Patient-Reported Outcomes Measurement Information System
Dynamic Tools to Measure Health Outcomes From the Patient Perspective

ADULT PAIN INTERFERENCE PROFILE SHORT FORMS

A brief guide to the 4-item PROMIS Short Form v1.0 – Pain Interference 4a,
the 6-item PROMIS Short Form v1.0 – Pain Interference 6a,
and the 8-item PROMIS Short Form v1.0 – Pain Interference 8a

ABOUT PAIN INTERFERENCE*

The pain interference item bank measures the self-reported consequences of pain on relevant aspects of one's life. This includes the extent to which pain hinders engagement with social, cognitive, emotional, physical, and recreational activities. Pain interference also incorporates items probing sleep and enjoyment in life, though the item bank only contains one sleep item. The pain interference short forms are generic rather than disease-specific. Each assesses pain interference over the past seven days.

(*abbreviated definition: *see nihpromis.org for the full version*)

INTRODUCTION TO ASSESSMENT OPTIONS

There are two administration options for assessing pain interference: short forms and computerized adaptive testing (CAT). When administering a short form, instruct participants to answer all of the items (i.e., questions or statements) presented. With CAT, participant responses guide the computer's choice of subsequent items from the full item bank (41 items in total). Although items differ across respondents taking CAT, scores are comparable across participants. Some administrators may prefer to ask the same question of all respondents or of the same respondent over time, to enable a more direct comparability across people or time. In these cases, or when paper administration is preferred, a short form would be more desirable than CAT.

This guide provides information on the 4-, 6-, and 8-item pain interference short forms designed for use with short forms of similar length from other domains (physical function, depression, anxiety, fatigue, sleep disturbance, and satisfaction with participation in social roles). When a short form from each of the seven domains is administered together, this offers a 'profile' of the respondent. While these short forms are designed for use as part of a PROMIS Profile, they can also be administered individually.

Whether one uses a short form or CAT, the score metric is Item Response Theory (IRT), a family of statistical models that link individual questions to a presumed underlying trait or concept of pain interference represented by all items in the item bank. When choosing between CAT and a short form, it is useful to consider the demands of computer-based assessment, and the psychological, physical, and cognitive burden placed on respondents as a result of the number of questions asked.

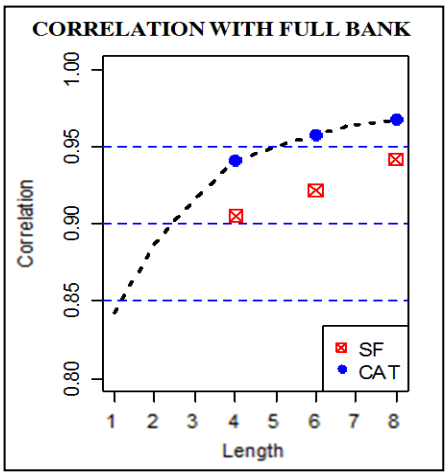

Figure 1

Figure 1 illustrates the correlations (strength of relationship) of the full bank with CAT and with short forms of varying length. The correlation of CAT scores with the full bank score is greater than a short form of any length. A longer CAT or longer short form offers greater correlation, as well as greater precision. When evaluating precision, not all questions are equally informative. The flexibility of CAT to choose more informative questions offers more precision.

Graphical reports, which visually illustrate results, are available if you choose to administer a PROMIS Profile. To access a sample report, complete the CAT demo at nihpromis.org.

SCORING THE INSTRUMENT

Each question has five response options ranging in value from one to five. To find the total raw score, sum the values of the response to each question. For example, for the 4-item form, the lowest possible raw score is four; the highest possible raw score is 20 (Table 1).

Pain Interference 4a
Short Form Conversion Table

Raw Score	T-score	SE*
4	41.6	6.1
5	49.6	2.5
6	52.0	2.0
7	53.9	1.9
8	55.6	1.9
9	57.1	1.9
10	58.5	1.8
11	59.9	1.8
12	61.2	1.8
13	62.5	1.8
14	63.8	1.8
15	65.2	1.8
16	66.6	1.8
17	68.0	1.8
18	69.7	1.9
19	71.6	2.1
20	75.6	3.7

*SE = Standard Error

Table 1

Pain Interference 6a
Short Form Conversion Table

Raw Score	T-score	SE*
6	41.1	6.0
7	48.6	2.4
8	50.7	1.8
9	52.2	1.6
10	53.4	1.6
11	54.5	1.6
12	55.6	1.5
13	56.6	1.5
14	57.6	1.5
15	58.6	1.5
16	59.5	1.5
17	60.4	1.4
18	61.2	1.4
19	62.1	1.4
20	63.0	1.5
21	63.8	1.5
22	64.8	1.5
23	65.7	1.5
24	66.7	1.5
25	67.6	1.5
26	68.7	1.5
27	69.8	1.5
28	71.0	1.6
29	72.6	2.0
30	76.3	3.6

*SE = Standard Error

Table 2

Pain Interference 8a
Short Form Conversion Table

Raw Score	T-score	SE*
8	40.7	5.9
9	47.9	2.4
10	49.9	1.8
11	51.2	1.5
12	52.3	1.4
13	53.2	1.4
14	54.1	1.4
15	55.0	1.4
16	55.8	1.4
17	56.6	1.4
18	57.4	1.3
19	58.1	1.3
20	58.8	1.3
21	59.5	1.3
22	60.2	1.3
23	60.8	1.3
24	61.5	1.3
25	62.1	1.3
26	62.8	1.3
27	63.5	1.3
28	64.1	1.3
29	64.8	1.3
30	65.5	1.3
31	66.2	1.3
32	66.9	1.3
33	67.7	1.3
34	68.4	1.3
35	69.2	1.3
36	70.1	1.4
37	71.0	1.4
38	72.1	1.6
39	73.5	2.0
40	77.0	3.5

*SE = Standard Error

Table 3

You can use Tables 1, 2, and 3 to translate the total raw score into a T-score for each participant. The T-score rescales the raw score into a standardized score with a mean of 50 and a standard deviation (SD) of 10. Therefore, a person who has a T-score of 40 is one SD below the U.S. general population mean. These conversions are accurate ONLY when all questions on the short form have been answered. For the 4-item form, a raw score of 10 converts to a T-score of 58.5 with a standard error (SE) of 1.8. Thus, the 95% confidence interval around the observed score ranges from 55.0 to 62.0 (T-score $\pm$ (1.96*SE) = 58.5 $\pm$ 3.5 = 55.0 to 62.0).

Important: *A higher PROMIS T-score represents more of the concept being measured*. For negatively-worded concepts like pain interference, a T-score of 60 is one SD worse than average. By comparison, a pain interference T-score of 40 is one SD better than average.

You can upload data to a computer program called PROMIScore, which will score your data one person at a time or as a group. PROMIScore is particularly useful because it can calculate T-scores even when there are missing responses. The PROMIScore software and user manual are available for download at nihpromis.org.

STATISTICAL CHARACTERISTICS

There are three key features of the score for pain interference:

- **Reliability**: The degree to which a measure is free of error. It can be estimated by the internal consistency of the responses to the measure, or by correlating total scores on the measure from multiple time points when there has been no true change in what is being measured (for z-scores, reliability = $1 - SE^2$).
- **Precision**: The consistency of the estimated score (reciprocal of error variance).
- **Information:** The precision of an item or multiple items at different levels of the underlying continuum (for z-scores, information = $1/SE^2$).

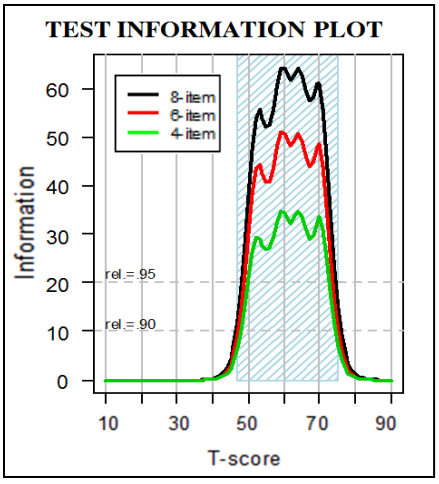

Figure 2

In Figure 2, the two dotted horizontal lines each represent a degree of reliability (i.e., .90 or .95) typically regarded as sufficient for an accurate individual score. The shaded blue region marks the range of the scale where measurement precision is comparable to the reliability of .90 for the 8-item form. Figure 2 also tells us where on the scale the form is most informative based upon the T-score: the 8-item form is more informative than the 6-item form, which is more informative than the 4-item form.

PREVIEW OF SAMPLE ITEMS

Figure 3 is an excerpt from the paper version of the 4-, 6-, and 8-item short forms. These instruments are also available for online administration. There are a variety of formatting options for the online version. Note: This excerpt comes from the version for investigators; there is also a version for participants which does NOT include the labels for response scores (1 through 5) or the identification tag for each item (e.g., PAININ9).

	In the past 7 days…	Not at all	A little bit	Somewhat	Quite a bit	Very much
PAININ9 1	How much did pain interfere with your day to day activities?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PAININ22 2	How much did pain interfere with work around the home?.....	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Figure 3

FREQUENTLY ASKED QUESTIONS

Q: *I am interested in learning more. Where can I do that?*

Each of these short forms is available on the PROMIS website through Assessment Center, an online research management tool which houses all PROMIS instruments. Assessment Center enables researchers to create study-specific websites for capturing participant data securely. Studies can include measures within the Assessment Center library, as well as custom instruments created or entered by the researcher. PROMIS instruments (short forms, CAT, profiles) are a central feature of the instrument library within Assessment Center. Any PROMIS measure can be included in an online study or downloaded for administration on paper. Figure 3 is an excerpt from a paper short form for investigators.

Detailed statistical information and development history about PROMIS items and instruments are available for review at nihpromis.org and assessmentcenter.net. To learn more, contact help@assessmentcenter.net.

Q: *Do I need to register with PROMIS to use these short forms?*

Yes, to get a copy of one or more of these short forms, we ask that you register with Assessment Center so that we are better able to track who has accessed instruments for research. Assessment Center is available at assessmentcenter.net, along with the PROMIS terms and conditions of use.

Q: *Are these short forms available in other languages?*

Yes, these short forms are available in Spanish. The PROMIS group is working to translate these forms into other languages. Information on available translations is updated periodically at nihpromis.org.

Q: Can I make my own short form?

Yes, custom pain interference short forms of any length can be made by selecting items from the full item bank. Instructions can be found in the Assessment Center User Manual at assessmentcenter.net.