ASSESSING THE AFFECTIVE COMPONENT OF CHRONIC PAIN: DEVELOPMENT OF THE PAIN DISCOMFORT SCALE

MARK P. JENSEN,* PAUL KAROLY,t and PAMELA HARRIS†

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Abstract—Few methods exist to assess the affective or reactive dimension of chronic pain, and there are psychometric and practical limitations on the methods that do exist. The current paper reports on the development and validation of the Pain Discomfort Scale, a 10-item instrument designed to fill the need for a brief and psychometrically sound measure of pain affect. Preliminary evidence supports the reliability and validity of the measure. Its internal consistency and test–retest stability coefficients are high. In addition, the results of both correlational and factor analyses of the PDS with other measures support its distinctiveness (from measures of pain intensity) and construct validity (as indicated by its close association with other measures of pain affect). These results support the use of the PDS in situations where a measure of the affective response to chronic pain is needed.

INTRODUCTION

Current theory and research point to the multidimensional nature of the human pain experience [1]. Although several dimensions of pain have been identified, two constructs have been of particular interest to clinicians and researchers: pain intensity and pain affect [2–4]. Pain intensity may be defined as the degree of pain severity reported by an individual, whereas pain affect may be defined along an unpleasantness or upsettingness dimension.

Several instruments have been developed to assess pain intensity, and research supports the validity of most [3, 5]. However, fewer indices of pain affect are available, and relatively little research has examined the psychometric properties of those that do exist.

Perhaps the most widely used measure of pain affect is the Affective subscale of the McGill Pain Questionnaire (MPQ) [6]. This subscale consists of 14 words divided into five categories of affective response to pain. Respondents are asked to circle one word within each category that best describes their pain, or circle no word if none describes their current experience. Within each category, the words are scaled in ascending order of severity [7]. This portion of the MPQ may be scored either by summing the rank order of the circled words or summing their 'scale values' (the average rating of pain severity that the word represents) in the five affect categories [7].

Evidence for the construct validity of the MPQ Affective subscale is favorable. The scale can for example, discriminate between pain patients with and without psychiatric

*Department of Rehabilitation Medicine RJ-30, University of Washington Medical Center, Seattle, WA 98195, U.S.A.
†Department of Psychology, Arizona State University, Tempe, AZ 85287, U.S.A.
‡Correspondence to Mark P. Jensen, Department of Rehabilitation Medicine RJ-30, University of Washington Medical Center, Seattle, Washington 98195, U.S.A., or to Paul Karoly, Department of Psychology, Arizona State University, Tempe, AZ 85287, U.S.A.
disturbance [8, 9]. The Affective subscale has also demonstrated discriminant validity by evidencing stronger relationships to measures of psychological distress than to measure of pain intensity [10].

Despite these positive findings, several considerations suggest that the MPQ may not be the most practical measure of pain affect across all situations. First, evidence indicates that the MPQ Affective scale lacks distinctiveness from the other MPQ subscales designed to assess different dimensions of the pain experience [10, 11]. In addition, although research indicates that patients tend to choose similar words to describe their pain over time [6, 12] estimates of the stability and internal consistency of the MPQ Affective subscale have not been provided [13]. Finally, the validity of the MPQ Affective subscale when administered out of context (i.e. without administering the other MPQ subscales) has not been established. Thus, at this point, researchers would do best to administer the entire MPQ even if they only desire a measure of pain affect.

Another method of assessing pain affect involves the use of Verbal Rating Scales. Verbal Rating Scales (VRSs) of pain affect consist of adjectives describing increasing amounts of discomfort and suffering [2, 14]. Respondents are asked to indicate the single word on the list that best describes their pain. Verbal rating scales may be scored using either: (a) the rank method, which involves giving each word a score associated with its position on the list; or (b) the standardized score method, which involves assigning each word a score equal to its average severity as rated by individuals experiencing laboratory (i.e. nonclinical) pain. The two scoring methods appear to provide essentially the same information, however [3].

Evidence for the validity of VRSs is mixed. On one hand, these measures are more sensitive than measures of pain intensity to treatments designed to impact the affective component of pain under laboratory conditions [2, 15]. On the other hand, factor analytical investigations among both chronic pain and postoperative patients indicate that VRSs designed to measure pain affect are not always distinct from measures of pain intensity [3, 10]. A final drawback to VRS measures of pain affect is that they allow respondents to choose only one descriptor, even though the patient may be experiencing a number of negative affective correlates.

The foregoing discussion suggests a need for a new measure of the affective dimension of the pain experience that: (a) is brief; (b) is distinct (from other pain dimensions, in particular, pain intensity); and (c) samples from multiple components of pain affect. The purpose of this article is to describe the development and preliminary validation of such a measure, called the Pain Discomfort Scale (PDS).

METHOD

Subjects

The subjects for this study consisted of 59 chronic pain patients who were admitted to an in-patient multidisciplinary pain program in a large south-western metropolitan hospital. Of these subjects, 19 (32%) were male and 40 (68%) were female. The patients presented with pain from a number of sites, including back pain (39.6%), pain from more than one site (24.5%), headache pain (9.4%), abdominal pain (7.5%), and limb pain (7.5%). The average age of these patients was 49.3 yr (SD = 14.5) and average duration since onset of the pain problem was 9.3 yr (SD = 14.4).

Item development and analysis

Based on statements made by patients seen in the in-patient chronic pain program, 16 items were written to reflect the possible effects of pain on well-being. Half of the items were reverse-scored to control for
TABLE I.—THE 10 ITEMS OF THE PAIN DISCOMFORT SCALE

1. I am scared about the pain I feel.
2. The pain I experience is unbearable.
3. The pain I feel is torturing me.
4. My pain does not stop me from enjoying life.*
5. I have learned to tolerate the pain I feel.*
6. I feel helpless about my pain.
7. My pain is a minor annoyance to me.*
8. When I feel pain I am hurting, but I am not distressed.*
9. I never let the pain in my body affect my outlook on life.*
10. When I am in pain, I become almost a different person.

*These items are reverse-scored.

Instructions: Please indicate by circling the appropriate number whether each of the statements below is more true or false for you. Please ANSWER EVERY QUESTION and circle ONLY ONE number per question. Answer by circling the appropriate number (0 through 4) according to the following scale:

0 = This is very untrue for me.
1 = This is somewhat untrue for me.
2 = This is neither true nor untrue for me (or it does not apply to me).
3 = This is somewhat true for me.
4 = This is very true for me.

response bias. The 16-item PDS was then administered to 59 patients consecutively admitted to a multidisciplinary in-patient pain program. Subjects were asked to indicate their level of agreement with each statement on five-point Likert scales, with 0 = 'This is very untrue for me' and 4 = 'This is very true for me'. The individual items were then examined and retained if they met the following inclusion criteria [16]: (1) item mean score: 0.4 < i < 3.6; (2) item standard deviation: SD > 0.60; (3) inter-item correlations: r > 0 for regular items and r < 0 for reverse-scored items; and (4) item-scale correlation: r > 0.30.

These analyses resulted in a 10-item scale that was used in all subsequent analyses (see Table I).

RESULTS

Mean and standard deviation

The mean and SD of the 10-item PDS in this sample were 27.46 and 7.68, respectively (the possible range of the PDS is 0–40, and the range obtained was 2–39).

Reliability

The 10-item PDS had a coefficient alpha reliability of 0.77, indicating that the PDS items are internally consistent.

To assess the test–retest stability of the PDS, the subjects were administered the scale at discharge, and were mailed questionnaires one and four months following discharge. Thirty-two subjects returned the questionnaire at the one-month follow-up, and 21 subjects returned the four-month follow-up questionnaire. The discharge/one-month correlation was 0.64 (p < 0.001, one-tailed test) and the one-month/four-month correlation was 0.76 (p < 0.001, one-tailed test).

Validity

The construct validity of the 10-item PDS was studied by examining the measure's relationship with two similar indices: depression as assessed by the Beck Depression Inventory [17] and the MPQ Affective subscale [6]. The PDS's relationships with four measures of pain intensity [5] were also examined to obtain scale distinctiveness.
Correlation of the Pain Discomfort Scale score with criterion measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pain Discomfort Scale score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beck Depression Inventory</td>
<td>0.58***</td>
</tr>
<tr>
<td>Affective Pain scale from the McGill Pain Questionnaire</td>
<td>0.38**</td>
</tr>
<tr>
<td>Visual Analogue Scale—Intensity</td>
<td>0.12</td>
</tr>
<tr>
<td>Box Scale—Intensity</td>
<td>0.16</td>
</tr>
<tr>
<td>Numerical Rating Scale—Intensity</td>
<td>0.13</td>
</tr>
<tr>
<td>Present Pain Intensity Scale</td>
<td>0.03</td>
</tr>
</tbody>
</table>

**p < 0.01; ***p < 0.001, two-tailed tests.

In one of these measures, the 101-point Numerical Rating Scale, respondents are asked to choose a number between 0 and 100 to represent their pain experience. The anchors of the scale are 0 (no pain) and 100 (pain as bad as it can be). The second measure, the 11-point Box Scale, consists of 11 numbers (0–10) surrounded by boxes and anchored by the words ‘no pain’ next to the 0 and ‘pain as bad as it could be’ next to the 10. Respondents are asked to place an ‘X’ through the number to indicate their current level of pain. The third measure of pain intensity used was a visual analogue scale (VAS) consisting of a 10 cm line anchored by the same words as above. Respondents are asked to place a mark through the point in the line that represents their current pain level. The final measure of pain intensity was the Present Pain Intensity scale from the MPQ (PPI) [6]. The PPI is a list of five pain descriptors presented in ascending order. Respondents are asked to indicate the word in the list that best describes their perceived pain intensity. Each of these measures has demonstrated its validity as an indicant of pain intensity [3, 5, 6].

Correlations of the PDS with the criterion measures are presented in Table II. As can be seen, the PDS correlates more highly with depression and the MPQ Affective scale than with any of the measures of pain intensity.

### Table III. Results of the Principal Axis Factor Analysis of the Pain Discomfort Scale andCriterion Measures—Oblique Rotation

<table>
<thead>
<tr>
<th>Scale</th>
<th>Factor I (Pain intensity)</th>
<th>Factor II (Pain affect)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRS-101</td>
<td>0.98</td>
<td>0.04</td>
</tr>
<tr>
<td>BS-11</td>
<td>0.94</td>
<td>0.02</td>
</tr>
<tr>
<td>VAS</td>
<td>0.84</td>
<td>0.07</td>
</tr>
<tr>
<td>PPI</td>
<td>0.36</td>
<td>0.06</td>
</tr>
<tr>
<td>PDS</td>
<td>-0.18</td>
<td>0.87</td>
</tr>
<tr>
<td>BDI</td>
<td>0.08</td>
<td>0.71</td>
</tr>
<tr>
<td>MPQ Affective scale</td>
<td>0.21</td>
<td>0.41</td>
</tr>
</tbody>
</table>

NRS-101 is the 101-point Numerical Rating Scale; BS-11 is the 11-point Box Scale; VAS is the Visual Analogue Scale; PPI is the Present Pain Inventory scale from the McGill Pain Questionnaire; PDS is the 10-item Pain Discomfort Scale; BDI is the Beck Depression Inventory; and MPQ Affective Scale is the Affective subscale from the McGill Pain Questionnaire. See text for a description of these measures.
As a means of obtaining additional evidence for the validity of the PDS, the six criterion measures and the PDS score were entered in a principle axis factor analysis, with the expectation that two primary factors, representing pain intensity and pain affect, would be revealed. As expected, two factors emerged in this analysis, and they accounted for 72% of the variance in these measures (see Table III). The first, second, and third eigenvalues were 3.47, 1.58 and 0.73, respectively. The factor solutions were rotated using an oblique procedure because some degree of relationship between pain intensity and affect was expected. The factor loadings, which represent the strength of the relationship between each scale and the two factors, indicate that one factor is a clear pain intensity factor, and the other represents pain affect. Close examination of the factor loadings suggests that the NRS-101 and the BS-11 are the most readily interpretable measures of pain intensity, and that the PDS is the strongest index of pain affect in the present sample of chronic pain patients. The correlation between the two factors was 0.31.

DISCUSSION

The results of this study demonstrate the reliability and validity of the Pain Discomfort Scale. The internal consistency of the measure is high, and the results of both correlational and factor analysis of the PDS with other measure of pain affect and pain intensity indicate that the PDS can be seen as distinct from pain intensity, while being closely associated with the emotional dimension.

One criticism of the Pain Discomfort Scale which might be raised is its apparent overlap with cognitive aspects of the pain experience. Most of the items reflect respondents' judgments or beliefs regarding the impact of pain on their emotional life. Thus, the scale cannot be seen as a pure measure of affect (e.g. anxiety, anger, distress), but rather as a measure of the affect that patients attribute to their pain experience. However, a general measure of affect would not serve the intended purpose of assessing the affective response associated specifically to pain. It would, of course, be interesting to carefully examine the relationship between the PDS and related cognitive aspects of the pain experience such as patient schemas concerning treatment or their pain memories [13, 18].

Another drawback to the PDS is that it was developed (and validated) for use with chronic pain populations only. Many of the items are not appropriate for individuals suffering from acute (e.g. experimentally induced or postoperative) pain. This problem is not shared by either the McGill Pain Questionnaire-affective subscale or Verbal Rating Scale measures of pain affect. At this time, either of the later two instruments would be recommended instead of the PDS in the assessment of acute pain.

The PDS is distinct from other measures of pain affect in several important ways. First, it has more items than other either the McGill Pain Questionnaire-affective subscale (in which respondents select from five affect categories) or Verbal Rating Scales (in which respondents pick one descriptor). This makes it possible for the PDS to assess a broader range of feeling responses to pain. For example, the PDS requires respondents to indicate their feelings of annoyance, fear, helplessness, and distress in response to pain—affective responses not addressed in other measures. Moreover, use of more items, provided they tap into a similar construct and are statistically
related to one another, can also act to increase the reliability of a measure. Finally, unlike the McGill Pain Questionnaire, the PDS is designed to assess pain affect exclusively and so may be used in situations where this construct is of primary interest.

The development of the PDS provides clinicians and researchers with another option for assessing the affective response to chronic pain. Its psychometric properties support its use at this time. Additional research is now needed to examine the sensitivity of the measure to treatments designed to influence affective responses to pain, and to examine the relationship between cognitive aspects of the pain experience and the PDS.

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