Respondent burden and satisficing in grid questions:
A comparison of early versus late positioning in a Web survey instrument

Presented at RC33 Conference 2016
9th International Conference on Social Science Methodology
Leicester, UK
September 13, 2016
Background

- In general, “context effect refers to a process in which prior questions affect responses to later questions in surveys” (Holyk, 2008)

- Question order effects:
  Preceding questions are likely to affect responses to subsequent questions by influencing one or more stages of the question-answer process.

- Semantic order effects:
  - Facilitation of cognitive processing by clarification of question meaning and increased temporary accessibility of relevant information.

- Serial order (or position) effects:
  - Fatigue and burden accumulating over the course of questionnaire completion impair the effort expended on cognitive processing. (Krosnick & Presser, 2010)
## Previous findings

<table>
<thead>
<tr>
<th>Satisficing</th>
<th>at questionnaire level</th>
<th>at question level (grid)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent</td>
<td>Respondent fatigue/ burden increases with the <strong>number of questions</strong> that have already been answered</td>
<td></td>
</tr>
<tr>
<td>fatigue/ burden</td>
<td></td>
<td>... <strong>number of items</strong> ...</td>
</tr>
<tr>
<td>Respondent</td>
<td>Respondent motivation gradually declines <strong>with each question</strong> respondents have to work through</td>
<td></td>
</tr>
<tr>
<td>motivation</td>
<td></td>
<td>... <strong>with each additional item</strong> ...</td>
</tr>
<tr>
<td>Data quality</td>
<td>Data quality is lower for <strong>questions positioned later</strong> in a questionnaire (e.g., higher item nonresponse, shorter response times, less differentiation)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>... <strong>items positioned later</strong> in a grid...</td>
</tr>
</tbody>
</table>
Research Questions

1. What effects do variations in question positioning within the questionnaire have on data quality?

2. What effects do variations in item positioning within the grid question have on data quality?
Methods

- Web survey among university applicants (n=4,034)
- Field phase from July/August, 2015
- Response rate (AAPOR RR6): 24%

- Experimental question: grid question with 10 items on the respondent’s perceived general self-efficacy (using a 5-point unipolar agreement scale)

- Between-subjects design with random assignment

- Randomization
  - At questionnaire level (question position within the questionnaire)
  - At question level (item position within the grid)
Experimental Design

At questionnaire level:

- Web page
  - 01 ...
  - 02 ...
  - 03 ...
  - 04 ...
  - 05 ...
  - 06 ...
  - 07 ...
  - 08 ... reasons for choice of field of study (single choice)

At question level:

1. I can always manage to solve difficult problems if I try hard enough.
2. If someone opposes me, I can find the means and ways to get what I want.
3. It is easy for me to stick to my aims and accomplish my goals.
4. I am confident that I could deal efficiently with unexpected events.
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
6. I can solve most problems if I invest the necessary effort.
7. I can remain calm when facing difficulties because I can rely on my coping abilities.
8. When I am confronted with a problem, I can usually find several solutions.
9. If I am in trouble, I can usually think of a solution.
10. I can usually handle whatever comes my way.
Analysis

- Indicators of data quality:
  - item nonresponse (percent)
  - response times (seconds)
  - response differentiation (McCarty/Shrum, 2000)

- Balanced sample: cases were excluded at several stages
  - who failed to pass all four possible question positions,
  - who exceeded the session timeout of 7,200 seconds on the target page

  Furthermore, for analysis of response time and response differentiation:
  - who needed longer time than two standard deviations above the group mean
  - who failed to complete all 10 grid items

- Separate consideration of desktop (incl. tablet) and mobile respondents (self-selective groups)
Please indicate how much you agree or not agree with each of the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>fully agree</th>
<th>somewhat agree</th>
<th>partly/partly</th>
<th>rather not agree</th>
<th>not agree at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can always manage to solve difficult problems if I try hard enough.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If someone opposes me, I can find the means and ways to get what I want.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is easy for me to stick to my aims and accomplish my goals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident that I could deal efficiently with unexpected events.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thanks to my resourcefulness, I know how to handle unforeseen situations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can solve most problems if I invest the necessary effort.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can remain calm when facing difficulties because I can rely on my coping abilities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When I am confronted with a problem, I can usually find several solutions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I am in trouble, I can usually think of a solution.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can usually handle whatever comes my way.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Continue
Results
At questionnaire level

- Item nonresponse depending on grid position:
  In total, n=182 with at least 1 item missing.
Results
At questionnaire level

- Response time spent on grid depending on grid position*

* Calculations were based on server-side paradata (page level), n=3,770.
Results
At questionnaire level

- Response time spent on grid depending on grid position, solely considering cases with at least 1 item missing*

<table>
<thead>
<tr>
<th>Grid completion time (seconds)</th>
<th>Desktop (n=110)</th>
<th>Mobile (n=65)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid position</td>
<td>Grid position</td>
<td>Grid position</td>
</tr>
<tr>
<td>#1</td>
<td>#1</td>
<td>#1</td>
</tr>
<tr>
<td>#2</td>
<td>#2</td>
<td>#2</td>
</tr>
<tr>
<td>#3</td>
<td>#3</td>
<td>#3</td>
</tr>
<tr>
<td>#4</td>
<td>#4</td>
<td>#4</td>
</tr>
<tr>
<td>60.8#4</td>
<td>58.9#4</td>
<td>65.6</td>
</tr>
<tr>
<td>48.8</td>
<td>46.4</td>
<td>53.4</td>
</tr>
<tr>
<td>43.9</td>
<td>45.8</td>
<td>41.1</td>
</tr>
<tr>
<td>34.0#1</td>
<td>34.1#1</td>
<td>33.8</td>
</tr>
<tr>
<td>34.0#1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Calculations were based on server-side paradata (page level); deviations from n=182 due to exclusion of time outliers ± 2 SD from group mean.
Results
At questionnaire level

- Response differentiation depending on grid position

Degree of differentiation (McCarty/Shrum, n=3,734)

<table>
<thead>
<tr>
<th>Grid position</th>
<th>#1</th>
<th>#2</th>
<th>#3</th>
<th>#4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile (n=1,153)</td>
<td>.518</td>
<td>.520</td>
<td>.507</td>
<td>.502</td>
</tr>
<tr>
<td>Desktop (n=2,581)</td>
<td>.526$^{*34}$</td>
<td>.523</td>
<td>.505$^*$</td>
<td>.504$^*$</td>
</tr>
</tbody>
</table>

* Calculations were based on server-side paradata (page level), n=3,770.
Results
At question level

- Item nonresponse depending on item and grid position*

* Calculations were based on client-side paradata (item level), n=3,913.
† Respondents may have seen different items at item position #1, #2, #3, ...
Results
At question level

- Response time spent on *item* depending on item and grid position*

* Calculations were based on client-side paradata (item level), n=3,728.
† Respondents may have seen different items at item position #1, #2, #3, ...; item position #1 not considered because of extra time for initial orientation and processing of question stem.
Results
At question level

- Top-down processing of items as originally displayed† using 10 clicks depending on grid position*

* Calculations were based on client-side paradata (item level), n=3,728.
† Respondents may have seen different items at item position #1, #2, #3, ...; item position #1 has been taken into account in the analysis.
Results
At question level

- Response time spent on *item* depending on item and grid position* for subgroup “top-down processing using 10 clicks”

* Calculations were based on client-side paradata (item level), n=1,480.
† Respondents may have seen different items at item position #1, #2, #3, …; item position #1 not considered because of extra time for initial orientation and processing of question stem.
Results
At question level

- Response differentiation depending on item and grid position*
  for subgroup “top-down processing using 10 clicks”

Degree of differentiation (McCarty/Shrum):
item position top half - bottom half† (n=1,357)

* Calculations were based on client-side paradata (item level), n=1,480.
† Respondents may have seen different items at item position #1, #2, #3, ...; item position #1 has been taken into account in the analysis.
Summary

At questionnaire level:
For grid questions asked later in the questionnaire ...
- item nonresponse increased, especially for mobile respondents;
- response times decreased, especially for desktop respondents;
- response differentiation decreased, especially for desktop respondents.

At question level:
For items positioned later in the grid ...
- item nonresponse, response time, and response differentiation remained largely unaffected among desktop and mobile respondents.
Conclusions

- The positioning of a question within the questionnaire has a greater impact on data quality than the positioning of a particular item in a multi-item question.

- Respondent fatigue and burden accumulating over the course of questionnaire completion lower respondent motivation to thoroughly process latter questions.

- It appears that even long multi-item measures can be administered without further deterioration of data quality, even if presented in an non-optimized grid design.
Thank you.

Darmstadt University of Technology
Department 02
Institute of Sociology
Research Methods
Dipl.-Sozswiss. Tanja Kunz

Im Carree 3 (S4|21, Room 240)
64283 Darmstadt
Germany

Phone: +49 6151/16-70973
Fax: +49 6151/16-72070

kunz@ifs.tu-darmstadt.de