General Online Research Conference
GOR12
March 05-07, 2012, DHBW Mannheim, Germany

Tanja Kunz, Darmstadt University of Technology
Marek Fuchs, Darmstadt University of Technology

Effects of Static versus Dynamic Formatting Instructions for Open-Ended Numerical Questions in Web Surveys

Contact: kunz@ifs.tu-darmstadt.de
Effects of Static versus Dynamic Formatting Instructions for Open-Ended Numerical Questions in Web Surveys

Presented at GOR 2012, Mannheim
March 6, 2012
Background
Open-Ended Numerical Questions in Web Surveys

- Types of “open-ended” questions:
  - in-depth narrative answers in the respondent’s own words
  - list style open-ended questions
  - gathering short numerical information (dates, numbers, frequencies, counts, etc.)

- Advantages of open-ended questions:
  - no scale effects
  - nonrestrictive collection of metric data

- Disadvantages of open-ended questions (esp. in web surveys):
  - reduced orientation due to the absence of response options
  - answers deviating from the desired format (value ranges, estimates, alphanumeric supplements, etc.)

→ Decreased data quality.
→ Increased efforts for data cleansing and preparation.
Previous Findings
Clarification Features in Web Surveys

- In general, clarification features (instructions, definitions, etc.) convey additional information regarding question-answer processing.

- Basic problem:
  Effects of clarification features often suffer from limited attention.

- The effect of formatting instructions on answers may depend on:
  1. Question type
     - whether respondents know the answer or need to estimate, and whether conventions exist (e.g., dates) (Couper et al., 2011)
     - whether it is a factual or behavioral question (Schwarz & Oyserman, 2001).
  2. Verbal and visual design of instructions
Previous Findings
Verbal and Non-Verbal Design Features

➔ Graphical location:
  - Clarification features should be provided within the respondent’s foveal view, and exactly where they are needed (Dillman, 2000; Kahneman, 1973).

➔ Interactive elements:
  - Definitions by mouseover text are more effective than definitions by mouse clicks (Conrad et al., 2006).
  - However, always visible definitions are consulted more than definitions requiring a mouseover request (Peytchev et al., 2010).

➔ Use of symbols:
  - Labeling of input fields with symbols significantly increases the proportion of correctly formatted answers (Christian, Dillman, & Smyth, 2007; Couper et al., 2011).
  - Default values within the input field provide effective shorthand information regarding the desired answer format (Fuchs, 2007).
Research Questions

1. Is the use of mouseover formatting instructions more effective compared to conventional static instructions
   
   a. when no additional effort for instruction retrieval is needed,
   b. and formatting instructions appear in close proximity to the input field?

2. Are additional verbal explanations needless when symbolic formatting instructions are used as pre-defined cues within the input field?

3. Is there an increased effect of combining different kinds of visual presentation of formatting instructions?
Methods

- **Study I:**
  - Sample: university freshman students in an opt-in panel (N=668)
  - Field phase: 18.-29.10.2011
  - Response rate (RR2): 15%
  - Questions: factual issues
    - transfer time (home – university) (survey page 10 of 29)
    - grade (in mathematics and German language) (survey page 27 of 29)

- **Study II:**
  - Sample: students in an opt-in panel (N=907)
  - Response rate (RR2): 41%
  - Questions: factual and behavioral issues
    - time for university courses (survey page 9 of 23)
    - time for non-university activities (survey page 10 of 23)
    - transfer time (home – university) (survey page 19 of 23)
Study Design
Experimental conditions – screenshots

1. *Fixed* instruction as part of the question:
   How much time do you need from your apartment to the TU Darmstadt with the most commonly used means of transport?
   Please specify the time in the format hh:mm.

2. *Tooltip* instruction appearing dynamically by mouseover:
   How much time do you need from your apartment to the TU Darmstadt with the most commonly used means of transport?
   Please specify the time in the format hh:mm.

3. *Pre-filled* symbolic instruction within the input field:
   How much time do you need from your apartment to the TU Darmstadt with the most commonly used means of transport?
   hh:mm
## Results – Study I
### Formatting, Item Nonresponse, and Response Times

<table>
<thead>
<tr>
<th></th>
<th>fixed (a)</th>
<th>tooltip (b)</th>
<th>pre-filled (c)</th>
<th>pre-filled &amp; fixed (d)</th>
<th>pre-filled &amp; tooltip (e)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>sample size (n), page 10</strong></td>
<td>127</td>
<td>168</td>
<td>150</td>
<td>124</td>
<td>108</td>
</tr>
<tr>
<td><strong>transfer time</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>correctly formatted - hh:mm (%)$^1$</td>
<td>85$^{b,c}$</td>
<td>66$^{a,d}$</td>
<td>57$^{a,d,e}$</td>
<td>85$^{b,c}$</td>
<td>76$^c$</td>
</tr>
<tr>
<td>no answer (%) $^2$</td>
<td>2</td>
<td>4$^d$</td>
<td>1</td>
<td>0$^b$</td>
<td>2</td>
</tr>
<tr>
<td>response time (mean in sec.) $^3$</td>
<td>25</td>
<td>21</td>
<td>22</td>
<td>28</td>
<td>25</td>
</tr>
<tr>
<td><strong>sample size (n), page 27</strong></td>
<td>126</td>
<td>148</td>
<td>120</td>
<td>140</td>
<td>134</td>
</tr>
<tr>
<td><strong>grade (math)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>correctly formatted - 0,0 (%)$^1$</td>
<td>74$^{b,c}$</td>
<td>57$^{a,d,e}$</td>
<td>51$^{a,d,e}$</td>
<td>73$^{b,c}$</td>
<td>70$^{b,c}$</td>
</tr>
<tr>
<td>no answer (%) $^2$</td>
<td>3</td>
<td>2$^c$</td>
<td>9$^b$</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>grade (German)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>correctly formatted - 0,0 (%)$^1$</td>
<td>67$^c$</td>
<td>58$^{d,e}$</td>
<td>52$^{a,d,e}$</td>
<td>70$^{b,c}$</td>
<td>70$^{b,c}$</td>
</tr>
<tr>
<td>no answer (%) $^2$</td>
<td>5</td>
<td>4</td>
<td>9</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>response time (mean in sec.) $^3$</td>
<td>48</td>
<td>48</td>
<td>41$^d$</td>
<td>57$^c$</td>
<td>49</td>
</tr>
</tbody>
</table>

**Notes.**
1) Answer correct vs. false: pairwise chi$^2$ tests p<.05; 2) answer vs. no answer: pairwise chi$^2$ tests p<.05; 3) mean response times: one-way ANOVA p<.05.
## Results – Study II
### Formatting, Item Nonresponse, and Response Times

<table>
<thead>
<tr>
<th></th>
<th>fixed (a)</th>
<th>tooltip (b)</th>
<th>pre-filled (c)</th>
<th>fixed &amp; tooltip (d)</th>
<th>fixed &amp; pre-filled (e)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>sample size (n)</strong></td>
<td>171</td>
<td>184</td>
<td>164</td>
<td>187</td>
<td>201</td>
</tr>
<tr>
<td><strong>university time</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>correctly formatted - hh:mm (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1)</td>
<td>74&lt;sup&gt;b,c&lt;/sup&gt;</td>
<td>54&lt;sup&gt;a,d,e&lt;/sup&gt;</td>
<td>51&lt;sup&gt;a,d,e&lt;/sup&gt;</td>
<td>73&lt;sup&gt;b,c&lt;/sup&gt;</td>
<td>80&lt;sup&gt;b,c&lt;/sup&gt;</td>
</tr>
<tr>
<td>no answer (%)</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>response time (mean in sec.)</td>
<td>44</td>
<td>41</td>
<td>42</td>
<td>42</td>
<td>43</td>
</tr>
<tr>
<td><strong>non-university time</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>correctly formatted - hh:mm (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1)</td>
<td>56&lt;sup&gt;b,c&lt;/sup&gt;</td>
<td>42&lt;sup&gt;a,d,e&lt;/sup&gt;</td>
<td>40&lt;sup&gt;a,d,e&lt;/sup&gt;</td>
<td>62&lt;sup&gt;b,c&lt;/sup&gt;</td>
<td>67&lt;sup&gt;b,c&lt;/sup&gt;</td>
</tr>
<tr>
<td>no answer (%)</td>
<td>4</td>
<td>5</td>
<td>2&lt;sup&gt;d&lt;/sup&gt;</td>
<td>7&lt;sup&gt;c,e&lt;/sup&gt;</td>
<td>2&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>response time (mean in sec.)</td>
<td>28</td>
<td>25</td>
<td>29&lt;sup&gt;d&lt;/sup&gt;</td>
<td>20&lt;sup&gt;c&lt;/sup&gt;</td>
<td>27</td>
</tr>
<tr>
<td><strong>transfer time</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>correctly formatted - hh:mm (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1)</td>
<td>76&lt;sup&gt;b,e&lt;/sup&gt;</td>
<td>65&lt;sup&gt;a,d,e&lt;/sup&gt;</td>
<td>68&lt;sup&gt;e&lt;/sup&gt;</td>
<td>77&lt;sup&gt;b,e&lt;/sup&gt;</td>
<td>87&lt;sup&gt;a,b,c,d&lt;/sup&gt;</td>
</tr>
<tr>
<td>no answer (%)</td>
<td>1&lt;sup&gt;e&lt;/sup&gt;</td>
<td>1&lt;sup&gt;e&lt;/sup&gt;</td>
<td>1&lt;sup&gt;e&lt;/sup&gt;</td>
<td>4&lt;sup&gt;e&lt;/sup&gt;</td>
<td>0&lt;sup&gt;a,b,c,d&lt;/sup&gt;</td>
</tr>
<tr>
<td>response time (mean in sec.)</td>
<td>22</td>
<td>21</td>
<td>21</td>
<td>19&lt;sup&gt;e&lt;/sup&gt;</td>
<td>25&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

**Notes.** 1) Answer correct vs. false: pairwise chi² tests p<.05; 2) answer vs. no answer: pairwise chi² tests p<.05; 3) mean response times: one-way ANOVA p<.05.
Result overview
Effects of Different Modes of Formatting Instructions

- Conventional fixed formatting instructions attain significantly higher percentages in correctly formatted answers compared to dynamic (tooltip) and symbolic (pre-filled) instructions.

- Even combined formatting instructions achieve no significant advantages compared to conventional fixed instructions.

- Basically, there are no differences in item nonresponse and mean response time.

- The positive formatting effect of conventional fixed instructions pertains irrespective of the question type.
Conclusions

- The sole use of symbolic formatting instructions (*pre-filled*) insufficiently convey the desired answer format.

- The attention-grabbing effect of dynamic formatting instructions (*tooltip*) appearing suddenly in the respondent’s field of view on correct answer formatting is restricted even if no additional triggering is required.

- The efficiency of dynamic instructions further might depend on:
  - the time of appearance within the question-answer process, and
  - the minimum duration of display.
Thank you.

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

Residenzschloss (Room 31)
64283 Darmstadt
Germany

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

kunz@ifs.tu-darmstadt.de