

Model and Processes of Acceptance and Commitment Therapy (ACT) for Chronic Pain Including a Closer Look at the Self

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Published online: 23 January 2016
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Abstract Acceptance and commitment therapy (ACT) is one of the so called “third-wave” cognitive behavioral therapies. It has been increasingly applied to chronic pain, and there is accumulating evidence to support its effectiveness. ACT is based on a model of general human functioning called the psychological flexibility (PF) model. Most facets of the PF model have been examined in chronic pain. However, a potential key facet related to “self” appears underappreciated. Indeed, a positive or healthy sense of self seems essential to our well-being, and there have been numerous studies of the self in chronic pain. At the same time, these studies are not currently well organized or easy to summarize. This lack of clarity and integration creates barriers to progress in this area of research. PF with its explicit inclusion of self-related therapeutic processes within a broad, integrative, theoretical model may help. The current review summarizes the PF model in the context of chronic pain with a specific emphasis on the parts of the model that address self-related processes.

Keywords Chronic pain · Self · Acceptance and commitment therapy · Psychological flexibility

Introduction

Treatments based on cognitive behavioral therapy (CBT) have been broadly applied to chronic pain and are deemed clinically and cost-effective [1, 2]. However, their effectiveness could improve [3]. One way to do this is to organize research and treatment development efforts around specific clearly stated assumptions and goals and an appropriately integrating theoretical model. The philosophy and theory underlying acceptance and commitment therapy (ACT), with its focus on therapeutic processes, including psychological flexibility [4, 5], may provide the guidance and model needed [6].

In this article, we first outline the psychological flexibility (PF) model and describe ACT. Next, we review the evidence for treatment outcomes in ACT in general, as well as in chronic pain. We then focus on one of the least appreciated and researched aspects within PF and ACT, the facet related to self. To examine this facet, we briefly review literature on the self in chronic pain. We then apply and elaborate the PF model in relation to this literature and suggest that the PF model may be a particularly promising guide for future research.

The Psychological Flexibility Model

The underlying principles of ACT are organized around a set of core processes within a unified model, the PF model [5]. PF is the capacity to be directly, consciously, and fully in contact with the present moment without needless defense and to persist or change one’s behaviors in the service of one’s goals. The PF model includes the following six interrelated core processes: acceptance, cognitive defusion, being present, self as context, values, and committed action [5]. Simply put, acceptance is the willingness to experience undesirable thoughts, feelings, and sensations when doing so serves one’s

This article is part of the Topical Collection on *Psychological and Behavioral Aspects of Headache and Pain*

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goals. Cognitive defusion involves distancing or separation from the content of one's thoughts, a process that reduces cognitive influence without necessarily changing cognitive content. Being present involves being aware of ongoing events. Self as context entails an experience of taking a perspective, or a stance as observer, with respect to one's psychological experiences without getting attached to them, needing to defend them as a matter of identity or to defend against them as if they present a threat. Values are ongoing qualities that one defines as important and desired and that guide one's goals and actions. Committed action is the ability to flexibly persist in actions guided by values, to meet difficulty and to persist again. These processes are also summarized as "open, aware, and active" [7].

What is ACT?

ACT is among the so-called "third wave" of cognitive behavioral therapies, sometimes referred to as contextual cognitive behavioral therapy [8•]. ACT is grounded in basic operant behavioral principles to a degree that is arguably greater than is the case for conventional CBT. It is also linked to active empirical research into human language and cognition called relational frame theory [9•]. Sharing the same philosophical roots as relational frame theory (RFT), ACT stems from the world view of functional contextualism. The root metaphor within this philosophy is the act in context. In this view, behavioral events are interpreted as ongoing acts understandable best within their current and historical context. The truth criterion of functional contextualism lies in "successful working," in that if a hypothesis or principle leads to effective action or achievement of goals, it is regarded as "true" [10]. From a functional contextual point of view, psychological events, such as thoughts and feelings, do not cause other actions all by themselves. Rather, they participate in processes of behavior influence based on their historically and situationally defined context. In other words, the content of thoughts and feelings is not a problem, unless the context leads this content to regulate actions in a way that undermines one's goals and values [11]. Hence, ACT does not focus on creating change in the content of thoughts and feelings but instead to alter their functions. This is sometimes referred to as changing the individual's "relationship with" their thoughts and feelings. This is a key defining feature of both PF and ACT with broad implications for the design and delivery of treatment. ACT is guided by the sub-processes of the PF model. Here, the influence of psychological experiences, or experiences that include significant psychological obstacles, such as chronic pain, can readily dominate an individual's behavior and narrow his or her behavioral choices. ACT attempts to reduce the influence of psychological experiences, notably thoughts and feelings, on individual's behavior, and expand their choices, again through the sub-processes of PF.

ACT is not a set of techniques, rather an orientation to psychotherapy guided by the PF model. ACT-oriented interventions target the often predominant processes of language and thinking in their unhelpful influences on behavior. One of the ways it does this is by using "experiential methods" designed to create change in behavior directly, by allowing actions to contact experience and meet consequences as they emerge naturally in the environment. Exposure-based methods, mindfulness exercises, sensory focusing exercises, role play, direct rehearsal, and methods that use paradox or confusion can operate in this predominantly non-verbal, experience based "experiential" fashion. Metaphors are also frequently used. Each of these examples represents a contrast from didactic methods, lecturing, verbal persuasion, or providing information, for example. The dynamic and customized or individualized delivery style, based on ongoing observation and functional analysis, and the often emotionally intensive quality, of ACT means that it is perhaps most appropriately delivered by fully trained clinical psychologists. However, other professionals, such as other mental health providers, physiotherapists, nurses, and others, can certainly deliver their treatments in a way that is consistent with ACT and even incorporate some types of ACT methods.

ACT is designed to be flexibly applied and can be tailored to different resources and needs of different populations. ACT-oriented interventions can be delivered in individual sessions, groups, as couple therapy, online, or as workplace training, among other formats. The length of ACT intervention can vary from one or a few sessions to many and from minutes to many hours or days. There is no official protocol of ACT for chronic pain, although there are examples available, and local guides can be created to support uniformity within a single center. The official website of the Association of Contextual Behavioral Science (ACBS; <https://contextualscience.org/>) provides useful resources related to ACT, such as protocols of ACT for different populations proposed by researchers, training resources, list of ACT therapists, and so forth.

Evidence for the Effectiveness of ACT

There is now accumulating supportive evidence for the effectiveness of ACT across a variety of health conditions. In a meta-analysis of 13 randomized controlled trials (RCTs), where ACT was compared to a control group or another active treatment, a medium-sized mean effect was demonstrated for ACT (Hedge's $g = .68$) [12]. In a more recent meta-analysis of 18 RCTs, where ACT was compared to inactive control conditions, as well as established treatments (e.g., cognitive therapy, cognitive behavioral therapy, and interpersonal therapy), an overall advantage was found for ACT compared to inactive control conditions (Hedge's $g = .42$). The average ACT-treated participant was more improved than 66 % of the participants in the control condition. However, ACT was not found

significantly more effective than established treatments (Hedge's $g = .18$) [12]. Also, ACT was not superior to control conditions for depression or anxiety (Hedge's $g = .03$) [13].

From a slightly different perspective, it is possible to view ACT and related approaches as type of self-help. In a meta-analysis of 15 RCTs of self-help treatments including ACT and mindfulness-based interventions, small to medium effect sizes were identified on measures of acceptance/mindfulness, depression, and anxiety, favoring ACT or mindfulness-based interventions [14•]. It has been argued from a systematic review of empirical evidence for ACT, including evidence from correlational, experimental psychopathology, component, and outcome studies, that overall, these studies represent a coherent case in support of ACT [15]. This same researcher also examined studies that have empirically compared ACT to traditional CBT, and mean effect sizes on primary outcomes significantly favored ACT (Hedge's $g = .40$) [16]. None of this is to say that there are no weaknesses in the current literature, as there clearly are [12], and it is continuing to develop.

In the domain of chronic pain, the evidence similarly supports the efficacy and effectiveness of ACT. In a systematic review of RCTs of ACT for adults with chronic pain, ten trials were identified [17••]. Out of the ten between group comparisons, six showed small to large effect sizes on physical functioning and two showed significant medium to large effect sizes on pain and global disease impact in fibromyalgia, favoring ACT in each case. Nine out of ten comparisons showed significant small to large effect sizes for anxiety, depression, and general emotional distress, favoring ACT. One comparison showed significant large effect size for life satisfaction favoring ACT. Three comparisons showed significant small to large effect sizes favoring ACT on components of psychological flexibility. In one study, the effect did not appear immediately after treatment, but at follow-up. In addition to evidence from RCTs, there also are result from partially controlled trials, from effectiveness studies with large average effect sizes across outcomes ($d = .85$ to $.89$) and from follow-up data, including 3 years posttreatment, showing a medium average effect size ($d = .57$) (see review [6••]).

Evidence from the Components of Psychological Flexibility Model of ACT

In addition to evidence for the effectiveness of ACT as a whole treatment package, there has been accumulating experimental evidence for the relevance of the component processes of the PF model. In a meta-analysis of 66 laboratory-based studies of components related to ACT, significant small to medium effect sizes were found for outcomes with results favoring acceptance, cognitive defusion, present moment, mixed mindfulness, values, and value plus mindfulness, in comparison to inactive conditions. When examining theoretically specified outcomes (behavioral performance-based

rather than based in the content of thoughts and feelings), significant small to large effect sizes were observed favoring mixed mindfulness, values, defusion, present moment, acceptance, and values plus mixed mindfulness in comparison to inactive conditions [18•].

In the domain of chronic pain, evidence supports the therapeutic role of processes of PF in ACT trials. Results from these trials show that increases in acceptance of pain correlate with reduction in anxiety, depression, and disability during treatment and increases in value-based action correlate with improvement in the same outcomes at 3-month follow-up [19]. Increases in acceptance of pain, general acceptance, mindfulness, and value-based action during the treatment correlate with reduction in anxiety, depression, and disability, at 3-month follow-up, independent of changes in pain [20] (see review [6••]). In addition, in a mediation study of a trial of ACT for chronic pain, it was found that psychological flexibility significantly mediated outcomes, while pain, emotional distress, fear of movement, and self-efficacy did not [21]. This indicated that ACT improved the outcomes through the therapeutic processes specified in the underlying theory, rather than processes specified in other theories.

Evidence from Self-Related Processes Within ACT in Chronic Pain

Most of the evidence for facets of PF in relation to treatment for chronic pain is focused on the role of acceptance. Some are focused on value-based action, contact with the present moment (as reflected in a measure of mindfulness), and general psychological inflexibility. In addition to evidence from these more commonly researched facets of psychological flexibility, there has been emerging evidence from the less-examined facet of psychological flexibility, the processes that tap into self as context, and related ones, including cognitive defusion and decentering. These processes touch on a particular functional contextual sense of self, in that they entail distancing or separation from one's psychological experiences.

In one preliminary study [22], the cognitive fusion questionnaire (CFQ) was used. This is a measure of the process that is opposite to cognitive defusion. Here, the measure was validated in a chronic pain sample. Here, cognitive defusion (created by reversing the score of the CFQ) was significantly correlated with other processes of PF, including general psychological acceptance ($r = 0.78$, $p < 0.001$) and pain-related acceptance ($r = 0.53$, $p < 0.001$). In addition, cognitive defusion significantly correlated with emotional functioning, general psychological functioning, social functioning, and general health in the expected direction.

Decentering is another process that taps into the contextual self and has been investigated in relation to ACT in chronic pain. Decentering is defined as the ability to observe one's thoughts and feelings in a detached manner, as temporary

events in the mind, as neither necessarily true nor reflections of the self [23]. The experience questionnaire (EQ) has been developed to measure decentering [24]. In one study, the EQ was validated in a chronic pain sample [25]. Decentering significantly correlated with other processes of PF, including acceptance of pain ($r = .56, p = .001$), general psychological acceptance ($r = .67, p = .001$), mindfulness ($r = .41, p = .001$), and value-based action ($r = .49, p = .001$). In addition, decentering significantly correlated with emotional and general psychological functioning. A recent study of decentering in people with chronic pain [26] uncovered two independent factors from analysis of the structure of the EQ, namely, cognitive defusion and self as context. Again, in this study, decentering was significantly correlated with other processes of PF, including general psychological acceptance ($r = .31, p < .01$) and pain acceptance ($r = .37, p < .01$), as well as psychological functioning and social functioning.

Cognitive defusion and decentering, as well as mindfulness, reflect processes related to self as context, and yet, they do this to a limited degree. The item content in the measures used is not comprehensive enough to capture the full range of contextual self-related behavior patterns. In fact, self as context has not yet been examined in its entirety as a process within ACT in chronic pain nor in other conditions.

Conceptualization of the Self in ACT

ACT places significant emphasis on the use of self-based techniques, often with the therapeutic aim of facilitating a direct experience of self as context [5•]. According to relational frame theory, we learn to relate (relationally frame) stimuli in our environment, and this can change the psychological functions of those stimuli. For instance, for a person who was attacked by a dog, even hearing the word “dog” could trigger the same physiological reactions and actions as if the actual dog that attacked him or her is present. Here, the psychological function of the word dog is changed, due to the person’s experience of being attacked by the animal, and the relation between the word dog and the animal. Within this view, available senses of self are a product of by-product of human language. A sense of self as context, for example, results from learning to frame one’s behaviors as different from others, or perspective-taking, through three basic perspective relations, I versus you, here versus there, and now versus then. Through training with numerous exemplars of perspective-taking, for example, through answering questions such as “what are you doing here now” or “what was I doing there then,” and so forth, “I,” a coherent perspective despite the changing physical and social environment, emerges [27]. Relative to the content of one’s psychological experiences, self-as-context or self-as-observer is the context where these psychological events happen, the context that contains these, or a perspective one can take to observe one’s psychological

experiences. The downside of framing is that experiences or meanings can become associated with the self automatically, via verbal mechanisms, and in ways that can create blocks to healthy functioning, either because the content of this experience is restricting, painful, or threatened by current circumstance. A so-called transcendent sense of self, a self that is a step back from this content, can foster and in turn be fostered from cognitive defusion.

From the point of view of PF, the self was initially conceptualized as the following three senses of selves: self-as-content, self-as-process, and self-as-context [28, 29••]. Briefly, self-as-content involves identifying with the description and evaluation of one’s thoughts and feelings. Simply put, “I am who I think I am.” Self-as-process involves a process of ongoing awareness, or the ability to be aware of one’s experiences, which is also a transitional stage to the transcendent sense of self or contextual self. Self-as-context is a “perspective” one can take, to connect with oneself as an observer the content of one’s thoughts and feelings, a perspective of distinction. This distinction of self-as-context and self-as-content echoes the distinction made by Williams James between “I” and “me” [30].

The Self in Chronic Pain

Through the looking-glass of the PF conceptualization of self, we briefly examined the literature of self and identity in chronic pain. In the literature of self and identity in chronic pain, research has heavily focused on sense of self as content, rather than the contextual sense of self. Numerous studies have been done in chronic pain on content-based self, or sense of self resulted from a process of description or evaluation. This includes self-evaluation processes of long-standing interest, such as self-esteem, e.g., [31–34], and self-concept, e.g., [35–37], as well as processes conceptualized specific to pain condition, such as mental defeat, e.g., [38–40], which basically involves negative self-evaluations resulted from pain experience. Self has also been theorized as cognitive processes, and numerous studies have been done in chronic pain, such as studies on self-schema, e.g., [41–43]; self-discrepancy, e.g., [44, 45]; and self-pain enmeshment, e.g., [46]. These studies essentially examined self-related information processing, using techniques where participants were required to generate, rate, and recall self-descriptive information. This is fundamentally a process of self-evaluation in some cases or the association of self with verbal descriptors of self in others. On the other hand, only a few studies have tapped into a more contextual self, such as self-compassion, e.g., [47, 48], and decentering, e.g., [25]. Self-compassion entails a non-judgmental kindness to oneself and a distinction from evaluations. Similarly, decentering entails the experience of “stepping back” from one’s thoughts and feelings or “observing” these in a detached manner. In contrast to processes

related to a content-based self, self-compassion and decentering entail a context-based approach to evaluations, including a sense of ongoing self-awareness.

Without the application of the distinction between self-as-content versus self-as-context studies of self and chronic pains appear as a relatively unorganized and heterogeneous group. Despite the relatively large number of studies of self in chronic pain, the conceptualizations of the “self” itself that is applied are often ambiguous and sometimes unstated. Certainly, no study has presented a fully comprehensive model of self that can accommodate each of the processes so far discussed here, including those derived from a more contextual model. In turn, the lack of a widely applied comprehensive model is likely to hinder the development of research. In a sense by asking “who is the self” in self-esteem, for example, or what are the assumptions behind the substance of self and the model of “what is a healthy self,” one can begin to find some clarity and order. The distinction between, again, self-as-content and self-as-context appears to provide a helpful step forward in this regard.

The conceptualization of self presented here, based as it is within the PF model, with the same philosophical roots as ACT and RFT, may promote research and, through this, better and more focused treatments.

Conclusions

Previous reviews in this journal summarized the literature on acceptance of chronic pain [49] and then the wider model of psychological flexibility as applied to chronic pain [50]. The current review updates these previous ones and adopts a focus on one of the less researched facets of this model, involving self-related processes. These reviews, including the current one, chart a course over the years, a course that reflects the increasing development of psychological constructs from what is called a functional contextual perspective. This area of development in many ways represents an alternative to the “coping and beliefs” focus of more conventional cognitive behavioral approaches. As reviewed here, treatments derived from this alternative approach appear effective and have good evidence for their specific mechanisms of action [6•, 17•]. As for self, this is presented as a new potential direction, for both research and treatment development.

A clear and healthy sense of self seems to be essential to our well-being not just in chronic pain but fundamental for all of us as human beings. Certainly, the change and suffering wrought from chronic pain could interfere with our sense of who we are. Although self is of long-standing interest in chronic pain research, this area of investigation seems to lack conceptual clarity, precision, and order. A conceptualization of the self that fits in a broadly applicable model of psychological flexibility may create an advance. So far, there are too

little data from this framework to say with certainty how well it will pull together research efforts and feed directly into treatment development. As we say, the PF model, with its focus on therapeutic process, appears productive so far.

Compliance with Ethical Standard

Conflict of Interest Lin Yu and Lance M. McCracken declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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