Psychometric Evaluation and Calibration Plan

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October 14, 2006

ISOQOL (Opala)

2:00-3:30 pm

PROMIS Domains

Physical functioning (Hays/Bjorner)

Pain (Revicki/Cook)

Fatigue (Lai)

Emotional distress (Choi/Reise)

Social/role participation (Bode/Hahn)

Datasets

Cancer Item Banks (Northwestern)

Digitalis Investigation Group Study--randomized double-blind placebo-controlled trial evaluating effect of digoxin on mortality in 581 patients with heart failure and sinus rhythm.

IMMPACT--internet-based survey of individuals with chronic pain from the American Chronic Pain Association website

Medical Outcomes Study--observational study of persons with hypertension, diabetes, heart disease, and/or depression in Boston, Chicago, and Los Angeles

WHOQOL-100 data (n = 442 from U.S. field center)

Types of Analyses

- Classical Test Theory Statistics
- IRT Model Assumptions
- Model Fit
- Differential Item Functioning
- Item Calibration

Classical Test Theory Statistics

- Out of range
- Item frequencies and distributions
- Inter-item correlations
- Item-scale correlations
- Internal consistency reliability

IRT Model Assumptions

- (Uni)dimensionality
- Local independence
- Monotonicity

Sufficient Unidimensionality

- Confirmatory factor models
  - One factor
  - Bifactor (general and group factors)

Local Independence

- After controlling for dominant factor(s), item pairs should not be associated.
  - Look at residual correlations (> 0.20)

Monotonicity

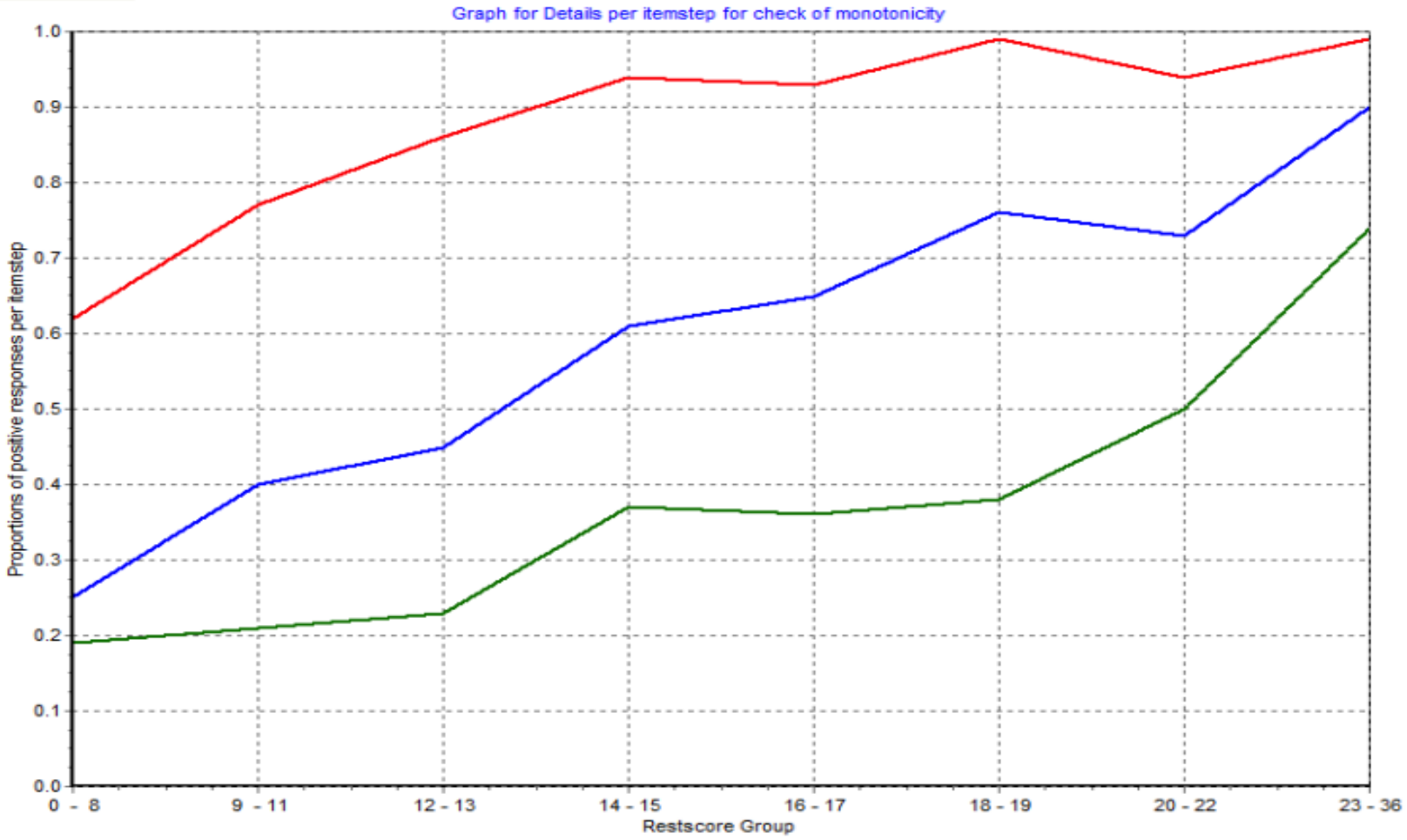
- Probability of selecting a response category indicative of better health should increase as underlying health increases.
- Item response function graphs with
  - y-axis: proportion positive for item step
  - x-axis: raw scale score minus item score

Step 5: View Results from TEST.out

Output items

Graph for Details per itemstep for check of monotonicity

Item1



Notes...

Full Report...

Save this part...

Print this part...

Back to STEP 2

Back to STEP 4

Done

Help

start | Inbox - Outlook Express | Yahoo! Mail - bruin45... | mspguide.doc - Micro... | mspwin5 | 12:05 PM

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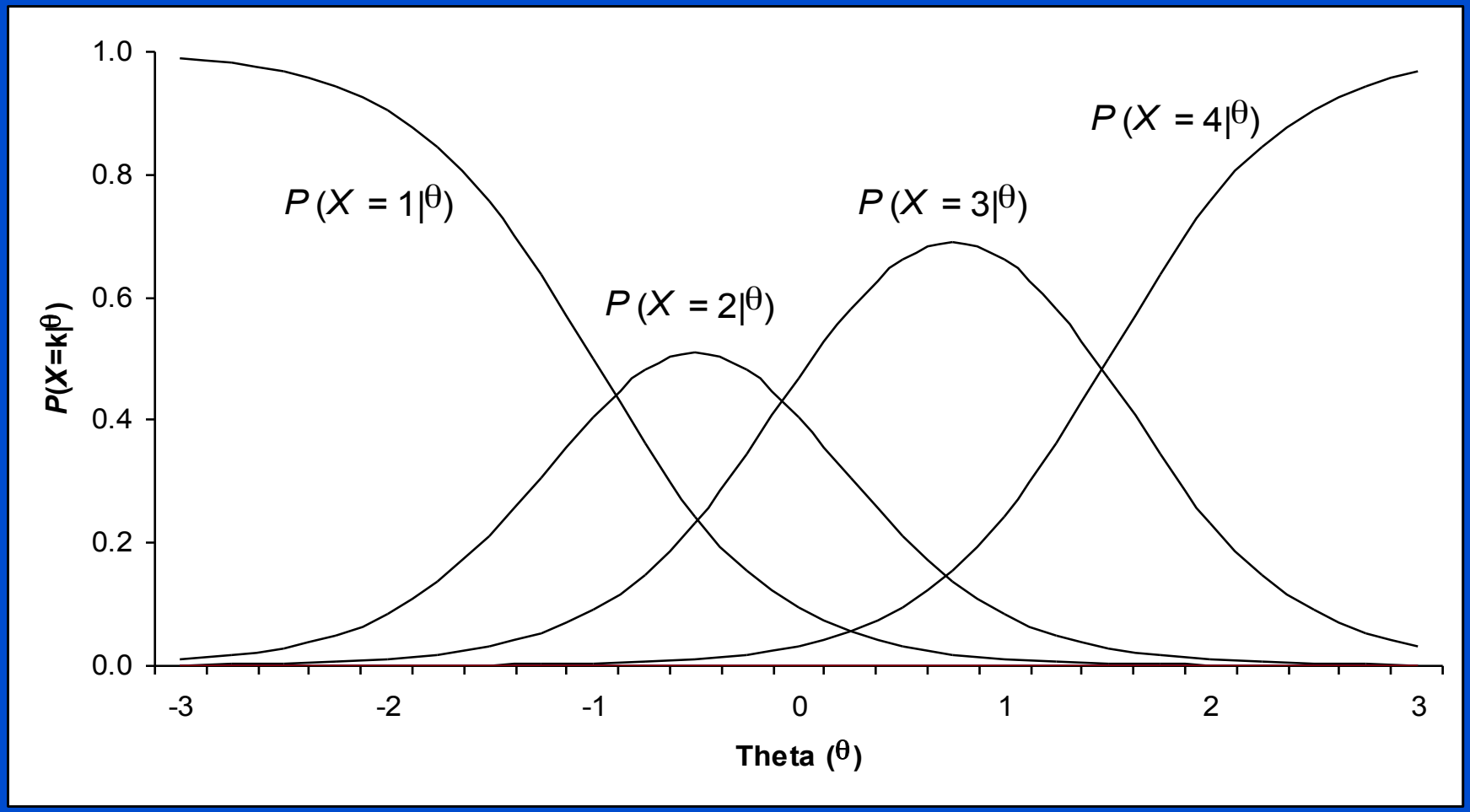
Category Response Curves for Samejima's Graded Response Model



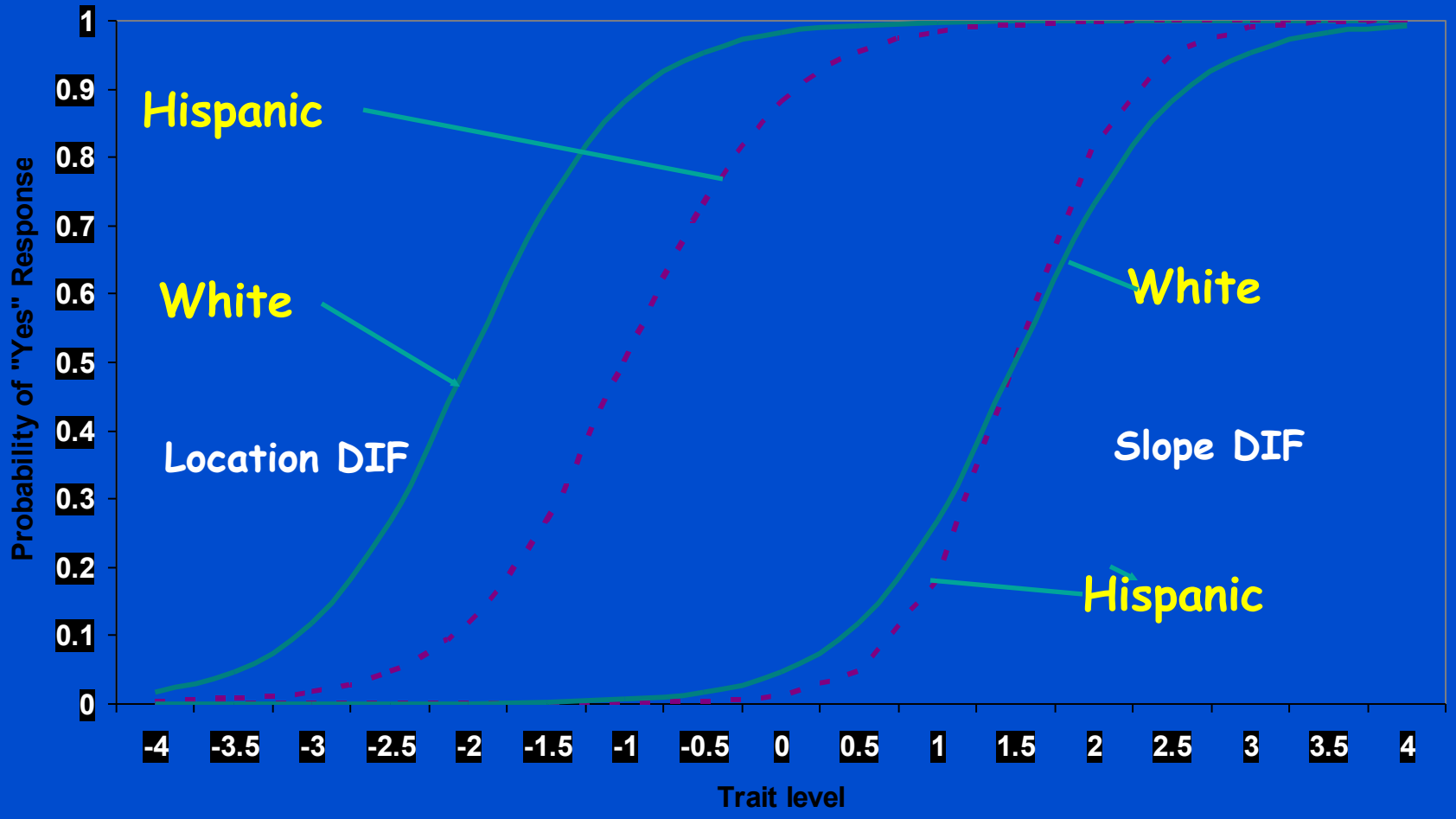
Model Fit

- Compare observed and expected response frequencies by item and response category
- Items that do not fit and less discriminating items identified and reviewed by content experts

Differential Item Functioning

- Uniform DIF
  - Threshold parameter
- Non-uniform DIF
  - Discrimination parameter
- Gender, race/ethnicity, age, disease

Dichotomous Items Showing DIF
(2-Parameter Model)



Item Calibration

- Item parameters (threshold, discrimination)
- Mean differences for studied disease groups

Example of Lessons Learned in Secondary Analyses

Emotional distress

Cannot be adequately modeled as a unidimensional construct.

Limited representation of positive end of construct

Several items having some response options that provide little information.

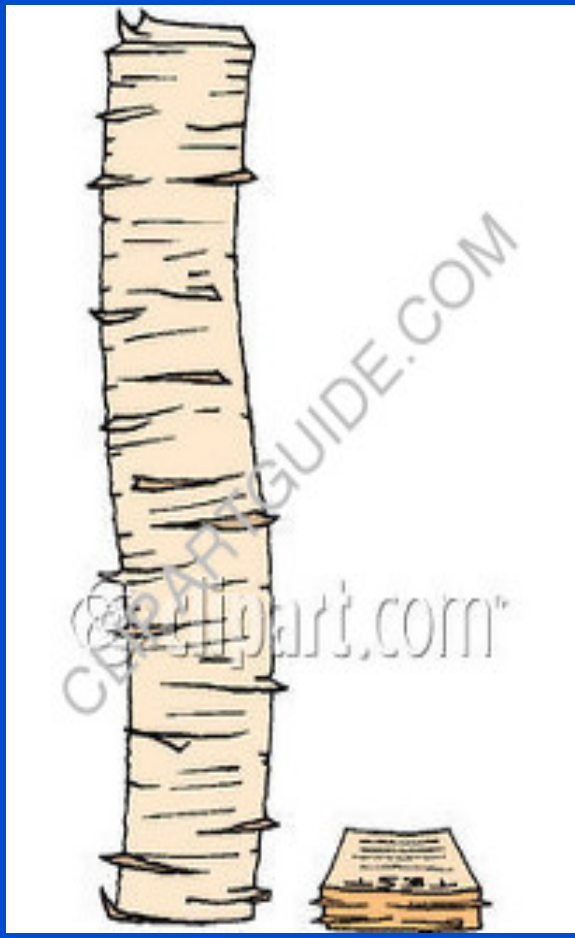
Documentation

Public website: http://www.nihpromis.org/

Peer-reviewed manuscripts, e.g.:

Hays, R. D. et al. (in press). Item response theory analyses of physical functioning items in the Medical Outcomes Study. Medical Care.

Reeve, B. B. (in press). Psychometric evaluation and calibration of health-related quality of life items banks: Plans for the Patient-Reported Outcome Measurement Information System (PROMIS). Medical Care.



Datasets Subjected to Psychometric Analysis

Cancer Fatigue: Cancer Item Banking Project at NWU

Cancer Pain: Cancer Item Banking Project at NWU

Cancer Social: Cancer Item Banking Project at NWU

CSSCD: Cooperative Study of Sickle Cell Disease (pediatric)

CHC: Chronic Hepatitis C Study

CHS: Cardiovascular Health Study

DIG: Digitalis Investigation Group Quality of Life Sub-study

IMMPACT: Multiple Pain Projects

MOS: Medical Outcomes Study

NGHS: National Growth and Health Study (peds.)

Q-Score: Cancer Quality of Life Project at NWU

WHOQOL: World Health Organization Quality of Life Project

Datasets Subjected to Psychometric Analysis