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Psychological Flexibility in Coping with Chronic Pain:
Further Examination of the Brief Pain Coping Inventory-2

Kevin E. Vowles^{1,3}, Lance M. McCracken², Gail Sowden³,
& Julie Ashworth³

¹Department of Psychology, University of New Mexico, United States of America

²Psychology Department, Institute of Psychiatry, King's College, United Kingdom

³Interdisciplinary Musculoskeletal Pain Assessment and Community Treatment (IMPACT)
Service, The Haywood Hospital & Arthritis Research UK Primary Care Centre, Keele University,
United Kingdom

Correspondence to:
Kevin E. Vowles, Ph.D.
Department of Psychology
University of New Mexico
Logan Hall
MSC03 2220, 1 University of New Mexico
Albuquerque, NM 87131
United States of America
+1 505 277-5676
k.e.vowles@gmail.com (e-mail)

Abstract

Objective: The role of coping in chronic pain management is well established. One challenge to the coping approach, however, is in identifying forms of coping that reliably lead to better functioning. An emerging approach to coping is based on the notion of psychological flexibility, a response pattern entailing openness to experience, awareness of specific behavioral options in a given situation, and persistence or alteration of activity according to personally-held values and goals. A primary measure of psychological flexibility has been the Brief Pain Inventory-2 (BPCI-2) and initial analyses have provided support for its utility in chronic pain treatment settings. The present study aimed to extend previous work by examining relations of the BPCI-2 with measures of patient functioning, as well as with measures related to psychological flexibility, in this case pain acceptance and valued activity.

Method: Participants were 324 individuals with chronic pain who completed a series of measures at an initial assessment appointment.

Results: In correlation and regression analyses, the Psychological Flexibility subscale of the BPCI-2 achieved consistently significant relations with measures of disability, emotional functioning, pain acceptance, and valued activity, even after controlling for pain intensity and traditional coping methods.

Discussion: These results lend support to the adoption of psychological flexibility as a framework in future studies of coping with chronic pain.

Keywords: Chronic Pain, Coping, Psychological Flexibility, Cognitive Behavioral Therapy, Functioning

Introduction

The experience of chronic pain can adversely affect physical, emotional, and social functioning, often to the extent that treatment is required. Treatment development efforts over the past 30 years have focused on coping as an organizing framework for understanding patient functioning and for guiding treatment efforts^{1,2}. Broadly speaking, the promotion of effective coping is a primary objective of the cognitive and behavioral therapies for chronic pain. Unfortunately, the identification of specific, adaptive coping behavior patterns has been difficult. Traditionally identified coping variables, such as physical exercise, strategic rest, disputation of illogical or irrational thinking, and pacing of activity tend to be only weakly or inconsistently related to important aspects of patient functioning^{3,4}. Further, the relation of adherence to these coping strategies during treatment with post-treatment functioning is fairly modest⁵, particularly when measured at follow-up appointments⁶.

Given these results, a revision of current coping models may be beneficial. A framework that could guide this development is the approach provided in Acceptance and Commitment Therapy (ACT⁷). ACT is a form of cognitive behavioral therapy that focuses on psychological flexibility as its primary therapeutic process and behavior change as the primary outcome. It offers a functional and contextual approach that focuses less on changing the content of psychological experiences and more on the changing processes by which these experiences exert their influence over behavior^{7,9}. It also adopts a radically pragmatic therapeutic stance, one that is equal, compassionate, genuine, and itself incorporates psychological flexibility in provider behavior^{10,11}. Psychological flexibility includes multiple component processes: acceptance, open and direct contact with present experiences, purposeful identification of what one values, and values-based action, a flexible persistence in the pursuit of these goals and values^{7,8}. Hence pain coping behaviors that reflect psychological flexibility include willingness to experience pain and pain-related distress, openness to present experiences (both pleasant and unpleasant), actions that are guided by what one values (rather than predominantly by pain),

and the absence of avoidance behavior in relation to pain or pain-related thoughts and emotions⁹⁻¹⁰.

There are several measures that examine aspects of psychological flexibility in chronic pain and these measures are reliably associated with aspects of patient behavior¹². Representative measures include, for example, the Chronic Pain Acceptance Questionnaire¹³ and the Chronic Pain Values Inventory¹⁴, as well as the Psychological Inflexibility in Pain Scale¹⁵. To our knowledge, however, the Brief Pain Coping Inventory-2¹⁶ (BPCI-2) is the only measure that specifically examines psychological flexibility and traditionally conceived coping methods within a coping framework.

To date, only two studies have examined the BPCI-2 in chronic pain treatment settings. The first examined cross-sectional relations among psychological flexibility and traditional pain coping items with patient emotional and physical functioning. Findings indicated that the traditional coping items were generally unrelated to patient functioning and that the psychological flexibility items had reliable and significant associations with all measures of functioning used, including pain intensity, pain-related distress and anxiety, physical and psychosocial disability, analgesic medication use, daily uptime, and work status¹⁴.

The second study of the BPCI-2 examined how the measure's two subscales changed over the course of residential interdisciplinary pain rehabilitation and how these changes related to clinical improvements immediately post rehabilitation and at a three month follow-up appointment¹⁷. Findings indicated that both subscales improved significantly. Further, improvements in the psychological flexibility coping items were significantly associated with improvements in functioning at follow-up, while improvements in the traditional coping items were unrelated to improvements in any of the measures of outcome.

The primary purpose of the present study was to further investigate the role of psychological flexibility in chronic pain coping, as there is a need for replication and extension of previous work. Only one previous study¹⁶ has analyzed patterns of relations between the BPCI-2

subscales and measures of patient functioning, therefore, additional examination of these patterns is needed. The secondary purpose of the present study was to examine relations among the BPCI-2 and other measures of psychological flexibility. We felt that such an analysis would allow for enhanced clarity regarding the relation between coping behaviors theorized to specifically reflect psychological flexibility and broader measures derived from the same theoretical model.

Given the results of previous analyses, it was hypothesized that the Psychological Flexibility subscale of the BPCI-2 would account for a significant amount of variance in patient emotional and physical functioning, whereas the Traditional Pain Management subscale would account for lesser amounts of variance. Furthermore, we hypothesized that this pattern of findings would also be present when examining relations between the two BPCI-2 subscales and other measures of psychological flexibility, specifically acceptance of pain and values-based actions.

Materials & Methods

Participants

Data from 324 participants, collected from August 2009 to February 2011, were included in the analysis. Patients were consecutive referrals presenting for an assessment appointment at a newly established community-based pain service. Most participants were women (72.3%) and white European (97.6%). Mean age and education were 48.9 years ($SD = 14.8$ years) and 12.6 years ($SD = 2.9$ years), respectively. Most were married or co-habiting (67.0%; single: 17.0%; divorced: 11.2%; widowed: 4.8%). A minority were employed on a full or part time basis (30.4%). Median pain duration was 88 months (range: 3 to 548 months). Primary pain site was low back (50.0%; full body: 12.2%, lower limb: 11.2%; neck: 9.4%; upper limb: 8.0%; mid-back/abdominal: 5.6%; other: 3.6%). The majority of patients reported more than one pain site (57.4%). This study was approved by the local ethics board of the National Health Service (NHS).

Measures

Procedures.

Prior to an initial assessment appointment, all participants were sent a set of standardized questionnaires to complete. A research coordinator was available at all initial appointments to provide assistance with completing the questionnaires when needed and to check for missing data. Missing data were rare; at most, 6.3% of responses were missing for any single item. Patient refusal to complete measures was not formally tracked by the service.

The Brief Pain Coping Inventory-2 (BPCI-2).

The two subscales of the BPCI-2¹⁶ were used as an index of pain-related coping. The BPCI-2 consists of 19 items and encompasses two subscales: (a) Psychological Flexibility, which includes items relating to acceptance of pain and distress, broad and present-focused awareness, and engagement in valued activity with the presence of pain and (b) Traditional Pain Management, which includes items relating to activity pacing, exercise, relaxation, positive self-statements, and distraction (see Table 1). Patients are asked to indicate how many days in the past week they responded to their pain in the way described on each individual item with higher subscale and total scores presumed to indicate more adaptive coping. Internal consistency within the present sample was consistent with previous work¹⁶, Cronbach's alpha in this sample equaled 0.70 and 0.75 for the Traditional Pain Management and Psychological Flexibility subscales, respectively.

-- Insert Table 1 about here --

Measures of Patient Functioning.

Participants completed a brief demographic and healthcare use form that included items pertaining to pain intensity, pain treatment history, employment status, and analgesic medication use. Usual pain intensity over the preceding week was assessed by using a zero (no pain) to ten (pain as bad as possible) numeric rating scale. For analgesic medication use, a summary score of the number of classes of medication currently listed as prescribed for pain in

health service records was calculated (i.e. weak opioids, strong opioids, non-steroidal anti-inflammatory drugs, tricyclic antidepressants, muscle relaxants, sedatives, anticonvulsants, selective serotonin reuptake inhibitors, over-the-counter analgesics), as classified using the British National Formulary. The number of GP, specialist, and emergency department visits for pain over the last three months, as reported by the patient, was summed to form an overall pain-related medical visit score. Finally, a single item was used to assess the number of hours spent each day resting or sleeping because of pain.

Disability was assessed using the Physical and Psychosocial Disability subscales of the Sickness Impact Profile (SIP)¹⁸. Scores on each subscale range from 0 to 1 with greater scores indicating greater disability. The Physical Disability subscale score is composed of the separate Ambulation, Mobility and Body Care, and Movement scales. The Psychosocial Disability subscale score is made up of the Social Interaction, Alertness, Emotional Behavior, and Communication scales. The SIP has excellent test-retest reliability, internal consistency, and good evidence of clinical validity¹⁸. With regard to the present study, the SIP was added to the questionnaire pack in March 2010; therefore, data for the SIP was available for 172 participants.

Depression was assessed using the symptom score of the British Columbia Major Depression Inventory (BC-MDI)¹⁹. Scores range from 0 to 80 with higher scores indicating more severe symptoms. The items of the BC-MDI were modeled after the Diagnostic and Statistical Manual of Mental Disorders (4th ed.)²⁰ symptom criteria for Major Depressive Disorder. The total score has demonstrated adequate internal consistency and test-retest reliability, as well as good sensitivity and specificity for a diagnosis of Major Depressive Disorder¹⁹.

Pain-related fear was assessed using the short form of the Pain Anxiety Symptom Scale (PASS)²¹. Scores range from 0 to 100 with greater scores indicating more severe symptoms. The psychometric properties of the PASS are well established^{21,22}.

Measures of Psychological Flexibility

Two measures related to the psychological flexibility were used. Higher scores on these measures have been reliably associated with more adaptive functioning in individuals with chronic pain (see ¹⁰ for a review).

First, acceptance of chronic pain was assessed using the Chronic Pain Acceptance Questionnaire (CPAQ)¹⁴. The measure consists of two subscales; Activity Engagement, which reflects the degree to which individuals participate in activities in the presence of pain, and Pain Willingness, which assesses the degree to which individuals withhold attempts to avoid or control pain. Scores on the Activity Engagement subscale range from 0 to 66 and for the Pain Willingness subscale range from 0 to 54. Several studies have provided support for the psychometric properties of the CPAQ^{14,23,24}.

The Chronic Pain Values Inventory (CPVI)¹⁴ is a 12-item measure of values-based action for use with people with chronic pain. It measures importance and success in six domains of valued functioning; close interpersonal relationships, family, friends, work, health, and growth and learning. Total scores are averaged and range from 0 (not at all important/successful) to 5 (extremely important/successful). Two primary scores can be calculated. The first, Values Success, is the average of the values success items and is an index of values-based activity. The second, Values Discrepancy, is calculated by subtracting the mean difference between each of the success ratings and the corresponding importance rating and quantifies the divergence between assigned importance and overall success in valued areas. The CPVI has established psychometric properties^{14,25}.

Analyses

First, summary statistics and frequency distributions were inspected to identify any significant outliers or deviations from normality. Second, correlations were calculated between the BPCI-2 subscale scores and measures of patient psychosocial and physical functioning. Third, a series of multiple regression analyses were performed to evaluate the relative contribution of the BPCI-2 subscale scores in accounting for variance in these same measures

of functioning after controlling for relevant demographic characteristics, including gender, age, and pain duration, and also controlling for usual pain intensity. Demographic characteristics were initially tested for entry based on statistical criteria (F to enter $p < .05$; F to remove $p > .10$). Usual Pain Intensity, Traditional Pain Management, and Psychological Flexibility were then entered into each equation in sequential steps. Finally, correlations and regression analyses were repeated using the measures of psychological flexibility to examine correlations with the subscales of the BPCI-2 and unique variance accounted for after controlling for demographic variables. Order of entry into the regression equations was identical to that used for the measures of patient functioning.

Results

Descriptive Analyses

Examination of descriptive data did not indicate any significant outliers or skewed distributions on any of the questionnaire measures. Means and standard deviations are displayed in Table 2.

-- Insert Table 2 about here --

Coping and Patient Functioning

Correlation results regarding the measures of patient functioning indicated a pattern of findings that was broadly similar to previous studies (Table 2). The Pain Management subscale of the BPCI-2 generally had small and non-significant correlations with measures of functioning, with the lone exception of work status, $r = -.15$, $p < .05$. It is worth noting that the direction of the correlation indicated that higher scores on the Pain Management Subscale were related to unemployment, which was not expected. The Psychological Flexibility subscale of the BPCI-2 was significantly correlated with all but two measures of functioning, absolute value of r range = .23 to .45, all p 's $< .005$. All relations were in the expected direction such that higher scores on this subscale were associated with better functioning. Correlations with the number of pain-

related medical visits over the preceding three months and the total number of analgesic medications were not significant.

Results of the regression analyses for measures of patient functioning are included in Table 3. Of the demographic variables, age accounted for significant variance for two measures of patient functioning, including physical disability subscale and work status. In each case, the amount of variance accounted for was approximately 4%. In addition, pain duration accounted for significant variance in daily rest due to pain, accounting for approximately 8% of variance. Demographic variables did not account for significant variance in any of the other regression equations.

Pain intensity over the previous week accounted for significant variance in all measures of functioning, with the sole exception of Psychosocial Disability. Where significant, the amount of variance accounted for ranged from 1.7% for daily rest to 10.0% for physical disability.

The pattern of findings for the two BPCI-2 subscales was broadly as would be expected given the correlation results. The Pain Management subscale did not account for significant variance in any of the regression analyses while the Psychological Flexibility subscale accounted for significant and unique variance in each case where a significant correlation was indicated, including physical and psychosocial disability, depression, pain-related anxiety, daily rest due to pain, and work status. The variance accounted for ranged from 5.2% for physical disability to 15.0% for pain anxiety.

-- Insert Table 3 about here --

Coping and Psychological Flexibility

The Pain Management subscale of the BPCI-2 was correlated with the Activity Engagement subscale of the CPAQ and Values Success subscale of the CPVI only, $r = .26$ and $.18$, respectively, p 's $< .005$. The Psychological Flexibility subscale was correlated with all four measures, including Activity Engagement, Pain Willingness, Values Success and Values Discrepancy, r range = $.27$ to $.60$, all p 's $< .001$. See Table 2.

Results of the regression analyses for measures of acceptance and values are located in Table 4. Of the demographic variables, age accounted for significant variance in Pain Willingness, while sex accounted for significant variance in Values Success and Discrepancy. In each case, the variance accounted for was approximately 2%.

The next variable entered, usual pain intensity over the preceding week, accounted for significant variance for Activity Engagement and Pain Willingness only. The variance accounted for was 5.2% and 8.8%, respectively.

The Traditional Pain Management Strategies subscale accounted for significant variance in three of four equations, including Activity Engagement, Pain Willingness, and Values Success. Variance accounted for ranged from 1.9% to 8.8%, although Beta weights in the final models failed to reach significance in each case. The Psychological Flexibility subscale accounted for significant variance across all four variables. Variance accounted for ranged from 3.1% for Values Discrepancy to 23.4% for Activity Engagement, with significant Beta weights on each occasion.

-- Insert Table 4 about here --

Discussion

The present study considered the role of a specific conceptualization of coping with chronic pain in relation to more adaptive patient functioning through an examination of the BPCI-2. Initially, the results of previous work were reproduced as the Psychological Flexibility subscale of the BPCI-2 was significantly related to multiple measures of patient functioning in a consistent pattern. When measures of acceptance of chronic pain and values-based actions were examined alongside the data from the BPCI-2, the Psychological Flexibility subscale showed significant overlapping variance while the overlap with the Traditional Pain Management subscale was much smaller or non-significant. These findings provide evidence of convergence among psychological flexibility items from the BPCI-2 and more established measures derived from the same theoretical model.

The failure of the traditional pain management strategies to account for variance in patient functioning is interesting given that such strategies (e.g. exercise, relaxation, pacing, positive thinking) are often a focus in current treatment programs for chronic pain. While this result may be surprising given the widespread adoption of these coping skills, the lack of correspondence with patient functioning is not unusual as several cross-sectional and prospective studies have also found that these traditional coping strategies have modest or insignificant relations with measures of patient functioning (e.g.,^{3-6, 26-28}). For example, Curran and colleagues⁶ found that patient adherence to commonly trained coping strategies after treatment, including exercise, pacing, and “cognitive” techniques (e.g., identification and challenging of maladaptive thoughts), was of limited value in predicting treatment outcomes one month following treatment. This consistency in findings across several studies, and in different patient groups, is noteworthy and suggests that it may be prudent to re-evaluate our focus on training these traditional coping responses in treatments for chronic pain.

The organizing framework for the present analyses was based on the theoretical model of ACT and its focus on the promotion of psychological flexibility. This model suggests an alternative approach to traditional coping skills training, one that has a highly pragmatic focus on goals and values as the priority, particularly those that are not contingent on reduced pain. We would argue that where traditional pain management strategies founder is that they do not get to the root of the problem. People with chronic pain suffer because pain is overwhelming and controlling it is prioritized. This creates a trap when direct patient experience shows a mix of two things: pain cannot be controlled all of the time and, when it is controlled, it comes at the cost of losses in functioning that are intolerably high. In essence the aim of psychological flexibility is to make pain reduction less important, make valued goals more important, and to uncouple the two, so that they are no longer synonymous or contingent upon one another. The very heart of psychological flexibility is this highly pragmatic devotion to individual goals for living well *with* continued pain.

It is perhaps unsurprising that the Psychological Flexibility subscale was reliably related to the two subscales of the pain acceptance measure and to the values success and values discrepancy measures given the concordance in underlying model. It is noteworthy, however, that the Traditional Pain Management Strategies subscale accounted for significant variance in three of four measures of the ACT model, including Activity Engagement, Pain Willingness, and Values Success, although the standardized regression coefficients failed to achieve significance within the final models. This finding potentially suggests that there may be qualities in these more “traditional” methods of coping that are relevant to aspects of flexible and adaptive responding to pain-related difficulties, as highlighted in the preceding paragraph. It is not necessary, for example, to discontinue use of the traditional methods in the cognitive and behavioral treatment methods used in this area given the evidence of efficacy for these approaches²⁹⁻³². Instead, perhaps the use of these traditional methods can be improved if they are applied in a way that is more sensitive to what situations afford and with an explicit incorporation of patient-identified goals.

There are limitations to the present analysis. First, all measures used were self-report and shared method variance or response biases may have influenced results. Second, the analyses were cross-sectional in design and causal conclusions cannot be drawn. Third, due to the late introduction of the SIP in the assessment package, only 172 patients (53.0% of the sample) provided information with regard to physical and psychosocial functioning. It may be that the pattern of findings would have been different if complete data for this measure were available. Fourth and finally, neither BPCI subscale was significantly related to pain-related medical visits or the number of classes of analgesic medication currently prescribed. It is possible that these aspects of patient functioning are relatively independent of coping behaviors or that there are other aspects of coping relevant to healthcare that were not assessed by the BPCI-2.

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