

Evaluating Options for Presenting Health States From PROMIS[®] Item Banks

JANEL HANMER, MD, PHD

OCTOBER 21, 2016

UNIVERSITY OF PITTSBURGH

A solid green horizontal bar at the bottom of the slide.

Acknowledgements

David Feeny, Baruch Fischhoff, Ron Hays, Rachel Hess, Paul Pilkonis,
Dennis Revicki, Mark Roberts, Joel Tsevat, Lan Yu

I have no disclosures

The project was supported by the National Institutes of Health through
Grant Number KL2 TR001856

Background

The Patient Reported Outcomes Measurement Information System (PROMIS®) developed *item banks* to assess health-related quality of life.

- An item bank is a large number of items calibrated on a unidimensional scale

Historically, preference-based summary scores of health were created using relatively small, discrete health state spaces.

Because item banks include a large number of items,
it is unclear how to present an item bank for valuation exercises.

Methods: overview

We evaluated four different approaches to create a health state description from an item bank:

- one item (1I)
- two items presented separately (2S)
- two items presented together (2T)
- five items presented together (5T)

We evaluated these four approaches in three PROMIS® item banks:

- Depression
- Physical function
- Sleep disturbance

Methods: overview

We evaluated four different approaches to create a health state description from an item bank:

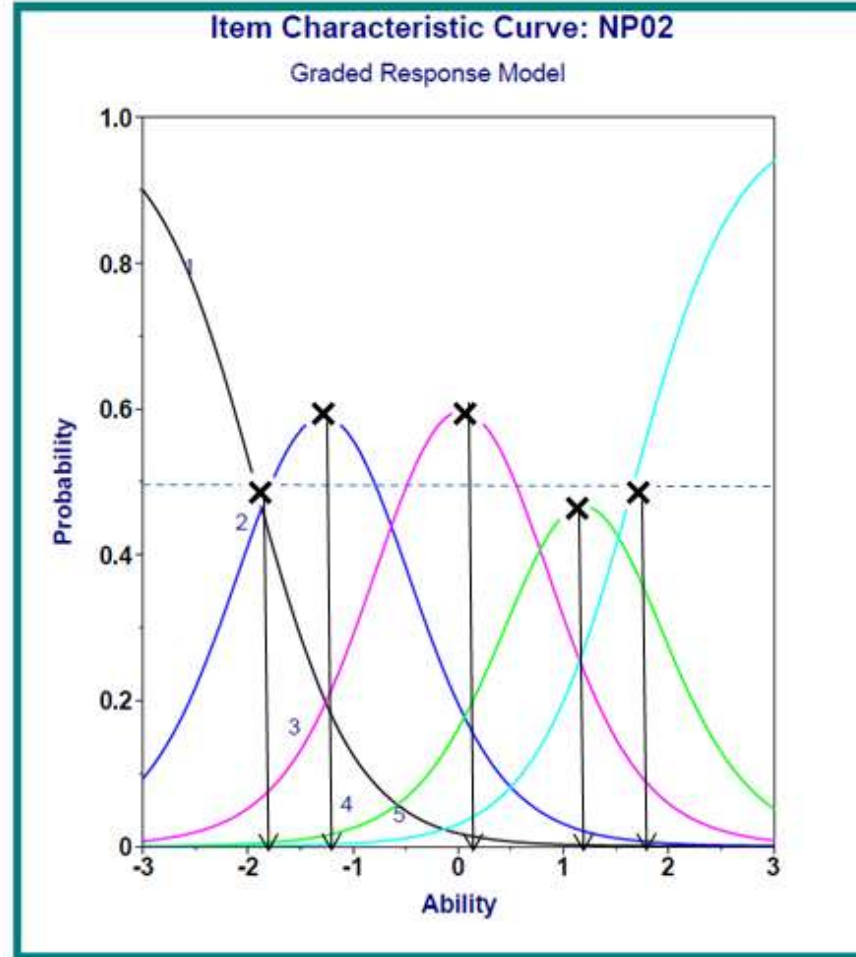
- one item (1I)
- two items presented separately (2S)
- two items presented together (2T)
- five items presented together (5T)

We evaluated these four approaches in three PROMIS® item banks:

- **Depression**
- Physical function
- Sleep disturbance

Methods: 1I

Creating Point Estimates

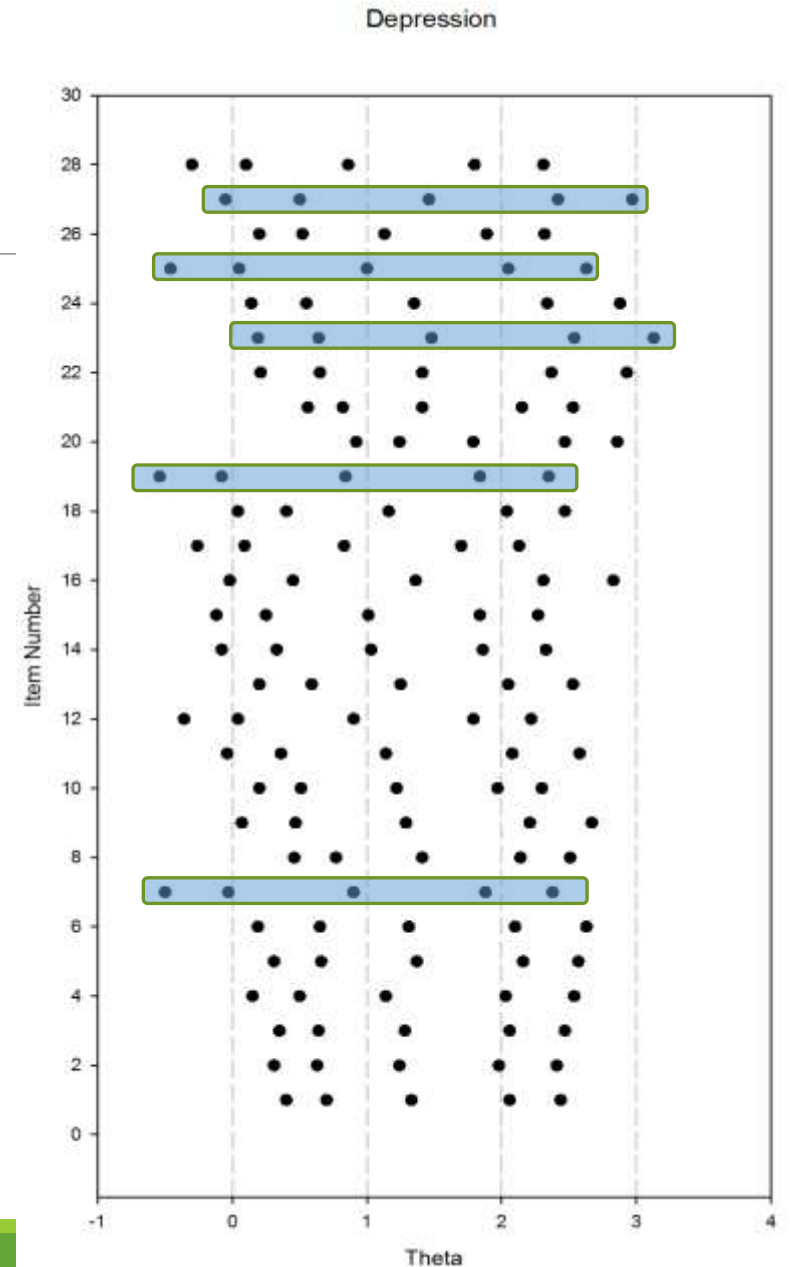


Methods: 1I Depression

Here I have highlighted the items with the widest range

These options were reviewed by experts for content validity.

A single item was selected . . .



Methods: 11 Depression

I felt sad . . .	Never	Rarely	Sometimes	Often	Always
------------------	-------	--------	-----------	-------	--------

I felt sad . . .	Never	Rarely	Sometimes	Often	Always
------------------	-------	--------	-----------	-------	--------

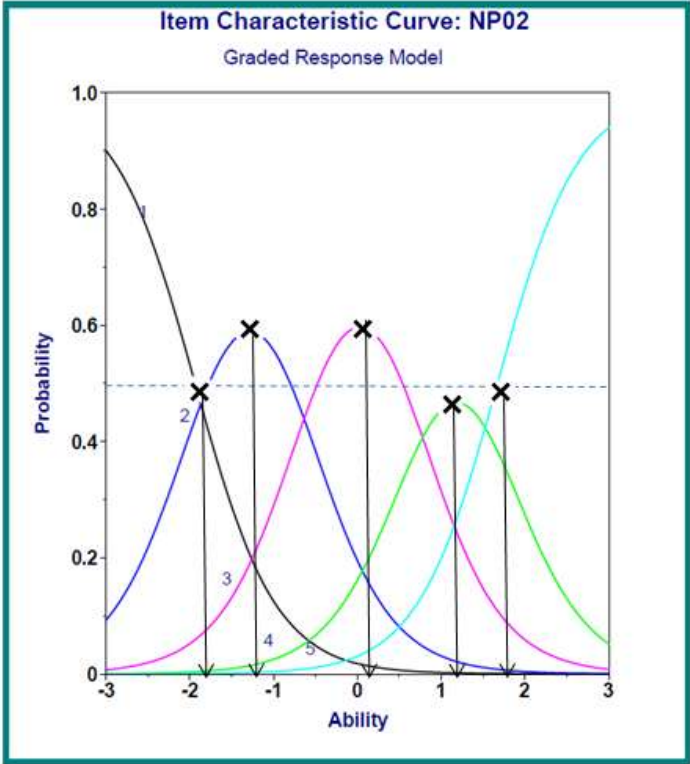
I felt sad . . .	Never	Rarely	Sometimes	Often	Always
------------------	-------	--------	-----------	-------	--------

I felt sad . . .	Never	Rarely	Sometimes	Often	Always
------------------	-------	--------	-----------	-------	--------

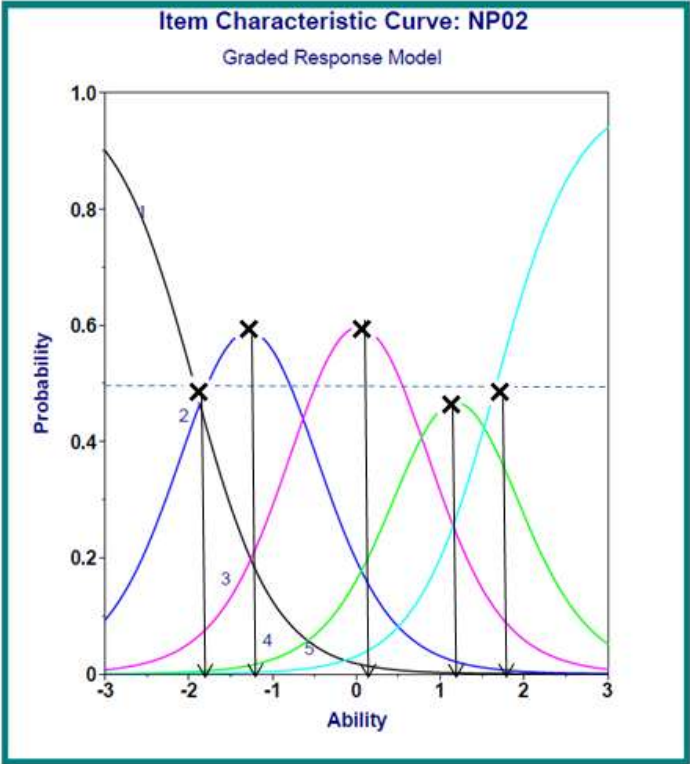
I felt sad . . .	Never	Rarely	Sometimes	Often	Always
------------------	-------	--------	-----------	-------	--------

Methods: 2S

Creating Point Estimates



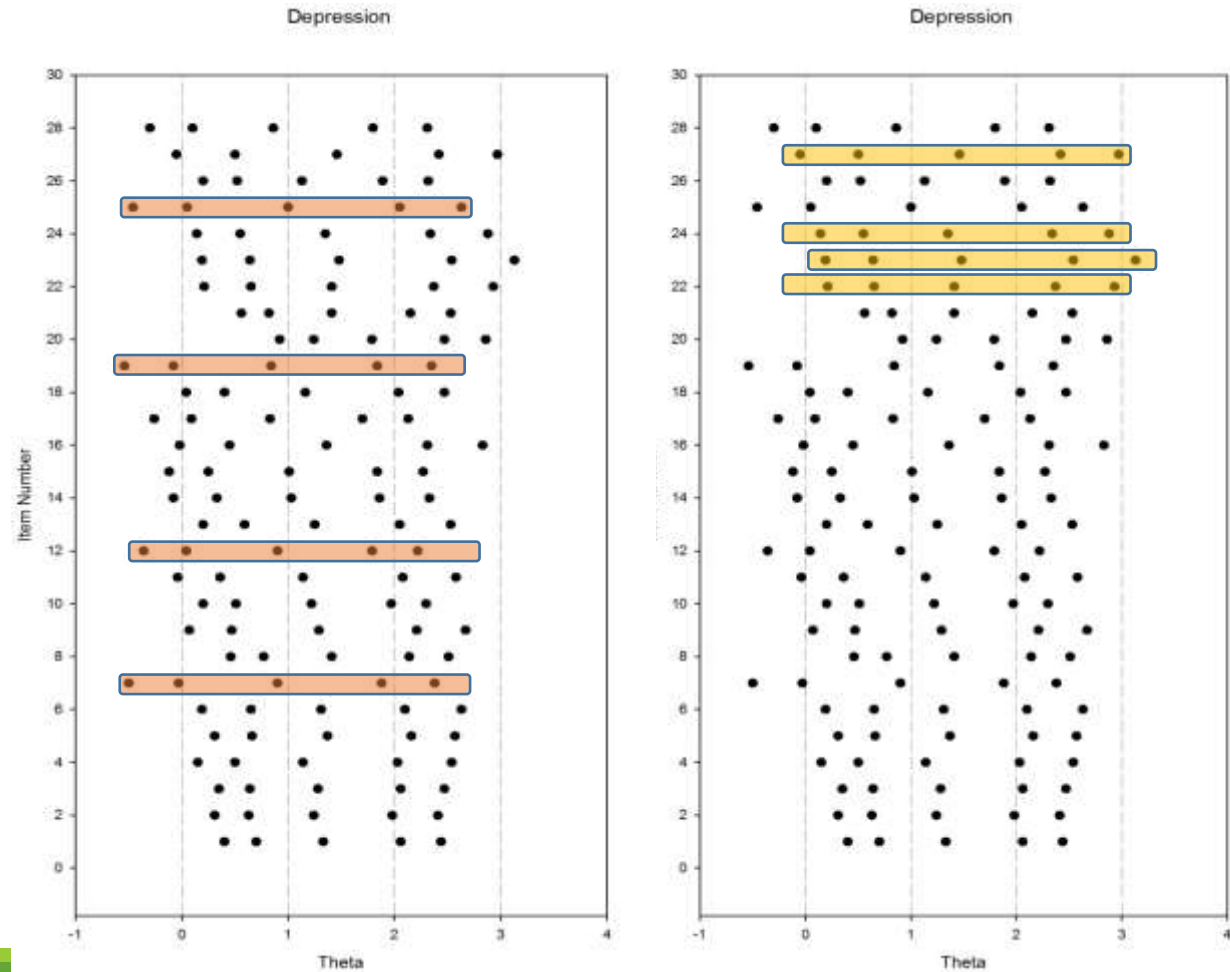
Creating Point Estimates



Methods: 2S Depression

Items selected with the highest and lowest points

Experts evaluated for content validity



Methods: 2S Depression

I felt unhappy	Never	Rarely	Sometimes	Often	Always
I felt unhappy	Never	Rarely	Sometimes	Often	Always
I felt unhappy	Never	Rarely	Sometimes	Often	Always
I felt unhappy	Never	Rarely	Sometimes	Often	Always
I felt unhappy	Never	Rarely	Sometimes	Often	Always

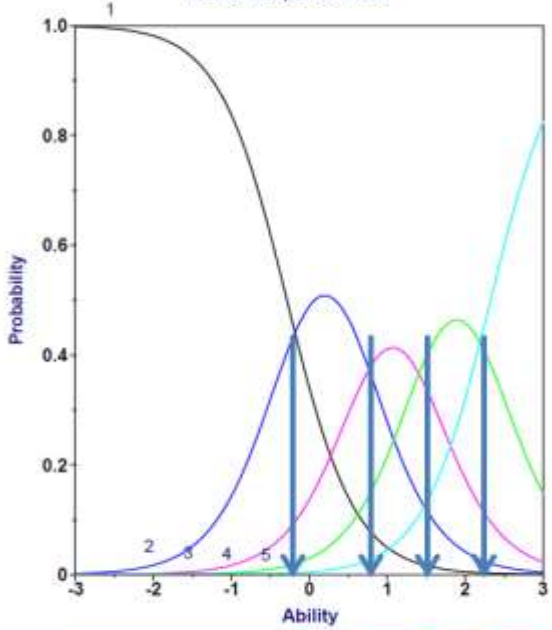
Methods: 2S Depression

I felt that nothing was interesting . . .	Never	Rarely	Sometimes	Often	Always
I felt that nothing was interesting . . .	Never	Rarely	Sometimes	Often	Always
I felt that nothing was interesting . . .	Never	Rarely	Sometimes	Often	Always
I felt that nothing was interesting . . .	Never	Rarely	Sometimes	Often	Always
I felt that nothing was interesting . . .	Never	Rarely	Sometimes	Often	Always

Methods: 2T

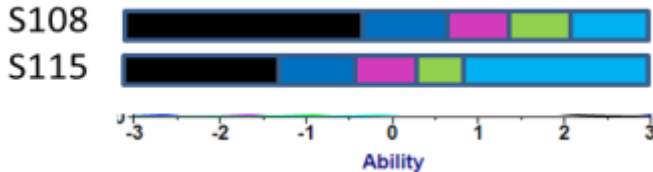
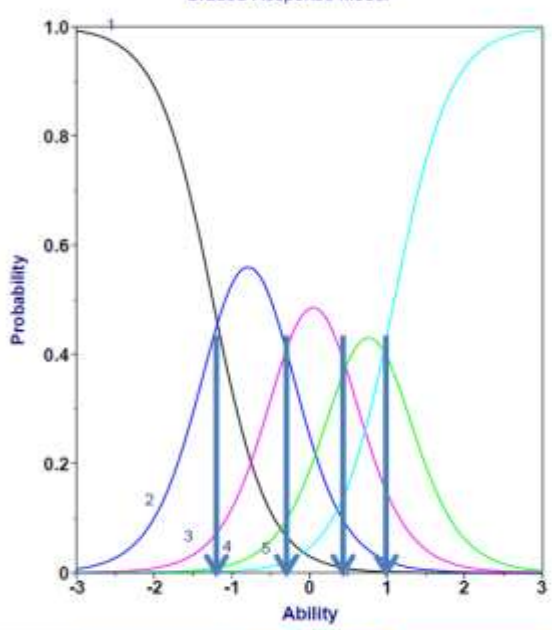
Item Characteristic Curve: S108

Graded Response Model



Item Characteristic Curve: S115

Graded Response Model



Methods: 2T Depression (9 states)

Description #	Item 36	Item 50	I felt unhappy . . .	I felt that nothing was interesting. .
1	1	1	Never	Never
2	2	1	Rarely	Never
3	2	2	Rarely	Rarely
4	3	2	Sometimes	Rarely
5	3	3	Sometimes	Sometimes
6	4	3	Often	Sometimes
7	4	4	Often	Often
8	5	4	Always	Often
9	5	5	Always	Always

Methods: 2T Depression

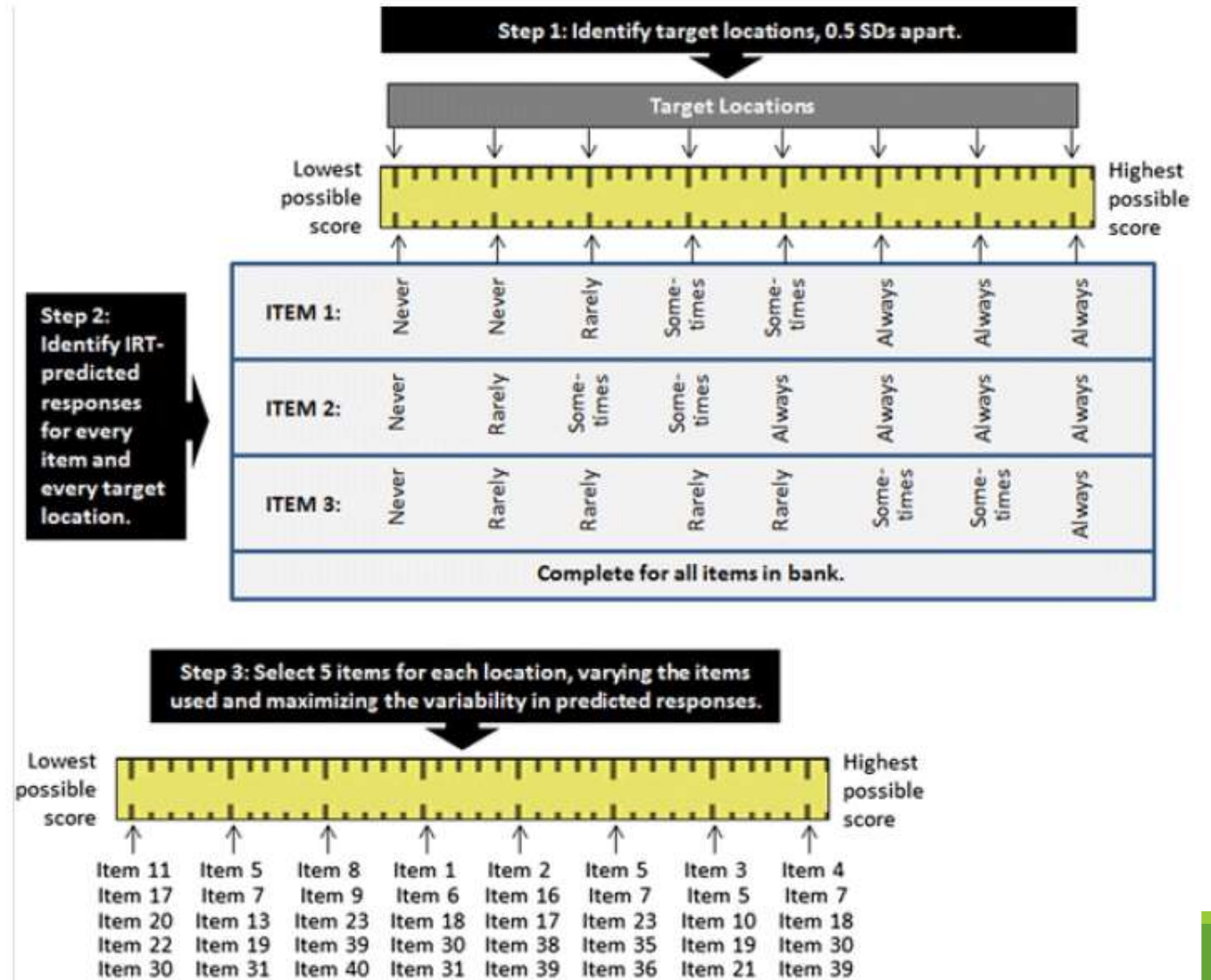
I felt unhappy . . .	Never	Rarely	Sometimes	Often	Always
I felt that nothing was interesting . . .	Never	Rarely	Sometimes	Often	Always

I felt unhappy . . .	Never	Rarely	Sometimes	Often	Always
I felt that nothing was interesting . . .	Never	Rarely	Sometimes	Often	Always

I felt unhappy . . .	Never	Rarely	Sometimes	Often	Always
I felt that nothing was interesting . . .	Never	Rarely	Sometimes	Often	Always

Methods: 5T

Method developed by
Cook et al, QOLR 2015



1. Within a column, choose items which change response when you move over a column
2. Some variability in response within the column
3. Each item is only used two or three times

item	30	35	40	45	50	55	60	65	70	75	80	85
DEP04	1	1	1	1	1	2	3	3	4	5	5	5
DEP05	1	1	1	1	1	2	3	3	4	5	5	5
DEP06	1	1	1	1	1	2	3	3	4	5	5	5
DEP07	1	1	1	1	1	2	3	3	4	5	5	5
DEP09	1	1	1	1	1	2	3	3	4	4	5	5
DEP14	1	1	1	1	1	2	3	3	4	4	5	5
DEP17	1	1	1	1	2	3	3	4	4	5	5	5
DEP19	1	1	1	1	1	1	3	3	4	5	5	5
DEP21	1	1	1	1	1	2	3	3	4	4	5	5
DEP22	1	1	1	1	1	2	3	3	4	5	5	5
DEP23	1	1	1	1	1	2	3	3	4	4	5	5
DEP26	1	1	1	1	2	3	3	4	4	5	5	5
DEP27	1	1	1	1	1	2	3	3	4	5	5	5
DEP28	1	1	1	1	1	2	3	4	4	5	5	5
DEP29	1	1	1	1	2	2	3	4	4	5	5	5
DEP30	1	1	1	1	1	2	3	3	4	4	5	5
DEP31	1	1	1	1	2	3	3	4	4	5	5	5
DEP35	1	1	1	1	1	2	3	3	4	5	5	5
DEP36	1	1	1	2	2	3	3	4	4	5	5	5
DEP39	1	1	1	1	1	1	1	3	3	4	5	5
DEP41	1	1	1	1	1	1	2	3	4	4	5	5
DEP42	1	1	1	1	1	2	3	3	4	4	5	5
DEP44	1	1	1	1	1	2	3	3	4	4	4	5
DEP45	1	1	1	1	1	2	3	3	4	4	5	5

I felt depressed. . .	Never	Rarely	Sometimes	Often	Always
I felt that I was not as good as other people. . .	Never	Rarely	Sometimes	Often	Always
I felt that I had nothing to look forward to. . .	Never	Rarely	Sometimes	Often	Always
I felt emotionally exhausted. . .	Never	Rarely	Sometimes	Often	Always
I felt unhappy. . .	Never	Rarely	Sometimes	Often	Always

I felt hopeless . . .	Never	Rarely	Sometimes	Often	Always
I felt that I was to blame for things . . .	Never	Rarely	Sometimes	Often	Always
I felt disappointed in myself. . .	Never	Rarely	Sometimes	Often	Always
I felt unhappy . . .	Never	Rarely	Sometimes	Often	Always
I felt upset for no reason . . .	Never	Rarely	Sometimes	Often	Always

Methods: interview

We recruited adult community members for in-person interviews

Participants valued the health state descriptions from all four approaches

- VAS
- SG

We compared the approaches by:

- the item bank theta scores captured
- participant assessments of difficulty by Likert-type scale (1 = very easy to 7 = very hard)
- perceptions from qualitative exit interviews

Results: Sample Characteristics

The 118-person sample

- age ranged from 18 to 71
- 63% were female
- 54% white, 34% black, 10% other

Self Rated Health

- 30% Excellent
- 48% Very good
- 19% Good
- 3% Fair
- 0% Poor

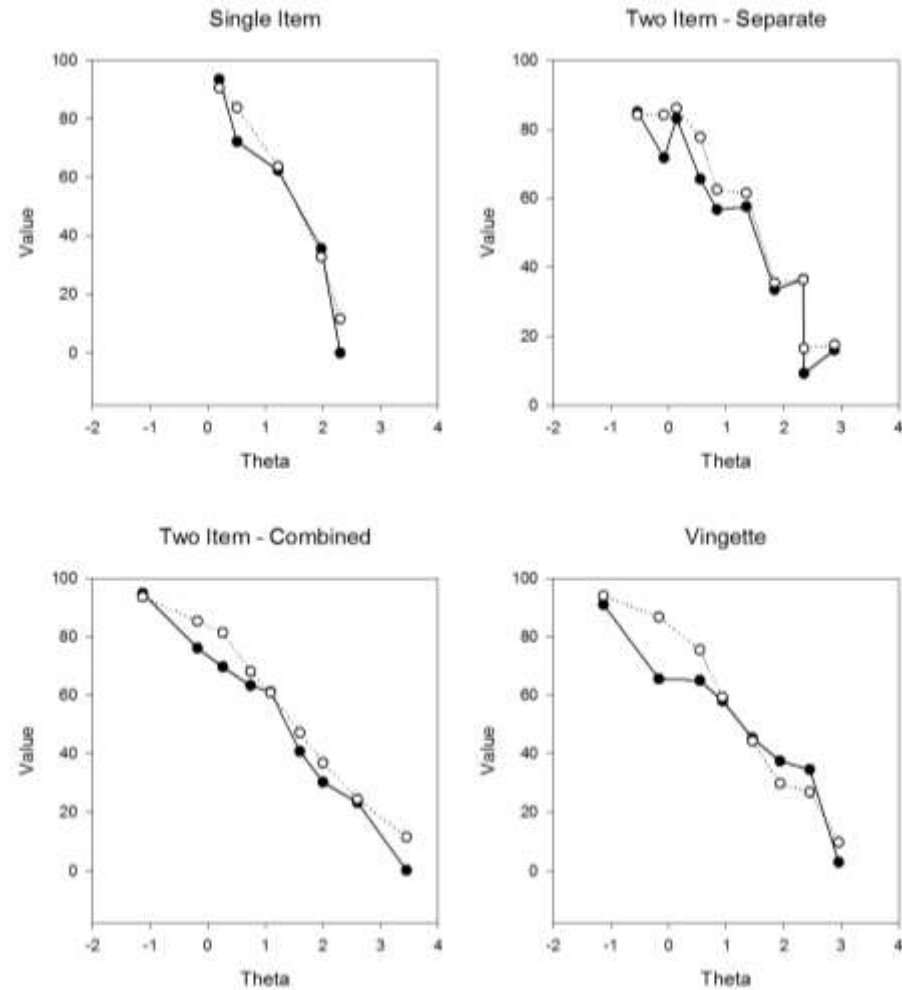
Results: Range of Theta

The 1S approach captured a smallest range

The 2T approach captured the widest range

	Depression	Physical Function	Sleep Disturbance
1I	0.2 – 2.3	-3.35 – 0.30	-2.13 – 2.44
2S	-0.54 – 2.88	-3.44 – 0.38	-2.13 – 3.19
2T	-1.13 – 3.45	-3.55 – 0.97	-2.49 – 3.45
5T	-1.13 – 2.96	-2.99 – 0.95	-1.68 – 2.83

Results: Monotonic relationships?



Results: Difficulty

Across all three item banks,

- 74% of respondents found 1S to be easiest and
- 71% found 5T to be hardest.

Mean difficulty assessments were

- 2.35 (1I)
- 2.69 (2T)
- 2.78 (5T)
- 2.80 (2S)

Results: Qualitative

In general, people report that:

- The vignettes to be an overwhelming amount of information
- Single item is easiest
- The two item - combined tasks are manageable

Respondents generally found all four approaches to be similarly meaningful and realistic

- They understand the valuation task
- They think the valuation task makes sense

Conclusions

Creating health-descriptions by presenting two items together:

- Captures a wide range of item bank theta scores
- Creates monotonic functions over theta
- Is acceptable to community members

We recommend this approach for valuation of IRT-based descriptive systems such as PROMIS®.

Thank you

I look forward to your comments and questions

hanmerjz@upmc.edu