Next Steps in Use of IRT in the Assessment of Health Outcomes

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FOR FURTHER COMMENTS OR QUESTIONS ABOUT THE CONFERENCE,

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Albert Einstein

"As far as the laws of IRT refer to reality, they are not certain; and as far as they are certain, they do not refer to reality."

(mathematics)

Further Work/Research

- **Absolute Model fit**
  - **Model fit is important (Hambleton)**
  - **Chi square is not good**
  - **Graphical evaluation requires judgment— "skilled data analysis judgment" (Thissen)**
  - **If logistic model assumptions are met (monotonicity, unidimensionality, local independence), model should fit (Reise)**
- **Relative Model fit**
  - **Effect size: if correlations between theta estimates from one model or another are similar (Wilson)**

Further Work/Research 2

- **Sample size requirements**
- **Essential unidimensionality**
  - **General construct versus bloated specific (Reise)**
  - **Bi-factor model /TESTFACT (Reise)**
  - **Imputation required for some scales**
- **DIF**
  - **How big does DIF need to be to matter?**
- **Deriving fixed length short-form using IRT (Orlando)**
  - **How much better than IRT in predicting long-form or diagnostic criterion?**
  - **How much better than same number of items randomly selected?**

Further Work/Research 3

- **Does the 3-parameter model have a role in health outcomes research?**
  - **Avoidance of extremes (4-parameter model)**
  - **Socially desirable responding**
- **CAT**
  - **Item exposure**
    - **Communication telling older people how to "pass" cognitive screening measures (Crane)**
    - **Potential value of redundant (locally dependent item)**
  - **ML versus EAP**
  - **Method effects**
    - **Sequence effects, mode of administration (IVR, interviewer, web)**
    - **Usability studies to detect problems**

Further Work/Research 4

- **Constructs for which it is impossible to develop items to tap extreme levels of theta.**
  - **High satisfaction with medical care (Hambleton)?**
  - **Item misfit more likely for very easy or hard items (Cella)?**
- **Construct definition (Ware)**
  - **Symptom presence/frequency versus bother/impact**
- **Summary score**
  - **IRT-based versus preference-based (Fine)**
- **Person fit**
  - **Ultimate DIF**
  - **Carelessness**

Albert Einstein

"Do not worry about your difficulties in IRT. I can assure you mine are still greater."

(Mathematics)

Educational Needs

- **Tutorials/workshops (live and web)**
- **Conferences**
- **Articles**
- **Books**
- **Newsletters (Bjorner & Ware, 1998)**
- **Email listserv**
- **Website dedicated to IRT**
  - **Continuation of NCI website:** http://outcomes.cancer.gov/conference/irt

FAQs

- **Aren't item parameter estimates dependent (not invariant) on the sample in which they were derived?**
  - **Wood (1976): "it is not correct to say that the latent trait models provide invariant item parameter estimates. Only if a common scale … is used from group to group will this be true."**
- **What does an information of 10 mean?**
  - **SE = 1/SQRT(10) = 0.32**

Software Needs

"What software program is used to run IRT? I'm trying to learn how to do it and wanted to play around with it in an analysis"

- Better software
    - LISREL vs. EQS; Liscomp vs. MPLUS
    - Parscale-Equate-DFIT (Morales); SAS ML Mixed, GLAMM, Conquest (Wilson)
- SBIR funding

Challenges Ahead

- Integrating IRT into health outcomes field along with other standard methods (expert and stakeholder input, focus groups, cognitive interviews, readability, classical test theory analyses)
  - Fear of recurrence ("I do not worry about my illness returning." *Strongly agree*, *Agree*, *Neutral*, *Disagree*, *Strongly Disagree*)
  - Renaissance researcher (IRT and survey expertise)

Challenges Ahead 2

- Common versus unique item banks
  - A common bank developed with collaboration by multiple investigators
  - Individual investigators who have unique and creative ideas encouraged to pursue this and push the envelope from another angle
- Collaboration among academia, government & industry; private versus public funded research
  - Kallich, J. D., & Hays, R. D. (1994). The benefits and pitfalls of health services research funded by proprietary firms. <u>Quality of Life Research</u>, 3, 231-233.

Challenges Ahead 3

- Demonstrating the value of IRT
  - Grant support of demonstration projects aimed at evaluating the usefulness of IRT in improving the assessment of health outcomes for research and clinical practice (including MID).
- Standards for use and reporting IRT
  - "Assessing health status and quality-of-life instruments: Attributes and review criteria" (<u>Quality of Life Research</u>, 2002)

Concluding Thought

"The most incomprehensible thing about IRT is that it is at all comprehensible."

(the world)