



Acceptance of chronic pain: component analysis and a revised assessment method

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Abstract

Acceptance of chronic pain entails that an individual reduce unsuccessful attempts to avoid or control pain and focus instead on participation in valued activities and the pursuit of personally relevant goals. Recent research suggests that pain-related acceptance leads to enhanced emotional and physical functioning in chronic pain patients above and beyond the influence of depression, pain intensity, and coping. In these studies, acceptance was measured using the Chronic Pain Acceptance Questionnaire (CPAQ). Preliminary analyses of the CPAQ have supported its psychometric properties. The present study sought to further refine the CPAQ by examining its factor structure and evaluating the relations of these factors to other indices of pain-related distress and disability. Although a previously demonstrated factor structure of the CPAQ was generally supported, only factors assessing (a) the degree to which one engaged in life activities regardless of the pain and (b) willingness to experience pain had adequate reliability and validity and were significantly related to the other measures of patient functioning. A revised version of the CPAQ is suggested.

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1. Introduction

Acceptance is emerging as a potentially valuable concept in contemporary theories of how patients react and adapt to chronic pain. McCracken and Eccleston (2003), for example, recently reported on a sample of 200 patients awaiting interdisciplinary treatment. They found that acceptance of chronic pain was more successful in predicting pain, depression, disability, pain-related anxiety, and patient physical and vocational functioning than were measures of coping. Earlier studies have shown convincingly that acceptance of chronic pain is associated with reports of less pain, psychological distress, and physical and psychological disability, as well as more daily uptime (McCracken, 1998; McCracken et al., 1999; Summers et al., 1991). In one study, we demonstrated that individuals who endorsed higher levels of acceptance of pain were more likely to adaptively respond to pain, above and beyond

the influences of depression, pain intensity, or pain-related anxiety (McCracken et al., 1999).

To date, the Chronic Pain Acceptance Questionnaire (CPAQ) has been used as the primary method of quantifying acceptance in pain populations. The measure was originally developed by Geiser (1992) based on a measure of emotional avoidance called the Acceptance and Action Questionnaire (Hayes et al., 2003). Initial data regarding the CPAQ indicated fully adequate internal consistency (Cronbach's $\alpha = 0.85$) and expected correlations with other measures of psychosocial distress and physical functioning (Geiser, 1992). The original scoring scheme included 24 of the 34 items, with the remaining items excluded on empirical grounds.

There was just one additional study of the item content of the CPAQ (McCracken, 1999). Analyses of the original pool of 34 items indicated that seven of the items could be excluded because of restricted frequency distributions and poor item–total correlations. The remaining items formed four factors that were labeled: (1) engaging in normal life activities; (2) believing that controlling thoughts controls pain; (3) recognizing the chronicity of pain; and (4) needing

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to avoid or control pain. The second factor was later determined to be divergent from the overall construct as it was poorly correlated with the other factors and the total score (McCracken, 1999).

It is unclear if acceptance is more usefully understood as a single process or a number of smaller related processes. The utility of the four-factor model has been contested. For example, the value of factor 2, including the notion that ‘thoughts control pain’ is doubtful, seemingly contributing little to the overall total score (McCracken, 1999; Vianne et al., 2003). The relations of the separate factors to other established measures of pain-related distress and disability have yet to be evaluated. Finally, current scoring schemes derived from Geiser (1992) and McCracken (1999) exclude items from the total 34, therefore, the need for including these items in the measure is questionable.

This study investigated the item content, internal consistency, and factor structure of the CPAQ. We also sought to examine relations of the subcomponents of acceptance with other aspects of the chronic pain experience. We intended our work to yield a revised version of the measure. It was hypothesized that the four-factor structure of the CPAQ would be replicated and that our results would again indicate exclusion of the factor assessing beliefs about thoughts controlling pain intensity from the measure.

2. Methods

2.1. Participants and procedures

Participants included 235 (61.8% women) consecutive referrals to an interdisciplinary pain management program located in the United Kingdom. The majority of participants were married or co-habiting (65.2%); others were divorced or separated (17.2%), single (16.3%) or widowed (1.3%). History of chronic pain was prolonged at an average of 119.5 months (SD 118.7 months; range 12–600 months). Most participants reported primary low back pain (49.8%), with additional individuals reporting pain in the lower limbs (13.7%), upper limbs (12.4%), thoracic (3.9%), or other locations (12.5%). In addition, 7.7% of patients reported full body pain and 82.8% reported pain in more than one location. The majority of the sample was not working due to pain with 57.5% not working at all, 4.7% working only part-time, and 20.6% having retired early. Only 10.2% reported working full-time, with the remaining 4.7% stating that their unemployment was not related to pain.

2.2. Measures

As part of an initial patient evaluation each participant provided information about a number of demographic and pain-related variables including current pain intensity (0–10 numerical rating scale), number of hours per day spent resting or sleeping as a result of pain, medications, and

number of medical visits related to pain. Further, in addition to the CPAQ, participants completed a battery of self-report questionnaires assessing emotional distress, pain-related anxiety, and physical and psychosocial disability, which are described below.

2.2.1. Beck depression inventory (BDI)

The BDI (Beck et al., 1961) is a 21-item inventory designed to measure responses associated with depression. The measure’s psychometric properties are well established (Beck et al., 1988).

2.2.2. Pain anxiety symptoms scale (PASS)

The PASS (McCracken et al., 1992) is a 40-item self-report measure designed to assess anxiety and fear responses related to the experience of chronic or recurrent pain. Only the total score was used in this study. It is calculated by summing of individual items. Prior research has supported the psychometric properties of the PASS (McCracken and Gross, 1995; McCracken et al., 1992; Osman et al., 1994).

2.2.3. Sickness impact profile (SIP)

The SIP (Bergner et al., 1981) was included as a measure of disability across physical and psychosocial dimensions. The 136 items of the SIP measure the effects of illness across 12 categories of functioning. The measure has demonstrated satisfactory internal and temporal consistency, as well as good convergent and divergent validity (Bergner et al., 1981). The psychosocial and physical disability composite scores were utilized in the present analyses.

2.3. Analytic approach

As has been the case with previous analyses of the psychometric properties of the CPAQ (McCracken, 1999), the original pool of 34 items was submitted to initial analysis. First, frequency distributions were examined for each item in order to identify extreme skewness or limited variability. Next, corrected item–total correlations were calculated to identify items that did not correlate appropriately with the measure’s total score. Finally, preliminary factor analyses were performed to identify items without clear factor adherence.

Following this preliminary evaluation, the remaining items were subjected to a principal components analysis and the result of this analysis was compared to the original factor solution reported (McCracken, 1999), using Cattell’s salient variables index, *s* (Cattell et al., 1969). Finally, the relations of these factors to the other measured variables were assessed with correlation and multiple regression methods.

3. Results

3.1. Factor analysis of the CPAQ

Frequency distributions for the original 34 items showed one item with a significantly skewed distribution. More than half (61.3%) of participants selected 6 ('always true') for item 18, which reads, 'It's important to keep fighting this pain'. Three items had corrected item–total correlations that were opposite to their expected direction. These items were '11. I've done my best to try to control my chronic pain, and it looks like it won't change.', '12. The thoughts and feelings I have about pain are just my reactions, not real facts.', and '21. There is really nothing anyone can do to keep from having disturbing thoughts and feelings about pain.' As the final step of evaluating the original 34 items, a series of initial factor analyses extracting a range of factors (5–8) was performed. These analyses did not reveal any items that consistently loaded independently of the other factors; they led to no item exclusions. Hence four items were eliminated from further analyses on empirical grounds. Two additional items were excluded based on concerns that they did not have clear reference to pain. These items included '13. Before I take action, I must be sure in my own mind that that course of action I am taking is best.' and '27. In order for me to accept something, I have to feel good about it.' These items were also eliminated in McCracken's (1999) initial analysis of the CPAQ factors because they emerged as single item factors. Overall the items eliminated in the previous and current analyses are quite similar including concordance on six of the seven items.

We next conducted principal components analysis with oblique rotation on the remaining 28 CPAQ items. Although this analysis revealed eight factors with eigenvalues greater than one, evaluation of the scree plot, as well as interpretability and parsimony, indicated that a four-factor solution was the most appropriate. The four factors accounted for 46.8% of the variability in the item set. The factors were labeled: (1) activity engagement (pursuit of life activities regardless of pain); (2) pain willingness (recognition that avoidance and control are often unworkable methods of adapting to chronic pain); (3) thought control (belief that pain can be controlled or changed by altering

one's thoughts); and (4) chronicity (recognizing that pain may not change). Comparison of the factor loadings in the factor pattern matrices of the present solution and the earlier solution (McCracken, 1999) indicated that each factor was significantly similar across analyses. Table 1 includes the results of the factor comparison.

Six items did not show a clearly highest loading on the same factor across the prior and current analyses. These discordant items were individually examined for purposes of subscale assignment. First, CPAQ subscale scores were calculated using only the items that were concordant between current and the previous analyses. Then, correlation coefficients were calculated individually for the non-concordant items and these initial subscale scores. Next, the contribution of the non-concordant items to the internal consistency (Cronbach's α) of each subscale was evaluated. Finally, face validity was considered with respect to the match between subscale and item content. Based on these considerations, item subscale assignments were straightforward. Table 1 details the final number of items assigned to each subscale.

Table 2 shows descriptive data and intercorrelations for each of the factor-derived subscales and the total score of the CPAQ. For these analyses, a number of items was reverse-keyed, including all the nine items on factor 2 and four items on factor 3. All items were keyed such that higher scores indicated higher levels of acceptance.

3.2. Relations between CPAQ dimensions and medical, functional, and psychosocial measures

In order to further investigate the factors of the CPAQ, relations between the subscale scores and other measures of chronic pain were investigated. For conceptual reasons, these measures were divided into three variable groups: (1) medically oriented variables, (2) physical and work functioning, and (3) emotional and social functioning issues. The medical variable group included a pain intensity rating on a 0–10 numerical rating scale, number of medical visits over the past 6 months, and current number of prescribed pain medications. The physical and work functioning variables were number of hours spent resting or sleeping during the day due to pain, SIP-physical

Table 1
CPAQ factor structure comparison with prior analyses

Factor	Number of items			Cattell's salient variables index		Final number of items
	McCracken (1999)	Present analyses	Overlap	<i>s</i>	<i>P</i> ≤	
1	10	9	7	0.74	0.01	11
2	8	9	7	0.82	0.005	9
3	5	6	4	0.73	0.01	5
4	4	4	3	0.75	0.005	3

N = 235. Factor labels were: (1) activity engagement; (2) pain willingness; (3) thought control; and (4) chronicity.

Table 2
Descriptive data for CPAQ subscales and total score

Factor	<i>M</i>	SD	Cronbach's α	Correlations			
				1	2	3	4
1. Activity engagement	29.3	12.0	0.82				
2. Pain willingness	17.4	9.7	0.78	0.36*			
3. Thought control	14.3	5.5	0.64	−0.38*	0.02		
4. Chronicity	9.5	4.3	0.62	0.43*	0.07	−0.26*	
Total	70.5	19.0	0.78	0.80*	0.76*	0.004	0.46*

* $P < 0.001$.

disability score, and current work status. The work status variable was dichotomously coded reflecting whether an individual was not working due to pain or was still working. Finally, the emotional and social variables included scores from the BDI, PASS, and SIP-psychosocial disability scale.

Correlation results are included in Table 3. These correlations generally indicated that participants who reported engaging in normal life activities regardless of pain (activity engagement) or who felt little need to avoid or control painful experiences (pain willingness) were more likely to report less pain, less healthcare and medication use, better physical and work-related functioning and less emotional distress. The other two factors of the CPAQ had much weaker and less consistent relations with the measures of patient functioning.

Finally, a series of regression analyses were performed to assess the combined and unique contribution of the dimensions of acceptance to pain-related functioning. To control the influence of background variables, the first step of the equations examined age, gender, years of education, pain intensity, and pain duration. A stepwise procedure was used. Only those background variables that were significantly related to the criterion measure were retained in equations. Next, the four acceptance factors were entered simultaneously.

As shown in Table 4, the demographic and background factors accounted for little variance across most measures of

pain-related healthcare use, disability and distress. The only notable exception occurred for pain intensity, which accounted for significant variance in number of medical appointments in the past 6 months, number of classes of medications for pain, physical disability, work status, depression, pain-related anxiety, and psychosocial disability. However, after the CPAQ factors were entered into the equation, the contribution of pain intensity became non-significant for all variables except number of medical visits, physical disability, and depression. None of the other variables were selected and retained in the first step of the regressions with the exception of age, which entered in the equation for depression.

The acceptance subscales were shown to be important predictors of each of the criterion measures, although a variable pattern of relationships emerged. Pain willingness accounted for significant variance in pain intensity, number of pain-related office visits in the past 6 months, and number of pain medications. However, the other three acceptance factors failed to consistently contribute to these variables. A more complex picture was apparent for the measures of disability. In these analyses, activity engagement accounted for significant variance in work status and pain willingness accounted for significant variance in physical disability. Both subscales were significantly predictive of hours per day spent resting or sleeping. Finally, both the pain willingness and activity engagement significantly predicted

Table 3
Correlations between CPAQ subscale and total scores and measures of patient functioning in chronic pain

	Medically oriented			Physical disability and functioning			Psychosocial issues		
	Pain intensity	Medical visits	Pain medications	Hours of daytime rest	Physical disability	Work status	Depression	Pain-related anxiety	Psychosocial disability
Activity engagement	−0.17**	−0.24***	−0.18**	−0.32***	−0.19**	0.33***	−0.51***	−0.51***	−0.34***
Pain willingness	−0.25***	−0.31***	−0.27***	−0.32***	−0.33***	0.24**	−0.49***	−0.63***	−0.46***
Thought control	0.15*	0.05	0.02	0.11	−0.02	−0.01	0.25***	0.21**	0.08
Chronicity	0.01	−0.08	0.003	−0.12	0.04	0.01	−0.09	−0.10	−0.10
Total score	−0.19**	−0.31***	−0.24***	−0.36***	−0.29***	0.33***	−0.52***	−0.60***	−0.29***

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. Pain was assessed using a 0–10 numerical rating scale; medical visits included the number of visits with the patient's general practitioner, for pain, over the 6 months prior to assessment; pain medications was the number of medication classes taken for pain; disability was assessed with the sickness impact profile; work status was coded 0, not working due to pain and 1, working or other; depression was assessed with the Beck depression inventory; and pain-related anxiety with the pain anxiety symptoms scale.

Table 4
Regression analyses predicting measures of patient functioning using acceptance domains

Step	Predictor variable	ΔR^2	Cumulative R^2	β	$P \leq$
Pain intensity					
1	Acceptance of pain	0.10	0.10		
	Activity engagement			−0.07	ns
	Pain willingness			−0.23	0.001
	Thought control			0.15	0.05
	Chronicity			0.10	ns
Medical visits					
1	Pain intensity	0.05	0.05	0.15	0.05
2	Acceptance of pain	0.09	0.14		
	Activity engagement			−0.14	ns
	Pain willingness			−0.23	0.001
	Thought control			−0.02	ns
	Chronicity			−0.01	ns
Pain medications					
1	Pain intensity	0.04	0.04	0.12	ns
2	Acceptance of pain	0.06	0.10		
	Activity engagement			−0.13	ns
	Pain willingness			−0.20	0.01
	Thought control			−0.03	ns
	Chronicity			0.07	ns
Hours of daytime rest					
1	Acceptance of pain	0.15	0.15		
	Activity engagement			−0.22	0.005
	Pain willingness			−0.23	0.001
	Thought control			0.03	ns
	Chronicity			−0.01	ns
Physical disability					
1	Pain intensity	0.11	0.11	0.27	0.001
2	Acceptance of pain	0.09	0.20		
	Activity engagement			−0.13	ns
	Pain willingness			−0.22	0.001
	Thought control			−0.08	ns
	Chronicity			0.09	ns
Work status					
1	Pain intensity	0.01	0.01	−0.06	ns
2	Acceptance of pain	0.14	0.15		
	Activity engagement			0.40	0.001
	Pain willingness			0.08	ns
	Thought control			0.14	ns
	Chronicity			−0.12	ns
Depression					
1	Pain intensity	0.09	0.03	0.13	0.05
2	Age	0.03	0.12	−0.10	ns
3	Acceptance of pain	0.31	0.43		
	Activity engagement			−0.35	0.001
	Pain willingness			−0.35	0.001
	Thought control			0.12	0.05
	Chronicity			0.14	0.05
Pain-related anxiety					
1	Pain intensity	0.06	0.06	0.06	ns
2	Acceptance of pain	0.45	0.51		
	Activity engagement			−0.33	0.001
	Pain willingness			−0.50	0.001
	Thought control			0.10	ns
	Chronicity			0.12	0.05

(continued on next page)

Table 4 (continued)

Step	Predictor variable	ΔR^2	Cumulative R^2	β	$P \leq$
Psychosocial disability					
1	Pain intensity	0.04	0.04	0.09	ns
2	Acceptance of pain	0.21	0.25		
	Activity engagement			–0.20	0.01
	Pain willingness			–0.37	0.001
	Thought control			–0.01	ns
	Chronicity			0.005	ns

At the first step of each equation age, gender, education, pain, and pain duration were tested for entry and retained if significant. Pain was assessed using a 0–10 numerical rating scale; office visits included the number of general practitioner visits, due to pain, over the 6 months prior to assessment; pain medications was the number of medication classes taken for pain; disability was assessed with the sickness impact profile; work status was coded 0, not working due to pain; 1, working or other; depression was assessed with the Beck depression inventory; and pain-related anxiety with the pain anxiety symptoms scale.

depression, pain-related anxiety, and psychosocial disability. The remaining CPAQ subscales, chronicity and thought control, did not account for significant variance in a uniform fashion, although contributions were observed for pain intensity, depression, and pain-related anxiety. In each of these cases, these subscales accounted for a smaller amount of variance than the first two subscales of the CPAQ.

4. Discussion

The purpose of the present analyses was to evaluate the CPAQ and examine the facets of acceptance. Selected items from the CPAQ produced a four-factor structure: activity engagement, pain willingness, thought control, and chronicity. These findings are clearly concordant with previously published results derived from a separate clinical context in a different country (McCracken, 1999).

Our analyses of acceptance show that some of the previously defined constituents are likely to be more useful than others. The two smaller factors derived from the CPAQ had marginal scale reliabilities. The factor concerning beliefs about cognitive control of pain was unrelated with the CPAQ's total score. And, these factors were generally unrelated with other measures of pain-related distress and disability. Based on these results, it was decided to exclude these components from further use as part of the overall measure. On the other hand, our analyses of item variability, item intercorrelation, internal consistency, and predictive validity strongly support continued use of the first two larger factors. We recommend that the content of the CPAQ be reduced to include these factors concerning activity engagement and pain willingness. A complete version of the revised CPAQ appears in Appendix 1, including scoring procedures.

Findings indicated that the activity engagement and pain willingness factors of the CPAQ were significant predictors of pain-related disability and distress. The pattern of results, however, was not consistent between the two subscales

as they related differentially with five of the nine criterion variables, and made similar contributions on the remaining four. This finding provides support not only for the importance of acceptance in chronic pain, but also the factor structure of the measure. Hence, acceptance of chronic pain can be usefully considered as a behavioral domain with two components. The first of these concerns the pursuit of life activities in a normal manner even while pain is being experienced. As noted by McCracken and Eccleston (2003), this focus is more than a mental process; it requires that the individual actually engage in positive and functional everyday activities under the influence of circumstances separate from pain. The second identified factor concerns recognition on the part of the patient that avoiding or controlling pain are strategies that are often patently ineffective. Those patients who showed in their responses that it is not necessary to control or avoid sensations of pain in order to pursue goals and values were the patients who used less health care, were the least distressed and disabled by their pain, and most likely to be working. In general, more accepting patients reported lower pain intensities, although pain intensity alone did not account for the relation of acceptance to other measures of functioning. Finally, it is notable that pain duration failed to account for significant variance in any of the measures used as criterion variables in the regression analyses, thus indicating that the length of time a person has suffered from pain may not account for whether a person is accepting pain or not.

The results of our study are limited in some ways. Our correlation methods cannot unambiguously determine whether acceptance leads to decreased levels of disability and distress or vice versa. Given the consistent relations between acceptance and these measures, however, it is clear that there are important behavioral processes at work. Experimental, longitudinal, or clinical methods are needed to illuminate these processes, methods such as those applied with transient, experimental pain (Hayes et al., 1999a) and psychiatric disorders (Bach and Hayes, 2002). In addition, despite the fact that the included measures were intended to

sample patient functioning across emotional and behavioral domains, self-report was the only method included in the present analyses. Alternate methods may add more persuasive data. Possible examples include direct observations of pain behavior (Keefe and Block, 1982; Prkachin et al., 2002) or direct evaluations of physical/functional ability (e.g. Al-Obaidi et al., 2000; Crombez et al., 1998; Geisser et al., 2000; Vowles and Gross, 2003). Finally, this was a treatment-seeking population who were being evaluated for an interdisciplinary cognitive behavioral program and whose pain duration was longstanding. Therefore, it is possible that a sample of persons not seeking treatment, patients who had already received treatment, or who were seeking different pain-management services may have responded differently.

At its core acceptance is an active process. It requires that an individual maintain functioning and participate in enjoyable and reinforcing activities in daily life even while continuing to experience sensations of pain. It can be hypothesized that behavior showing acceptance is produced from an interaction of past and ongoing experience with current social, emotional, and verbal influences. If approaching chronic pain in an active and accepting manner maintains functioning, then the converse is likely true; a passive and avoidant approach will engender increasing losses in functioning (Jensen et al., 1991). It may be important that healthcare providers ensure that treatments they provide do not encourage passivity on the part of the patient when that passivity is injurious to healthy functioning. The assertion that patients cannot function while experiencing pain appears to be without merit in many circumstances. Accumulating evidence, including the present analyses, suggests that (1) giving up the struggle to control pain and (2) pursuing normal life activities is a more appropriate, and ultimately successful, approach to chronic pain for at least some portion of patients in some circumstances. There are numerous treatment developments within behavior therapy and in psychology more generally that show potential for acceptance-based treatment (Baer, 2003; Hayes et al., 1999b). Their applicability to chronic pain appears to be increasingly compelling.

We are just beginning to understand how to enhance acceptance of chronic pain. More data are needed. Unfortunately the approach of acceptance-based treatments is somewhat counterintuitive in Western societies. Within these treatments, aversive sensations, such as pain, are not things to control and avoid, as these actions can serve to increase problems and suffering. Instead, it is useful for individuals to realize that aversive and unpleasant feelings are a normal part of living and are to a large extent uncontrollable. Counterintuitive as it might be, acceptance is a potentially valuable concept in our understanding of the process and treatment of chronic pain. The present analyses clarify the measurement of acceptance within pain populations and may help during the next phases of research in this area.

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Appendix. CPAQ

Directions: below you will find a list of statements. Please rate the truth of each statement as it applies to you. Use the following rating scale to make your choices. For instance, if you believe a statement is 'Always True,' you would write a 6 in the blank next to that statement

0	1	2	3	4	5	6
Never true	Very rarely true	Seldom true	Sometimes true	Often true	Almost always true	Always true

- I am getting on with the business of living no matter what my level of pain is
- My life is going well, even though I have chronic pain
- It's OK to experience pain
- I would gladly sacrifice important things in my life to control this pain better
- It's not necessary for me to control my pain in order to handle my life well
- Although things have changed, I am living a normal life despite my chronic pain
- I need to concentrate on getting rid of my pain
- There are many activities I do when I feel pain
- I lead a full life even though I have chronic pain
- Controlling pain is less important than any other goals in my life
- My thoughts and feelings about pain must change before I can take important steps in my life
- Despite the pain, I am now sticking to a certain course in my life
- Keeping my pain level under control takes first priority whenever I'm doing something
- Before I can make any serious plans, I have to get some control over my pain
- When my pain increases, I can still take care of my responsibilities
- I will have better control over my life if I can control my negative thoughts about pain
- I avoid putting myself in situations where my pain might increase
- My worries and fears about what pain will do to me are true

19. It's a relief to realize that I don't have to change my pain to get on with my life
20. I have to struggle to do things when I have pain

Scoring:

Activities engagement: Sum items 1, 2, 3, 5, 6, 8, 9, 10, 12, 15, 19.

Pain willingness: reverse score items 4, 7, 11, 13, 14, 16, 17, 18, 20 and sum.

Total: activity engagement + pain willingness.

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