



Comparing PROMIS Computer Adaptive Tests (CAT) to the BSI in Prostate Cancer Patients

George Baum, MS

Karen Basen-Engquist, PhD, MPH

Maria Chang, MPH

Cindy L. Carmack, PhD

THE UNIVERSITY OF TEXAS

**MDAnderson
Cancer Center**

Making Cancer History®

- Support provided by the Patient-Reported Outcomes, Survey, and Population Research (PROSPR) Shared Resource. NCI funded #CA 16672.
- PC Smart 5R21CA126854-02

Computer Adaptive Testing

- Computer Adaptive Tests (CAT) adapt to respondent by sequentially choosing items
- Results can often be obtained administering fewer items
- Reduced respondent burden may lead to higher completion rates for surveys
- Commonly used in education testing, but not in the medical field

The PROMIS Network

- Patient Reported Outcomes Measurement Information System (PROMIS)
- Part of the NIH Roadmap Initiative
- Improve the reliability and validity of Patient Reported Outcomes (PROs)
- Develop item banks used to create short forms and CAT measures across different chronic diseases
- Individuals will answer different items to arrive at a score
- Used Item Response Theory (IRT) to calibrate the item bank so scores can be compared across individuals

The PROMIS Network

- **Has developed psychometrically sound item banks**
 - **Physical functioning**
 - **Fatigue**
 - **Pain**
 - **Emotional distress**
 - **Depression, Anxiety and Anger**
 - **Social role participation**
 - **Sleep and wake disturbance**

The PROMIS Network Assessment Center

- Administers CAT tests
- Easy access to PROMIS instruments including short forms
- Allows for secure selection and storage of data
- Anyone can use this service
- Address: www.assessmentcenter.net

The PROMIS Network Assessment Center

Assessment CenterSM

[Register New User](#)[Forgot Password](#)

Resources

[Instrument Library](#)[Scoring Manuals](#)[Workshops](#)[Publications](#)[Presentations](#)[User Manuals](#)[Terms and Conditions](#)[FAQ](#)[Release History](#)[Usage Statistics](#)[About Us](#)[Video Tutorials](#)[Contact Us](#)help@assessmentcenter.net

Help Line: 877-283-0596

[Support Hours:](#)

9:00am - 5:00pm CST

Monday - Friday

WHAT IS ASSESSMENT CENTERSM

Assessment CenterSM 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, CATs, profiles) are a central feature of the instrument library within Assessment Center. Any PROMIS measure can be downloaded for administration on paper or be included in an online study. Detailed statistical information and development history about PROMIS items and instruments is available for review.

Assessment Center enables customization of items or instruments (e.g., format, randomization, skip patterns), real-time scoring of CATs, storage of protected health information in a separate, secure database, automated accrual reports, real-time data export, graphing of individual CAT or Profile scores, and ability to capture endorsement of online consent forms among many other features.

ANNOUNCEMENTS

Assessment Center Release 8.3

Assessment Center has recently been updated to include new features and improve its functionality. Details for using these features can be found in the Assessment Center User Manual. Highlights to our latest update are:

Improved Consent Form functionality. Users will now be able to remove an uploaded consent form. Examples of why this feature was implemented are the accommodation of studies which included a consent form at one point but later obtained an exemption and no longer needed participants to endorse the online consent or studies which modify recruitment procedures, e.g. initially collected consent online but now wish to obtain consent on paper, etc.

Demonstration CAT

Try out a PROMIS Computerized Adaptive Test and get an instant score report. CATs include Emotional, Physical, and Social Health. Click here to begin.



Sponsors

[PROMIS](#)[Neuro-QOL](#)[NIH Toolbox](#)

Assessment Center reserves the right to have regular scheduled maintenance windows. Weekly maintenance may be performed on Sunday mornings from 7am to 9am CST. During this time, Assessment Center may be unavailable. We apologize for any inconvenience this may have. If you have any questions, please contact us at help@assessmentcenter.net

The PROMIS Network Assessment Center

Assessment CenterSM

Studies

Instruments

Set-up

Preview

Administration

Resources My Account Help Logout

Current Study: PC_Smart_Baseline_1

Study List (PC_Smart_Baseline_1)

Study List

To get started, please select an existing study or create a new one. Then continue work in the system by selecting from the tabs above.

Create New Study

To select, click on study name:

☒ Hide Archived Studies

My Studies

Name	Created By			
PC_Smart_Baseline_1	Baum, George (10/9/2009)	Copy	Properties	Team
georgestudy	Baum, George (12/15/2008)	Copy	Properties	Team
instrument test	Baum, George (2/1/2011)	Copy	Properties	Team
PC_Smart_1A	Baum, George (5/22/2009)	Copy	Properties	Team
PC_Smart_3_Month	Baum, George (12/23/2009)	Copy	Properties	Team
PC_Smart_Baseline	Baum, George (10/6/2009)	Copy	Properties	Team
Presentation_BSSG	Baum, George (5/4/2009)	Copy	Properties	Team
Take_Heart_Setup	Baum, George (9/17/2009)	Copy	Properties	Team
Take_Heart_Baseline	Baum, George (5/7/2010)	Copy	Properties	Team
Take_Heart_Final	Baum, George (9/21/2010)	Copy	Properties	Team
Take_Heart_M1	Baum, George (9/21/2010)	Copy	Properties	Team
Take_Heart_M2	Baum, George (9/21/2010)	Copy	Properties	Team
Take_Heart_M3	Baum, George (9/21/2010)	Copy	Properties	Team
Take_HeartTest	Baum, George (2/9/2011)	Copy	Properties	Team
Validation_TFEQ	Baum, George (2/17/2012)	Copy	Properties	Team
Validation_TFEQ_1	Baum, George (2/17/2012)	Copy	Properties	Team

The PROMIS Network Assessment Center

Assessment CenterSM

[Studies](#)[Instruments](#)[Set-up](#)[Preview](#)[Administration](#)

[Resources](#)[My Account](#)[Help](#)[Logout](#)

Current Study: PC_Smart_1A

Study Content (PC_Smart_1A)

Study Content

Click the Add button to add instruments to your study. Click the Create button to create custom instruments in your study.

You have selected the following instruments for this study.

Order the instruments by entering the desired position into the text box, then click Save.

To exclude an instrument from your study, click on the Include checkbox.

AddSaveCreate

☒ Hide Excluded Instruments

Study Content

Order	Name	Administration Study					Include	Terms of Use
<input type="text" value="1"/>	BSI_Test_Launch_2	PC_Smart_V6	Customize	Preview	Properties	Statistics	<input checked="" type="checkbox"/>	Notes
<input type="text" value="2"/>	PROMIS Bank v1.0 - Anger	PROMIS	Customize	Preview	Properties	Statistics	<input checked="" type="checkbox"/>	Notes
<input type="text" value="3"/>	PROMIS Bank v1.0 - Anxiety	PROMIS	Customize	Preview	Properties	Statistics	<input checked="" type="checkbox"/>	Notes
<input type="text" value="4"/>	PROMIS Bank v1.0 - Depression	PROMIS	Customize	Preview	Properties	Statistics	<input checked="" type="checkbox"/>	Notes

The PROMIS Network Assessment Center

- **PROMIS CAT**
 - T score with mean 50 and SD of 10
 - Higher T score represents more of the latent construct being measured
 - Based on US general population

The PROMIS Network Assessment Center

- **PROMIS CAT**
 - First question provides most information based on the general population
 - Response dictates the choice of the next item
 - CAT continues until
 - SE drops below a specified level
 - Max number of questions reached

The PROMIS Network Assessment Center

In the past 7 days
I felt depressed

☐ Never

☐ Rarely

☐ Sometimes

☐ Often

☐ Always

In the past 7 days
I felt unhappy

☐ Never

☐ Rarely

☐ Sometimes

☐ Often

☐ Always

In the past 7 days
I felt hopeless

☐ Never

☐ Rarely

☐ Sometimes

☐ Often

☐ Always

Brief Symptom Inventory

- **BSI**
 - 53 items
 - T score based on non-patient male general scores
 - T score range from 0 to 80
 - Has cut points for caseness

PC Smart

- Two condition randomized pilot test
- Goal: Determine if group composition affected the efficacy of an established group based cognitive behavioral stress management intervention
- Participants completed Brief Symptom Inventory (BSI) as part of a battery of tests
- Participants completed PROMIS CAT domains for depression, anxiety and anger

Investigator: Cindy Carmack, PhD

PC Smart Eligibility

- **DX of prostate cancer**
- **No evidence of metastatic disease**
- **Read, speak and write English**
- **Resides within 1 hour of MD Anderson**
- **21 years of age or older**
- **Be able to provide meaningful informed consent**

Demographics PC Smart

- 136 prostate cancer patients
- Mean age 63 (SD = 8.0)

Race	N	%
White	85	65
African American	29	22
Hispanic	11	9
Asian	4	3
Other	1	1

Comparison of BSI to PROMIS CAT Tools

- **Data collected during screening for PC Smart**
- **Compared PROMIS subscales for depression, anxiety and anger with the corresponding BSI subscales**
- **Analysis: Bivariate correlations and Receiver Operating Characteristics Curves (ROC)**

Mean BSI Values PC Smart

BSI	Mean T Score	SD	BSI Case N (%)
Depression	52.3	10.6	27 (20%)
Anxiety	50.7	11.2	21 (15%)
Hostility	50.2	10.1	15 (11%)

Mean Values and Item Numbers

PROMIS CAT	Mean CAT	SD CAT	Mean # Items CAT	# Items BSI
Depression	45.9	8.9	9.5	6
Anxiety	48.6	8.2	7.4	6
Anger	47.2	8.2	7.1	5

Mean Values PROMIS CAT by BSI Case

	BSI Case	
Mean CAT Score	Yes	No
Depression	58.2	42.8
Anxiety	61.1	46.4
Hostility	61.2	45.4

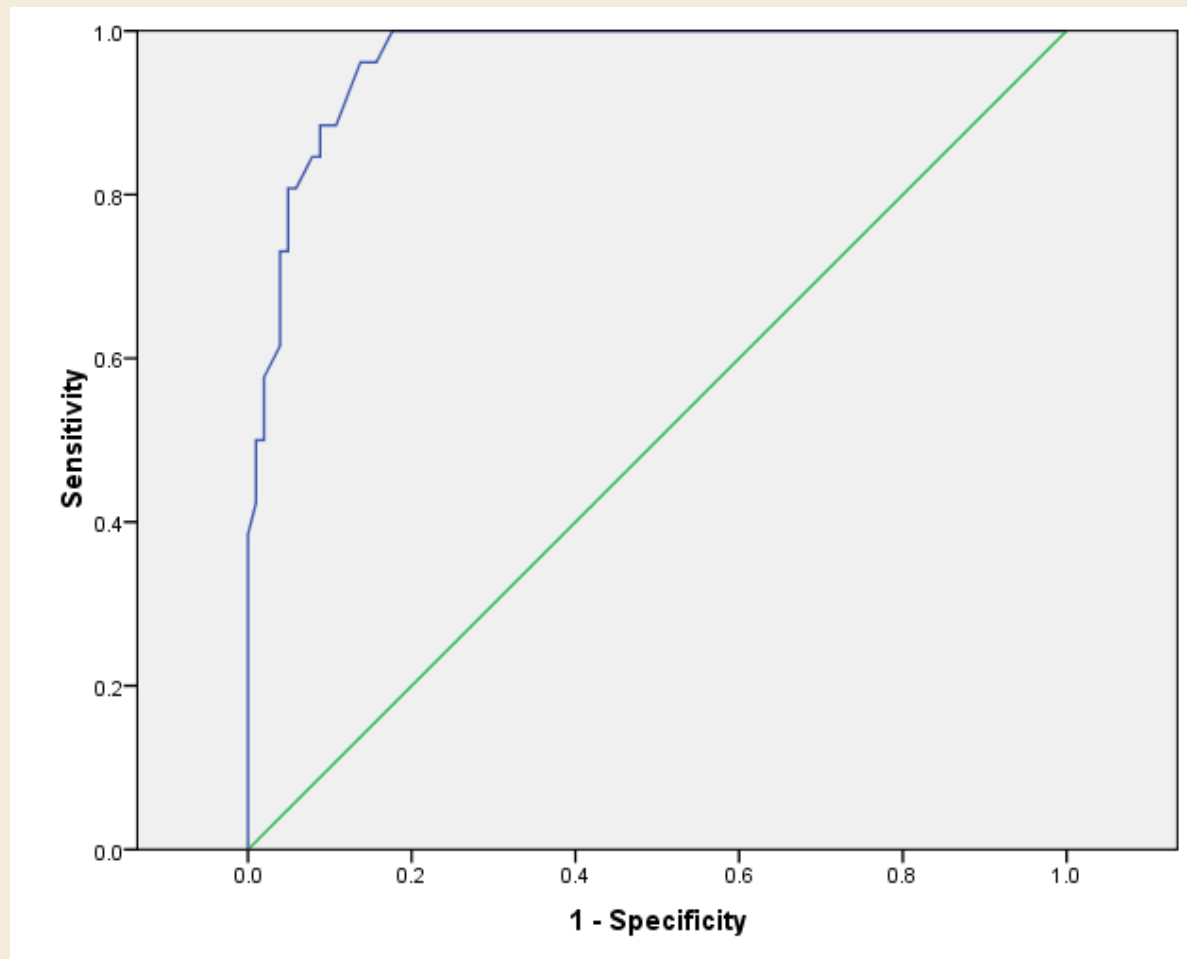
Significance $P < .000$ for all variables

Comparison of BSI to PROMIS CAT Tools

	Correlation (P Value)	ROC Area Under Curve (SE)
Depression	.85 (.000)	.966 (.014)
Anxiety	.76 (.000)	.975 (.012)
Hostility	.66 (.000)	.952 (.027)

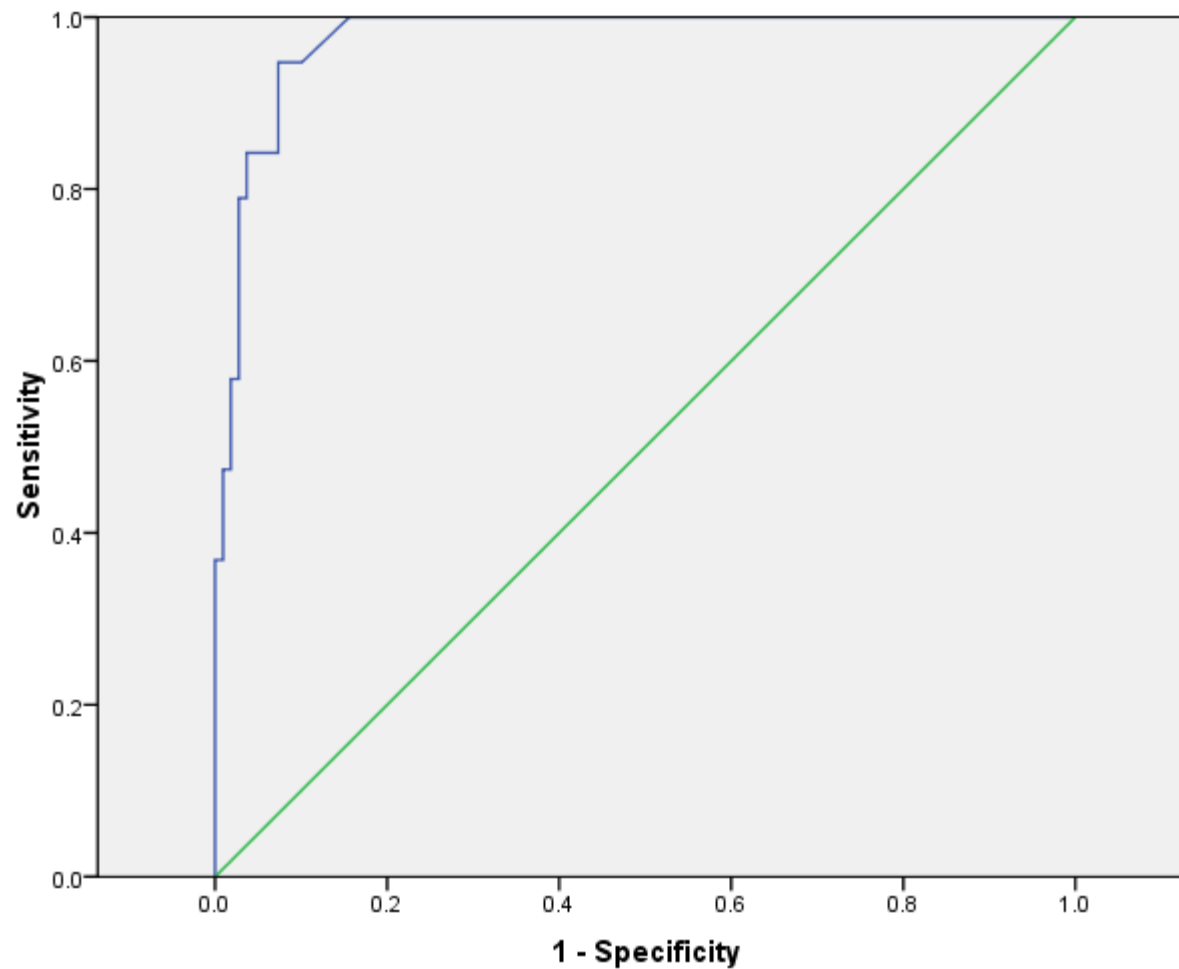
ROC Curve PROMIS CAT Depression

BSI Depression Cut Point by PROMIS Depression Score



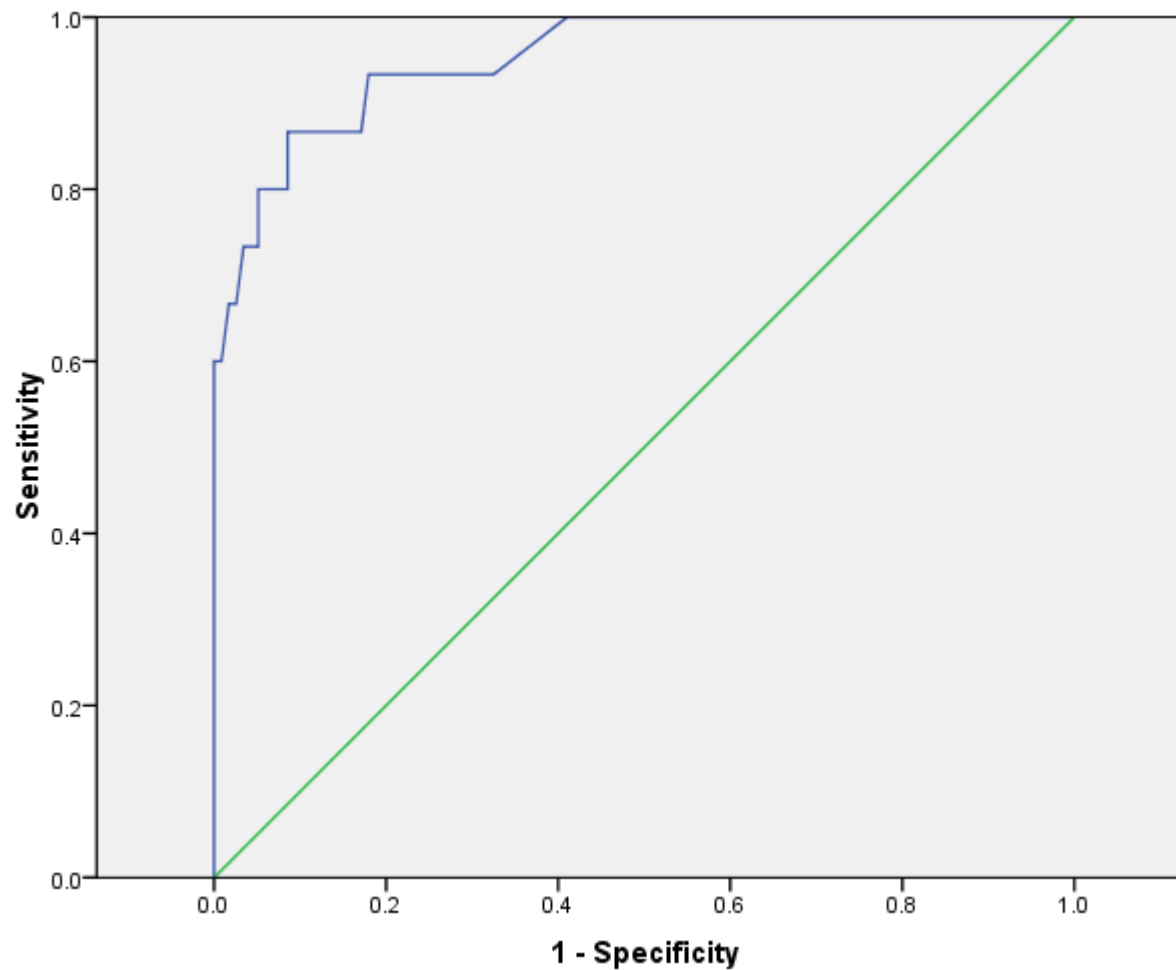
ROC Curve PROMIS CAT Anxiety

BSI Anxiety Cut Point by PROMIS Anxiety Score



ROC Curve PROMIS CAT Anger

BSI Anger Cut Point by PROMIS Anger Score



Potential Cut Points for PROMIS CAT Depression

Depression CAT Score	Sensitivity	Specificity
49.5	.962	.863
52.8	.808	.951
57.8	.500	.990

Potential Cut Points for PROMIS CAT Anxiety

Anxiety CAT Score	Sensitivity	Specificity
54.7	.947	.927
56.1	.842	.963
61.5	.474	.991

Potential Cut Points for PROMIS CAT Anger

Anger CAT Score	Sensitivity	Specificity
51.5	.993	.821
54.5	.800	.949
58.1	.667	.983

Limitations

- **Small sample size**
- **Only male participants**
- **BSI not the best ‘gold standard’**

Conclusions

- CAT were highly correlated to BSI
- ROC analysis indicated strong relationship between BSI caseness and PROMIS CAT
- Respondent burden was minimal
- Did not have big savings compared to BSI
- Further testing of CAT important for cancer populations