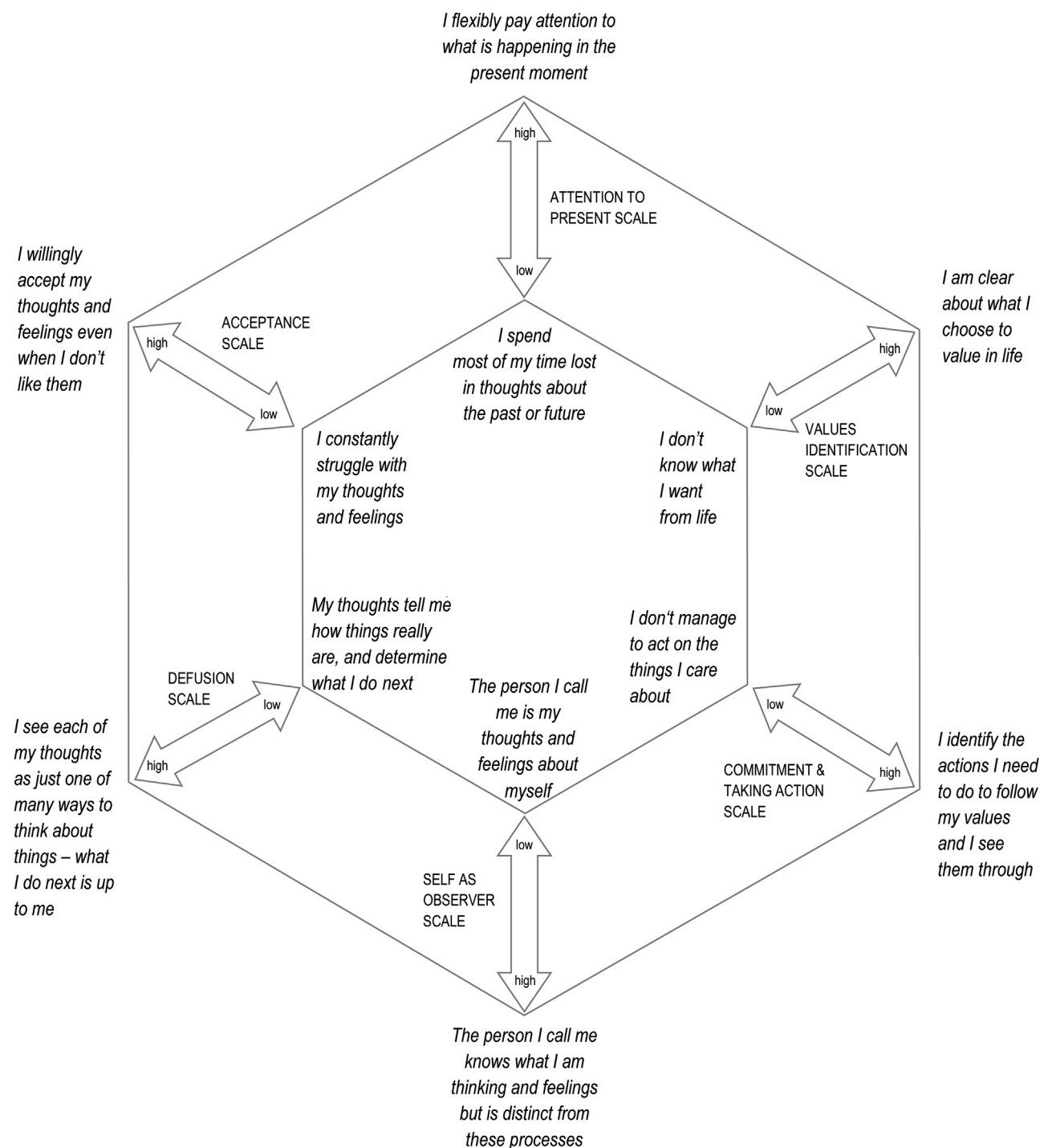
The PF model as a whole is currently not well known within the field of chronic pain. Some of its 6 constituent processes, however, are gaining prominence, especially acceptance<sup>4,10,11,18,26,57,59,70,85,88,98</sup> and values-based action.<sup>55,57,60,68,85</sup> Even the least well-recognized processes of PF now have some empirical support, including present-focused awareness,<sup>51</sup> cognitive defusion and self-as-observer,<sup>53</sup> and committed action.<sup>49</sup> A meta-analysis of the processes of PF, including 66 experimental laboratory studies, many employing transient pain exposure, concluded that there is support for significant positive effects on outcomes for acceptance, values-based action, cognitive defusion, present-focused awareness, and committed action.<sup>42</sup> Although it is not clear whether these results will also fully pertain to chronic pain, the findings are encouraging.

There are certain barriers to the easy adoption of PF as a model for research and treatment development. Some of the principles included in the model are different from our everyday assumptions. As it includes new psychological processes, and there is a need to make precise distinctions with these processes, this requires new terms.

## Psychological Inflexibility and Psychopathology

The direct opposite processes to psychological flexibility constitute a model of suffering and behavior problems. These 6 processes include experiential avoidance, cognitive fusion, preoccupation with the past or future, inability to take a perspective separate from thoughts and feelings, failures in clarity or pursuit of values, and rigid persistence or impulsive avoidance (failures of flexible committed action). Fig 1 shows processes of PF (outer hexagon) and inflexibility (inner hexagon), each process and its counterpart shown as a single dimension. Ideally, this figure would also show that each of the dimensions is interrelated with each of the others and that they are not entirely distinct. The act of categorizing or separating these dimensions is not to say that they are "real" entities that can be verified as such. It is simply a useful way to talk about different perspectives on a set of related qualities. In fact, the terms for these 6 processes of suffering and 6 processes of therapy are what is called "midlevel" terms.<sup>30</sup> They do not themselves describe basic behavioral processes in a technically precise way, processes such as stimulus control,





**Figure 1.** The psychological flexibility model. Source: Adapted from the ACT ADVISOR measure by David Chantry; available at [http://contextualpsychology.org/act\\_advisor\\_psychological\\_flexibility\\_measure](http://contextualpsychology.org/act_advisor_psychological_flexibility_measure). Used with permission from the author. This figure, in a modified form, also appeared in Twohig (2012).<sup>77</sup>

reinforcement, or relational responding. Rather, these terms bridge the gap between these and terms that may be used in a treatment context, for example. These terms provide a point of contact between 2 sets of vocabulary, a set of terms that both researchers and clinicians can understand. One may not use the terms *acceptance* or *cognitive defusion* with a patient during treatment delivery; however, these terms help organize case conceptualization and selection of treatment methods in part through their link with basic behavioral processes.

## The Philosophical Roots of Psychological Flexibility

It is difficult to find explicit statements of the core philosophical assumptions underlying the OB, TCB, and FA models. This is not the case with PF. PF is based on a particular philosophy of science called functional contextualism and an approach to science called a *contextual behavioral science approach*.<sup>82</sup> A few of the key features of this approach can be briefly described here. Further

description is well beyond the scope of this article and can be found elsewhere.<sup>30,82</sup> Functional contextualism includes a set of clear assumptions about ontology, epistemology, and truth criteria. It rejects dualism. Here there is no particular distinction made between the physical and the nonphysical, as a matter of what exists, and no emphasis on overt behavior as opposed to thoughts and feelings. "Behavior" includes all the activity of the whole actor, including those that are private, such as feeling and thinking. Behavior and elements that exert influence over behavior are of central interest—abstract hypothetical constructs that constitute a level of analysis remote from behavior and its functions and that are not strictly manipulable are deemphasized. The unit of analysis in functional contextualism is the *whole* act in context. Context is defined situationally and historically. Its criterion for truth is not observed consistency between one's ideas and what supposedly is real; rather, it is the achievement of the purposes or goals of the given analysis. Hence, it is pragmatic. Truth here requires first stating one's goals and then demonstrating that they are reached. Science, within this specific approach, is a process of generating successful principles that are not "true" in the sense that they reflect "how the world is" but in the sense that they guide effective action.

The PF model is based within a primarily inductive tradition. It includes observation of relations between behavior patterns and context, and the formulation and refinement of principles abstracted from these observations into a limited set of constructs that are broadly applicable.<sup>82</sup> The goals of the research program associated with functional contextualism are to create an account of human behavior 1) that allows both prediction and influence and 2) is specific in how it applies, 3) is broad in the situations to which it is relevant, 4) is consistent with other levels of analysis in other fields of science, and 5) *constantly updating* itself. Such an account with these qualities is said to have precision, scope, and depth.<sup>30,82</sup> The built-in feature of its being "constantly updating" means that the philosophy is held consistently, as a matter of choice, but the model and treatment methods that derive from it are held more tentatively with the assumption that they will eventually be proven to be limited in some way or another.<sup>30</sup>

The PF model is based in basic experimental research into operant conditioning and Relational Frame Theory (RFT).<sup>25</sup> RFT is an account of the nature of language and cognition and their role in behavior regulation.<sup>2</sup> PF is essentially based in operant theory updated by RFT. A core concept within RFT is the "relational operant," a generalized response class that includes responding to one event in terms of another—within RFT this is the basis of cognition. Here, thoughts and language are not merely products or stimulus materials but acts of relating. The generalized class of "relating," the basis of "verbal behavior" and cognition, is somewhat similar to the generalized class of "imitating," a learned class of behavior under contextual control.<sup>25</sup> Psychological flexibility, with its base in a contemporary operant

account of cognition, achieves an integration of the operant model with cognitive processes, the goal at the time when the cognitive behavioral tradition first emerged.

## Psychological Flexibility Integrates

The mainstream of cognitive behavioral approaches is characterized by a proliferation of new variables. Well-known variables such as anger, attachment style, attention, catastrophizing, control beliefs, coping, depression, distraction, fear, hypervigilance, illness representations, interference, pacing, resilience, and self-efficacy are just a few, not to mention the many other possible emotional experiences, and many other types of beliefs and appraisals that also are commonly studied. The search for new and more powerful variables seems to be a constant feature within CBT for chronic pain, perhaps leading in the past to more expansion than integration of variables of interest. The PF model has not created this type of variable proliferation, but rather it is inherently integrative. The model has been in development for more than 25 years, and in all of this time the model has never included more than 6 dimensions, now organized under a single unifying process, PF (see Fig 1).<sup>30,99</sup>

## Defusion and Acceptance as Examples of Integrative Processes

To illustrate the integrative quality of psychological flexibility, *cognitive defusion* is one of the primary processes for addressing adverse effects of distressing or disabling thoughts and beliefs within psychological flexibility. Cognitive fusion is an automatic process, typically outside of awareness, where the literal content of thoughts dominates over other sources of behavior influence, and the situation or a person having a thought is experienced as only what the thought content says, such as "This is unbearable" or "I am worthless." In practice, once a thought is determined to impose a restricting effect on a person's behavior, such as in reaching his or her goals, there are different ways to approach it. In one way, it is not so important whether the thought is catastrophic, magnifying, ruminative, helpless, hopeless, depressing, angering, self-critical, irrational, or "black and white." Cognitive fusion is conceptualized as a problem process that cuts across all of these, and cognitive defusion is a potentially therapeutic process for reversing this problem.

Cognitive defusion is a process of reducing direct literal functions of thought content, reducing the restrictions they impose on behavioral options, and enhancing other functions. Changing the experience of a thought, from one where the thought is overwhelming, believed, and followed, to an experience where it is simply seen as a thought and as part of a stream of changing content, is an example of this kind of change in function targeted in cognitive defusion. It is this process of addressing the general response-narrowing or behavior-restricting influences

exerted by the thought content, and not the specific content itself, that defines cognitive defusion as a functional, contextual, and integrative cognitive process.

Another key integrative process within PF is *acceptance*. Acceptance, again, is most simply engaging in activities while in the presence of unwanted experiences, openly, without struggling with those experiences, when this engaging is guided by one's goals. When psychological experiences coordinate avoidance and struggling for control, this can signal the presence of the process referred to as "experiential avoidance."<sup>32</sup> Experiential avoidance is defined as unhealthy efforts to control or reduce psychological experiences. It appears to be a widely applicable "functional dimension" of psychopathology that plays a wide-ranging role in many forms of human behavior problems.<sup>32</sup> Whether it is fear, anxiety, sadness, guilt, pain, fatigue, shame, or painful memories, if the experience coordinates an unwillingness to contact the experience and attempts to decrease that contact, and if these attempts represent a barrier to one's goals, methods to promote acceptance may apply.

The central role of experiential avoidance in psychological inflexibility is useful as this emphasis helps researchers and treatment providers to be sensitive to the many diverse forms that patterns of avoidance behavior can take. Some less often appreciated forms can include rumination, hypervigilance, problem solving, thought suppression, denial, "overactivity," and even relaxation, medication use, or treatment seeking. Again, this dimension, including avoidance on the one end and acceptance on the other, integrates; it pulls together psychological experiences and behavior patterns that are diverse in their surface features but equivalent in their psychological functions. It also connects the general problem of avoidance, and the restrictions it imposes on functioning, with a therapeutic process uniquely designed to address this, acceptance.

In the same way that the PF model has been restrained in generating new variables, it has been prolific in supporting the generation of many specific treatment methods.<sup>30</sup> As an example, there are 38 metaphor-based and experiential exercises indexed in the original ACT book alone.<sup>29</sup> Those who adopt models such as PF to guide their delivery of treatment appear to use more acceptance, mindfulness, and exposure-based methods and to more naturally use a wider range of treatment methods than those who follow a more traditional CBT approach, who use more cognitive restructuring and relaxation.<sup>6</sup> The generation of new methods can be considered a reflection of a progressive quality.

Of course no model is perfect and the PF model also has limitations. The PF model has a set of prespecified component processes at this point. It remains to be seen whether these will successfully integrate the wide array of cognitive and emotional variables in current CBT or whether these too will require integration or replacement one day by different processes. PF includes a particular philosophy of science. One day the assumptions underlying PF may be found to be flawed or nonoptimal and may need to be changed. Finally, descriptions

of PF prescribe that it include a process of rejecting elements that do not achieve the goals of the approach. However, this stated openness to letting go of failing ideas or methods does not guarantee that it will occur.

## Model, Process, and Targets in CBT

One of the important challenges to be met within current CBT approaches to chronic pain is the challenge of treatment processes or mechanisms.<sup>63,65,75,95</sup> These are the answer to the question of what must be changed during the experience of treatment so that treatment outcome will be as beneficial as possible. Researchers developing CBT-based approaches have perhaps not always adopted a focus on processes of therapeutic change and have not always included process measures in their research trials. Historically the predominant focus was more on "does it work" and not on "how," "under what circumstances," or "for whom." And yet, finding the mediators, mechanisms, and moderators of change in CBT, and refining our conceptualizations and our means for capitalizing on these, are considered perhaps our best strategies for creating progress in treatment development.<sup>38,72</sup>

Research into treatment process often reveals surprising findings. For example, numerous studies show that very good treatment outcomes can be achieved for people with chronic pain without pain reduction<sup>91,94,96</sup> or without a substantial correlation between change in pain and improvement in other outcome domains.<sup>50,52</sup>

If pain cannot be effectively reduced, the content of thoughts and beliefs about pain appears to be appropriate and necessary targets in treatment. In the general CBT literature, however, it is concluded that the evidence does not show that such change is necessary to achieve improvements in primary outcome measures from CBT.<sup>8,15,45</sup> Focusing on changing cognitive content, such as negative future expectations or critical self-evaluations, may fail in those people whose problem is that they already focus on this content too much, such as those with problems with rumination.<sup>24</sup> Also, for some people, approaches that attempt to impose positive self-statements, especially where negative or self-critical thoughts have prevailed, may have the reverse of the intended effect, leaving them feeling more distressed and more self-critical.<sup>97</sup>

In studies of CBT for chronic pain, there are data showing that change in the content of thoughts can be associated with improvements during treatment.<sup>9,35,80</sup> At the same time, a substantial number of studies suggest that it is unnecessary to employ methods that target the content of thoughts for change in treatment for chronic pain. Thoughts may change substantially or not very much during treatment and in either case good outcomes can be achieved.<sup>13,44,73,85-87</sup>

PF is a model of how psychological experiences influence behavior and of how to create healthy and durable behavior change. In this model, thoughts and feelings can and do exert influence over behavior. It is not solely their form or content that does it; however, it is the content of thoughts and feelings *in context* that influences



behavior. It is possible to have experiences of the same thoughts and feelings in different ways, a process that happens to all of us every day. Yet because this is automatic and we rarely do it on purpose, it is often difficult for us to grasp or register the experience of this happening. In the simplest case, I can feel afraid and, with the very same experience, felt to the same degree, either retreat or confront the source of my fear. Again, according to this model, the change in my fear as a *barrier* to action that happens without change in my fear as the *content* of experience reflects a contextual change. The psychological flexibility model emphasizes a focus on this type of change in the context of psychological experiences rather than on the content of these experiences.

PF is a model of treatment process. It provides directly testable questions about how treatment processes relate to treatment outcomes and how treatment processes in turn also relate to treatment methods. By providing a base for refining our understanding of these links, it provides a direct strategy for optimizing treatment methods.

## Psychological Flexibility Clarifies and Empowers Other Existing Treatments

PF may clarify and empower currently used methods, such as those applied within the FA model, for example. Again, the focus with exposure-based therapies for chronic pain tends to be the reduction of catastrophizing and fear as mediators of avoidance and disability.<sup>1,83</sup> By directly assigning and rehearsing exposure trials, avoidance patterns are directly reversed, and naturally avoidance-coordinating thoughts and feelings reduce too, and all seems well. But processes of learning move in one direction. Thoughts, feelings, and avoidance patterns, once acquired, are not erased from one's learning history. They are only suppressed or elaborated.<sup>5</sup>

Thoughts and feelings are notoriously difficult to not think or to block.<sup>90</sup> So, a reduction of a pattern of avoidance based on a process of reduced thoughts and feelings carries the risks that it will be difficult to initiate reduction of these experiences at the outset and that if the thoughts and feelings return, so will the avoidance. From the view of PF, the problem of fear and avoidance is that the fearful experiences coordinate a narrow range of responding, all or almost all avoidant in quality. A therapeutic goal from this model is to widen the range of possible behavior, so that although the fearful experiences are present the person can either avoid, as they have typically done, or remain in contact with the experience and do whatever their goals require. With PF, persistence in a pattern of engagement does not depend on the absence of notoriously difficult to change thoughts and feelings.

So, the PF model fully integrates with models that propose thoughts and feelings as "causes" of behavior problems, such as the disability and activity interference

experienced by some people with chronic pain. It then proposes that there are 2 avenues available for addressing those thoughts and feelings as "causes" of behavior: 1) change the content of the thoughts and feelings, as is the predominant approach within much of CBT, or 2) change the context that affords the thoughts and feelings their influence, as is increasingly being done in approaches now labeled as acceptance-based, mindfulness-based, "third wave," or contextual CBT.<sup>31,47</sup>

## Further Analysis: Another Next Generation of the FA Model

Recently, some of those involved in the development of the FA model proposed that it needs to meet several important challenges and that this would create a next generation of the model.<sup>12</sup> Three primary elements of the model were identified as lacking: 1) a model of normal psychological processes rather than pathological ones, 2) a proposal for how recovery from fear and avoidance is to occur, and 3) appreciation of the context of multiple goals, meaning, in their words, that "pain-related fear and avoidance cooccur [*sic*] in a context of multiple and often competing goals."<sup>12</sup>

It is suggested here that the PF model actually addresses each of the proposed challenges to the FA model, creating a model with greater scope and with no loss of precision. PF is a model of normal human behavior that also proposes how it can fail to serve goals, health, and wellness.<sup>30,31</sup> Its processes of experiential avoidance and cognitive fusion, for example, are not just the fate of the person disabled by chronic pain; they happen in all of us with a functioning mind, without exception. Unlike the current generation of the FA model, which is a model of disability with only a limited focus on recovery, the psychological flexibility model is entirely symmetrical, equally presenting how problems arise and how to reduce them. For every process of suffering and behavior restriction there is a process of resilience and action, including acceptance, cognitive defusion, flexible awareness of the present, perspective-taking, values, and committed action.<sup>30</sup> Finally, the FA model has not had a well-developed approach to goals, whereas the PF model does. PF explicitly includes values in a "motivational" role, and it connects directly to goals. Behavior patterns that reflect values are inherently reinforcing to do and, hence, reflect a "motivated" quality.<sup>30,47</sup>

As for the competition between pain-related and non-pain-related life goals—part of this final challenge needing to be addressed in a new model—this is the essence of the PF model. It addresses directly the dynamic interplay of 2 sets of processes: those aimed at reducing avoidance, by applying acceptance and cognitive defusion, and those aimed at increasing engagement, guided by the influences of goals and values.<sup>30</sup> Treatment is a recursive process of disintegrating and integrating 2 sets of influences, reducing restrictions and increasing positive choices, weakening aversive behavior regulation, and enhancing appetitive regulation.

## Acceptance and Commitment Therapy

PF can be increased by a range of different methods and therapy approaches. It has even been called a “fundamental aspect of health,”<sup>37</sup> suggesting that its general applicability in treatments may be seen one day as more central than is now appreciated. The one current approach specifically designed to increase PF is a form of CBT called acceptance and commitment therapy (ACT).<sup>29,30,42</sup> To be clear, ACT is a treatment approach—it is itself not a theory or scientific model. It is a set of treatment methods and an approach to the therapeutic relationship, both designed around processes from the PF model and based in operant theory and RFT.

Studies supporting the efficacy and effectiveness of ACT in chronic pain have developed quickly during just the past 6 or 7 years. There are now 7 published randomized controlled trials (RCTs) of ACT related to chronic pain in adults<sup>7,14,56,76,89,91,92</sup> and 1 in young people.<sup>93</sup> There are other trials that are pseudo-randomized, partly controlled, or pilot studies,<sup>36,59,88</sup> a partial reanalysis of treatment outcome focused on older adults,<sup>54</sup> and several larger-scale effectiveness studies,<sup>52,85</sup> including a large treatment cohort that showed good outcomes at 3 years posttreatment.<sup>87</sup> There are also 2 small RCTs of ACT for headache.<sup>16,66</sup> In general, the controlled trials described here are small and preliminary, and of course the uncontrolled trials are susceptible to biases.

In a systematic review of cognitive behavioral treatments for pain-related fear and avoidance, it was concluded that, along with graded *in vivo* exposure, ACT currently appears to result in the best outcomes for reducing patterns of fear and avoidance.<sup>1</sup> A meta-analysis of “acceptance-based” treatment that included both ACT and mindfulness-based treatments concluded that these methods currently appear equally effective to standard CBT for chronic pain.<sup>81</sup> ACT is listed as an empirically supported treatment with “strong research support” for general chronic pain by the organization within the American Psychological Association that determines this.<sup>74</sup>

The heart of ACT is not acceptance and values, as might appear to be the case in the current chronic pain literature; rather, it is PF. And the heart of PF is its unique philosophical assumptions and theoretical base, its focus on the act in context as its subject matter, its use of practical demonstrated success as its truth criteria, and its letting go of ontology.

## ACT in Context

It may help to place ACT in its larger context, to understand the range of its development. In 2011, it was identified that there were more than 65 published RCTs of ACT for a wide variety of conditions, including mental health problems such as depression, anxiety, and psychosis; physical health problems such as diabetes, epilepsy, and smoking; and more “normal” human behavior problems such as work stress and performance, and stigmatizing attitudes.<sup>30</sup> Hence, the potential scope of ACT and PF is broad. ACT is truly a “transdiagnostic” approach as is sometimes advocated,<sup>62</sup> meaning that it

is meant to be applicable to different types of psychological problems and, in a specifically pain-related context, that it ought to be applicable across a full range of different pain diagnosis.<sup>61,71</sup> ACT has generated a wide array of applications, including the following treatment formats for chronic pain: 3- or 4-week residential group treatment delivered by an interdisciplinary team,<sup>59,86</sup> individual treatment,<sup>91</sup> self-administered workbooks with therapist support,<sup>76</sup> via the internet,<sup>7</sup> outpatient group treatment,<sup>56,92</sup> and 1-day workshop-based treatment.<sup>16</sup> ACT also appears to be a sustainable approach, and not a passing fad, insofar as it has been in process of continued growth for more than 25 years.<sup>99</sup>

## Summary

In order to achieve a goal, it is typical to first define the goal and then focus on the means for getting there, in research and in treatment delivery as in other human enterprises. This review has examined our goals and means in psychological approaches to pain management. In research, our goals and means sit within or emerge naturally from our models, the theories that underpin them, and the philosophical assumptions those theories contain. We propose that an adequate scientific model for the field of chronic pain research ought to integrate current findings and provide clear principles for treatment developers to follow. It ought to serve a process of building an account of the problem with broad applicability and precision. It also ought to be progressive. Progressive here means that the model yields advances in technology or methods, generates increasingly diverse applications, and is self-optimizing, finding areas of weakness and revising itself as it goes along.

All of the current psychological models applied to chronic pain research and treatment development are limited in one way or another, including PF. Some models lack scope or precision, the capacity to integrate, or the capacity to specifically guide research and treatment development, or they have not consistently created progress. The less well known PF model may help with some of these goals.

PF is an integrative, process-oriented, and broadly applicable model of human behavior and behavior change. Its key concept includes the interaction of cognitive and direct environmental influences on behavior. Its subprocesses, including acceptance, cognitive defusion, self-as-context, values, and committed action, create a therapeutic focus on wide-ranging feelings and other psychological experiences, on diverse types of cognitive content, and on active, goal-directed processes of behavior change. It focuses on psychological experiences functionally and contextually, regardless of their form but based on unifying elements of their functions.

PF has roots deep in operant models and in a more than half-century-long tradition of laboratory based experimental behavioral research. It is theory based and linked to a philosophy of science that is explicit in its goals, its dependent and independent variables, and its epistemological assumptions. ACT, the treatment approach that emerges from this model, is now the

subject of at least 7 RCTs published in areas related to chronic pain treatment (and 1 in pediatric pain) and many more follow-up process analyses, uncontrolled trials, pilot studies, and instrument development studies. At the same time, it is the model and its allied approach to research that holds the promise here. Treatments need to shift and change, their limits and weaknesses be found, and improvements be introduced, but the model or models from which we do that need to be explicit and consistent to some degree.

The clear theoretical base, philosophical principles, and scientific strategy associated with PF ought to guide research activity in a consistent fashion. The conscious embrace within PF of the notion that it will one day prove incomplete or inadequate lends it a progressive quality. It has already created innovations in ACT, such as the emphasis on a compassionate and open therapeutic stance, direct experiential learning, nonliteral uses of language, and nondidactic methods of behavior change. Treatments for chronic pain that emerge from PF also have sprung up in a diverse range of formats, showing a high level of versatility, which is also a progressive quality. So, according to our criteria for a good model, PF appears successful so far.

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## Conclusion

Pain, particularly chronic pain, is such a huge problem on so many levels that its importance is almost impossible to exaggerate. Because pain is so compelling and so personal, and because the activities of researching pain and developing treatments are themselves patterns of human behavior, pain seems to be a particularly challenging problem from a psychological standpoint. Perhaps it requires a model of suffering, behavior change, health, and well-being that is itself complex enough for meeting this challenge.

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