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Pain beliefs: assessment and utility [1]

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Summary When pain becomes persistent, patients may abandon previously held cultural or personal beliefs about pain to form new pain beliefs that are more consistent with their persistent pain experience. The Pain Beliefs and Perceptions Inventory (PBPI) is an instrument to assess these new beliefs. This paper presents 4 studies examining the utility of the PBPI. Two studies are factor analytic and support recent literature identifying 4 belief factors associated with this instrument. The third and fourth studies used a new scoring method for the PBPI creating 4 scales: Mystery, Self-blame, Pain Permanence, and Pain Constancy. These scales were then correlated with important pain indices such as measures of pain quality, psychological states (i.e., depression and anxiety), personality traits, physical functioning, and coping strategies. Each belief appears to have a unique association with the pain indices thus supporting the rescoring of this instrument with 4 scales. Belief in pain constancy is associated with greater pain self-report, permanence is associated with anxiety, mystery is associated with greatest overall distress, and self-blame is associated with depressive symptoms. An appendix is included that provides clinical norms for the use of the PBPI and a revised scoring key.

Key words: Pain belief; Coping strategy; Chronic pain; Depression; Anxiety; Personality trait

Introduction

Patients' beliefs about their pain are thought to play a prominent role in pain perception, function, and response to treatment (for a good overview see DeGood and Shutty 1992). In recent years increased attention has been placed on the assessment of pain beliefs with the advent of specialized scales and methods for this purpose. One of these methods asks patients to view video tapes of various treatment modalities and to rate the applicability of the modalities to their pain condition. Patients who believed the treatment was applicable had much better outcomes (Schwartz et al. 1985; Shutty et al. 1990). Recently a number of self-report belief inventories have been developed. A few of these scales include Skevington's Beliefs about Pain Control Questionnaire (BPCQ) (1990), the Survey of Pain Attitudes (SOPA) (Jensen et al. 1987), and the Pain Beliefs Questionnaire (PBQ) (Edwards et al. 1992).

Beliefs are probably best judged not by how true or false they are but by how adaptive they are in enabling the believer to function in the world he/she experiences. For example, a culturally shared belief about pain may be that pain is a warning signal and terminates when all is well (DeGood and Shutty 1992). For many, this belief is supported by personal experience and enables the believer to function in an adaptive manner when pain is experienced. For some pain sufferers, however, this common belief may not be supported if, for example, pain persists for no apparent reason. In this case where beliefs about pain are at odds with personal experience, patients may abandon the culturally shared beliefs about pain and formulate new replacement beliefs about pain that better match

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their personal experience. Are these new beliefs more adaptive for the pain sufferer in promoting functioning? One pain beliefs instrument that assesses new (replacement) beliefs is the Pain Beliefs and Perceptions Inventory (PBPI) (Williams and Thorn 1989). The PBPI originally purported to assess 3 beliefs about pain but recently several independent researchers have proposed splitting 1 of the scales into 2 so as to create a total of 4 belief scales.

The PBPI was originally developed by soliciting a broad range of beliefs about pain from a sample of injured workers receiving Workers' Compensation benefits. These beliefs were then formed into items and given to another sample of 121 injured workers. Item and factor analysis of these data resulted in the final version of the inventory which was then validated on a third sample of 87 injured workers. The PBPI is a 16-item self-report inventory composed of 3 belief scales. The first scale was labeled Time. This scale taps into future-oriented beliefs that pain is and will be an enduring part of life. Endorsement of this belief differs from a common culturally shared belief that pain is time-limited and fixable. The second scale was labeled Mystery. This scale taps into the belief that pain is a mysterious, aversive event that is poorly understood. Endorsement of this belief differs from the culturally shared belief that pain serves a useful warning function. Endorsement of this belief may also represent a temporary measure of how well patients are proceeding in formulating a new understanding of their pain. The third scale assessed self-blame. The Self-Blame scale taps into patients' beliefs that they are the appropriate target for blame for their pain experience. In previous studies the beliefs assessed by the PBPI have been shown to have negative associations with future treatment compliance in physical therapy and health psychology interventions (Williams and Thorn 1989) and to have utility for identifying and tailoring appropriate cognitive and behavioral treatment strategies (Williams and Keefe 1991).

To further explore the factor structure of the PBPI, Strong et al. (1992) administered the PBPI to 100 chronic low back pain patients presenting to pain clinics and neurological services at two Australian metropolitan hospitals. Factor analysis of the items suggested a 4- rather than 3-factor solution. The Mystery factor and the Self-Blame factor were replicated; however, the authors suggested that the Time scale be divided into 2 scales which they labeled Acceptance and Constancy. The Acceptance scale retained much of the meaning of the original Time scale with items suggestive of pain being an enduring part of life. The Constancy scale retained items concerned with the temporal aspects of daily pain (e.g., whether it was constant or intermittent). Recently, Herda et al. (1994) translated the PBPI into German and administered the inventory to 193 out-patients of a metropolitan hospital pain clinic. Factor analysis of the items from this sample also found 4 factors to best fit those data. Factor loadings in this German sample were similar to the Australian sample, suggesting the same 4 subscales: Mystery, Self-Blame, Constancy, and Acceptance.

Due to the findings that will be presented later in this paper, it is recommended that the Acceptance scale be relabled belief in pain Permanence (PERM). Acceptance can connote a positive cognitive process where the patient accepts or acknowledges the persistent nature of pain and engages in adaptive behavioral strategies such as activity pacing. Alternatively, acceptance can connote a negative cognitive process where accepting the pain is associated with giving up hope, adopting the victim role, or adopting behavioral passivity with regard to pain management. Given that this scale is correlated with many constructs typically associated with negative outcome and suffering, the content of this scale is not accurately reflected in a label that could be construed as a positive or helpful belief. Labeling this scale Permanence captures the descriptive nature of the belief yet avoids the potential confusion of the previous label.

This manuscript presents 4 studies. Study 1 explores the factor structure of the PBPI in a North American out-patient chronic pain population. Study 2 seeks to cross-validate the factor structure with a second North American out-patient chronic pain sample. Study 3 explores psychological and behavioral correlates with the factors identified from the first two studies in a third sample from a North American out-patient chronic pain program. Study 4 uses a subset of patients taken from the combined samples from studies 1, 2, and 3 and explores the relationship of the identified belief factors with the use of cognitive and behavioral coping strategies. Appendix I presents scale norms from the combined studies and provides a revised scoring key for the PBPI.

Study 1

Methods

Subjects

Patients were 79 chronic pain patients referred to a pain clinic associated with a Southern university-based medical center. The sample was composed of 51 men and 28 women. The average age of the sample was 39 years (SD: 11.5). The site of pain was low back in 78%, head and face for 10%, and 'other' for the remainder of the sample. Mean pain duration was 35 months (SD: 30.7) and 76% of the sample was receiving Workers' Compensation.

Procedure

Patients completed the PBPI (Williams and Thorn 1989) as part of a pretreatment pain assessment battery. The 16 items of the PBPI

TABLE I

VARIMAX ROTATION OF PBPI ITEMS (study 1)

Item number and descriptor	Factors and % variance accounted by each factor			
	1 (25%)	2 (21%)	3 (15%)	4 (15%)
12 There is a cure	0.81	0.13	−0.03	−0.10
15 Will be pain free	0.80	0.08	0.07	0.03
9 Pain is temporary	0.58	0.03	−0.23	0.03
2 Lost hope for cure	−0.38	0.38	0.07	0.24
5 Pain is here to stay	−0.72	0.22	0.17	0.10
1 No known cause	−0.06	0.73	−0.21	0.11
4 Pain is confusing	−0.04	0.66	0.06	−0.02
14 Can't make sense of pain	0.11	0.62	−0.23	−0.02
8 Need more info about pain	0.09	0.44	−0.11	−0.10
16 Varies in intensity	−0.07	0.31	0.16	0.21
11 I caused my pain	0.02	0.00	0.85	−0.67
13 I blame myself	−0.19	−0.19	0.52	0.13
7 Pain is my fault	−0.31	−0.24	0.46	0.14
6 Pain is continuous	−0.00	0.28	0.05	0.72
10 Wake and sleep with pain	0.09	−0.24	−0.24	0.71
3 Some pain-free periods	0.03	0.03	−0.22	−0.55

were subjected to principle axis factoring using the factoring program provided by SAS (1988). Squared multiple correlations (SMC) served as prior communality estimates. Guttman's weakest lower bound (Rummel 1970) was used to determine the number of factors to retain. To aid in factor interpretation, simple structure was attained by principle axis factoring followed by Varimax orthogonal rotation.

Results

Guttman's weakest lower bound criteria suggested a 4-factor solution as the best model to fit these data. The 4-factor solution accounted for 76% of the explained variance. Examination of the simple structure shows the items associated with the Mystery and Self-Blame scale to retain unique high loadings on their respective factors (see Table I). The loadings for items on the Time scale were divided among the remaining 2 factors and displayed a pattern of loadings similar to these found by Strong et al. (1992) and by Herda et al. (1994).

Study 2

Methods

Subjects

Patients were 71 chronic pain patients referred to a pain clinic associated with an Eastern university-based medical center. The

TABLE II

VARIMAX ROTATION OF PBPI ITEMS (study 2)

Item number and descriptor	Factors and % variance accounted by each factor			
	1 (24%)	2 (23%)	3 (20%)	4 (15%)
4 Pain is confusing	0.82	0.04	0.06	0.12
14 Can't make sense of pain	0.72	0.01	0.02	0.11
1 No known cause	0.72	0.09	0.04	−0.05
8 Need more info about pain	0.63	0.12	0.21	0.11
2 Lost hope for cure	0.36	0.01	−0.26	0.11
16 Varies in intensity	0.09	0.82	−0.18	0.06
10 Wake and sleep with pain	0.01	0.78	−0.01	0.05
6 Pain is continuous	0.18	0.76	−0.35	0.00
3 Some pain-free periods	0.09	−0.42	0.41	0.17
12 There is a cure	0.13	−0.07	0.73	0.09
15 Will be pain-free	0.11	−0.12	0.63	0.12
9 Pain is temporary	0.00	−0.15	0.54	−0.02
5 Pain is here to stay	0.26	0.41	−0.50	−0.12
13 I blame myself	0.10	−0.05	−0.04	0.75
11 I caused my pain	0.22	−0.07	0.08	0.70
7 Pain is my fault	−0.02	0.13	0.16	0.56

sample was composed of 21 men and 50 women. The average age of the sample was 45 years (SD: 14.9). The site of pain was low back in 41%, head and neck for 25%, abdominal or pelvic for 15%, upper back and limbs for 10%, and 'other' for the remainder of the sample. Mean pain duration for the sample was 107 months (SD: 124) and only 27% of the sample was receiving Workers' Compensation.

Procedure

The procedure in this cross-validation study was identical to that in Study 1.

Results

Guttman's weakest lower bound criteria suggested a 4-factor solution as the best model to fit these data. The 4-factor solution accounted for 82% of the explained variance. Examination of the simple structure showed the items of the Mystery and Self-Blame scales to retain unique high loadings on their respective factors (see Table II). The loadings for items on the Time scale were divided among the remaining 2 factors and displayed a pattern of loadings similar to those in study 1.

The similarity of the factor loadings in this cross-validation sample add additional empirical support for exploring the utility of splitting the Time scale into 2 separate temporally based scales. The Permanence scale would retain much of the same meaning as the original Time scale, that is, the belief that pain will be an enduring part of life. The constancy scale assesses the perception that pain is constant on a daily basis as opposed to an intermittent experience. Whereas correlates such as coping skills use and compliance have been associated with the original Time scale, it is unknown what incremental utility or differential utility the 2 newly identified scales (Pain Permanence and Pain Constancy) will provide.

Study 3

Methods

Subjects

Patients were a separate sample of 37 chronic pain patients referred to a pain clinic associated with an Eastern university-based medical center. The sample was composed of 9 men and 28 women. The average age of the sample was 42 years (SD: 12.7). The site of pain was low back in 42%, head and neck for 24%, abdominal or pelvic for 11%, upper back and limbs for 14%, and 'other' for the remainder of the sample. Mean pain duration for the sample was 69.8 months (SD: 78) and 24% of the sample was receiving Workers' Compensation.

Procedure

Subjects completed the PBPI along with other self-report questionnaires as part of a pretreatment assessment battery. Concurrent correlations were possible between the PBPI and the instruments listed below.

Instruments

Pain quality. Pain ratings were obtained using the Short-Form of the McGill Pain Questionnaire (MPQ-SF) (Melzack 1987). The MPQ-SF is composed of 11 sensory and 4 affective descriptors of pain which are rated on a 0–3 intensity scale. This study used the summed ratings from this questionnaire which produce the sensory and affective scales.

Psychological states. The Beck Anxiety Inventory (BAI) (Beck et al. 1988) and the Beck Depression Inventory (BDI) (Beck and Steer 1987) were used to assess anxiety and depression, two psychological states common to chronic pain patients. Both are 21-item self-report inventories assessing both somatic and cognitive facets of anxiety or depression.

Personality traits. The NEO-Personality Inventory (NEO-PI) (Costa and McCrae 1985) is a 181-item self-report inventory with 5 empirically validated factors: Neurotic traits (N), Extraverted traits (E), Openness traits (O), Agreeableness (A), and Conscientiousness (C). Factors N, E, and O are in turn made up of 6 individual facets. For example, Neuroticism is made up of the facets: anxiety, hostility, depression, self-consciousness, impulsiveness, and vulnerability.

Physical functioning. The Activities Discomfort Scale (ADS) (Turner et al. 1983) was used as a measure of functioning. The ADS asks patients to rate on a 5-point scale the amount of discomfort caused by each of 18 commonly encountered daily tasks (e.g., walking, bending, driving, etc.). Uptime was also assessed by asking patients to keep 7 days worth of a functional pain diary. Patients recorded on an hourly basis the number of minutes of each hour that were spent engaged in uptime (walking, standing or sitting upright) versus downtime (reclining).

Results

Pain quality

Of the 4 belief scales only the belief in pain constancy was significantly and positively associated with the rating of sensory pain ($r(37) = 0.48$, $P < 0.01$). The same belief scale approached a significant association with the affective scale whereas no other belief appeared to be associated with qualitative ratings of pain.

Personality traits

The domain of Neurotic traits was significantly and positively associated with beliefs in mystery, pain permanence, and self-blame (see Table III). The domain of Extraverted traits was not correlated with pain beliefs. The domain of Openness traits was significantly and negatively associated with the belief in pain permanence (e.g., the less one endorses cognitive openness as a trait, the stronger the belief in pain permanence). Agreeableness was unrelated to pain beliefs; however, greater conscientiousness was significantly associated with the perception of pain being more constant than intermittent.

Psychological states

The belief in pain being mysterious was significantly correlated with the BDI and the BAI. The belief in pain permanence approached a significant association with the BDI and demonstrated a significant association with anxiety (BAI). The belief in pain constancy

TABLE III

CORRELATIONS OF THE 4-SCALE VERSION OF THE PBPI WITH MEASURES OF PAIN QUALITY, PERSONALITY TRAITS, PSYCHOLOGICAL STATES, AND PHYSICAL FUNCTIONING

Measures	PBPI scales			
	Constancy	Permanence	Mystery	Self-Blame
MPQ-SF				
Sensory	0.48 **	0.15	−0.05	0.06
Affective	0.28	0.09	0.20	0.26
NEO-PI				
N	−0.15	0.36 *	0.33 *	0.39 **
E	0.23	−0.08	−0.08	−0.03
O	−0.07	−0.32 *	0.01	0.13
A	0.14	−0.26	−0.06	−0.29
C	0.37 *	0.24	0.14	0.00
BDI	−0.04	0.30	0.32 *	0.39 **
BAI	0.13	0.38 **	0.42 **	0.16
ADS [1]	0.33 *	0.29	−0.00	−0.00
Uptime [1]	−0.12	−0.21	−0.07	0.47 *

* $P < 0.05$, ** $P < 0.01$.

[1] All analyses are based on n = 37 with the exception of the two functional status measures: ADS (n = 36) and Uptime (n = 22).

was not associated with these psychological states and the belief in self-blame was significantly correlated with depression (BDI).

Physical functioning

The ADS was significantly correlated with the belief in pain constancy ($r(36) = 0.33$, $P < 0.05$). No other belief was associated with this measure of functional status. A subset of these patients completed 7 days worth of pain diaries. Uptime, or active time, was significantly associated with the belief in self-blame for pain ($r(22) = 0.46$, $P < 0.05$). No other beliefs were associated with uptime.

Study 4

Methods

Subjects

A subset of patients from each of the previous studies (n = 148) completed both the PBPI and the Coping Strategies Questionnaire (CSQ). The combined demographics for study 4 are as follows. The sample was composed of 57 men and 91 women. The average age of the sample was 43 years (SD: 15.0). The site of pain was low back in 55%, head and neck for 19%, abdominal for 9%, upper back and limbs for 11% and other for the remainder of the sample. Mean pain duration for the sample was 85 months (SD: 108) and 28% of the sample was receiving Workers' Compensation.

Procedure

In each pain sample, subjects completed the PBPI and the CSQ along with other self-report questionnaires as part of a pretreatment assessment battery. Concurrent correlations were possible between the PBPI and the CSQ.

Instruments

The CSQ (Rosenstiel and Keefe 1983) is a 50-item questionnaire that measures the frequency of use of the following cognitive and behavioral strategies for coping with pain: (1) diverting attention, (2) calming self-statements, (3) praying and hoping, (4) increasing behavioral activities, (5) reinterpretation of pain sensations, (6) ignoring pain sensations, and (7) catastrophizing. The CSQ also provides 2 measures of coping strategy effectiveness: a rating of perceived ability to control pain and a rating of ability to decrease pain through strategy use. The CSQ has been subjected to factor analytic techniques and frequently the scores for the 2 factors (Coping attempts, and Pain control and rational thinking) are reported (Keefe et al. 1987). These 2 factor scores were also calculated.

Results

Table IV presents the correlation matrix between the PBPI and CSQ scales. The belief in pain constancy was significantly correlated with the use of calming self-statements, and negatively correlated with the per-

TABLE IV

CORRELATIONS OF THE 4-SCALE VERSION OF THE PBPI WITH SUBSCALES OF THE CSQ

CSQ	PBPI scales			
	Constancy	Permanence	Mystery	Self-Blame
Diverting Attention	0.15	−0.07	−0.08	−0.18 *
Reinterpretation of pain sensation	0.14	−0.15	−0.00	−0.20 *
Calming Self-Statements	0.24 *	−0.09	−0.00	−0.00
Ignoring pain sensations	0.09	−0.12	−0.01	−0.14
Praying and Hoping	−0.02	−0.35 **	0.12	−0.07
Catastrophizing	0.06	0.18 *	0.25 **	0.22 **
Increasing behavioral activity	0.06	−0.03	−0.01	−0.12
Control	−0.19 *	−0.30 **	−0.21 **	0.10
Decrease	−0.33 **	−0.19 *	−0.31 **	−0.07
CSQ Factors				
Coping Attempts	0.15	−0.18 *	0.00	−0.16 *
Pain control and Rational thinking	−0.15	−0.24 **	−0.32 **	−0.19 *

* $P < 0.05$, ** $P < 0.01$.

All analyses are based on n = 148.

ceived effectiveness of coping strategies to control and decrease pain. The belief in pain permanence similarly had a significant negative correlation with the perceived effectiveness of coping strategies to control and decrease pain. The belief in pain permanence was significantly associated with less praying and hoping and positively correlated with more catastrophizing thoughts, a maladaptive coping strategy. Holders of the belief that pain is mysterious showed a similar coping pattern to holders of the belief in pain permanence (i.e., greater catastrophizing and less perceived effectiveness of coping strategies to control and decrease pain. Stronger beliefs in self-blame for pain was significantly associated with less use of diverting attention, and reinterpretation of pain sensations, and more catastrophizing. The belief in self-blame was not associated with the perceived effectiveness of coping strategies.

Belief in pain constancy was not associated with either of the CSQ factors. Belief in pain permanence, however, was significant and negatively related to both factors suggesting that greater belief in pain permanence is associated with decreased coping attempts and decreased pain control and rational thinking. There was no relationship between the belief in pain being mysterious and coping attempts but there was a strong association between the belief in pain being mysterious and the lower perceived ability to control pain and engage in rational thinking. Self-blame was significantly and negatively associated with both factors.

Discussion

The current study identified 4 belief factors in two samples of pain patients using the PBPI. These 4 factors were similar to the 4 factors identified by other researchers in both Australian and German samples (Strong et al. 1992; Herta et al. 1994). While some researchers may use factor analytic strategies to support statements about the quality and structure of an instrument (e.g., Strong et al. 1992), the procedures used in each of the above mentioned studies including this one, speak more to the qualities of the patient sample under study than about the structure of the questionnaire (Gracely 1992). Many pain assessment instruments have revealed differing factor structures when given to different patient populations without discrediting the psychometric integrity of the questionnaire (e.g., MPQ, Holroyd et al. 1992; CSQ, Rosenstiel and Keefe 1983; Keefe et al. 1987; Parker et al. 1989).

The decision of whether to score the PBPI with 3 versus 4 scales is an option that can be guided by factor analytic studies and ultimately should be based on the utility of the information obtained from each scale. The current set of studies lend support for scoring the PBPI with 4 scales. When the Time scale is split into 2 scales the resulting new scales appear to provide differing and unique insights into the organization of patients' beliefs about pain.

Pain intensity (visual analog scale) was previously shown to be associated with the belief in Time (greater intensity was reported by people believing pain would persist over time) (Williams and Thorn 1989). In the current study, temporal beliefs about pain were again associated with pain ratings, but the splitting of the Time scale into Permanence and Constancy allowed greater interpretation of which type of temporal beliefs were associated with increased pain ratings. The perception of pain constancy (as opposed to intermittency) was the only temporal pain belief that had an association with pain ratings. Believing pain would persist into the future did not appear to be associated with intensity ratings.

The beliefs in pain being mysterious, permanent, and self-blame for pain were all associated with higher scores on the Neurotic traits domain of the NEO-PI. The personality traits assessed by the NEO are assumed to be stable over time. Thus, these pain beliefs appear to be associated with aspects of the personality that are well integrated into the make-up of the patient. The negative association between the openness domain and the permanence scale suggests that individuals who adopt this belief are likely to hold onto it somewhat rigidly and may not see value to attempting conservative or self-management efforts at pain control given their belief in the permanence of their pain. Such an interpretation is consistent with earlier findings that the original Time scale was associated with poor compliance with psychological and physical therapy interventions (Williams and Thorn 1989) and with findings from this paper that the Permanence scale is associated with decreased praying and hoping, and decreased perceived effectiveness in the use of cognitive and behavioral coping attempts.

The findings from this study suggest that pain beliefs in permanence, mystery, and self-blame are associated with psychological distress but not in identical ways. A belief in mystery appears to be associated with the most distress as it shows correlations with both anxiety and depression symptoms. This finding is consistent with MMPI data presented in an earlier study (Williams and Thorn 1989). This finding is also consistent with pain patients' reports that they would feel better if only they could find out what was causing the pain. The lack of a structure around which to erect an understanding of pain, and the lack of an understanding of pain upon which goals for the future can be made, appears to facilitate emotional distress. The belief in pain permanence may represent a more advanced belief than mystery. Although permanence and mystery can co-occur, a belief in permanence suggests

that some progress has been made in solidifying a new understanding about pain. This progress may not be wholly adaptive, however, given the association between this belief and anxiety.

The belief in self-blame for pain was associated with depression symptoms. This finding is consistent with previous studies with pain patients (Kiecolt-Glaser and Williams 1987; Williams and Thorn 1989). Despite the apparent maladaptive association between self-blame and depressive symptoms, there was a strong association between self-blame and uptime, a measure of physical functioning. It might be interpreted that self-blame is adaptive in that it motivates and promotes increased physical functioning. The positive effects of self-blame on coping and motivation have been reported on in work with severe accident victims (Bulman and Wortman 1977). In this case, however, given the association with depressive symptoms it is unlikely that self-blame is playing an adaptive role. A more likely interpretation is that the patients adopting a belief in self-blame may be motivated to be up and functional but are engaging in over-activity and perpetuating a defeating behavioral pattern of over-activity followed by prolonged downtime and increased pain. Such a pattern would be discouraging and consistent with the depression symptoms found to be associated with greater uptime. Empirical support for this interpretation is currently in progress with a new sample of patients.

In summary, it appears that when experience or perception fails to support existing cultural or personal beliefs about pain, some sufferers develop new beliefs compatible with their experience. Based on correlational evidence from these and previous studies, pain sufferers who adopt the new beliefs assessed by the PBPI appear to be in greater distress than those who do not. Future research will want to explore the relative emotional distress of developing these new pain beliefs as compared to retaining preexisting beliefs even though they may be inconsistent with experience.

With 4 scales, the PBPI serves as a useful tool for research on cognitive factors that influence pain such as pain perception, pain-related affect, and behavior. While knowledge of a person's beliefs cannot perfectly predict future behavior, assessing sufferer's beliefs can provide insight into how one understands what they are experiencing and what needs to be done to remedy the experience. Beliefs therefore are precursors to behavior and can influence motivation to engage in future actions (Lazarus and Folkman 1984; Ajzen and Fishbein 1980; Ajzen 1988). The PBPI therefore is also a useful clinical tool for identifying cognitive factors that could benefit from cognitive-behaviorally oriented treatment. While at this time, no treatment strategies have been developed that focus directly on changing the PBPI beliefs, the PBPI can be used to assess a patient's cognitive readiness to engage in traditional forms of cognitive and behavioral psychotherapy for pain management (Williams and Keefe 1991).

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Appendix I

NORMATIVE DATA FOR PBPI SCALES TAKEN FROM THE COMBINED SAMPLES OF PAIN PATIENTS PRESENTED IN THIS PAPER

PBPI normative values for pain sufferers				
Scale	Mystery	Permanence	Constancy	Self-Blame
Mean	0.29	0.45	0.82	−1.36
SD	1.15	0.89	1.01	0.75

A scoring key presents scoring options taken from this and previous publications using the PBPI (n = 213).

Appendix II

PAIN BELIEFS AND PERCEPTIONS INVENTORY: SCORING KEY

The PBPI can be scored in 3 ways.
(1) Original (scale) scoring (Williams and Thorn, Pain, 36 (1989) 351–358).

Scales:

TIME = 2+3(R)+5+6+9(R)+10+12(R)+15(R)+16
MYSTERY = 1+4+8+14
SELF-BLAME 7+11+13

Note: R = Reverse scoring (i.e., −2 = +2)

Note: Positive scores indicate endorsement of the belief (e.g., the belief that pain will be enduring with time, the belief that pain is a mystery and the belief that blame for the pain should be directed toward oneself).

(2) Cluster scoring (Williams and Keefe, Pain, 46 (1991) 185–190).

Step 1: score the PBPI using original scoring.

Step 2: equate (standardize) the scales by dividing the sum of each scale by the number of items in each scale.

TIME = (sum)/9
MYST = (sum)/4
SB = (sum)3

Step 3: determine cluster

Cluster 1 (hi TIME, low MYST)
If TIME > 0 and MYST < 0), the subject falls into cluster 1

Cluster 2 (hi TIME, hi MYST)
If TIME > 0 and MYST > 0, the subject falls into cluster 2

Cluster 3 (low TIME, low MYST)
If TIME < = 0 and MYST < = 0, the subject is a member of cluster 3

A few patients may not fit into any of the clusters described (e.g., low TIME and high MYST). This group is likely to be relatively small and

currently behavioral corollaries do not exist to describe this theoretically
possible yet empirically unvalidated cluster of patients.

(3) Four-factor solution (IASP 7th World Congress on Pain, Topical Seminar, Paris, France, Aug. 1993).

MYST = (1+4+8+14)/4
PERM = (2+5+9(R)+12(R)+15(R))/5
CONST = (3(R)+6+10+16)/4
SELF-BLAME = (7+11+13)/3

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