A Prospective Investigation of Acceptance and Control-Oriented Coping with Chronic Pain

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Abstract Historically, investigations of coping with chronic pain primarily have sought methods for gaining greater control over pain and pain-related distress. Recently, it has been suggested to expand the framework of coping so that control efforts are redirected from circumstances where they fail, and so that coping can more explicitly incorporate potentially more practical and flexible notions of acceptance. The purpose of the present study was to evaluate the role of control-oriented and acceptance-oriented coping responses for patient functioning using a prospective design. Participants included 120 adult patients with chronic pain who completed measures of coping, pain, disability, depression, and pain-related anxiety at two time points, separated by an average of 3.7 months ($SD = 2.6$ months). Factor analyses revealed four factors within the coping data: Pain Management, Pain Control, Help Seeking, and Activity Persistence. A series of correlation and linear regression analyses was performed to assess the relations of these factors at initial assessment to functioning later in time. In general, Activity Persistence was associated with better functioning over time while control-oriented responses were associated with greater difficulty. The factor representing more or less traditional pain management methods showed surprisingly limited relations with aspects of patient functioning. Analyses of concurrent change in coping and functioning highlighted a unique, apparently unhelpful, role of Pain Control. These results support the inclusion of contextual acceptance-related processes in current frameworks for understanding adjustment to chronic pain.

Introduction

Behavioral and cognitive-behavioral treatments for chronic pain are based on the idea that altering an individual's responses to their condition can reduce disability and suffering. Along these lines, a great deal of research has examined the range and efficacy of patients' ''coping'' strategies (Keefe et al. 2004). It has been assumed that an individual's choice of coping strategies will determine their adjustment to chronic pain, and research effort has focused largely on identifying healthy strategies.

Questionnaires such as the Coping Strategies Questionnaire (CSQ, Rosenstiel and Keefe 1983) and the Chronic Pain Coping Inventory (CPCI, Jensen et al. 1995) have been developed to characterize coping responses. These instruments have, in part, reflected a traditional conceptualization of coping, with a focus on controlling pain and other distressing experiences related to pain. Research using these instruments, however, has more readily identified detrimental, rather than beneficial, methods of coping. Coping responses such as guarding and catastrophizing have often shown a strong positive association with disability and distress (e.g., Jensen et al. 2003; Tan et al. 2001). Only a minority of coping responses, such as task persistence, has been consistently associated with lower disability (Jensen et al. 1995; Romano et al. 2003; Tan et al. 2001), and the size of the association tends to be small. The failure to identify

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strongly positive ways of coping is unfortunate, as most clinicians would wish to help patients build positive, healthy, behavioral repertoires.

Instead of seeing coping responses as almost exclusively about control of pain and other unwanted experiences, it may help to see them within a broader and more flexible framework. McCracken and Eccleston (2003) have recommended an expansion of coping in the context of chronic pain to more explicitly include accepting responses. Here acceptance is defined as a willingness to experience pain without attempts to control it, and as persisting with healthy activities while pain is present, but doing so in a manner that is free from influences of the pain itself. Studies to date support the role of acceptance in functioning with chronic pain (e.g., McCracken and Eccleston 2005; McCracken et al. 2004; Nicholas and Asghari 2006; Viane et al. 2003). When both coping, as it is traditionally conceived, and acceptance were studied in relationship to disability and distress, coping variables showed weak and positive associations with functioning poorly, whereas acceptance showed reliably stronger positive associations with functioning well (McCracken and Eccleston 2003, 2006).

Given that acceptance appears to be associated with better functioning, it is important to identify the day-to-day behaviors that represent an accepting approach to pain. The Brief Pain Coping Inventory (BPCI, McCracken et al. 2005a) was developed to measure patients' reports of specific behavioral responses to pain. Some items in this instrument represent traditional notions of 'coping', whereas others reflect acceptance-oriented responses. Previous research using this instrument has shown that individual items are specifically and differentially associated with measures of patients' social, physical, and emotional functioning (McCracken et al. 2005a). Items that reflected willingness to experience pain, and to perform activities in the presence of it (i.e., components of acceptance), were associated with greater daily activity and less distress.

Previous study of the BPCI involved assessment at one point in time. A prospective analysis of the same variables would strengthen the case that, compared to control-oriented responses, accepting responses to chronic pain lead to continuing better quality activity and emotional functioning over time.

The purpose of this study was to examine the relative utility of control-oriented and acceptance-oriented responses to chronic pain over time. It was predicted that variables from the BPCI designed to measure accepting responses would predict less disability and emotional distress and greater daily activity, and that they would reliably account for more variance in these aspects of functioning than could be accounted for by more traditionally conceived control-oriented coping responses.

Method

Subjects

Participants in this study were 120 consecutive adult patients (64.2% women) treated on an interdisciplinary pain management unit in the UK. Mean age was 44.6 years ($SD = 10.7$). Most were married (68.3%), and the rest were never married (13.3%), divorced (11.7%), living with a partner (4.2%), or other (2.5%). Participants completed a mean of 12.2 years of education ($SD = 2.5$). The vast majority was White European in background (98.3%). They reported pain had been present for a median of 92.0 months (range 12–528) and the primary locations of pain were low back (50.0%), lower extremity (14.2%), upper extremity (11.7%), neck (10.8%), or other (13.3%). The sample was generally quite disabled; 84.1% were either retired or out of work due to pain and just 5.8% were continuing work on a full time basis.

Measures

At both the initial assessment and on the first day in treatment, $M = 3.7$ months later ($SD = 2.6$ months), all patients completed a general background questionnaire requesting biographical data, 0–10 ratings of present, usual, and highest pain in the past week, and an estimate of uptime (time spent standing or walking per day in the past week). They also completed a standard set of questionnaires described below. All data were provided as part of routine clinical assessment procedures and the interval between assessments was a natural product of clinical scheduling, patient availability, and time requirements for funding approval and communication.

The primary measure used in this study was the Brief Pain Coping Inventory (BPCI; McCracken et al. 2005a), an 18-item measure designed to assess acceptance-oriented and control or avoidance-oriented responses to pain. Patients are asked to indicate the number of days in the past week they responded to their pain as indicated in each item. Three acceptance items are keyed positively (e.g., 'Realized that pain did not need to keep me from engaging in activity') and three keyed negatively (e.g., 'Struggled to control the pain'); six directly assess pain control oriented strategies (e.g., 'Used pain medication'), and the remaining seven assess commonly used practical strategies, such as activity management methods (e.g., 'Used physical exercise or stretching,' or 'Paced myself...'). The BPCI items were factor analyzed to derive summary scores, as part of the present study.

Patients completed the Chronic Pain Acceptance Questionnaire (McCracken et al. 2004). The CPAQ is a 20-item measure of acceptance of chronic pain that yields a total

score and two subscale scores for pain willingness and activity engagement. It has been used in at least 11 published studies of chronic pain over the past 9 years, providing a consistent pattern of support for the reliability, validity, and practical utility of the scores derived from it. The total score from the CPAQ was used to examine the validity of scores from the BCPI.

Patients completed several standard measures of patient functioning and adjustment. These included measures of disability, the Sickness Impact Profile (SIP; Bergner et al. 1981); depression, the Beck Depression Inventory (BDI; Beck et al. 1961); and pain-related anxiety, the Pain Anxiety Symptoms Scale (PASS; McCracken et al. 1992; see also Roelofs et al. 2004). The SIP yielded summary scores for physical, psychosocial, and ''other'' disability (made up of sleep and rest, eating, work, home management, and recreation). The PASS was used to measure both avoidance and overall pain-related anxiety. One final measure was collected at the start of treatment only (i.e., Time 2 in the present analyses), frequency of a sit-to-stand performance during a one-minute interval. Participants performed this task in a low armless chair and were not allowed to use their upper extremities to assist.

Analyses

Preliminary factor analyses were used for two purposes, to create composite pain scores from the ratings of present, average, and worst pain, and to create summary scores from the items of the BPCI. Additional preliminary analyses examined change and correlation across the two time points for each of the measures of coping and patient functioning. Also, patient background variables were examined in relation to the coping variables. The primary analyses consisted of correlations of the coping scores from Time 1 with the patient functioning variables at Time 2 and regression analyses of these same relations. The purpose of the regression analyses was to control for relevant patient background variables and to look at unique relations of each coping score with patient functioning, when the coping scores are considered simultaneously. A final set of regressions were designed to examine relations between coping variables at Time 1 and measures of functioning at Time 2 after controlling for the same measures of functioning from Time 1.

Results

Factor and Validity Analyses

First, factor analyses of the BPCI items were planned for data reduction purposes. Based on frequency distributions

in preparation for factor analyses, two items were found to be highly skewed, 'used relaxation to help focus' and 'sought attention of health care provider,' for which 76.7% and 80.8% of patient, respectively, endorsed ''0'' days. With these items eliminated, a principal axis factor analysis with orthogonal rotation was done. Successive extractions showed three additional problem items. The items 'used relaxation to reduce pain' and 'accepted the pain and realized I did not need to change it' both formed single item factors with low variance. These were eliminated. Finally, the item 'avoided a painful activity' demonstrated low factor loadings and low communality, and was therefore eliminated as well. Thirteen items were submitted to the final factor analysis. Four interpretable factors emerged with eigenvalues greater than one. This solution was substantiated by the scree plot and accounted for a modest 40.0% of the variance in the variable set. The factors were labeled Pain Management, Pain Control, Help Seeking, and Activity Persistence. The factor solution is shown in Table 1.

Four summary scores based on the derived factors were calculated by assigning items to the factors on which they had their primary loading and summing the raw item ratings. Preliminary correlation analyses sought to examine the relations of the summary scores to acceptance of pain and to each other. These results are shown in Table 2. Predictably, Pain Control was negatively associated with acceptance of pain and Activity Persistence was positively associated with acceptance of pain. Although the former correlation was not large, these results generally support the validity of these factors as indices of control and acceptance oriented approaches. Significant positive correlations between Pain Management and both scores for acceptance of pain and Activity Persistence are notable and interesting.

Also included in Table 2 are correlations of the BPCI summary scores at Times 1 and 2. Based on paired t-tests none of these scores significantly shifted over this time interval (i.e., 3.7 months), all $P > .10$. The Pain Management, Pain Control, and Activity Persistence achieved reasonable test–retest correlations, all $r \geq .50$, but the Help Seeking factor clearly did not. A subsequent analysis, which included $n = 16$ patients with a less than 1 month intervening interval, showed that the Help Seeking scores correlated at $r = .67$.

Based on further analyses the Pain Management score was correlated with age, $r = .24$, $P < .05$, gender (1 = men, 2 = women), $r = .26$, $P < .01$, and years of education, $r = .23$, $P < .05$. Pain Control was also correlated with age, $r = .24$, $P < .01$, and Activity Persistence was correlated with years of education, $r = .23$, $P < .05$. None of the BPCI summary scores was correlated with duration of pain.

Table 1 Results from principal axis factor analysis with orthogonal (Varimax) rotation on the items of the BPCI ($N = 120$)

Summary Item content	Factor loadings			
	1	2	3	4
14. Changed activity	**.59**	−.04	.16	.07
3. Physical exercise/stretching	**.56**	.04	.02	.11
10. Paced activity	**.55**	.25	.01	−.03
1. Encouraged self or changed thinking	**.47**	−.08	−.01	.30
18. Tried not to think about pain	**.40**	.22	−.08	.20
12. Used pain medication	−.08	**.60**	−.04	−.08
17. Struggled to control pain	.02	**.46**	.16	.09
7. Rested	.08	**.42**	.12	−.16
15. Used ice, heat, massage, TENS	.24	**.39**	.06	−.06
5. Contacted friend/family for support	−.05	.11	**.92**	.02
6. Asked for/accepted help with a task	.19	.36	**.47**	.05
4. Kept doing an activity	.12	−.12	.13	**.75**
11. Realized pain doesn't prevent activity	.42	−.05	−.11	**.55**

Note: The final solution accounted for 40.0% of the variance in the variable set. Factor labels: (1) Pain Management, (2) Pain Control, (3) Help Seeking, and (4) Activity Persistence

Table 2 Intercorrelations of BPCI factor scores at Time 1, correlations with acceptance of pain at Time 1, and correlations of the BPCI factors over time (i.e., test–retest; in bold)

	Pain Manage.	Pain Control	Help Seek.	Activity Persist.
Acceptance of pain	.31***	−.26**	−.06	.53***
BPCI scores				
Pain Management	**.67*****			
Pain Control	.17	**.62*****		
Help Seeking	.14	.31***	**.27***	
Activity Persistence	.39***	−.11	.05	**.50*****

* $P < .05$, ** $P < .01$, *** $P < .001$

Note: Acceptance of pain was assessed with the Chronic Pain Acceptance questionnaire

Correlation Analyses of BPCI Summary Scores and Patient Functioning

There were nine measures of patient functioning examined in relation to the summary scores from the BPCI. Eight of these were available from both assessment occasions. The exception was the sit-to-stand performance that was collected at Time 2 only. The Time 1 and Time 2 scores for each of the eight measures was significantly correlated, range $r = .32$–.80, all $P < .001$, mean $r = .64$. Two of these measures changed significantly in level over time, ''other'' disability as measured by the SIP, which changed from .32 to .30, $t (118) = 2.65$, $P < .01$; and uptime, which changed from 3.22 h to 3.84 h, $t (108) = 2.78$, $P < .01$. There was no change in the mean for any of the other measures of patient functioning over time.

Correlation analyses between BPCI summary scores at Time 1 and nine measure of patient functioning at Time 2 are shown in Table 3. The measures of patient functioning included pain, uptime, disability, depression, pain-related anxiety and avoidance, and performance of the sit-to-stand

task. Pain Management demonstrated three significant results: negative correlations with depression, pain-related anxiety, and avoidance. Pain Control demonstrated seven significant results: positive correlations with pain, physical disability, other disability, depression, and avoidance, and a negative correlation with sit-to-stand performance. Help Seeking demonstrated four significant results: positive correlations with physical disability, other disability, and pain-related anxiety, and a negative correlation with sit-to-stand performance. And, finally, Activity Persistence demonstrated six significant results: a positive correlation with uptime, and negative correlations with physical disability, psychosocial disability, depression, and avoidance.

Multiple Regression Analyses of BPCI Scores and Patient Functioning

We followed the correlation analyses with a series of multiple regression analyses in which the nine measures of patient functioning from Time 2 served as the criterion variables and the BPCI summary scores from Time 1

Table 3 Correlation results including summary scores from the BPCI at Time 1 and measures of pain, functioning, and distress at Time 2 (3.7 months later)

	Pain	Uptime	Physical Disability	Psychosoc. Disability.	Other Disability	Depression	Pain-related anxiety	Avoidance	Sit-to-stand
Pain Manage.	−.14	.08	.02	−.11	.01	−.26**	−.24**	−.21*	−.06
Pain Control	.28**	−.05	.43***	.17	.35***	.25**	.18*	.25**	−.37***
Help Seeking	.09	−.06	.39***	.15	.32***	.09	.22*	.17	−.20*
Activity Persist.	−.06	.35***	−.18*	−.20*	−.15	−.25**	−.39***	−.41***	.09

* $P < .05$, ** $P < .01$, *** $P < .001$

Note: Pain was assessed as a composite score of present, average, and highest pain intensity in the past week. Uptime was assessed as an estimate of time standing or walking during an average day in the last week. Physical, psychosocial, and ''other'' disability were assessed by the Sickness Impact Profile. Pain-related anxiety and avoidance were assessed with the Pain Anxiety Symptoms Scale. Sit-to-stand was a directly assessed performance of repeated standing up from a chair in 1 min

served as the predictor variables. Age, gender, education, and chronicity of pain were considered for entry as covariates in these analyses based on statistical criteria ($P \leq .05$ to enter, $P \geq .10$ to remove). The four BPCI summary scores were entered simultaneously after that. Results of the regression analyses are included in Table 4.

The BPCI summary scores as a block accounted for significant variance in each of the nine regression equations, ranging from 7.8% for the sit-to-stand performance to 25.0% for physical disability. Patient background variables made little contribution, being retained on three occasions out of 36 tests. Perhaps the only result of note from these variables was from age, which contributed to physical disability, 4.1%, and the sit-to-stand performance, 8.1%.

According to the regression analyses Pain Management was a significant unique predictor in only two equations, where higher values on this summary score predicted less pain and less depression. Pain Control was a significant unique predictor of pain, physical disability, other disability, depression, avoidance, and sit-to-stand performance. Help Seeking was a significant unique predictor of physical disability, other disability, and pain-related anxiety. In each case more frequent attempts at Pain Control and Help Seeking, were associated with lower functioning and greater distress. Finally, Activity Persistence was a significant unique predictor of uptime, pain-related anxiety, and avoidance. Unlike the other factors, Activity Persistence was associated with greater daily activity, less distress, and less avoidance.

In a next set of regression analyses we tested the relations of the coping summary scores from Time 1 with eight of the measures of functioning at Time 2 after controlling for Time 1 values of each of measure. These analyses excluded the sit-to-stand performance as it was not available at Time 1. Patient background variables, as in the previous analyses, were also tested for entry in the equations in the second block, however, none of these were

significant. After these steps the four coping summary scores were tested. The block of coping scores did not add a significant increment to explained variance in any of the eight equations.

As the coping scores from Time 1 had failed to predict Time 2 functioning with Time 1 functioning controlled, we elected to test whether changes in the coping variables over time might better predict functioning when examined this way. This amounts to a test of relations between changes in coping and changes in functioning over time. These analyses proceeded just as the previous set, but instead of Time 1 coping scores we entered residualized change scores for the coping scores, as calculated with regression.

Results of the final set of regression analyses are included in Table 5. Naturally, Time 1 values for each of the measures of patient functioning accounted for large increments of variance in the Time 2 values, ranging from 37.0% for uptime to 66.0% for physical disability. Again, although age, gender, education, and duration of pain were tested as predictors of change in patient functioning, none of these were selected as significant predictors. The four coping change scores as a group, on the other hand, accounted for significant variance in five of eight equations, failing to make significant contributions to changes in uptime, physical disability, or avoidance. The significant increments in explained variance by changes in coping were generally small, ranging from 4.2% for depression to 7.0% for other disability. Pain Control was a significant unique predictor of pain, psychosocial disability, other disability, depression, and pain-related anxiety. In each case the relations were positive, meaning that changes in Pain Control and disability or distress moved in the same direction. The only other significant unique relationship was between Help Seeking and other disability, and this relations too was positive. Changes in Pain Management or Activity Persistence did not achieve significant unique relations in any equation.

Table 4 Results of hierarchical regression analyses predicting patient functioning at Time 2 from relevant patient background variables and coping summary scores at Time 1

Step	Predictors	ΔR^2	β	Total R^2
Pain Intensity				
1.	Pain Management		−.22*	
	Pain Control		.32***	
	Help Seeking		.022	
	Activity Persistence	.12**	.064	.12**
Uptime				
1.	Pain Management		−.053	
	Pain Control		.037	
	Help Seeking		−.081	
	Activity Persistence	.13**	.38***	.13**
Physical Disability				
1.	Age	.041**	.10	
2.	Pain Management		−.043	
	Pain Control		.30***	
	Help Seeking		.30***	
	Activity Persistence	.25***	−.15	.29***
Psychosocial Disability				
1.	Pain Management		−.11	
	Pain Control		.13	
	Help Seeking		.14	
	Activity Persistence	.085*	−.15	.089
Other Disability				
1.	Pain Management		.025	
	Pain Control		.26**	
	Help Seeking		.25**	
	Activity Persistence	.19***	−.12	.22***
Depression				
1.	Duration of Pain	.035*	−.16	
2.	Pain Management		−.26**	
	Pain Control		.26**	
	Help Seeking		.056	
	Activity Persistence	.16***	−.098	.19***
Pain-related Anxiety				
1.	Pain Management		−.16	
	Pain Control		.095	
	Help Seeking		.23*	
	Activity Persistence	.23***	−.32***	.23***
Avoidance				
1.	Pain Management		−.12	
	Pain Control		.18*	
	Help Seeking		.14	
	Activity Persistence	.24***	−.34***	.24***
Sit-to-stand				
1.	Age	.081**	−.22*	
2.	Pain Management		.029	
	Pain Control		−.29**	
	Help Seeking		−.097	

Table 4 continued

Step	Predictors	ΔR^2	β	Total R^2
	Activity Persistence	.078*	.068	.19***

* $P < .05$, ** $P < .01$, *** $P < .001$

Note: In each analysis patient age, gender, education, and duration of pain was tested for entry in step 1 (probably of F to enter $\leq$ .05; probably of F to remove >.10) and retained if significant. The four BPCI summary scores were entered simultaneously in the next step. Pain intensity was a composite score made up of present, average, and worst pain in the past week as rated on a 0–10 scale. Uptime was assessed as an estimate of time standing or walking during an average day in the last week. Physical, psychosocial, and ''other'' disability were assessed by the Sickness Impact Profile. Pain-related anxiety and avoidance were assessed with the Pain Anxiety Symptoms Scale. Sit-to-stand was a directly assessed performance of repeated standing up from a chair in 1 min

Table 5 Results of hierarchical regression analyses predicting patient functioning at Time 2 from relevant patient background variables and changes in coping summary scores from Time 1 to Time 2, after controlling for patient functioning measures at Time 1

Step	Predictors	ΔR^2	β	Total R^2
Pain Intensity				
1.	Pain Intensity Time 1	.51***	.67***	
2.	Δ Pain Management		−.084	
	Δ Pain Control		.14*	
	Δ Help Seeking		.093	
	Δ Activity Persistence	.056**	−.13	.57***
Uptime				
1.	Uptime Time 1	.37***	.57***	
2.	Δ Pain Management		−.052	
	Δ Pain Control		−.073	
	Δ Help Seeking		−.090	
	Δ Activity Persistence	.030	.091	.41***
Physical Disability				
1.	Physical Disability Time 1	.66***	.78***	
2.	Δ Pain Management		.035	
	Δ Pain Control		.045	
	Δ Help Seeking		.12*	
	Δ Activity Persistence	.022	.032	.68***
Psychosocial Disability				
1.	Psychosocial Disability Time 1	.51***	.68***	
2.	Δ Pain Management		.048	
	Δ Pain Control		.15*	
	Δ Help Seeking		.088	
	Δ Activity Persistence	.045*	−.040	.55***
Other Disability				
1.	Other Disability Time 1	.39***	.52***	
2.	Δ Pain Management		.012	
	Δ Pain Control		.15*	
	Δ Help Seeking		.19**	
	Δ Activity Persistence	.070**	−.070	.46***
Depression				
1.	Depression Time 1	.63***	.78***	
2.	Δ Pain Management		−.010	
	Δ Pain Control		.17**	
	Δ Help Seeking		.063	
	Δ Activity Persistence	.042*	−.037	.67***

Table 5 continued

Step	Predictors	ΔR^2	β	Total R^2
Pain-related Anxiety				
1.	Pain-related Anxiety Time 1	.63***	.76***	
2.	Δ Pain Management		−.050	
	Δ Pain Control		.16*	
	Δ Help Seeking		.080	
	Δ Activity Persistence	.049**	−.099	.68***
Avoidance				
1.	Avoidance Time 1	.44***	.65***	
2.	Δ Pain Management		−.13	
	Δ Pain Control		−.030	
	Δ Help Seeking		.13	
	Δ Activity Persistence	.040	−.12	.48***

* $P < .05$, ** $P < .01$, *** $P < .001$

Note: In each analysis Time 1 values for each criterion variable were entered in step one. Patient age, gender, education, and duration of pain were tested for entry in step 2 (probably of F to enter ≤.05; probably of F to remove ≥.10), however, none were significant. Finally, residualized change scores for each of the four BPCI factor scores were entered simultaneously in the final step. Pain at Time 1 and Time 2 were both composite scores made up of present, average, and worst pain in the past week as rated on a 0–10 scale. Uptime was assessed as an estimate of time standing or walking during an average day in the last week. Physical, psychosocial, and ''other'' disability were assessed by the Sickness Impact Profile. Pain-related anxiety and avoidance were assessed with the Pain Anxiety Symptoms Scale

The results of this last regression raised one further question for testing. As change in Pain Control was the single reliable predictor of change in functioning, this raised the possibility that change in pain could be responsible for both of these other changes. To test this we calculated a residualized change score for pain and entered this into each regression equation prior to the block of coping change scores. This included seven equations this time, excluding the equation for pain itself. The pain change score made a significant contribution to the equation for pain-related anxiety, $\Delta R^2 = .016$, $P < .05$, but it did not make a significant contribution to any other equation. The significant contributions of the coping change scores to depression, pain-related anxiety, and other disability remained significant, but the contribution to psychosocial disability, $\Delta R^2 = .037$, $P = .06$, shrunk to the level of a trend. Likewise, each of the standardized regression coefficients that had been significant in the previous analyses remained significant in these analyses with change in pain controlled.

Discussion

Results from the present study of chronic pain sufferers demonstrate that responses to pain such as carrying on with activity, while acknowledging that pain is present, were associated with better physical, psychosocial, and emotional functioning over time. Attempting to control pain, or seeking support or help, on the other hand, were associated with relatively worse functioning over time. Perhaps curiously, a combination of responses such as activity management (i.e., pacing), physical exercise, positive thinking, or attention/thought suppression, played a relatively limited role in these same analyses. In analyses of concurrent changes in functioning and coping the Pain Control responses appeared to be the overwhelmingly more important concern and the other types of responses played little or no role. In these analyses it was found that changes in pain control efforts and changes in functioning move in opposite directions, or, in other words, that increasing attempts at control are associated with increasing difficulties with functioning. Hence, overall, attempts to change or eliminate pain, or other experiences that come with it, appear less useful than responses that engender more acceptance of pain.

In many ways, these results are consistent with the previously reported cross-sectional study of the BPCI (McCracken et al. 2005a) where, again, the trend was that responses focused on avoiding pain were associated with greater difficulty in comparison with responses less focused on pain control and more focused on pain acceptance. They are also consistent with results showing that while task persistence is adaptive in chronic pain (Ersek et al. 2006; Jensen et al. 1995; Romano et al. 2003), some approaches to pacing may not be (Ersek et al. 2006; McCracken and Samuel in press). And finally, they are consistent with other results supporting the utility of acceptance, or flexible coping, for adjustment to chronic pain (e.g., Dahl et al. 2004; De Vlieger et al. 2006; McCracken et al. 2004,

2005b) and demonstrating the greater utility of acceptance over and above traditional approaches to coping (e.g., McCracken and Eccleston 2003, 2006).

Across the correlation and first set of regression analyses, Pain Control and Activity Persistence together achieved at least marginally higher relations with the measures of patient functioning. Notably, Pain Control appeared to be an unhealthy set of responses while Activity Persistence appeared to be healthy. Each of these factors reflects a facet of the current standard measure of acceptance of pain, the CPAQ (McCracken et al. 2004), with its subscales: activity engagement and pain willingness. Here the match between Activity Persistence, from the current analyses, and activity engagement, from the CPAQ, is obvious. Pain willingness, from the CPAQ, is defined as a relative absence of attempts at avoidance and control of pain. By this definition, Pain Control, from the current analyses, is the direct opposite of pain willingness. In this sense, the two key components of coping that predominate in the current data help to verify the continued focus on these behavior patterns within formulations of coping, and alternate formulations of acceptance.

Activity Persistence emerged as the sole positive strategy. In regression, however, it was not a significant unique predictor in six of nine regression analyses, including the analyses of pain, physical disability, psychosocial disability, other disability, depression, and the sit-to-stand performance. This is somewhat inconsistent with our predicted results. Consistent with the long tradition in pain management, unhelpful coping strategies appear more easily identified than helpful ones (e.g., Geisser et al. 1999). This suggests a continuing need for sharpening our conceptualizations of positive behavioral processes in pain management and for developing research methods to investigate them. Certainly, the Activity Persistence scale examined here was constructed from just two items. An expansion of this measure seems warranted.

In the regression analyses of change over time the complete failure of the Time 1 coping scores to predict later functioning may appear surprising. However, this may have occurred for several reasons. First, there was relative stability of all variables over time and the large amounts of variance in Time 2 functioning was accounted for by the Time 1 values. Second, to control for Time 1 functioning meant also extracting variance shared at that time point with the coping scores, making this unavailable in relation to Time 2 functioning. In addition, 3.7-month time interval is an arbitrary length of time in psychological terms. There were likely many individual changes in behavior and functioning in both directions during this interval and these may have obscured the identification of any systematic relations as sampled at one point in time.

In contrast to the results of the raw coping scores from Time 1, the analyses of concurrent changes in coping and functioning showed a number of significant relations. These are interesting, as they appear to demonstrate that when patients increase their attempts to control pain they also experience increasing difficulties, particularly with pain, psychosocial and other disability, anxiety and depression. Of course, the design of this study and the nature of these particular analyses do not allow us to make definitive statements about the direction of causality here. It appeared possible that increasing attempts at pain control and decreasing function could have both occurred in response to increasing pain. However, subsequent analyses seem to rule this out in that change in pain had few relations with changes in functioning, and the significant contribution of change Pain Control efforts was generally not diminished by entering change in pain in the equations.

It is worth emphasizing that the extent to which behavior includes attempts to control or avoid pain is a crucial component in acceptance of pain. In a sense acceptance has two separate, necessary, and irreducible components. The ''just do it'' approach implied by Activity Persistence is potentially congruent with acceptance but is not itself acceptance when considered alone. It is the broader qualities or *functions* of ''Activity Persistence'' behavior that will determine whether it reflects acceptance or not. The behavior of activity persistence may be done for negative purposes of ''beating the pain,'' or for ignoring or running away from pain, or done impulsively, such as out of anger or frustration. Some of these functions described here clearly serve as attempts to avoid or control experiences deemed undesirable. On the other hand, the behavior of activity persistence may also be done for positive purposes of family, friends, health, or parenting goals, for example, with full awareness of pain, in touch with emotions that are present, but with a less reactive and more patient attitude. This latter behavior pattern reflects processes of acceptance.

Emerging theories have highlighted that behavior aimed at changing feelings of pain or aversive moods may contribute to distress and disability when these feelings cannot be effectively controlled in a lasting way, or when control efforts themselves interfere with healthy living. An alternative approach is to direct behavior change efforts more explicitly at the pursuit of values and a fuller participation in life (e.g., Hayes et al. 1999; De Vlieger et al. 2006; McCracken 2005). This approach may be centrally important to the treatment of chronic pain.

Asking for support or assistance, using pain medications, and using other means for pain reduction were associated with poorer future functioning, which is striking as, on the surface, they might look like adaptive ways to behave. It is clearly true that asking for help, using pain

medication, and attempts to reduce pain can be quite adaptive responses on some occasions. On other occasions they may serve as part of a pattern of avoidance of pain, a pattern that could constrict daily functioning, if it is overly generalized or indiscriminate, and if it prevents the patient taking advantage of opportunities for healthy functioning. In clinical settings we see that some actions that produce short-term relief, such as asking for help, also limit functioning in the longer term, such as by setting up a pattern of dependency and inactivity.

There were some responses from the BPCI that were surprisingly weak in their relations with measures of functioning completed at the second time point. For example, the combination of physical exercise, pacing, positive thinking, and distraction was not correlated with measures of daily activity or disability. While it is important to note that this study examined naturally occurring instances of these strategies, rather than the specific techniques taught in pain management treatment, these results are not altogether unusual. Reviews in the area similarly highlight concerns over the approaches to chronic pain implied by these strategies (e.g., Boothby et al. 1999; Geisser et al. 1999; Turk 2002). Continued evaluation of these strategies may be necessary to see more precisely what they achieve, for whom, and under what circumstances.

This study is limited as it relied on correlational methods only. Obviously these methods cannot prove causation. Further, it relied on reports of the frequency of a set of behaviors without examining other aspects of these behaviors, such as the circumstances under which they are done and what they achieved. There are undoubtedly qualitative differences in the functions served by behaviors on different occasions, as mentioned above, and these differences are unlikely to be fully reflected in frequency data. Finally, the sample studied here consisted of significantly disabled persons seeking treatment. The generality of these findings beyond this group will require further investigation.

It seems helpful to examine the agenda at work behind behaviors that occur in response to chronic pain. Some responses, such as commonly identified ''coping strategies'' make intuitive sense and seem as if they should lead to better overall functioning, but they frequently do not deliver results in accord with this promise. Some of this difficulty may arise because our ways to conceptualize and assess ''coping,'' or other clinically relevant behavior patterns, do not always incorporate the *context* in which he behavior occurs. For example, does the behavior arise from a history of trying to eliminate experiences, or instead from a history of moving persistently toward personal goals? Precisely what influences are exerted on patient behavior by virtue of their history?

The present results provide an avenue for further work. The spirit of the findings is that patients may suffer a great deal less if they treat pain, at least on some occasions, not as something to be altered, avoided, or controlled, but rather as something that can occur in experience without interfering with functioning. With this view of the problem, it may be worthwhile at this stage to expand our cognitive-behavioral approaches to chronic pain with additional processes that are more contextual and functionally considered.

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