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

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

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# 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.

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# Previous Findings

## Clarification Features in Web Surveys

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- 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

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# Previous Findings

## Verbal and Non-Verbal Design Features

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### → 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).

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# Research Questions



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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?

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# 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)
  - Field phase: 13.12.2011-04.01.2012
  - 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)

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# Study Design

## Experimental conditions – screenshots

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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?**



# Results – Study I

## Formatting, Item Nonresponse, and Response Times

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

Notes. <sup>1)</sup> Answer correct vs. false: pairwise chi<sup>2</sup> tests p<.05; <sup>2)</sup> answer vs. no answer: pairwise chi<sup>2</sup> tests p<.05;  
<sup>3)</sup> mean response times: one-way ANOVA p<.05.

# Results – Study II

## Formatting, Item Nonresponse, and Response Times



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

Notes. <sup>1)</sup> Answer correct vs. false: pairwise chi<sup>2</sup> tests p<.05; <sup>2)</sup> answer vs. no answer: pairwise chi<sup>2</sup> tests p<.05;  
<sup>3)</sup> mean response times: one-way ANOVA p<.05.

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# 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.

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# Conclusions



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- 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.



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**Thank you.**

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