Gridlocked:
The impact of adapting survey grids for smartphones
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¹ RTI International
² New York City Department of Health & Mental Hygiene
1. *During the past 30 days, about how often did you feel ...*

<table>
<thead>
<tr>
<th></th>
<th>All of the time</th>
<th>Most of the time</th>
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<td>☐</td>
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</tr>
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<td>b. ....hopeless?</td>
<td>☐</td>
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<td>c. ....restless or fidgety?</td>
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<td>e. ....that everything was an effort?</td>
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<td>☐</td>
</tr>
<tr>
<td>f. ....worthless?</td>
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</table>
Grids avoid repetition.

1. During the past 30 days, about how often did you feel nervous?
   - All of the time
   - Most of the time
   - Some of the time
   - None of the time

2. During the past 30 days, about how often did you feel so depressed that nothing could cheer you up?
   - All of the time
   - Most of the time
   - Some of the time
   - None of the time

3. During the past 30 days, about how often did you feel hopeless?
   - All of the time
   - Most of the time
   - Some of the time
   - None of the time

4. During the past 30 days, about how often did you feel that everything was an effort?
   - All of the time
   - Most of the time
   - Some of the time
   - None of the time

5. During the past 30 days, about how often did you feel restless or frigoty?
   - All of the time
   - Most of the time
   - Some of the time
   - None of the time

6. During the past 30 days, about how often did you feel worthless?
   - All of the time
   - Most of the time
   - Some of the time
   - None of the time
Grids display poorly on small screens, esp. smartphones.

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• Summarize the literature on grids

• Suggest a modified grid format that displays better on small screens

• Review findings from comparison of modified versus traditional grid format
  – Indicators of data quality: missing data, straight-lining, etc.
What do we know about grids? (1/2)

- Inter-item correlations / straight-lining
  - Higher in grids
    - Significantly higher (Tourangeau, Couper, & Conrad, 2004)
    - Modest effect (Couper, Traugott, & Lamias, 2001; Toepoel, Das, & Van Soest, 2009)
    - No effect (Yan, 2005; Callegaro, Shand-Lubbers, & Dennis, 2009)

- Missing data
  - Higher in grids (Iglesias, Bir, & Torgerson, 2001; Toepoel, Das, & van Soest, 2009)
  - Lower in grids (Couper, Traugott, & Lamias, 2001)
What do we know about grids? (2/2)

- **Survey completion time**
    - Seems to be due to an increase in measurement error (Peytchev, 2005)

- **Respondents’ evaluation of the questionnaire**
  - Less favorable when grids are used (Toepoel, Das, & van Soest, 2009)

- **Display**
  - Poor on small screens (e.g. Link et al., 2014)
If you are conducting online surveys, you are conducting mobile surveys.

-Link, Murphy, Schober, et al. (2014)
By choosing to use [grid] question formats, the survey designers trade data quality for space efficiency.

Sometimes grids cannot be avoided:

- Longitudinal studies (compare data to earlier waves)
- Mail surveys (space constraints)
- Multi-mode surveys (compare findings across modes)
World Trade Center Health Registry

- Established 2002
  - Monitor long-term physical and mental health of people exposed to 9/11
  - Assess post-disaster needs
- Wave 4 survey: launched April 2015

<table>
<thead>
<tr>
<th></th>
<th>Wave 1</th>
<th>Wave 2</th>
<th>Wave 3</th>
<th>Wave 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Size</td>
<td>71,437</td>
<td>68,959</td>
<td>67,670</td>
<td>67,480</td>
</tr>
<tr>
<td>Modes</td>
<td>CATI</td>
<td>CATI</td>
<td>CATI</td>
<td>Web</td>
</tr>
<tr>
<td></td>
<td>CAPI</td>
<td>Web Mail</td>
<td>Web Mail</td>
<td>Mail</td>
</tr>
<tr>
<td>Response Rate</td>
<td>59%</td>
<td>68%</td>
<td>63%</td>
<td>TBD</td>
</tr>
</tbody>
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- Retained 5 grids for better comparison to Wave 3 grid data and to save space in the mail mode
Modifying grids for mobile respondents

- Used responsive web design
  - Screen width automatically detected
  - If < 760 px, display stacked format
  - If ≥ 760 px, display traditional format

- Stacked format displays each item above the response options to save space
Traditional vs. Stacked Format

Q30. Have you ever been told by a doctor or other health professional that you had any of these conditions? Note: Cancer is covered later in this survey.

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<td></td>
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<tr>
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<td></td>
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<tr>
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Stacked Version

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Research Purpose

- Do the stacked and traditional formats result in differences in data quality?

- We examined:
  - Response distributions
  - Missing data
  - Straight-lining
  - Inconsistent responses
Methods

- Used preliminary data: 4,358 Web respondents through first 4 weeks of data collection
- 92% completed survey on large screen (computer or large tablet); 8% on small screen (smartphone)
- Respondent characteristics:
  - Avg. age 55
  - 63% male
  - 62% Bachelor’s degree or higher
- Smartphone respondents:
  - Slightly younger
  - Less educated
  - Both differences statistically significant
- Used predicted probabilities from models that controlled for age, sex, education
Response Distributions

- Clear pattern of stacked respondents choosing more negative response in 4 of 5 grids

- No discernible pattern in 5th grid
PTSD –
Average Response Selected by Item & Format

* $p < .05$
Depression Symptoms – Average Response Selected by Item & Format

* $p < .05$
Psychological Distress Symptoms – Average Response Selected by Item & Format

* $p < .05$
Availability of Social Support—Average Response Selected by Item & Format

* \( p < .05 \)
Diagnosed Health Conditions—
Average Response Selected by Item & Format

* $p < .05$
Skipping 1+ Items: Predicted Probability by Grid & Format

* $p < .05$
Skipping Entire Grid: Predicted Probability by Grid & Format

*p < .05
Straight-Lining: Predicted Probability by Grid & Format

- Straight-lining: selecting same response for all items

![Graph showing predicted probabilities for different conditions with grid formats.](image)

* $p < .05$
Wave 3 and Wave 4 surveys both contained a grid asking about lifetime diagnosis of medical conditions.
  - Respondents who indicated they had a condition were then asked for year of diagnosis

Any condition diagnosed in 2010 or earlier should have been reported in Wave 3 and Wave 4.

Looked at average # of conditions with discrepancies across waves
  - Average: ~1.5 discrepancies per respondent
  - No statistically significant differences for stacked vs. traditional grid formats
Summary

- Grids have both advantages and disadvantages
- We kept grids in our survey to make longitudinal comparisons
- Respondents will utilize option to respond via smartphone
  - Must modify grids to work on small screens
  - ...But must do so without introducing mode/device effects
- Stacked format: good compromise
  - No consistent evidence of decreased data quality
  - Some evidence of increased data quality
- Stacked format may be a good option for all devices
Ashley Richards
Survey Methodologist
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References (2/2)


