Implementation and Results of a Cross-National, Structured-Interview Cognitive Test of a Measure of Disability

Kristen Miller, NCHS
Daniel Mont, World Bank
Aaron Maitland, NCHS
Barbara Altman, Consultant
Jennifer Madans, NCHS
Washington Group: Background

- Washington Group
  - United Nations City Group
  - Objectives to provide cross-nationally comparable questions on disability
  - Short set of questions for Censuses
  - Testing protocol
Vision: How much difficulty do you have seeing even if wearing glasses?

Hearing: How much difficulty do you have hearing even if using a hearing aid?

Cognition: How much difficulty do you have remembering or concentrating?

Mobility: How much difficulty do you have walking or climbing stairs?

Self-Care: How much difficulty do you have with self-care, such as washing all over or dressing?

Communication: Because of a physical, mental or health condition, how much difficulty do you have communicating, for example understanding or being understood by others?
Goal of Census Questions:
- Internationally comparable data
- Suitable for censuses
- Captures most disabled people in a consistent fashion

Goal of Cognitive Testing:
- Ensure that questions achieve those goals
- No reliance on “gold standard”
Evaluation Method:
Structured-Cognitive interview

- Structured interview guide
- Based on principles of cognitive testing
- Very simple instructions
- Few skip patterns
- Quantitative data and analysis
Cognitive Interview Protocol

I. Demographic Section: Country, language, gender, age, SES

II. Question Testing Sections
   A. Core Question
   B. Interviewer Coding
   C. Open-ended Follow-up Probe
   D. Subjective Cognitive Follow-up Probe
   E. Objective Functioning Follow-up Probe

III. Health Questions: subjective health, chronic condition list

IV. Interviewer Debriefing
Data Collection for Cognitive Test

- 16 Countries: South & Central American, Asia, Africa

- Country roles:
  - Trained interviewers (with prepared materials)
  - Conducted interviews
  - Entered data
    - Prepared Excel spreadsheet
    - Performed quality check
  - Performed initial analysis
  - Sent data to WG for larger, combined analysis

- Total Sample: N=1290
Initial Analysis of Test Data

- Examined the consistency between Washington Group question responses and follow-up questions responses

- Goal: explain the discrepancies
  - Problem with the WG questions
  - Misunderstood word?
  - Cultural difference?
  - Translation problem?
  - Error in the follow-up questions?
  - WG Question captures more dimensions of the disability
Initial Analysis: Problematic Responses

Inconsistencies between the WG question and follow-up questions

Do you have difficulty seeing, even if wearing glasses? **No**

Do you have difficulty seeing and recognizing a person you know from 7 meters (20 feet) away? **A lot of difficulty**

Do you have difficulty seeing the print in a map, newspaper or book? **Some difficulty**
Vision

<table>
<thead>
<tr>
<th></th>
<th>Washington Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Difficulty</td>
</tr>
<tr>
<td>Not Problematic Responses</td>
<td>617</td>
</tr>
<tr>
<td></td>
<td>53.1%</td>
</tr>
<tr>
<td>Problematic Responses</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>3.9%</td>
</tr>
</tbody>
</table>
# Vision Response Patterns

<table>
<thead>
<tr>
<th>Pattern</th>
<th>WG Disability</th>
<th>Wears Glasses</th>
<th>Follow-up Disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>B</td>
<td>No</td>
<td>Yes</td>
<td>No (corrected)</td>
</tr>
<tr>
<td>C</td>
<td>Yes, disability</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>D</td>
<td>Yes, disability</td>
<td>Yes</td>
<td>Yes (not corrected)</td>
</tr>
<tr>
<td>E</td>
<td>Yes, disability</td>
<td>Yes</td>
<td>No (corrected)</td>
</tr>
<tr>
<td>F</td>
<td>Yes, disability</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>G</td>
<td>No</td>
<td>Yes</td>
<td>Yes (not corrected)</td>
</tr>
<tr>
<td>H</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Reasons for inconsistency

1. True response error (in WG or follow-ups)—potential for Bias
2. Characteristic of respondent’s disability not captured in follow-up questions
3. Data entry/Interviewer error
## Hearing Response Patterns

<table>
<thead>
<tr>
<th>Pattern</th>
<th>WG Disability</th>
<th>Aid</th>
<th>Missed Words</th>
<th>Functioning Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>B</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>C</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>D</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>E</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>F</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>G</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>H</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>I</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>J</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>K</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>L</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>M</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>N</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>O</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>P</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
How to work with problematic cases:

- **Goal 1:** Assess whether the problematic cases matter when combining 6 questions to create 1 prevalence rate

- **Goal 2:** Conduct more analysis to identify the cases of “true response error”
Goal 2: Assess how well each question captures the specific domain

- Determine extent to which each question falsely identifies people as having a disability

- Determine reason for misidentifications
  - e.g. question design flaw, translation problem

- Determine which (if any) population may be more likely to be misidentified
  - e.g. less educated, particular country, elderly
Why it’s important to identify cases of “true error”

- Bias if there is pattern in the error
  - Gender
  - Country
  - Age
  - Disability or Health Status

- Conduct demographic analysis of error cases to identify bias
## Potential False Negatives/Positives

<table>
<thead>
<tr>
<th></th>
<th>False Negative</th>
<th>False Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less Problematic</td>
<td>More Problematic</td>
</tr>
<tr>
<td>Vision</td>
<td>0%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Hearing</td>
<td>6.7%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Mobility</td>
<td>14.9%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Cognition</td>
<td>8.7%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Self-Care</td>
<td>12.9%</td>
<td>4.1%</td>
</tr>
</tbody>
</table>
## Vision

<table>
<thead>
<tr>
<th></th>
<th>Washington Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Difficulty</td>
</tr>
<tr>
<td>Not Problematic</td>
<td>617</td>
</tr>
<tr>
<td>Responses</td>
<td>53.1%</td>
</tr>
<tr>
<td>Problematic</td>
<td>45</td>
</tr>
<tr>
<td>Responses</td>
<td>3.9%</td>
</tr>
</tbody>
</table>
Identifying True False Positives

12.8% (149 cases) of Potential False Positives

Next analysis to identify true error:

Additional follow-ups:

1. With your glasses, how often do you have difficulty seeing well?

2. With your glasses, how much effort do you have to put into seeing?
Vision False-positive Errors

- 53.7% No Effort and No Frequency
  - 80 out of the 149 potential false positives
  - 71 were Pattern E, 9 were Pattern F

- 15.4% No Effort or No Frequency
  - 23 out of the 149 potential false positives
  - 22 were Pattern E, 1 were Pattern F
Conclusions: True Error for Vision

- **Pattern E:**
  - Cases in Pattern E are likely true error
  - Related to the glasses clause

- **Pattern F:**
  - More problems with effort and frequency
  - Cannot assume is error; Likely disability
  - Not to be included in demographic/bias analysis
Vision: Demographic/Bias Analysis

- Does Pattern E occur more often among specific subgroups?
  - Country
  - Age
  - Gender
  - Disability Status
## Glasses Clause Problems by Age

<table>
<thead>
<tr>
<th></th>
<th>10-44</th>
<th>45-64</th>
<th>65+</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pattern E</strong></td>
<td>6.1%</td>
<td>17.3%</td>
<td>14.7%</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td><strong>Wear Glasses</strong></td>
<td>24.6%</td>
<td>62.0%</td>
<td>67.9%</td>
<td>p&lt;.0001</td>
</tr>
<tr>
<td><strong>Percent of glass wearers who are in Pattern E</strong></td>
<td>25.0%</td>
<td>28.7%</td>
<td>21.5%</td>
<td>p=.42</td>
</tr>
</tbody>
</table>
## Glasses Clause Problems by Gender

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>Male</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pattern E</strong></td>
<td>8.1%</td>
<td>11.9%</td>
<td>p&lt;.05</td>
</tr>
<tr>
<td><strong>Wear glasses</strong></td>
<td>38.3%</td>
<td>39.7%</td>
<td>p=.6175</td>
</tr>
<tr>
<td><strong>Percent of glass wearers in pattern E</strong></td>
<td>21.4%</td>
<td>29.6%</td>
<td>p&lt;.05</td>
</tr>
</tbody>
</table>
Glasses Clause Problems by Country

Pattern E as a % of glass wearers

- Gambia: 12.5%
- Kenya: 38.5%
- Lesotho: 25.0%
- Mauritius: 0.0%
- Uganda: 10.0%
- Egypt: 17.4%
- Vietnam: 27.5%
- Congo: 25.0%
- Philippines: 28.6%
- Argentina: 12.9%
- India: 20.0%
- Paraguay: 40.5%
- Brazil: 29.9%
- Mexico: 29.2%
- Tanzania: 28.6%
Conclusions

- New method: structured cognitive test
- Pattern analysis particularly advantageous
- Useful approach for testing cross-national indicators
- Lends support to the Washington Group measures