

# ADULT FATIGUE

## COMPUTERIZED ADAPTIVE TESTING (CAT)

A brief guide to the PROMIS Item Bank v1.0 – Fatigue

### ABOUT FATIGUE\*

The fatigue item bank evaluates a range of self-reported symptoms, from mild subjective feelings of tiredness to an overwhelming, debilitating, and sustained sense of exhaustion that likely decreases one’s ability to execute daily activities and function normally in family or social roles. Fatigue is divided into the experience of fatigue (frequency, duration, and intensity) and the impact of fatigue on physical, mental, and social activities. Fatigue computerized adaptive testing (CAT) is generic rather than disease-specific. It assesses fatigue over the past seven days.

(\*abbreviated definition: see [nihpromis.org](http://nihpromis.org) for the full version)

### PREVIEW OF SAMPLE ITEMS

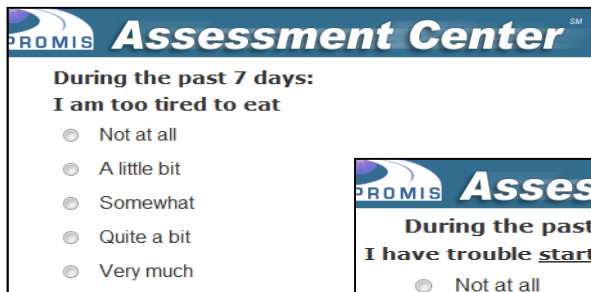


Figure 1

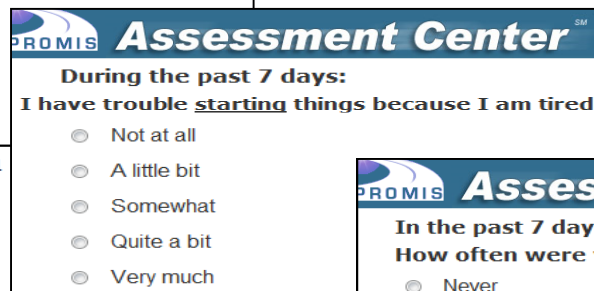
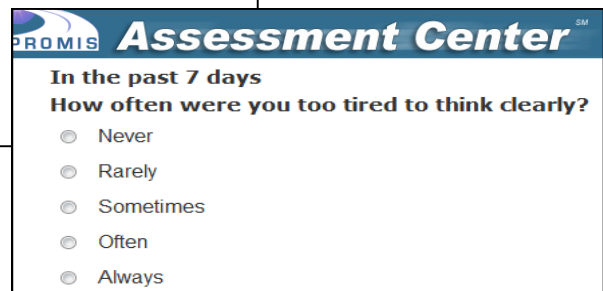



Figure 1 shows three fatigue items (i.e., questions or statements) from the full item bank that can be included in CAT. Several formats for presenting the items are available for computer-based administration through Assessment Center (see FAQ on page 3). CAT is not available for paper administration.

### SCORING THE INSTRUMENT

A minimum number of items (4) must be answered in order to receive a score for fatigue CAT. The first item is selected because it provides the most information about the U.S. general population. The response to this item will guide the computer’s choice of the next item for the participant. The participant’s response to this item will dictate the selection of the following question, and so on. As additional items are administered, the potential for error is reduced and confidence in the respondent’s score increases. CAT will continue until either the standard error drops below a specified level, or the participant has answered the maximum number of questions (12), whichever occurs first.

After finishing CAT, the participant’s pattern of responses is converted into a standardized T-score, with a mean of 50 based on the U.S. general population, and a standard deviation (SD) of 10. Thus, a person who has a T-score of 40 is one SD below the U.S. mean. The standardized T-score is reported as the final score for each participant.

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

## STATISTICAL CHARACTERISTICS

Figure 2 is a sample of the statistical information available in Assessment Center. Two key features are:

1) **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 two time points when there has been no true change in what is being measured (for z-scores, reliability =  $1 - SE^2$ ).

<b>Scaling Model Used For Calibration</b>	Graded Response Model (GRM)
<b>Total Number of Items</b>	95

Sample	N	Alpha Reliability
Promis	14931	0.99

2) **Standard Error (SE):** The possible range of the actual final score based upon the scaled T-score. With a T-score of 32 and a SE of 4, the 95% confidence interval around the actual final score ranges from 24.2 to 39.8 (T-score  $\pm$   $(1.96 * SE) = 32 \pm 7.8 = 24.2$  to 39.8).

Score Distributions									
	Mean	SD	P5	P10	P25	P50	P75	P90	P95
<b>Raw</b>	220.69	91.34	98.00	109.00	142.00	206.00	284.00	356.00	392.00
<b>Scale</b>	51.23	9.41	36.46	39.02	44.31	50.82	57.83	63.97	67.33

										Min	Max
<b>Scale Score</b>	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	0.0	0.0
<b>SE</b>	1.70	.70	.20	.10	.10	.10	.10	.10	.30		
<b>Reliability</b>	.00	.52	.94	.99	.99	.99	.99	.99	.90		

Note: SEs in Figure 2 are on the theta metric; multiply values by 10 to get SEs on the T-score metric. Figure 2

More information is available online via Assessment Center ([assessmentcenter.net](http://assessmentcenter.net)).

## DATA REPORTS

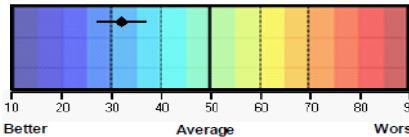
Upon completion of CAT, a data report is available in Assessment Center. Figure 3 is a sample report:

**Your score on the Fatigue CAT is \_\_. The average score is 50. Your score indicates that your level of fatigue is higher (worse) than:**

- \_\_ percent of people in the general population
- \_\_ percent of (age group)
- \_\_ percent of (gender)

Your score is shown below on the graph. The diamond (◆) is placed where we think your score lies. It represents your T-score, which is a standardized measure that is based on an average score of 50, based on responses to the same questions by the general population in the United States.

<b>Your Score SE</b>	
Fatigue	32     4



The horizontal, solid black line on either side of the diamond in your profile report shows the Standard Error (SE), a statistical measure of variance that represents the possible range of your actual score around this estimated score. It is very likely that your score is in the range between these lines.

Figure 3

To access a sample report for fatigue, complete the CAT demo at [nihpromis.org](http://nihpromis.org). More than one CAT domain can be completed at a time; results for all domains selected will be generated and displayed within the one report.

Data reports are also available if you choose to administer a PROMIS profile instrument, which includes a short form from seven PROMIS domains (physical function, depression, anxiety, fatigue, pain interference, satisfaction with participation in social roles, and sleep disturbance).

## COMPARING COMPUTERIZED ADAPTIVE TESTING TO SHORT FORMS

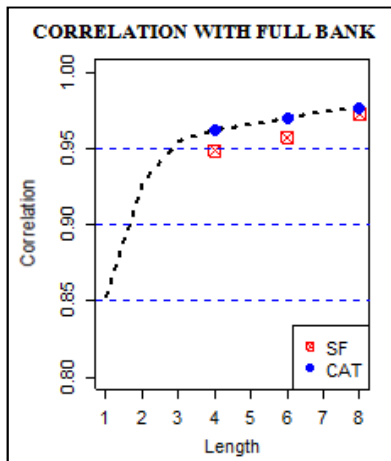


Figure 4

There are two administration options for assessing fatigue: short forms and CAT. With a short form, participants will be administered all of items within the instrument. With CAT, participant responses guide the computer's choice of subsequent items from the full item bank (95 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.

Figure 4 illustrates the correlations (strength of relationship) of the full bank with CAT and with short forms of varying length (4, 6 and 8 items).

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.

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 (fatigue) 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.

## FREQUENTLY ASKED QUESTIONS

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

The full version of this item bank is available on the PROMIS website through Assessment Center, which houses all PROMIS instruments for each domain.

Assessment Center is a free, online research management tool. It 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 non-adaptive administration on paper.

Detailed statistical information and development history about PROMIS items and instruments are available for review at [nihpromis.org](http://nihpromis.org) or [assessmentcenter.net](http://assessmentcenter.net). To learn more, contact [help@assessmentcenter.net](mailto:help@assessmentcenter.net).

### **Q: Do I need to register with PROMIS to use this CAT?**



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

Yes, to gain access to this CAT, we ask that you register with Assessment Center and endorse the terms and conditions of use, so that we are better able to track who has accessed instruments for research. Assessment Center is available at [assessmentcenter.net](http://assessmentcenter.net).

**Q: *Is this CAT available in other languages?***

This CAT is not currently available in other languages. The PROMIS group is working to translate this CAT into Spanish and other languages. Information on available translations is updated periodically at [nihpromis.org](http://nihpromis.org).