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

Smoking – Negative Health Expectancies

A brief guide to the PROMIS© Smoking – Coping Expectancies instruments:

ADULT
PROMIS Item Bank v1.0 – Smoking – Negative Health Expectancies for All Smokers
PROMIS Item Bank v1.0 – Smoking – Negative Health Expectancies for Daily Smokers
PROMIS Item Bank v1.0 – Smoking – Negative Health Expectancies for Nondaily Smokers
PROMIS Short Form v1.0 – Smoking – Negative Health Expectancies for All Smokers 6a
PROMIS Short Form v1.0 – Smoking – Negative Health Expectancies for Daily Smokers 6a
PROMIS Short Form v1.0 – Smoking – Negative Health Expectancies for Nondaily Smokers 6a

ABOUT SMOKING – NEGATIVE HEALTH EXPECTANCIES

The PROMIS Smoking – Negative Health Expectancies item banks assess smokers' self-reported expectancies about the health-related concerns that are experienced as a result of smoking. These items cover health-related outcome expectancies of smoking (e.g., smoking gives me a headache) and quitting (e.g., if I quit smoking, I will breathe easier), and emotions such as worry (e.g., about developing serious health problems in the future). The smoking – negative health expectancies short forms are universal rather than disease-specific. The item banks do not use a time frame (e.g. over the past seven days) when assessing smoking – negative health expectancies.

Smoking – coping expectancies instruments are available for adults (ages 18+). Items banks are available for all current smokers (PROMIS Item Bank v1.0 – Smoking – Negative Health Expectancies for All Smokers) and specifically for daily smokers (PROMIS Item Bank v1.0 – Smoking – Negative Health Expectancies for Daily Smokers) and nondaily smokers (PROMIS Item Bank v1.0 – Smoking – Negative Health Expectancies for Nondaily Smokers). The three item banks share 12 common items. There are 7 additional items that are unique to the Daily Smokers bank and 6 additional items that are unique to the Nondaily Smokers bank.

In situations where smoking status is not known prior to computer administration, the All Smokers bank items should be used. However, where the smoking status of respondents is known, the Daily Smokers or Nondaily Smokers item banks may be more appropriate as these provide additional items and information specific to each status.

One 6-item short form is also available (PROMIS Short Form v1.0 – Smoking – Negative Health Expectancies for All, Daily, and Nondaily Smokers 6a) and is appropriate for use with all current smokers, regardless of daily/nondaily smoking status.

INTRODUCTION TO ASSESSMENT OPTIONS

There are two administration options for assessing smoking – negative health expectancies: underline short forms and computerized adaptive test (CAT). When administering a short form, instruct participants to answer all of the items (i.e., questions or statements) presented. With a CAT, participant responses guide the system's choice of subsequent items from the full item bank (12 items for the All Smokers bank, 19 items for the Daily Smokers bank and 18 items for the Nondaily Smokers bank). Although items differ across respondents taking a 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 a CAT. This guide provides information on all smoking – negative health expectancies short form and CAT instruments.

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 smoking – negative health expectancies represented by all items in the item bank. When choosing between a CAT and 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 illustrates the correlations (strength of relationship) of the full bank with a 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

Figure 1

as greater precision. When evaluating precision, not all questions are equally informative. The flexibility of a CAT to choose more informative questions offers more precision.
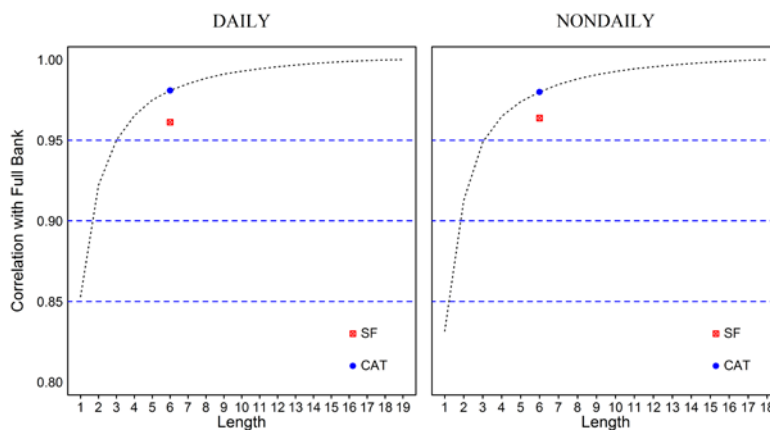
SCORING THE INSTRUMENT

Short Forms: PROMIS instruments are scored using item-level calibrations. This means that the most accurate way to score a PROMIS instrument is to use the HealthMeasures Scoring Service (https://www.assessmentcenter.net/ac_scoringservice) or a data collection tool that automatically calculates scores (e.g., Assessment Center℠, REDCap auto-score). This method of scoring uses responses to each item for each participant. We refer to this as "response pattern scoring." Because response pattern scoring is more accurate than the use of raw score/scale score look up tables included in this manual, it is preferred. Response pattern scoring is especially useful when there is missing data (i.e., a respondent skipped an item), different groups of participants responded to different items, or you have created a new questionnaire using a subset of questions from a PROMIS item bank.

Each question usually has five response options ranging in value from one to five. To find the total raw score for a short form with all questions answered, sum the values of the response to each question. For example, for the adult 6-item form, the lowest possible raw score is 6; the highest possible raw score is 30 (see all short form scoring tables in Appendix 1). **All questions must be answered in order to produce a valid score using the scoring tables**. If a participant has skipped a question, use the HealthMeasures Scoring Service (https://www.assessmentcenter.net/ac_scoringservice) to generate a final score.

There is one common short form that is applicable for all smokers, regardless of daily/nondaily smoking status. However, there are three score conversion tables in Appendix 1; the All Smokers Short Form Conversion Table is appropriate for scoring smokers without considering their daily/nondaily status. The Daily and Nondaily Smokers Short Form Conversion Tables can be used when respondents' smoking status is known. If you are not sure which table to use, the All Smokers Short Form Conversion Table is recommended.

Locate the applicable score conversion table in Appendix 1 and use this table to translate the total raw score into a T-score for each participant. The smoking bank scores are standardized relative to the daily smokers sample (i.e., the mean of the daily smokers is 50 with an SD of 10). Therefore a person with a T-score of 40 is one SD below the daily smokers mean.

For the adult PROMIS All Smokers 6a short form, a raw score of 16 converts to a T-score of 51.1 with a standard error (SE) of 3.2 (see scoring table for the 6a All Smokers short form in Appendix 1). Thus, the 95% confidence interval around the observed score ranges from 44.83 to 57.37 (T-score $\pm$ (1.96*SE) or 51.1 $\pm$ (1.96*3.2).

CAT: A minimum number of items (4 for adult CATs) must be answered in order to receive a score for the Smoking – Negative Health Expectancies CAT. The response to the first item will guide the system's choice of the next item for the participant. The participant's response to the second 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. The CAT will continue until either the standard error drops below a specified level (on the T-score metric 3.0 for adult CATs), or the participant has answered the maximum number of questions (12), whichever occurs first.

For most PROMIS instruments, a T-score of 50 is the average for the United States general population with a standard deviation of 10 because calibration testing was performed on a large sample of the general population. You can read more about the calibration and centering samples at HealthMeasures.net in the Interpret PROMIS (http://www.healthmeasures.net/score-and-interpret/interpret-scores/promis) section. The T-score is provided with an error term (Standard Error or SE). The Standard Error is a statistical measure of variance and represents the "margin of error" for the T-score.

Important: *A higher PROMIS T-score represents more of the concept being measured.* For negatively-worded concepts like negative health expectancies, a T-score of 50 is one SD worse than average. By comparison, a negative health expectancies T-score of 40 is one SD better than average.

STATISTICAL CHARACTERISTICS
There are four key features of the score for smoking – negative health expectancies :
- **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 = $1 - SE^2$).
- **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 = $1/SE^2$).
- **Standard Error (SE):** The possible range of the actual final score based upon the scaled T-score. For example, with a T-score of 52 and a SE of 2, the 95% confidence interval around the actual final score ranges from 48.1 to 55.9 (T-score $\pm$ (1.96*SE) = 52 $\pm$ 3.9 = 48.1 to 55.9).

The final score is represented by the T-score, a standardized score with a mean of 50 and a standard deviation (SD) of 10.

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In Figure 2 (Adult 6a Daily and Nondaily short forms), the two dotted horizontal lines each represent a degree of internal consistency reliability (i.e., .80 or .90) 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 .80 for the six-item form. Figure 2 also tells us where on the scale the form is most informative based upon the T-score.
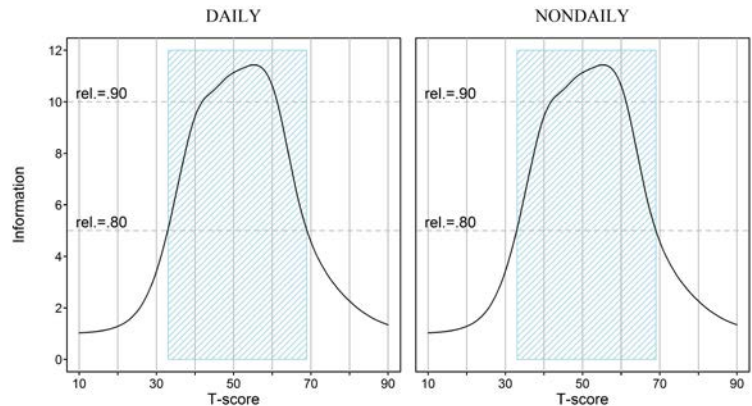

Figure 2

More information is available at www.HealthMeasures.net.

PREVIEW OF SAMPLE ITEM

Figure 3 is an excerpt from the paper version of the adult six-item short form. This is the paper version format used for all smoking – negative health expectancies instruments. It is important to note that the CAT is not available for paper administration.

		Not at all	A little bit	Somewhat	Quite a bit	Very much
SMKHLTH01	Smoking is taking years off my life............	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
SMKHLTH02	Smoking makes me worry about getting heart troubles.......................................	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Figure 3

FREQUENTLY ASKED QUESTIONS (FAQs)

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

Review the HealthMeasures website at www.healthmeasures.net.

Q: Do I need to register with PROMIS to use these instruments?

No.

Q: Are these instruments available in other languages?

Yes! Look at the HealthMeasures website (http://www.healthmeasures.net/explore-measurement-systems/promis/intro-to-promis/available-translations/117-available-translations) for current information on PROMIS translations.

Q: Can I make my own short form?

Yes, custom short forms can be made by selecting any items from an item bank. This can be scored using the Scoring Service (https://www.assessmentcenter.net/ac_scoringservice).

Q: How do I handle multiple responses when administering a short form on paper?

Guidelines on how to deal with multiple responses have been established. Resolution depends on the responses noted by the research participant.

- If two or more responses are marked by the respondent, and they are next to one another, then a data entry specialist will be responsible for randomly selecting one of them to be entered and will write down on the form which answer was selected. Note: To randomly select one of two responses, the data entry specialist will flip a coin (heads - higher number will be entered; tails – lower number will be entered).To randomly select one of three (or more) responses, a table of random numbers should be used with a statistician's assistance.
- If two or more responses are marked, and they are NOT all next to one another, the response will be considered missing.

Q: What is the minimum change on a PROMIS instrument that represents a clinically meaningful difference?

To learn more about research on the meaning of a change in scores, we suggest conducting a literature review to identify the most current information. The HealthMeasures website (http://www.healthmeasures.net/score-and-interpret/interpret-scores/promis) has additional information on interpreting scores.

APPENDIX 1 - SCORING TABLES

Negative Health Expectancies 6a		
All Smokers Short Form Conversion Table		
Raw Score	**T Score**	**SE***
6	30.6	5.2
7	35.4	4.1
8	38.2	3.7
9	40.5	3.5
10	42.5	3.4
11	44.2	3.4
12	45.7	3.3
13	47.2	3.3
14	48.5	3.2
15	49.8	3.2
16	51.1	3.2
17	52.3	3.2
18	53.5	3.2
19	54.8	3.2
20	56.0	3.2
21	57.2	3.3
22	58.5	3.4
23	59.9	3.5
24	61.3	3.6
25	62.8	3.8
26	64.4	4.0
27	66.1	4.2
28	68.1	4.5
29	70.2	4.7
30	73.5	5.4
SE* = Standard Error on T-score metric		

Negative Health Expectancies 6a		
Daily Smokers Short Form Conversion Table		
Raw Score	**T Score**	**SE***
6	30.8	5.2
7	35.5	4.1
8	38.3	3.7
9	40.6	3.5
10	42.5	3.4
11	44.2	3.4
12	45.8	3.3
13	47.2	3.3
14	48.6	3.2
15	49.9	3.2
16	51.1	3.2
17	52.4	3.2
18	53.6	3.2
19	54.8	3.2
20	56.0	3.2
21	57.3	3.3
22	58.6	3.4
23	59.9	3.5
24	61.4	3.6
25	62.9	3.8
26	64.5	4.0
27	66.2	4.2
28	68.2	4.5
29	70.2	4.7
30	73.6	5.5
SE* = Standard Error on T-score metric		

Negative Health Expectancies 6a		
Nondaily Smokers Short Form Conversion Table		
Raw Score	**T Score**	**SE***
6	30.1	5.3
7	35.1	4.1
8	38.0	3.8
9	40.3	3.6
10	42.2	3.5
11	43.9	3.4
12	45.5	3.3
13	47.0	3.3
14	48.3	3.3
15	49.6	3.2
16	50.9	3.2
17	52.1	3.2
18	53.3	3.2
19	54.6	3.2
20	55.8	3.2
21	57.0	3.3
22	58.3	3.4
23	59.7	3.5
24	61.1	3.6
25	62.5	3.7
26	64.1	3.9
27	65.8	4.1
28	67.7	4.4
29	69.7	4.6
30	72.9	5.3
SE* = Standard Error on T-score metric		