Instant Interactive Feedback in Grid Questions: 
Insights from Eye Tracking Data 

Presented at the VI European Congress of Methodology 2014 
Utrecht, The Netherlands 
July 25, 2014
Interactive Feedback

Background

- Grid questions are especially prone to various satisficing behaviors (e.g., nondifferentiation, speeding).

- Interactive feedback may prevent satisficing behaviors in Web surveys.

- Interactive feedback is most useful (Conrad et al., 2005):
  - when it is provided immediately after the relevant action, and
  - when no additional effort is required to obtain the feedback.

- Interactive feedback can be provided either
  1. after a respondent has already submitted a grid ('delayed feedback'), or
  2. while a respondent is still in the process of answering grid items ('instant feedback').
Instant Interactive Feedback

Previous Findings

➔ Delayed feedback
  ▪ speed prompts (Conrad et al., 2011; Hudson et al., 2013):
    longer response times; mixed findings on straight-lining and survey breakoff
  ▪ speed & nondifferentiation prompts in grid questions (Zhang, 2013):
    reduction of speeding and nondifferentiation by either prompt

➔ Instant feedback
  ▪ speed & nondifferentiation prompts in grid questions (Kunz & Fuchs, 2014):
    both prompts reduced speeding and nondifferentiation; no increase of item nonresponse
    or survey breakoff

Suggestions:

Instant feedback encourages meaningful instead of superficial behavioral changes.
Research Questions

1. How effective is instant feedback in reducing speeding and nondifferentiation in grid questions?

2. How much attention is given to instant feedback?
   a. one-off or repeated attention?
   b. conscious or superficial awareness?

3. How does instant feedback affect the processing of grid questions?
Methods

- Lab experiment:
  - "Studies and Occupation" Web survey (Jan/Feb, 2013)
  - Students recruited on campus (N=124)
  - Between-subjects design with random assignment
    (with 26 of 39 survey questions being part of experimentation)

- Eye tracking equipment:
  - Monocular, remote mounted eye tracking system
  - 19 inch monitor
  - 60 Hz sampling rate
Design
Experimental Conditions

In your view, how important are the following aspects for an employer's decision to employ a graduate?

<table>
<thead>
<tr>
<th>aspect</th>
<th>very important</th>
<th>important</th>
<th>quite important</th>
<th>partly/ partly</th>
<th>quite unimportant</th>
<th>unimportant</th>
<th>very unimportant</th>
</tr>
</thead>
<tbody>
<tr>
<td>subject of study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>specialization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>thesis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>degree (i.e., Bachelor, Master, Diploma, Doctorate)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>final grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>practical experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Feedback Instruction (Q28, 14 items)

**CG:** No feedback

**EG:** Nondiff prompt
nondiff (click<sub>i</sub> < .60
(McCarty&Shrum, 2010)

How important are the following job aspects for you personally?

<table>
<thead>
<tr>
<th>aspect</th>
<th>very important</th>
<th>important</th>
<th>quite important</th>
<th>partly/ partly</th>
<th>quite unimportant</th>
<th>unimportant</th>
<th>very unimportant</th>
</tr>
</thead>
<tbody>
<tr>
<td>flexible working hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sufficient time for leisure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to be stimulated by daily challenges</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sufficient time for my family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to be faced repeatedly with new tasks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Feedback Instruction (Q33, 14 items)

**CG:** No feedback

**EG:** Speed prompt
time span (click<sub>i</sub> – click<sub>i-1</sub>) < 3500ms
## Results

### Survey Data I

<table>
<thead>
<tr>
<th>Feedback Instruction</th>
<th>n</th>
<th>Nondifferentiation (McCarty &amp; Shrum)</th>
<th>Response Time (Seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no prompt</td>
<td>41</td>
<td>.704</td>
<td>60.9</td>
</tr>
<tr>
<td>nondiff prompt</td>
<td>52</td>
<td>.739</td>
<td>68.6</td>
</tr>
<tr>
<td><em>F-test</em></td>
<td></td>
<td>&lt; .05</td>
<td>&lt; .05</td>
</tr>
<tr>
<td>Q33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no prompt</td>
<td>48</td>
<td>.678</td>
<td>58.8</td>
</tr>
<tr>
<td>speed prompt</td>
<td>39</td>
<td>.703</td>
<td>93.3</td>
</tr>
<tr>
<td><em>F-test</em></td>
<td></td>
<td>ns</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

*Both feedback instructions reduced nondifferentiation and speeding.*
### Results

#### Survey Data II

<table>
<thead>
<tr>
<th>Feedback Instruction</th>
<th>n</th>
<th>mean index</th>
<th>$F$-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q28 no prompt</td>
<td>41</td>
<td>2.79</td>
<td>ns</td>
</tr>
<tr>
<td>nondiff prompt</td>
<td>52</td>
<td>2.91</td>
<td></td>
</tr>
<tr>
<td>Q33 no prompt</td>
<td>48</td>
<td>2.67</td>
<td>ns</td>
</tr>
<tr>
<td>speed prompt</td>
<td>39</td>
<td>2.73</td>
<td></td>
</tr>
</tbody>
</table>

Both feedback instructions did not affect substantive responses.
Eye Tracking Data
Areas of Interest (AOI)

| In your view, how important are the following aspects for an employer’s decision to employ a graduate? |
|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|
| Subject of study                                  | Very important | Important | Quite important | Partly | Quite unimportant | Unimportant | Very unimportant |
| Specialization                                    |                   |           |                  |        |                  |            |                   |
| Thesis                                            |                   |           |                  |        |                  |            |                   |
| Degree (i.e., Bachelor, Master, Diploma, Doctorate) |                   |           |                  |        |                  |            |                   |
| Final grade                                       |                   |           |                  |        |                  |            |                   |
| Practical experience                              |                   |           |                  |        |                  |            |                   |

Please try to differentiate more between your answers.
Results

Incidence of Prompts (Percent)

58 percent of the respondents received at least 1 prompt.

On average, 3.5 prompts appeared for those who received at least 1 prompt.

100 percent of the respondents received at least 1 prompt.

On average, 5.9 prompts appeared.
Results

Respondent Attention to Prompts (overall, mean)

Overall, 92 percent of the respondents fixated the speed prompt at least once compared to 70 percent the nondiff prompt.

Provided that a prompt was fixated at all, a nondiff prompt was fixated more frequently and longer than a speed prompt.

Note. Fixation counts and durations were divided by the total number of prompts.

1) Respondents completely ignoring the prompts (9 for nondiff and 3 for speed) were included in the calculation of mean fixation count, but 2) excluded from calculations of mean fixation duration.
Results

Respondent Attention to Prompts (single, mean)

Note. 1) Number of respondents who fixated the 1st, 2nd, 3rd, etc. prompt at least once; 2) Number of respondents who received a 1st, 2nd, 3rd, etc. prompt at all.

็ก One-off attention to nondiff prompts ATIC Repeated attention to speed prompts
Results
Respondent Attention to Prompts (single, mean)

Note. 1) Number of respondents who fixated the 1st, 2nd, 3rd, etc. prompt at least once.

 -$\blacklozenge$ One-off attention to nondiff prompts
 -$\blacklozenge$ Repeated attention to speed prompts
Results
Respondent Attention to AOIs (overall, mean)

Note. 1) AOIs 'question text', 'items', 'response option labels', and 'radio buttons' were included in the analysis.

Respondent attention to relevant question components was increased due to both feedback instructions.
Results
Respondent Attention to AOIs (single, mean)

Fixations on single AOIs with nondiff prompt (%)

- Question: CG: -1.6, EG: +12.6*
- Items: CG: +0.7, EG: +16.1*
- Labels: CG: , EG: +3.8*
- Buttons: CG: , EG: +34.2***

Fixations on single AOIs with speed prompt (%)

- Question: CG: , EG: +6.1*
- Items: CG: , EG: +66.5***
- Labels: CG: , EG: +34.2***
- Buttons: CG: , EG: +66.5***

Note. *** $P < .001$, ** $P < .01$, * $P < .05$. 
Results
Respondent Attention to AOIs (single, mean)

Both feedback instructions encouraged respondents to pay more attention to the items and the radio buttons.

Note. *** $P < .001$, ** $P < .01$, *$P < .05$. 

Both feedback instructions encouraged respondents to pay more attention to the items and the radio buttons.
Results
Respondent Attention to AOIs (single, mean)

Fixdurations on single AOIs with nondiff prompt (seconds)

<table>
<thead>
<tr>
<th>AOIs</th>
<th>CG: overall</th>
<th>EG: overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>-0.1</td>
<td>+2.5^</td>
</tr>
<tr>
<td>Items</td>
<td>+0.3</td>
<td>+3.9**</td>
</tr>
<tr>
<td>Labels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buttons</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fixdurations on single AOIs with speed prompt (seconds)

<table>
<thead>
<tr>
<th>AOIs</th>
<th>CG: overall</th>
<th>EG: overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>+1.1*</td>
<td>+13.1***</td>
</tr>
<tr>
<td>Items</td>
<td></td>
<td>+8.2***</td>
</tr>
<tr>
<td>Labels</td>
<td>+0.7^</td>
<td></td>
</tr>
<tr>
<td>Buttons</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. *** $P < .001$, ** $P < .01$, * $P < .05$, ^ $P < .10$. 
Results
Respondent Attention to AOIs (single, mean)

Both feedback instructions encouraged respondents to concentrate longer on the items and the radio buttons.

Note. *** $P < .001$, ** $P < .01$, *$P < .05$, ^ $P < .10$. 
Results
Summary

Survey data revealed:
1. Nondifferentiation and speeding could efficiently be reduced by means of instant feedback on either nondifferentiation or speeding.
2. Substantive responses remained unaffected by feedback instructions.

Eye tracking data indicated:
1. Respondents’ attention to the nondifferentiation prompts was one-off and induced higher attention to item content and radio buttons.
2. Respondents’ attention to the speed prompts was repeated and encouraged higher attention to all relevant components of a survey question.
Conclusions

- Overall respondent attention to instant feedback is considered high.
- Respondent attention to speeding feedback is more pronounced than their attention to nondifferentiation feedback.
  - The effectiveness of repeated nondifferentiation prompting is limited.
  - Instant feedback on speeding is more effective with increasing incidence of prompting.
- Instant feedback on nondifferentiation and speeding promotes higher respondent attention to grid questions.
- More precisely, respondents are encouraged to consider the content of the items and their own responses more carefully.
Thank you.

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

Residenzschloss (Room 31)
64283 Darmstadt
Germany

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

kunz@ifs.tu-darmstadt.de