Disentangling Mode and Nonresponse Effects in the World Trade Center Health Registry

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Mixed mode: proceed with caution!

respondent convenience
response rates

efficiency

- pulling apart nonresponse and mode effects
A perfect example...

- The largest effort ever in the U.S. to monitor the health of people exposed to a major disaster.
- Tracks enrollees to understand the short and long term health effects of 9/11.

- Conducted by the New York City Department of Health and Mental Hygiene
- Funded by the National Institute of Occupational Safety and Health
**WTC Health Registry timeline**

**Wave 1:**
- 71,437 enrolled mostly by **phone**, small **in-person** component

2001

**Wave 2:**
- 46,701 interviewed, first attempted by email for **web** survey, then by **mail** survey, then **phone** for remaining nonresponders

2003-04

**Wave 3:**
- 43,135 interviewed, similar sequential mixed mode approach to Wave 2

2006-08

2011-12
Example: High post-traumatic stress at Wave 2

- Mode effects remain when controlling for respondent demographics, suggesting underreporting on sensitive items.
Experiment at Wave 3 to disentangle

- Three comparable subsamples of 400 (1,200 total)
- Stratified by demographics
- Each subsample assigned exclusively to web-only, mail-only, or phone-only
- Cases released to other modes once response plateaued
Mode experiment response rates

Assigned Mode

- Web
- Mail
- Phone

Completed in assigned mode
Completed in other mode
Non-responders
Several measures were evaluated for mode differences at Wave 2, controlling for respondent demographics.

Among experimental cases, seven measures had a significantly lower rate at Wave 2 for those responding at Wave 2 by phone.
Items with significantly different rates by phone, Wave 2:

<table>
<thead>
<tr>
<th>Question</th>
<th>Not at all</th>
<th>A little bit</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>33. How much have you been bothered by the following problems in the last 30 days?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Avoiding thinking about or talking about the events of 9/11 or avoiding having feelings related to it?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>g. Avoiding activities or situations because they remind you of the events of 9/11?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>k. Feeling emotionally numb or being unable to have loving feelings for those close to you?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>i. Loss of interest in activities that you used to enjoy?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Items with significantly different rates by phone, Wave 2:

<table>
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<tr>
<th>In the last 30 days, about how often did you feel:</th>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>c. Restless or fidgety?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>d. Hopeless?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<td>f. Worthless?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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Feelings of worthlessness, by mode

Wave 2

None of the time
A little of the time

by Wave 2
response mode

ALL
M
W
P
Feelings of worthlessness, by mode

Wave 2

Wave 3

ALL

WM

NR

P

WM

WM

NR

WM

P

P
P:WM – ratio of estimate obtained from phone respondents to web/mail respondents

- Ratio of Wave 2 estimates by Wave 3 response mode (suggests which respondents are more likely to choose which mode)
- Ratio of Wave 3 estimates by Wave 3 response mode (suggests the effect of that mode on the estimate)
Estimating nonresponse and mode effects

\[ y_i = \beta_0 + x_{i1}\beta_1 + x_{i2}\beta_2 + \cdots + x_{ik}\beta_k + e_i \]

Model 1:
- \(y\)=Wave 2 survey estimate (generally 1=not at all to 5=extremely)
- \(x_1\)=Wave 3 mode assignment
- \(x_2\)=Wave 2 survey mode

Model 2:
- \(y\)=Wave 3 survey estimate
- \(x_1\)=Wave 3 mode assignment
- \(x_2\)=Wave 2 survey mode
- \(x_3\)=Wave 2 survey estimate
Systematic differences in respondents by mode vs. mode effects

Model 1: at Wave 2

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<td>Avoided thinking about 9/11</td>
<td>1.04</td>
<td>0.3983</td>
</tr>
<tr>
<td>Felt distant or cut off from people</td>
<td>0.89</td>
<td>0.1539</td>
</tr>
<tr>
<td>Felt emotionally numb</td>
<td>0.89</td>
<td>0.1502</td>
</tr>
<tr>
<td>Felt hopeless</td>
<td>0.86</td>
<td>0.0413</td>
</tr>
<tr>
<td>Loss of interest in activities</td>
<td>0.93</td>
<td>0.2924</td>
</tr>
<tr>
<td>Felt restless</td>
<td>0.95</td>
<td>0.4284</td>
</tr>
<tr>
<td>Felt worthless</td>
<td>0.89</td>
<td>0.1528</td>
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* model predicting measure at Wave 2 with phone completion at Wave 3, controlling for Wave 2 mode
Systematic differences in respondents by mode vs. mode effects

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<th>Model 2: at Wave 3</th>
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* model predicting measure at Wave 2 with phone completion at Wave 3, controlling for Wave 2 mode

** model predicting measure at Wave 3 with phone completion at Wave 3, controlling for Wave 2 mode and measure at Wave 2
So, what have we found?

• WTC Health Registry phone respondents in the Wave 3 mode experiment were *slightly* less likely than web/mail respondents to have previously reported any problems on selected measures. This may be a factor in their decision to respond.

• There *is* evidence of lower reporting of problems on selected measures by phone in Wave 3, though the differences are small (within the range of not at any time vs. a little of the time).
Future steps

• Look beyond means to variable distributions and multivariate relationships

• Develop quantitative adjustments to control for effect of mode in analyses

• Recommend repeating mode experiment in future waves and on similar studies to isolate and understand the mechanism of the mode effect
More Information

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