Pediatric Pain Beliefs Questionnaire: Psychometric Properties of the Short Form


*Department of Psychology and Human Development, Vanderbilt University, Nashville, Tennessee.
† Department of Pediatrics, Vanderbilt University School of Medicine, Nashville, Tennessee.
‡ Department of Psychology, North Park University, Chicago, Illinois.

Abstract: Cognitive appraisals inform and shape individuals’ pain experiences. As researchers examine mechanisms of cognitive-behavioral interventions for chronic pain, psychometrically sound measures based in cognitive theory are needed to directly assess pain beliefs. The Pain Beliefs Questionnaire (PBQ), a 32-item self-report measure informed by coping and appraisal theory, was designed to assess children’s pain threat appraisals, problem-focused pain coping efficacy, and emotion-focused pain coping efficacy. The present study aimed to: 1) create a short form of the PBQ, and 2) evaluate the psychometric properties of the reduced measure in a large database of pediatric patients with functional abdominal pain (n = 871). Item reduction analyses identified an 18-item short form of the PBQ (PBQ-SF) that exhibited psychometric properties similar to the original measure. All 3 subscales of the PBQ-SF exhibited strong internal consistency (α levels ranged from .79 to .80) and adequate test-retest reliability at 2 weeks. Evidence for construct validity was provided by examining patterns of partial correlations for each subscale. The PBQ-SF represents a valid and reliable measure for evaluating children’s pain beliefs. Future studies should investigate the treatment sensitivity of the PBQ-SF to evaluate its appropriateness for use in clinical trials.

Perspective: This article presents the psychometric properties of a reduced 18-item version of a measure used to assess children’s pain beliefs in a large sample of children with functional abdominal pain. This measure could help identify processes and individual differences underlying children’s responses to psychological treatments for chronic pain.

© 2016 by the American Pain Society

Key words: Chronic pain, functional abdominal pain, pain coping, cognitive appraisal, measure development.

Beliefs about pain are a central component of the pain experience. Cognitive-behavioral theory holds that beliefs about pain influence coping behavior, which in turn influences pain severity, emotional distress, and physical functioning. Specifically, cognitive appraisals of pain as highly threatening and beyond one’s ability to effectively cope have been associated with passive coping with pain. Passive coping, in turn, has been shown to exert direct negative effects on long-term pain severity and disability.

Indeed, cognitive-behavioral therapy (CBT), which aims to modify patients’ maladaptive beliefs about pain and increase adaptive behaviors, leads to improvements in patients’ pain severity, mood, and disability after treatment in adults and children. Psychometrically sound measures of pain-related appraisals are needed to measure changes in cognitive processes that may mediate treatment response. Although many trials have evaluated the efficacy of CBT for chronic pain, few have investigated the processes by which these therapies exert their effects.

The Pain Beliefs Questionnaire (PBQ), a 32-item self-report measure of the pain beliefs of children and...
adolescents with chronic pain, and assesses cognitive appraisals that may influence children’s coping strategies, disability, mood, and pain severity.49 The PBQ is grounded in the stress, appraisal, and coping framework advanced by Lazarus and Folkman.25 According to this framework, the extent to which a situation is experienced as stressful and associated with adverse consequences can be modulated by one’s appraisal of the level of personal threat presented by the situation (ie, primary appraisals) and one’s ability to cope with the situation (ie, secondary appraisals). The Pain Threat subscale of the PBQ assesses primary pain threat (ie, primary appraisals) and one’s ability to cope with pain. PFCE represents the extent to which one believes he or she can psychologically adjust to the pain. EFCE represents the extent to which one believes he or she can do something to reduce the pain. PFCE and EFCE subscales have been published with reliability data in several reports and tested in models that provide evidence for construct validity,30,42,49 but never presented in a validation study. The PBQ has been used in studies with a variety of designs (ie, cross-sectional, longitudinal, and randomized controlled trials). The present study aimed to: 1) create a short form of the PBQ (PBQ-SF), and 2) evaluate the internal consistency, test-retest reliability, concurrent validity, and construct validity of the subscales of the PBQ-SF in a large database of pediatric patients with FAP.

Methods

Participants

Baseline Participants

Data for the study were collected in 3 cohorts of pediatric patients described in detail elsewhere.1,4,6,7,10 Study participants (n = 871) were consecutive new patients, aged 8 to 18 years, who presented to a tertiary pediatric gastroenterology clinic for evaluation of abdominal pain between 1993 and 2004. Patients were eligible for participation in the baseline evaluation if they lived with parent(s) or a parent figure, reported abdominal pain of at least 3 months’ duration, had no history of chronic illness or disability, and had no organic disease diagnosis for abdominal pain from the referring physician.

The average age of participants at baseline was 11.56 years (SD = 2.46). Most participants were female (59.24%) and white (87.83%). A minority of participants were African American (4.13%), Hispanic (.69%), Asian (.69%), another race (1.61%), or did not report their race (5.05%). This is representative of the clinic population from which participants were recruited.

Time 2 Participants

We recruited participants from 2 of the cohorts to participate in a follow-up assessment (time 2; T2) 2 weeks after the baseline evaluation (n = 300; 57% female).

Procedure

For the baseline evaluation, an interviewer administered questionnaires to pediatric patients in a private room at the clinic before their medical evaluation. Parents completed questionnaires independently at the same time. For T2 follow-up interviews, an interviewer administered questionnaires to patients using the phone. Appropriate informed consent and assent were obtained at baseline and follow-up. The study was approved by the Vanderbilt Institutional Review Board.

Measures

PBQ

The PBQ consists of 32 statements designed to assess youth’s beliefs about their abdominal pain (see Table 1 for items). The measure is comprised of 3 subscales: Pain Threat (eg, “My stomach aches mean I have a serious illness”), PFCE (eg, “When I have a bad stomach ache, I can find ways to feel better”), and EFCE (eg, “I know that I can handle it no matter how bad my stomach hurts”). The items for these subscales were developed to capture primary and secondary appraisals as described by Lazarus and Folkman.25 The Pain Threat subscale consists of 20 items capturing 5 dimensions of pain severity: duration of chronic pain, chronic pain seriousness, pain frequency, episode duration, and episode intensity. The PFCE and EFCE subscales consist of 6 items each.

For each item on the PBQ, respondents indicate how true the statement is on a 5-point rating scale ranging from “not at all true” (0) to “very true” (4). Subscale total scores are computed by averaging items pertaining to each subscale. Reverse coded items are noted in Table 1. For the Pain Threat subscale, a higher score indicates stronger beliefs that one’s pain represents a personal threat. For the PFCE and EFCE subscales, higher scores indicate a stronger belief in one’s ability to cope with pain. A parent version of the measure captures parents’ beliefs about their child’s abdominal pain using parallel items (eg, “My child’s stomach aches mean he/she has a serious illness”).

Abdominal Pain Severity

The Abdominal Pain Index is comprised of 4 questions that assess weekly and daily frequency, duration, and intensity of abdominal pain experienced during the previous 2 weeks. The revised scoring method for the Abdominal Pain Index described in a recent validation study29 creates a composite score ranging from 0 to 4.
Somatic Symptoms

The Children’s Somatization Inventory assesses the severity of 35 somatic symptoms (e.g., headaches, faintness or dizziness, nausea) over the past 2 weeks. Participants rated how much they were bothered by each symptom on a 5-point scale ranging from “not at all” (0) to “a whole lot” (4). Item responses were averaged yielding a mean score ranging from 0 to 4 with higher scores indicating higher levels of somatic symptoms.

Functional Disability

The Functional Disability Inventory assesses self-reported difficulty in physical and psychosocial functioning due to physical health during the past 2 weeks. Responses to each of 15 items are scored on a 5-point scale, ranging from “no trouble” (0) to “impossible” (4). Items were averaged to compute a composite score. The Cronbach $\alpha$ coefficient for the Functional Disability Inventory was .90.

Pain Coping

The Pain Response Inventory (PRI) was developed to assess children’s typical coping responses to recurrent pain. The PRI consists of 60 items beginning with the stem, “When you have a bad stomach ache, how often do you...”. Response categories for each item are “never” (0), “once in a while” (1), “sometimes” (2), “often” (3), and “always” (4). It yields 3 broad-band factor scores. Active coping reflects problem-focused strategies aimed at pain reduction (e.g., “Try to do something to make it go away”). Passive coping reflects strategies that avoid confronting pain (e.g., “Not even try to do anything about it because it will not help”). Accommodative coping reflects efforts to accept and adjust to pain (e.g., “Try to learn to live with it”). The PRI was validated in 3 samples of children and adolescents with chronic abdominal pain. In the current baseline sample, the Cronbach $\alpha$ coefficients for the active, passive, and accommodative scales of the PRI were .86, .90, and .89, respectively.

Global Self-Efficacy

The Self-Perception Profile for Children assesses several dimensions of children’s perceived competence and self-worth and has been validated in multiple samples of children. For this study, we used the global self-efficacy scale composed of 6 items. Patients read 2 statements representing opposite descriptions of competence, one on the left side of the page and the other on
the right side of the page, and select the statement that is most like them, rating it as either “sort of true for me” or “really true for me.” A mean score for the 6 items was computed ranging from 1 to 4. Higher scores indicate higher levels of perceived self-efficacy.

**Negative Affect**

The self-report Children’s Depression Inventory was used to assess the severity of negative affect. For each of 26 items, participants were presented with 3 statements and asked to select the one that best described how they felt during the past 2 weeks. The Cronbach \( \alpha \) coefficient was .86.

**Family Socioeconomic Status**

The Hollingshead Index of Socioeconomic Status is a survey designed to measure social status on the basis of educational attainment and occupational prestige. Parents completed this measure at baseline.

**Data Analysis Overview**

First, we performed item analyses for the 3 scales of the PBQ to reduce the overall measure length. Although we focused on reducing the 20-item Pain Threat scale, we also examined the PFCE and EFCE scales to see whether removal of any of these items was warranted. The overall objective of these analyses was to yield an 18-item measure (PBQ-SF), with each scale represented by 6 items.

Second, we evaluated the psychometric properties of the PBQ-SF by examining internal consistency, test-retest reliability, concurrent validity, and construct validity for each of the subscales. Cronbach \( \alpha \) coefficients were calculated to evaluate internal consistency for child- and parent-report subscales of the PBQ-SF. To assess test-retest reliability, we examined the strength of the correlations between baseline PBQ-SF subscale scores and follow-up PBQ-SF subscale scores in the cohort who completed T2. We examined the correlation between parent-report PBQ-SF scores and children’s self-report PBQ-SF scores for evidence of concurrent validity. To assess construct validity, we examined the pattern of partial correlations for each of the 3 subscales assessed at baseline with baseline measures of pain coping, pain severity, functional disability, depressive symptoms, and global self-efficacy, while controlling for the other 2 subscales.

**Results**

**Item Reduction**

The baseline sample was randomly split into 2 subsamples and reliability analyses were computed within each subsample for the 20-item Pain Threat subscale. Within each subsample, we selected 6 items from the Pain Threat subscale on the basis of the following criteria: 1) face validity, 2) high item-total correlations, and 3) a balance of items reflecting characteristics of pain episodes (duration and intensity) and characteristics of the overall chronic pain condition (chronic pain duration, intensity, and pain frequency). The final reduced Pain Threat subscale consisted of items 5, 7, 8, 16, 18, and 20. It exhibited high \( \alpha \) reliability across both subsamples (\( \alpha = .830 \) for subsample 1, \( \alpha = .778 \) for subsample 2, and \( \alpha = .804 \) for total sample) and exhibited psychometric properties similar to the original 20-item subscale and earlier iterations of the reduced subscale.

We also examined the internal consistency and item-total correlations of the PFCE and EFCE scales to see whether removal of any items would improve the overall reliability of the scale in both samples. We found that removal of any items resulted in negligible changes to \( \alpha \) reliability. Thus, we retained all 6 items for the PFCE and EFCE scales. The PBQ-SF consisted of 18 items divided into three 6-item subscales (Table 1; Supplementary Appendix 1). All results reported in the following sections used the PBQ-SF.

**Descriptive Statistics**

Baseline means and standard deviations on the PBQ-SF subscales according to sex and age are presented in Table 2. Pain threat was significantly higher for girls than for boys (\( F_{1,869} = 14.73; \ P < .001 \)). Furthermore, PFCE and EFCE scores were significantly lower in girls compared with boys for problem-focused coping (\( F_{1,869} = 16.64, \ P < .001 \) and \( F_{1,869} = 13.80, \ P < .001 \), respectively). Pain threat and PFCE significantly correlated with age. Specifically, older children tended to report higher

<table>
<thead>
<tr>
<th>Table 2. Baseline PBQ-SF Subscale Scores According to Sex and Age in Pediatric Patients With FAP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
</tr>
<tr>
<td><strong>Pain threat appraisal</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Childhood</td>
</tr>
<tr>
<td>Early adolescence</td>
</tr>
<tr>
<td>Late adolescence</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Childhood</td>
</tr>
<tr>
<td>Early adolescence</td>
</tr>
<tr>
<td>Late adolescence</td>
</tr>
<tr>
<td><strong>Emotion-focused coping efficacy</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Childhood</td>
</tr>
<tr>
<td>Early adolescence</td>
</tr>
<tr>
<td>Late adolescence</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Childhood</td>
</tr>
<tr>
<td>Early adolescence</td>
</tr>
<tr>
<td>Late adolescence</td>
</tr>
<tr>
<td><strong>Problem-focused coping efficacy</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Childhood</td>
</tr>
<tr>
<td>Early adolescence</td>
</tr>
<tr>
<td>Late adolescence</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Childhood</td>
</tr>
<tr>
<td>Early adolescence</td>
</tr>
<tr>
<td>Late adolescence</td>
</tr>
</tbody>
</table>

**NOTE.** Childhood was defined as 8 to 10 years of age, early adolescence was defined as 11 to 14 years of age, and late adolescence was defined as 15 to 18 years of age.
pain threat ($r = .23$) and lower PFCE ($r = -.18$). There was no relation between EFCE and age. Socioeconomic status as indicated by the Hollingshead Index$^{17}$ was not significantly associated with pain threat ($r = .03$), PFCE ($r = .02$), or EFCE ($r = .05$). Table 3 shows the 0-order correlations of the PBQ-SF subscales with baseline outcome measures of pain severity, somatic symptoms, pain coping, functional disability, and emotional functioning.

**Internal Consistency**

Cronbach $\alpha$ coefficients were .80, .79, and .79, for the pain threat, EFCE, and PFCE subscales, respectively. The $\alpha$ reliability for the corresponding parent report subscales were .75, .67, and .76, respectively.

**Test-Retest Reliability**

All baseline PBQ-SF subscales were strongly correlated with their respective scales at the 2-week follow-up. Specifically, baseline Pain Threat was strongly correlated with Pain Threat at the 2-week follow-up ($r = .75$, $P < .001$, $n = 306$), baseline EFCE was strongly correlated with EFCE at the 2-week follow-up ($r = .77$, $P < .001$, $n = 305$), and baseline PFCE was strongly correlated with PFCE at the 2-week follow-up ($r = .75$, $P < .001$, $n = 305$).

**Concurrent Validity**

We predicted that children’s self-report PBQ-SF scores would be moderately associated with parent report PBQ scores. Following convention,$^{5,6}$ we defined a large (strong) effect as a Pearson correlation coefficient $>.5$, and a moderate effect as a Pearson correlation between .2 and .4. Children’s PBQ-SF subscale scores exhibited moderate to large correlations with their parents’ PBQ-SF subscale scores (Pain Threat: $r = .78$, $P < .001$, $n = 801$; EFCE: $r = .21$, $P < .001$, $n = 803$; PFCE: $r = .49$, $P < .001$, $n = 801$).

**Construct Validity**

To evaluate construct validity, we computed partial correlations for each subscale, controlling for the other 2 subscales, to examine the unique relations of each subscale to measures of pain, disability, emotional functioning, and pain coping. Column 1 of Table 4 shows the partial correlations of the Pain Threat subscale, with related self-reported constructs, controlling for EFCE and PFCE. We expected pain threat to be positively correlated with measures of passive, active, and accommodative pain coping because perceiving pain as a threat should signal a need to cope with one’s pain. Additionally, we expected strong correlations between Pain Threat and measures of symptom severity and disability because individuals who perceive their pain as threatening likely also report more severe symptoms and impairment. We did not anticipate a relationship between Pain Threat and global self-efficacy because Pain Threat assesses one’s appraisals of the consequences and implications of pain, not appraisals regarding their ability to take action or adjust to pain. Indeed, controlling for EFCE and PFCE, Pain Threat exhibited significant positive correlations with active, passive, and accommodative coping, as well as with abdominal pain severity, somatic symptoms, functional disability, and depressive symptoms.

### Table 3. Zero-Order Correlations of PBQ-SF Subscales With Other Measures at Baseline

<table>
<thead>
<tr>
<th></th>
<th>Pain Threat</th>
<th>PFCE</th>
<th>EFCE</th>
<th>Active Coping</th>
<th>Passive Coping</th>
<th>Accommodative Coping</th>
<th>Abdominal Pain</th>
<th>Somatic Symptoms</th>
<th>Functional Disability</th>
<th>Depressive Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Threat</td>
<td>-0.506*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PFCE</td>
<td>-0.628*</td>
<td>0.539*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active coping</td>
<td>0.312*</td>
<td>0.023</td>
<td>-0.183*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passive coping</td>
<td>0.557*</td>
<td>-0.375*</td>
<td>-0.554*</td>
<td>0.294*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accommodative coping</td>
<td>-0.019</td>
<td>0.277*</td>
<td>0.311*</td>
<td>0.325*</td>
<td>0.022</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>0.492*</td>
<td>-0.368*</td>
<td>-0.306*</td>
<td>0.152*</td>
<td>0.282*</td>
<td>-0.003</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somatic symptoms</td>
<td>0.506*</td>
<td>-0.306*</td>
<td>-0.365*</td>
<td>0.252*</td>
<td>0.501*</td>
<td>0.099*</td>
<td>0.460*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional disability</td>
<td>0.431*</td>
<td>-0.356*</td>
<td>-0.399*</td>
<td>0.233*</td>
<td>0.518*</td>
<td>0.025</td>
<td>0.354*</td>
<td>0.605*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>0.422*</td>
<td>-0.345*</td>
<td>-0.441*</td>
<td>0.089*</td>
<td>-0.084**</td>
<td>0.288*</td>
<td>0.521*</td>
<td>0.514*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global self-efficacy</td>
<td>-0.179*</td>
<td>0.183*</td>
<td>-0.254*</td>
<td>0.057</td>
<td>-0.419*</td>
<td>0.084**</td>
<td>-0.035</td>
<td>-0.273*</td>
<td>-0.309*</td>
<td>-0.643*</td>
</tr>
</tbody>
</table>

* $P < .001$.
** $P < .05$.

### Table 4. Partial Correlations Between PBQ-SF Subscales and Measures of Pain Coping, Pain Severity, and Affect

<table>
<thead>
<tr>
<th></th>
<th>Pain Threat (Controlling for PFCE and EFCE)</th>
<th>PFCE (Controlling for Pain Threat and EFCE)</th>
<th>PFCE (Controlling for Pain Threat and PFCE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active coping</td>
<td>.306*</td>
<td>-.051</td>
<td>.193*</td>
</tr>
<tr>
<td>Passive coping</td>
<td>.307*</td>
<td>-.282*</td>
<td>-.019</td>
</tr>
<tr>
<td>Accommodative coping</td>
<td>.310*</td>
<td>-.322*</td>
<td>.193*</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>.364*</td>
<td>.063</td>
<td>-.171*</td>
</tr>
<tr>
<td>Somatic symptoms</td>
<td>.373*</td>
<td>-.079**</td>
<td>-.039</td>
</tr>
<tr>
<td>Functional disability</td>
<td>.219*</td>
<td>-.143*</td>
<td>-.109**</td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>.223*</td>
<td>-.216*</td>
<td>-.043</td>
</tr>
<tr>
<td>Global self-efficacy</td>
<td>-.042</td>
<td>.165*</td>
<td>.020</td>
</tr>
</tbody>
</table>

* $P < .05$.
** $P < .001$. 

PBQ: Psychometric Properties of the Short Form
Discussion

Measures of pain beliefs should be theory-based, with items closely reflecting the theoretical constructs. The PBQ is on the basis of Lazarus and Folkman’s theory of appraisal and coping. In this study, we aimed to create a short form of the measure (PBQ-SF) and to evaluate its psychometric properties in pediatric patients with FAP. The psychometric properties of the PBQ-SF provide promising initial evidence for the scale’s validity. The sub-scales of the PBQ-SF exhibited high internal consistency and strong correlations with the PBQ-SF at the 2-week follow-up.

The concurrent relations between children’s self-report and parents’ proxy report sub-scales of the PBQ-SF were strong for Pain Threat, moderate for PFCE, and weak for EFCE. Because EFCE measures one’s ability to psychologically adjust to having pain, these internal processes may not be as observable as threat appraisals or PFCE. Parents and children tend to have higher levels of abdominal pain, somatic symptoms, and depressive symptoms. Notably, the correlation with abdominal pain was not statistically reliable.

The concurrent relations between children’s self-report and parents’ proxy report sub-scales of the PBQ-SF were strong for Pain Threat, moderate for PFCE, and weak for EFCE. Because EFCE measures one’s ability to psychologically adjust to having pain, these internal processes may not be as observable as threat appraisals or PFCE. Parents and children tend to have higher levels of pain, disability, and depressive symptoms. Notably, the correlation with abdominal pain was not statistically reliable.

Discussion

Measures of pain beliefs should be theory-based, with items closely reflecting the theoretical constructs. The PBQ is on the basis of Lazarus and Folkman’s theory of appraisal and coping. In this study, we aimed to create a short form of the measure (PBQ-SF) and to evaluate its psychometric properties in pediatric patients with FAP. The psychometric properties of the PBQ-SF provide promising initial evidence for the scale’s validity. The sub-scales of the PBQ-SF exhibited high internal consistency and strong correlations with the PBQ-SF at the 2-week follow-up.

The concurrent relations between children’s self-report and parents’ proxy report sub-scales of the PBQ-SF were strong for Pain Threat, moderate for PFCE, and weak for EFCE. Because EFCE measures one’s ability to psychologically adjust to having pain, these internal processes may not be as observable as threat appraisals or PFCE. Parents and children tend to have higher levels of pain, disability, and depressive symptoms. Notably, the correlation with abdominal pain was not statistically reliable.

The PBQ-SF could be useful for identifying pain beliefs associated with poor outcomes and assessing treatment mechanisms and outcomes in interventions directed at changing pain beliefs. Using the original PBQ, a childhood pain profile characterized by high pain threat, low PFCE, and low EFCE in combination with somatic symptoms, negative affect, and disability, predicted greatest risk for persistent abdominal pain, multiple chronic pain sites, and anxiety disorders at the 9-year follow-up in late adolescence and young adulthood. In a randomized
controlled trial evaluating the efficacy of CBT for treatment of pediatric FAP, Levy and colleagues\textsuperscript{29} reported that parents' and children's pain beliefs assessed using the PBQ changed significantly more in the CBT condition compared with a control condition. This finding suggests that the treatment achieved the aims of reducing perceived pain threat and increasing pain efficacy beliefs. Reductions in parental pain threat appraisals during the intervention mediated reductions in child-reported gastrointestinal symptom severity and child-reported pain at 3, 6, and 12 months.\textsuperscript{26} Similar studies will need to be replicated with the PBQ-SF to provide further information regarding the treatment sensitivity and long-term predictive validity of the PBQ-SF subscales.

Other investigators have developed measures of pain-related cognition and pain-related self-efficacy in children.\textsuperscript{2,16} In recent years, the pediatric version of the Survey of Pain Attitudes has evidence for its validity and reliability.\textsuperscript{11,33} Although some overlap exists between constructs measured using the pediatric version of the Survey of Pain Attitudes and the PBQ-SF, the PBQ-SF subscales measure broader constructs defined by a specific theoretical framework, and therefore may have greater utility for measuring cognitive processes in psychological interventions grounded in similar theories. The Pain Self-Efficacy Scale developed by Bursch and colleagues\textsuperscript{2} has been used by several investigators in recent years.\textsuperscript{3,20} It is a 7-item measure that assesses children's confidence in their ability to function normally despite pain. In contrast, the PFCE and EFCE scales of the PBQ assess children's confidence in their ability to cope with their pain, which represents a different dimension of self-efficacy than the Pain Self-Efficacy Scale. Additionally, the Pain Threat subscale of the PBQ-SF may overlap conceptually with aspects of pain catastrophizing. Further investigation is needed regarding discriminant validity between Pain Threat from the PBQ-SF and the Pain Catastrophizing Scale for Children.\textsuperscript{7}

Other investigators have developed measures of pain-related cognition and pain-related self-efficacy in children.\textsuperscript{2,16} In recent years, the pediatric version of the Survey of Pain Attitudes has evidence for its validity and reliability.\textsuperscript{11,33} Although some overlap exists between constructs measured using the pediatric version of the Survey of Pain Attitudes and the PBQ-SF, the PBQ-SF subscales measure broader constructs defined by a specific theoretical framework, and therefore may have greater utility for measuring cognitive processes in psychological interventions grounded in similar theories. The Pain Self-Efficacy Scale developed by Bursch and colleagues\textsuperscript{2} has been used by several investigators in recent years.\textsuperscript{3,20} It is a 7-item measure that assesses children's confidence in their ability to function normally despite pain. In contrast, the PFCE and EFCE scales of the PBQ assess children's confidence in their ability to cope with their pain, which represents a different dimension of self-efficacy than the Pain Self-Efficacy Scale. Additionally, the Pain Threat subscale of the PBQ-SF may overlap conceptually with aspects of pain catastrophizing. Further investigation is needed regarding discriminant validity between Pain Threat from the PBQ-SF and the Pain Catastrophizing Scale for Children.\textsuperscript{7}

Other investigators have developed measures of pain-related cognition and pain-related self-efficacy in children.\textsuperscript{2,16} In recent years, the pediatric version of the Survey of Pain Attitudes has evidence for its validity and reliability.\textsuperscript{11,33} Although some overlap exists between constructs measured using the pediatric version of the Survey of Pain Attitudes and the PBQ-SF, the PBQ-SF subscales measure broader constructs defined by a specific theoretical framework, and therefore may have greater utility for measuring cognitive processes in psychological interventions grounded in similar theories. The Pain Self-Efficacy Scale developed by Bursch and colleagues\textsuperscript{2} has been used by several investigators in recent years.\textsuperscript{3,20} It is a 7-item measure that assesses children's confidence in their ability to function normally despite pain. In contrast, the PFCE and EFCE scales of the PBQ assess children's confidence in their ability to cope with their pain, which represents a different dimension of self-efficacy than the Pain Self-Efficacy Scale. Additionally, the Pain Threat subscale of the PBQ-SF may overlap conceptually with aspects of pain catastrophizing. Further investigation is needed regarding discriminant validity between Pain Threat from the PBQ-SF and the Pain Catastrophizing Scale for Children.\textsuperscript{7}

Other investigators have developed measures of pain-related cognition and pain-related self-efficacy in children.\textsuperscript{2,16} In recent years, the pediatric version of the Survey of Pain Attitudes has evidence for its validity and reliability.\textsuperscript{11,33} Although some overlap exists between constructs measured using the pediatric version of the Survey of Pain Attitudes and the PBQ-SF, the PBQ-SF subscales measure broader constructs defined by a specific theoretical framework, and therefore may have greater utility for measuring cognitive processes in psychological interventions grounded in similar theories. The Pain Self-Efficacy Scale developed by Bursch and colleagues\textsuperscript{2} has been used by several investigators in recent years.\textsuperscript{3,20} It is a 7-item measure that assesses children's confidence in their ability to function normally despite pain. In contrast, the PFCE and EFCE scales of the PBQ assess children's confidence in their ability to cope with their pain, which represents a different dimension of self-efficacy than the Pain Self-Efficacy Scale. Additionally, the Pain Threat subscale of the PBQ-SF may overlap conceptually with aspects of pain catastrophizing. Further investigation is needed regarding discriminant validity between Pain Threat from the PBQ-SF and the Pain Catastrophizing Scale for Children.\textsuperscript{7}


One limitation of this study is the relative homogeneity of our sample. Studies with more diverse samples will help determine whether our results generalize to other age groups, ethnicities, and chronic pain populations. Because all of our participants had FAP, it is unknown whether the PBQ is appropriate for use in individuals with other types of chronic pain. The PBQ-SF is easily modifiable for other types of chronic pain by replacing “stomach” or “stomach aches” with other pain locations (eg, “back,” “back pain”). The PBQ-SF could also be used with mixed or general pain populations by leaving out a specific location and replacing “stomach aches” with “pain” (eg, “When I have bad pain, I can find ways to feel better,” “I have pain all the time”). These modifications need further investigation to determine their validity and reliability.

Conclusions

We conclude that the PBQ-SF is a valid and reliable measure of abdominal pain beliefs in children and adolescents ages 8 and older with FAP. The PBQ-SF could be useful for evaluating mechanisms of cognitive-behavioral interventions targeted at changing pain beliefs. Additional steps for further validation include evaluation of treatment sensitivity, predictive validity, and examination of psychometric properties in other pediatric chronic pain populations.

Acknowledgments

The authors gratefully acknowledge all individuals who participated in this study.

Supplementary Data

Supplementary data related to this article can be found online at http://dx.doi.org/10.1016/j.jpain.2016.06.006.


17. Hollingshead AB: Four factor index of social status. New Haven, CT, Yale University, 1975


