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Positioning of Clarification Features in Web Surveys: Evidence from Eye Tracking Data

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Background
Clarification Features in Web Surveys

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- In general, clarification features improve response accuracy by conveying additional information that supports the question-answer process.

- Special case 'open-ended questions in web surveys':
  Higher response burden due to the absence of response options and interviewer assistance.

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

  ➔ Attention-enhancing efforts

Previous Findings
Clarification Features in Web Surveys

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1. **Interactivity**: presentation 'by default' vs. 'respondent-initiated'

   ➔ more attention when always visible, and effort for retrieval is low (Conrad, Schober, & Coiner, 2007; Galesic et al., 2008; Peytchev et al., 2010)

2. **Graphical location**: clarification features should be provided
   - …within the navigational path,
   - …and exactly where they are needed (Dillman, 2000; Kahneman, 1973).

   ➔ Established convention:

   immediately *after* the question text, and *before* the answer space (Christian & Dillman, 2004; Dillman, 2000, Peytchev et al., 2010; Galesic et al., 2008).

Positioning of Clarification Features

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② *above* question

Communicating with classmates means face-to-face conversation both inside and outside the university, contact via email or text message, communication via social networks like Facebook or StudiVZ, Twitter, blogs or chats. Please include the time for communicating about private issues as well as subject-specific teaching and learning processes.

How much time a week do you spend on communicating with your classmates at university?

① *below* question

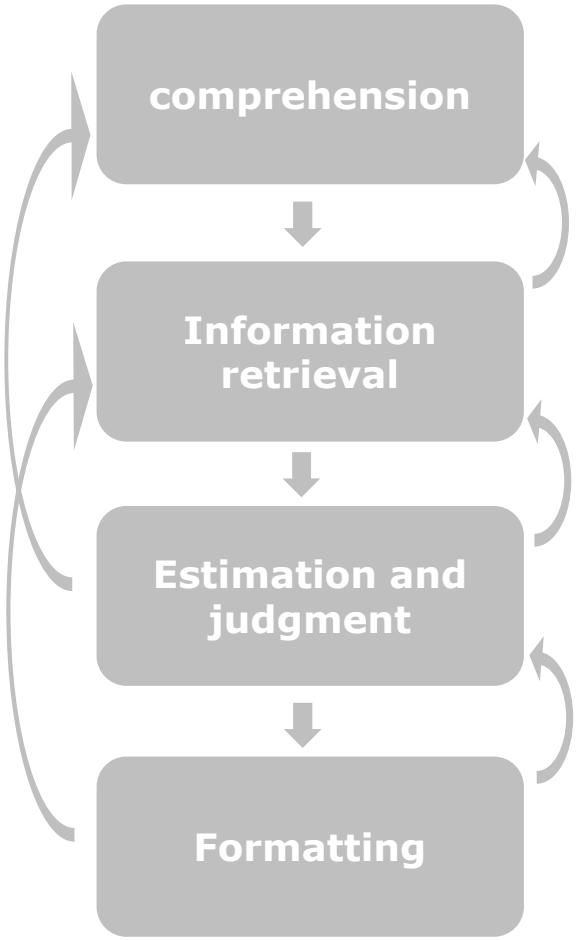
Communicating with classmates means face-to-face conversation both inside and outside the university, contact via email or text message, communication via social networks like Facebook or StudiVZ, Twitter, blogs or chats. Please include the time for communicating about private issues as well as subject-specific teaching and learning processes.

[ ] hours

③ *below* answer

Communicating with classmates means face-to-face conversation both inside and outside the university, contact via email or text message, communication via social networks like Facebook or StudiVZ, Twitter, blogs or chats. Please include the time for communicating about private issues as well as subject-specific teaching and learning processes.

Survey Response Process



• extending definition • restricting definition	➔ *increased* frequencies ➔ *reduced* frequencies
• motivating instruction • retrieval cues	➔ *increased* frequencies
• formatting instruction concerning numeric answers • instruction encouraging detailed narrative answers	➔ *more* correctly formatted answers ➔ *higher* number of characters

Research Questions

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1. Does the position of clarification features affect survey responses?

2. Is the effect on survey responses mediated by…

   a. the *differential intensity of attention* to clarification features while processing a survey question, or
   b. the *specific processing order*

   depending on the position of clarification features?

3. Are there any differences depending on the stage within the question-answer process?

Methods

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- Lab experiment:
  - „Satisfaction with Life and Studying“ web survey (Februrary, 2012)
  - Students recruited on campus (N=110)
  - Between-subjects design with random assignment

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

- Data cleaning (question-specific):
  - Exclusion of up to 18 subjects due to calibration and tracking issues

Study Design
Experimental Conditions & Key Variables

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Independent Variable: Position of clarification text

CG	**EGa**	**EGb**	**EGc**
none	*after* question	*before* question	*after* answer box

Dependent Variables

Survey Data

Eye Tracking Metrics → Areas of Interest (AOI)

- *fixation count*: degree of salience and importance
- *fixation duration*: level of cognitive processing
- *transition matrix*: efficiency of element arrangement

Results – Survey Data
Stage I: Comprehension

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	extending definition communication with classmates (time in hours)			restrictive definition computer and internet usage (time in hours)		
experimental condition	*n*	*mean (hours)*	*completion time (s)*	*n*	*mean (hours)*	*completion time (s)*
no definiton (CG)	20	*6**	22*	31	20***	21**
after question (EGa)	27	*9*	33	23	11	26^{b}
before question (EGb)	23	*13*	39	21	9	37^{a}
after answer box (EGc)	28	*11*	30	24	12	31

Notes. $^{***}p<.001$, $^{**}p<.01$, $^{*}p<.05$ main effect CG vs. EGs (overall *F*-test);
$^{a/\ b/\ c}p<.05$ pairwise post-hoc tests between EGs.

Results – Eye Tracking Data

Stage I: Comprehension

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	extending definition (communication with classmates)						**restrictive definition** (computer and internet usage)					
	fixation count (mean)			fixation duration (mean, s)			fixation count (mean)			fixation duration (mean, s)		
AOI [1)]	*Q*	*C*	*A*	*Q*	*C*	*A*	*Q*	*C*	*A*	*Q*	*C*	*A*
EGa	17[b]	24[b]	2[(b),c]	3[b]	4[b]	.6	17[(b)]	20[(b)]	3	3[(b)]	4	.7
EGb	8[a,c]	38[a,c]	.7[(a),c]	2[a,(c)]	8[a,c]	.2[c]	11[(a),c]	28[(a),c]	2[(c)]	2[(a),c]	5[c]	.4
EGc	15[b]	20[b]	4[a,b]	3[(b)]	4[b]	.9[b]	19[b]	18[b]	4[(b)]	4[b]	4[b]	.8

Notes. [a/ b/ c] $p<.05$, [(a)/ (b)/ (c)] $p<.10$ pairwise post-hoc tests between EGs;

[1)] Target AOIs within the first 15 seconds: Q=question, C=clarification feature (*here*:definition), A=answer box.

Results – Eye Tracking Data

Stage I: Comprehension

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Transition matrix: extending definition
(communication with classmates)

EGa	$\%_{row}$	Q_{post}	C_{post}	A_{post}	(n_{total})	*Q-C transition ratio (%)[1]:*
	Q_{pre}	-	96	4	*(91)*	73[c]
	C_{pre}	73	-	27	*(113)*	
	A_{pre}	31	69	-	*(29)*	
	(n_{total})	*(91)*	*(107)*	*(35)*	*(233)*	
EGb	$\%_{row}$	Q_{post}	C_{post}	A_{post}	(n_{total})	
	Q_{pre}	-	72	28	*(90)*	69[c]
	C_{pre}	90	-	10	*(73)*	
	A_{pre}	74	26	-	*(27)*	
	(n_{total})	*(86)*	*(72)*	*(32)*	*(190)*	
EGc	$\%_{row}$	Q_{post}	C_{post}	A_{post}	(n_{total})	
	Q_{pre}	-	35	65	*(74)*	26[a,b]
	C_{pre}	47	-	53	*(62)*	
	A_{pre}	64	36	-	*(75)*	
	(n_{total})	*(77)*	*(53)*	*(81)*	*(211)*	

Notes. [1)] pairwise chi-square tests between EGs: [a/ b/ c] $p<.05$.

Results – Survey Data
Stage II: Information Retrieval

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	motivating instruction			retrieval cues		
	reasons for studying			use of counseling and care services		
experimental condition	*n*	*mean (count)*	*completion time (s)*	*n*	*mean (count)*	*completion time (s)*
no definiton (CG)	27	2	43**	23	1**	14***
after question (EGa)	24	2	95	33	5	27
before question (EGb)	20	3	74	19	4	29
after answer box (EGc)	21	2	95	20	4	32

Notes. *** $p<.001$, ** $p<.01$, * $p<.05$ main effect CG vs. EGs (overall *F*-test).

Results – Survey Data

Stage IV: Answer Formatting

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	numeric answer			narrative answer		
	non-university activities (time in hh:mm)			study-related achievements (number of characters)		
experimental condition	*n*	*correctly formatted (%)* [1)]	*completion time* [2)]	*n*	*mean (count)* [2)]	*completion time* [2)]
no definiton (CG)	23	0***	25*	18	69*	62
after question (EGa)	28	43	28(b)	26	105	92
before question (EGb)	24	38	37(a)	25	90	57c
after answer box (EGc)	25	60	33	25	146	117b

Notes. 1) *** $p<.001$, ** $p<.01$, * $p<.05$ main effect CG vs. EGs (overall chi-square test),
2) *** $p<.001$, ** $p<.01$, * $p<.05$ main effect CG vs. EGs (overall *F*-test);
a/ b/ c $p<.05$, (a)/ (b)/ (c) $p<.10$ pairwise post-hoc tests between EGs.

Results – Eye Tracking Data

Stage IV: Answer Formatting

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	numeric answer (non-university activities)						**narrative answer** (study-related achievements)					
	fixation count (mean)			fixation duration (mean, s)			fixation count (mean)			fixation duration (mean, s)		
AOI [1)]	*Q*	*C*	*A*	*Q*	*C*	*A*	*Q*	*C*	*A*	*Q*	*C*	*A*
EGa	26[b]	8[c]	2	5[b]	2[c]	.6	19	8[b,c]	9	4	1[b,(c)]	2
EGb	35[a,c]	7[c]	2	8[a,c]	2[c]	.3	20	2[a,(c)]	10	4	.3[a,(c)]	2
EGc	26[b]	2[a, b]	2	5[b]	.4[a,b]	.4	19	4[a,(b)]	9	4	1[(a),(b)]	2

Notes. [a/ b/ c] $p<.05$, [(a)/ (b)/ (c)] $p<.10$ pairwise post-hoc tests between EGs;

[1)] Target AOIs within the first 15 seconds: Q=question, C=clarification feature (*here*: instruction), A=answer box.

Results – Eye Tracking Data

Stage IV: Answer Formatting

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Transition matrix: numeric answer
(non-university activities)

EGa	$\%_{row}$	Q_{post}	C_{post}	A_{post}	(n_{total})	*C-A transition ratio (%)[1]:*
	Q_{pre}	-	82	18	*(98)*	16[b]
	C_{pre}	82	-	18	*(93)*	
	A_{pre}	33	67	-	*(27)*	
	(n_{total})	*(85)*	*(98)*	*(35)*	*(218)*	
EGb	$\%_{row}$	Q_{post}	C_{post}	A_{post}	(n_{total})	
	Q_{pre}	-	61	39	*(99)*	4[a,c]
	C_{pre}	88	-	12	*(58)*	
	A_{pre}	97	3	-	*(39)*	
	(n_{total})	*(89)*	*(61)*	*(46)*	*(196)*	
EGc	$\%_{row}$	Q_{post}	C_{post}	A_{post}	(n_{total})	
	Q_{pre}	-	35	65	*(68)*	19[b]
	C_{pre}	57	-	43	*(35)*	
	A_{pre}	72	28	-	*(57)*	
	(n_{total})	*(61)*	*(40)*	*(59)*	*(160)*	

Notes. [1)] pairwise chi-square tests between EGs: [a/ b/ c] $p<.05$.

Conclusions

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- Compared to conventional positioning, the alternative placement of clarification features can potentially have an advantage:
  - higher salience,
  - deeper cognitive processing, and
  - highly interconnected cognitive processing of related question components.

- In general, the efficiency of alternative clarification feature positions depends on the respective processing stage:

  ➔ Stage I: Comprehension
  - Clarifications *before* the question provide higher attention-getting properties compared to conventional positioning.
  - However, avoid placing clarifications *after* the answer box!

  ➔ Stage IV: Formatting
  - Clarifications *after* the response box give information exactly when respondents need it.
  - However, avoid placing clarifications *before* the question text!

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Thank you.

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

Residenzschloss (Room 31)
64283 Darmstadt
Germany

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

kunz@ifs.tu-darmstadt.de