

Development of a Computer Adaptive Test to Assess Physical Capabilities for Work Disability Determination

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Presenter Disclosures

Christine M. McDonough, PT PhD

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No relationships to disclose

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- Westat 

Overview of the Presentation

- Background
- Steps in Computer-adaptive Test (CAT) Development
- Conceptual Framework Development
- Item Pool Development
- Calibration Study Design and Next Steps

Patient-reported Assessment

- FDA 2009: "Use of a patient-reported instrument is advised when measuring a concept best known by the patient or best measured from the patient perspective."
- "Data collection methods can include paper-based, computer-assisted, and telephone-based assessments."

Computer-Adaptive Testing (CATs)



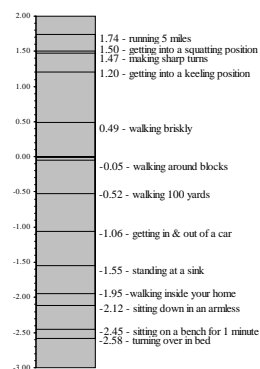
- The questions that are administered are chosen based on how a person answers the previous questions
- Claimant-based
- Highly Efficient
- Small sample of questions administered from a large calibrated 'item bank'
- Testing stops when the person's functional level is estimated to the required precision

The Science Behind CAT Instruments

- Create a “pool” of items to cover the entire continuum of ‘ability’ re: the construct.
- Items in the pool provide information at different levels of ability.
- Items are assigned a “difficulty” scores (calibration)



Basic Mobility Item Calibrations...



Why Build CATs?



- Efficiency (2-3 minutes to administer)
- Redundant or irrelevant items are not administered
- Improved accuracy & precision

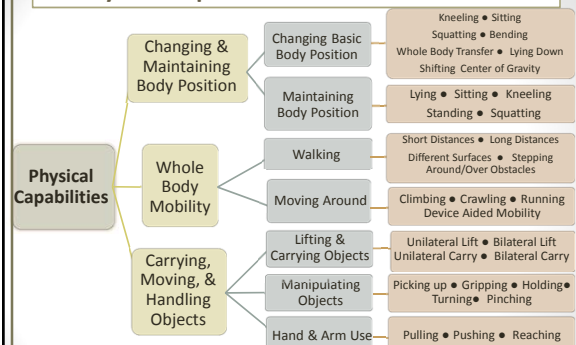
CATs are Widely Used...



Conceptual Framework Development

- Literature review to identify existing relevant frameworks
 - World Health Organization ICF
 - Functional Assessment Taxonomy
- Draft framework
- Content expert input
- Revise and finalize framework

Physical Capabilities Domain Framework



Item Pool Development

- Compile existing items across subdomains
- Focus groups/interviews
- Item review and new item development
 - Content expert input: conference and iterative
- Cognitive Interviews

Initial Item Pool

- 174 initial items
- 22 other instruments
- 31 PROMIS/NeuroQOL
- 75 new items

Final Item Pool

124 items

Sample Physical Capabilities Items

- Are you able to work overhead for 20 minutes (e.g. organizing a high shelf in a closet)?
- Are you able to carry a full laundry basket for 30 feet?
- Are you able to do yard work (e.g. plant shrubs or a garden) for 2 hours?
- Are you able to walk for at least 30 minutes?

Cognitive Interviews

Questions in pool were administered to claimants and health care providers.

Asked interviewees about question comprehension, decision processes and response processes.

10 physical demands items were completely re-written and 8 were removed due to comprehension difficulty.

Calibration Study Design

Administer pool to target sample:

- 1000 claimants from 120,000 SSA records of recent applicants
- Westat: screens and administers item pool by web and telephone interview

Calibrate items using Item Response Theory (IRT) methods

Use IRT to create the CAT algorithms and instrument

Next Steps

- Item Response Theory (IRT) analyses
- Build CAT algorithms
- Pilot validation study
- Collect normative data
- Develop techniques for score interpretation
- Demonstration project within SSA to assess feasibility and utility within the context of work disability program

Thank you

