Switching away from web surveys: what can we learn from JavaScript OnBlur functions about response behavior

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Web Surveys and OnBlur Functions I

- Web surveys allow passive collection of paradata.
  - *Response times, mouse activities, scrolling, window/tab switching, etc.*
- Paradata can be collected via …
  - *… apps installed on the device.*
  - *… browsers hosting web surveys.*
- Browser-based paradata are collected via JavaScript.
  - *Application Programming Interface (API).*
- Window/tab switching is detected by OnBlur functions.
  - *How often (off-count) and for how long (off-time).*
  - *Page-level detection.*

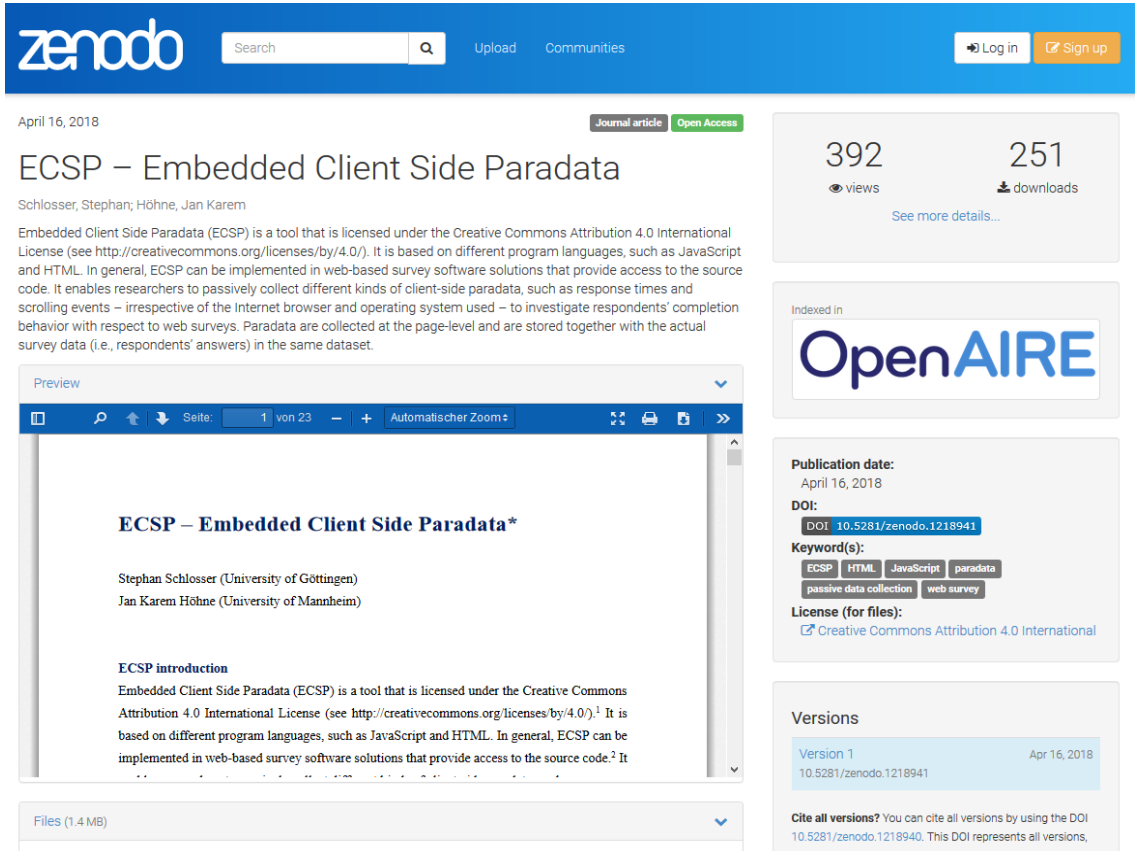
Web Surveys and OnBlur Functions II

- Raw data from OnBlur functions are stored as strings.

100431,230838	0,1
1011,125193	0,1
1020,17153	0,1
1027,3094	0,1
NA	*NA*
10646,29095	0,1
10750,28158	0,1
NA	*NA*
109472,133384,139913,159686	0,1,0,1
1096,41394,42668,52469	0,1,0,1
11,12207	0,1
111734,645909,770886,838399	0,1,0,1
1129,11930	0,1
1156,83178	0,1
11665,311456	0,1

Time stamps (ms)	Blur events
1027,3094	0,1
	No Blur event
10646,29095	0,1
10750,28158	0,1
	No Blur event
109472,133384,…	0,1,0,1
1096,41394,42668,…	0,1,0,1
11,12207	0,1

Web Surveys and OnBlur Functions III



Source: https://zenodo.org/record/1218941#.XYp-jmbgq70

- "Embedded Client Side Paradata" by Schlosser and Höhne (2018).
- Gathers switching events plus 13 further paradata.
- Based on JavaScript and HTML.
- Paradata collection across browsers, devices, and operating systems.
- Synchronous paradata transfer.
- Paradata are stored with survey responses.

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Web Surveys and OnBlur Functions IV

Scan Me!

Schlosser, Höhne, Couper, & Blom (in progress). Switching away: exploring on-device media multitasking in web surveys

Introduction I

- Increase in self-administered web surveys.
  - *Major social surveys employ web-based modules (e.g., ANES, ESS, and HRS).*
- Web surveys have several benefits.
  - *Researchers: timelines and cost-effectiveness.*
  - *Respondents: few time and location restrictions.*
- Benefits come at a price.
  - *Spatial distance between respondents and researcher.*
  - *Few information about survey environment.*
  - *Limited ways to monitor survey completion.*
- Previous research shows that respondents multitask.

Introduction II

- Different forms of multitasking.
  - *Non-media, on-device media, and off-device media.*
- These forms are commonly measured using self-reports.
  - *Measured on survey-level.*
  - *Prone to social desirability and recall errors.*
- Paradata (OnBlur functions) detect on-device media multitasking.
  - *Precise and reliable measure.*
  - *Measured on page- or question-level.*
- We conducted a web survey experiment exploring on-device media multitasking using paradata.

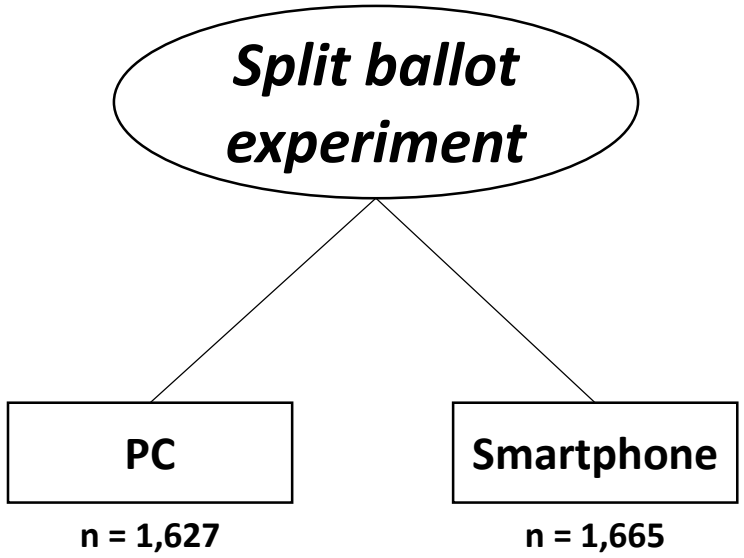
Research Questions

What is the prevalence of on-device media multitasking measured by means of paradata? (RQ1)

Do paradata and self-reports on on-device media multitasking come to the same conclusions? (RQ2)

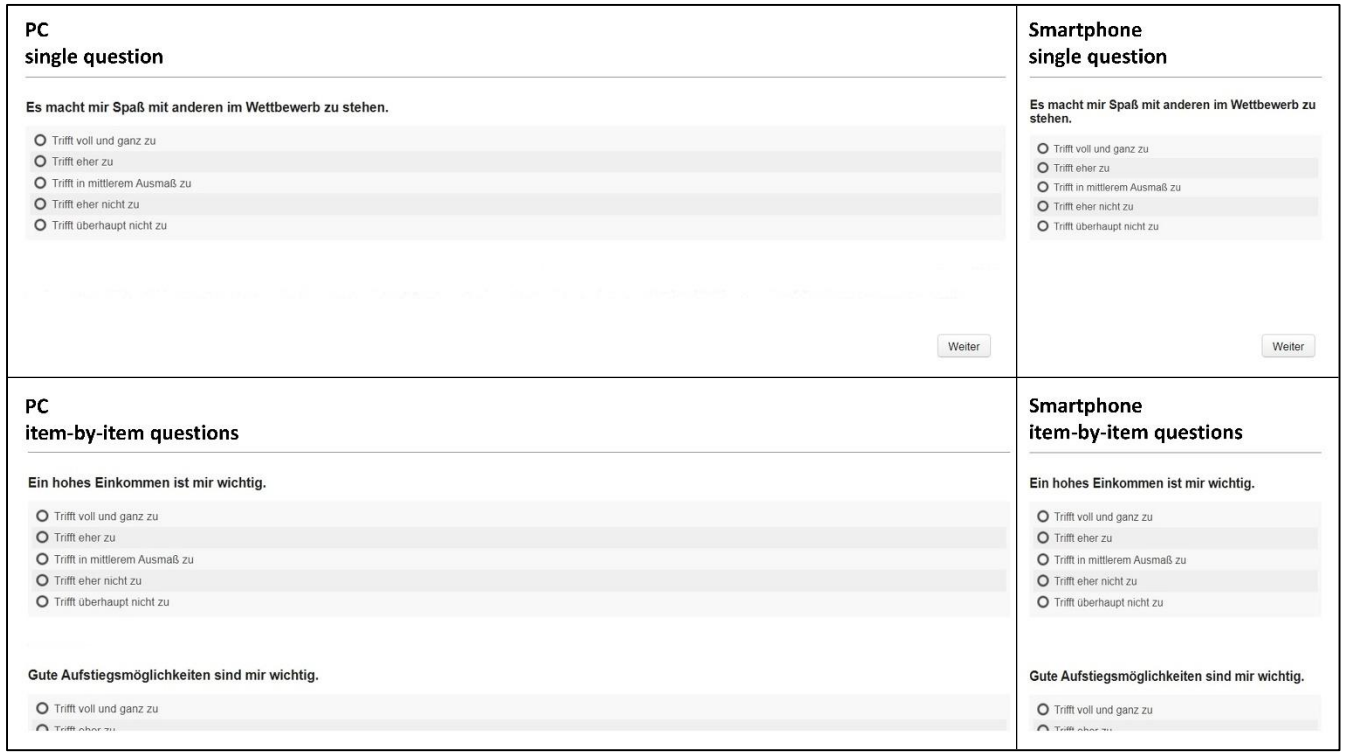
What are the stated reasons for on-device media multitasking? (RQ3)

Methods: Research Design



- Self-administered web survey in Germany in July and August 2019.
- We drew a cross-quota sample based on age and gender (3-2).
  - *The quota plan was designed to represent the German population regarding these characteristics.*
- Respondents were randomly assigned to a device.

Methods: Single and Item-by-Item questions



- We used 47 questions on a variety of topics.
  - *9 single questions.*
  - *37 item-by-item questions on six survey pages.*
- Questions were in German.
- We used an optimized survey layout.
  - *Avoiding horizontal scrolling and facilitating navigation.*
  - *Increasing device comparability.*

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Methods: Sample Characteristics

Final sample size:	*N = 3,292 (participation rate: 13.6%)*
Age (in years):	*Mean = 46.6*
Gender:	*50.5% female*
Education:	*12.5% lower secondary school (low)*
	34.6% intermediate secondary school (middle)
	52.9% at least college preparatory secondary school (high)
Daily usage:	*PC: 69.8%, smartphone: 87.4%, and internet: 93.9%*

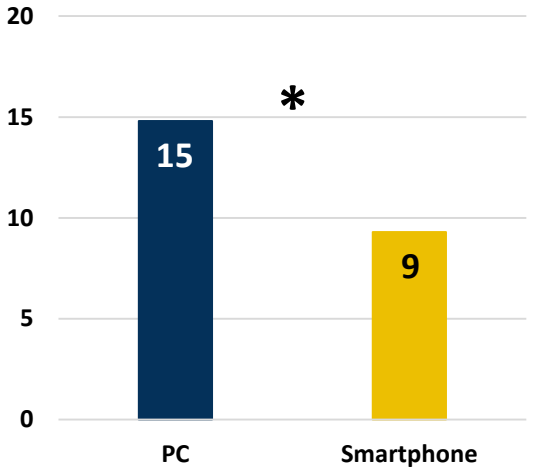
Methods: Analytical Strategy

- Prevalence of on-device media multitasking (percentages) across all questions.
  - *Window and browser tab switching (OnBlur functions).*
  - *Switching characteristics: off-count and off-time.*
- Match between paradata and self-reports.
  - *Percentages of self-reports.*
  - *Association between paradata and self-reports.*
- Stated reasons for on-device media multitasking.
  - *Categorization of reasons stated by respondents.*

Results: On-Device Media Multitasking

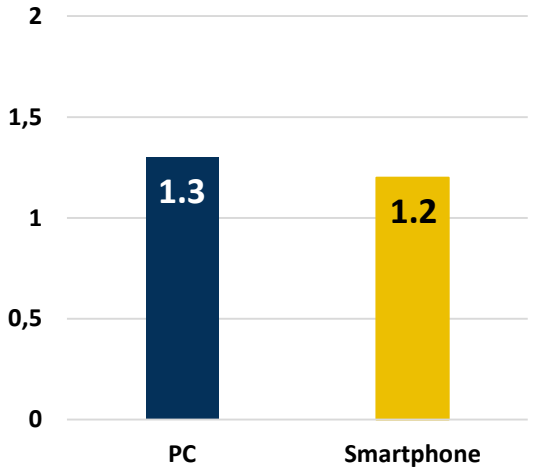
RQ1: Prevalence of on-device media multitasking.

Switching away: yes (%)



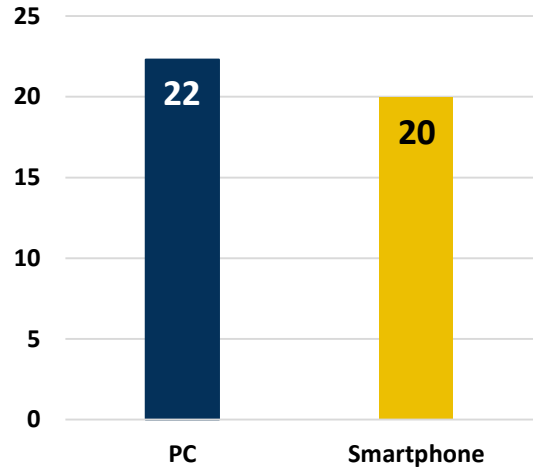
Base: All respondents.
***p < 0.05. Chi-square test.**

Off-count



Base: All switching respondents.
U-test.

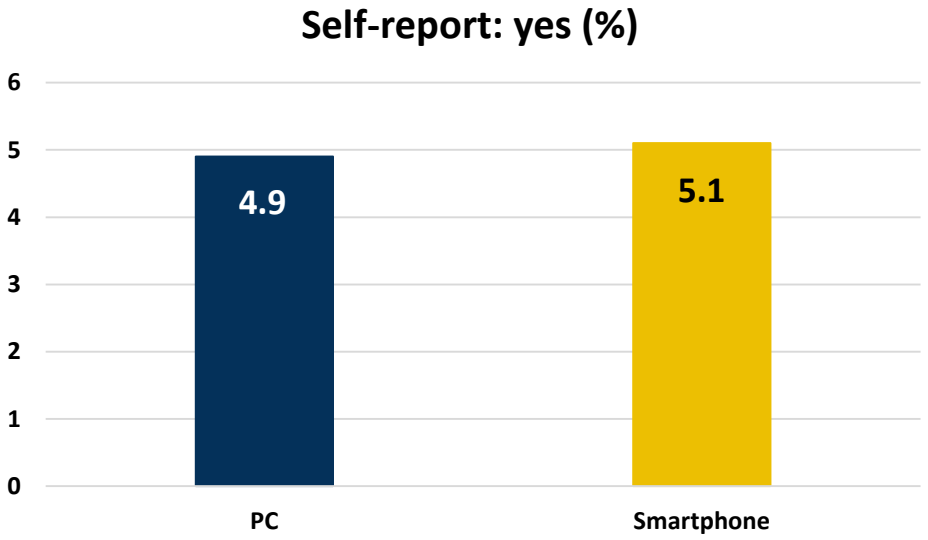
Off-time (sec)



Base: All switching respondents.
U-test.

Results: On-Device Media Multitasking

RQ2: Match between paradata and self-reports.



Base: All respondents.
Chi-square test.

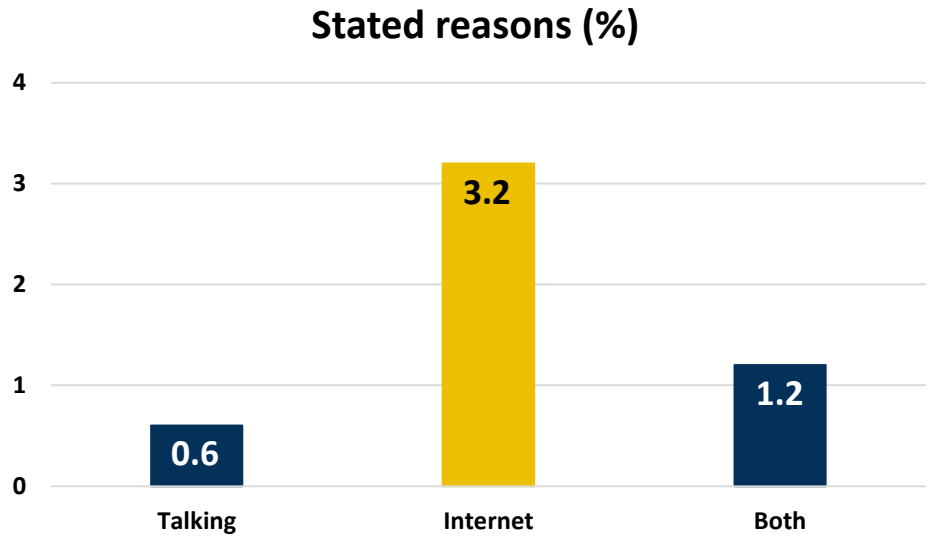
- Associations between switching away and self-reports (phi coefficients):
  - PC: phi = 0.22*
  - Smartphone: phi = 0.17*

***p < 0.05.**

Results: On-Device Media Multitasking

RQ3: Reasons for on-device media multitasking.

Stated reasons for on-device media multitasking
Talking to other people via this device.
Surfing the Internet via this device.
Writing emails or messages via this device.
Visiting social networks via this device.



Base: All self-reporting respondents.
Chi-square test.

Discussion and Conclusion

- On-device media multitasking is more common on PCs.
  - *Reasons might be device-related (e.g., screen size).*
- Precise and reliable gathering of on-device media multitasking by paradata.
  - *Page- or question-level.*
  - *Paradata do not inform about outside activities.*
- Paradata and self-reports yield different conclusions.
  - *Self-reports result in under-reporting.*
- A combination of paradata and self-reports seems superior.

Höhne, Cornesse, Schlosser, Couper, & Blom (under review). Measuring political knowledge: error of optimization in web surveys

Introduction I

- Political knowledge is a key determinant affecting outcomes in public opinion research.
- Many surveys employ political knowledge questions.
  - *American National Election Study (ANES).*
  - *Eurobarometer.*
- In interviewer-based surveys, respondents who do not know the answer have two options.
  - *Confessing their lack of knowledge.*
  - *Guessing the answer.*

Introduction II

- In self-administered web surveys there is a further option.
  - *Looking up answers on the Internet.*
- Looking up answers causes measurement error.
  - *Drawing on "procedural" instead of "declarative" memory.*
- Unlike errors committed by satisficing, errors caused by looking up answers can be seen as a kind of "optimization error".
- Only few studies provide insights into the prevalence and determinants of optimization errors in political knowledge questions.

Introduction III

- This gap of knowledge is partially closed by researchers relying on …
  - *self-reports,*
  - *response times,*
  - *comparing knowledge scores across survey modes,*
  - *comparing proportions of right answers with expected proportions by chance.*
- These methods do not provide strong evidence of optimization errors when answering political knowledge questions.
- We conducted a web survey experiment exploring optimization errors using paradata.

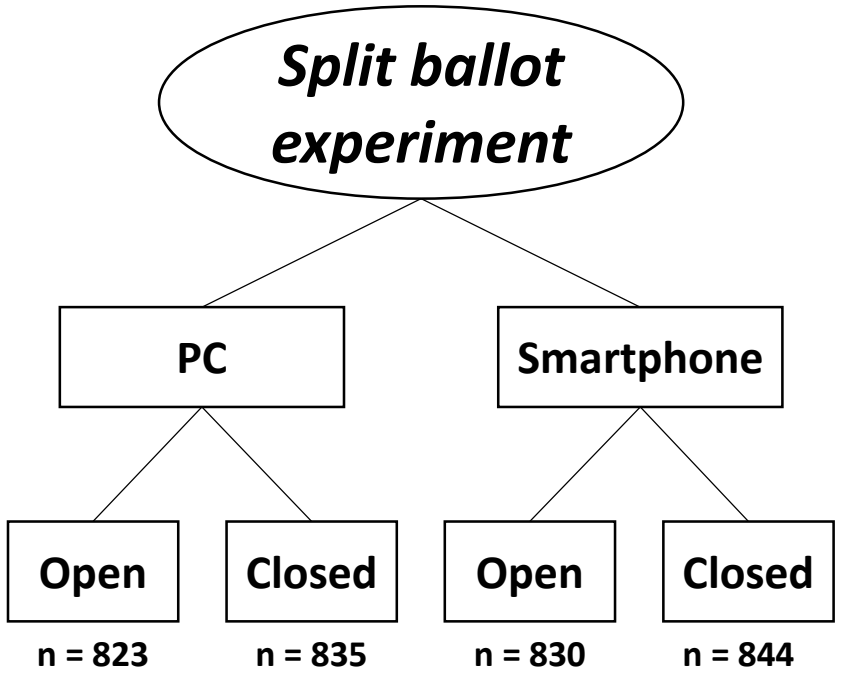
Research Questions

What is the prevalence of optimization errors in questions with open and closed response formats in mixed-device web surveys? (RQ1)

What is the prevalence of correct answers to questions with open and closed response formats in mixed-device web surveys? (RQ2)

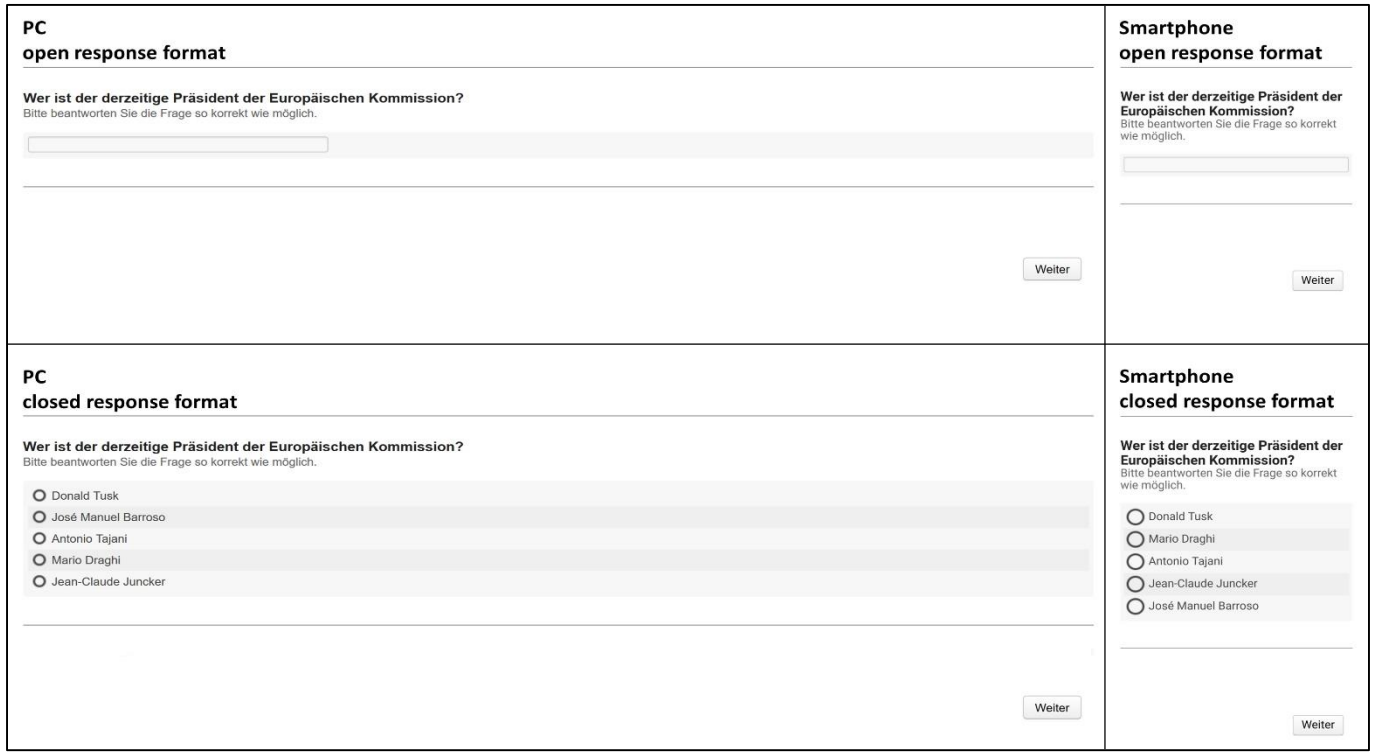
What are the determinants of correct answers to questions with open and closed response formats in mixed-device web surveys? (RQ3)

Methods: Research Design



- Self-administered web survey in Germany in September and October 2018.
- We drew a cross-quota sample based on age, education, and gender (3-3-2).
  - *The quota plan was designed to represent the German population regarding these three demographic characteristics.*
- Respondents were first randomly assigned to a device.
- Then, they were randomly assigned to a response format.

Methods: Political Knowledge Questions



- We developed 3 questions dealing with the EU.
  - *Including an instruction asking to answer as accurately as possible.*
- Questions were in German.
- We used an optimized survey layout.
  - *Avoiding horizontal scrolling and facilitating navigation.*
  - *Increasing device comparability.*

Methods: Sample Characteristics

Final sample size:	*N = 3,332 (participation rate: 9.1%)*
Age (in years):	*Mean = 47.1*
Gender:	*49.9% female*
Education:	*37.0% lower secondary school (low)*
	30.4% intermediate secondary school (middle)
	32.6% at least college preparatory secondary school (high)
Daily usage:	*PC: 63.2%, smartphone: 87.8%, and internet: 94.5%*

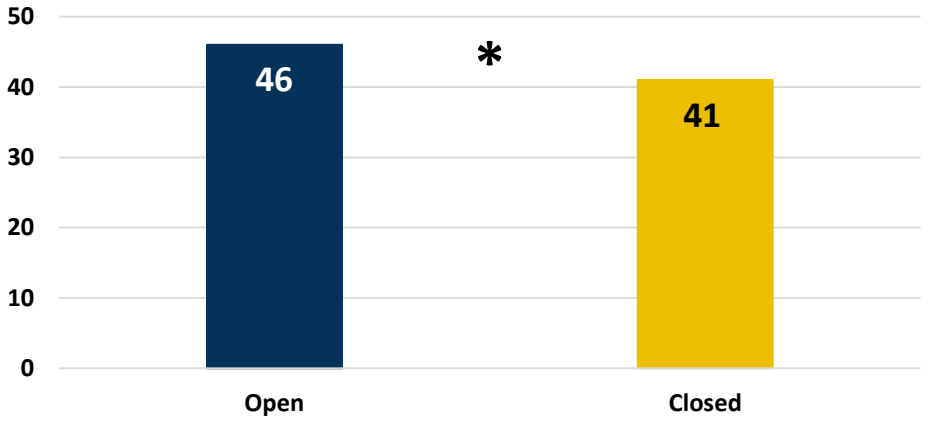
Methods: Analytical Strategy

- Prevalence of optimization errors (percentages) across all three questions.
  - *Browser tab or window switching (OnBlur functions).*
    - *Pretests showed that it takes ~5 sec (PC) and ~10 sec (smartphone) to look up answers.*
- Prevalence of correct answers (percentages) across all three questions.
- Determinants of correct answers across all three questions.
  - *Multivariate binary logistic regression.*
  - *Each question was treated as single observation.*

Results: Optimization Error

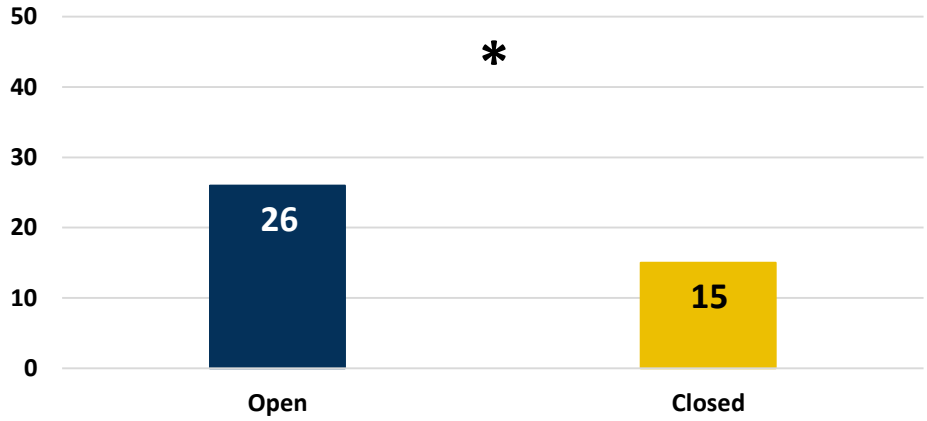
RQ1: Prevalence of optimization error.

PC – Questions 1 to 3 (% switching)



Note.*p < 0.05. Result of a chi-square test. We used only switching events that lasted at least 5 sec.

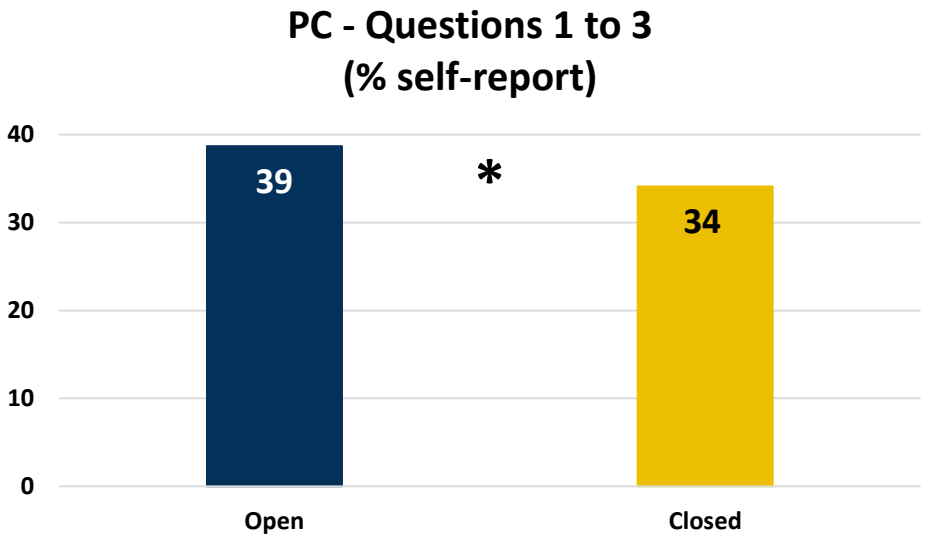
Smartphone – Questions 1 to 3 (% switching)



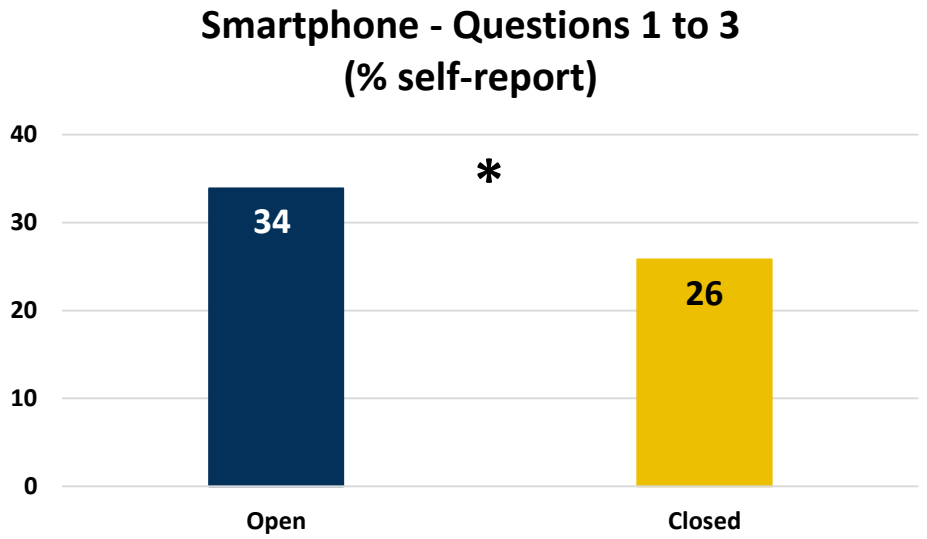
Note.*p < 0.05. Result of a chi-square test. We used only switching events that lasted at least 10 sec.

Results: Optimization Error

RQ1: Prevalence of optimization error.



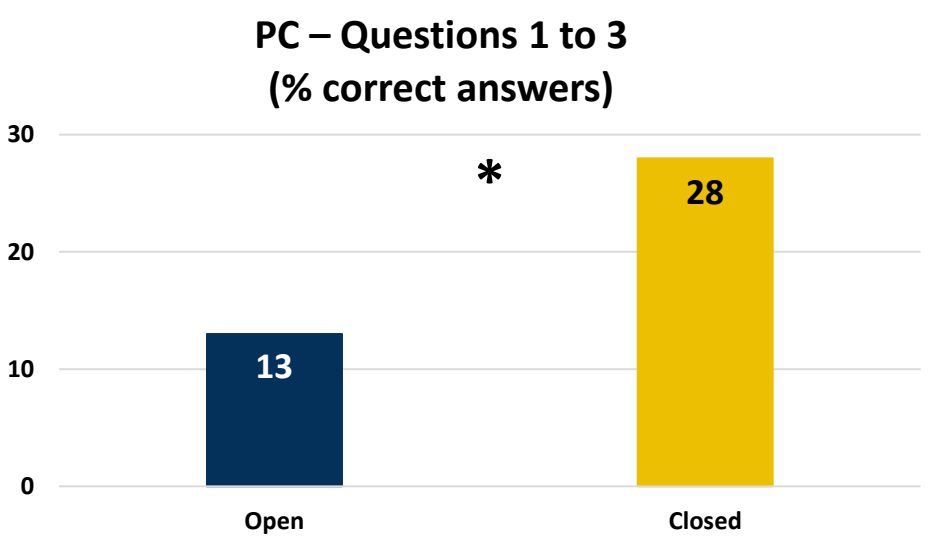
Note.*p < 0.05. Result of a chi-square test.



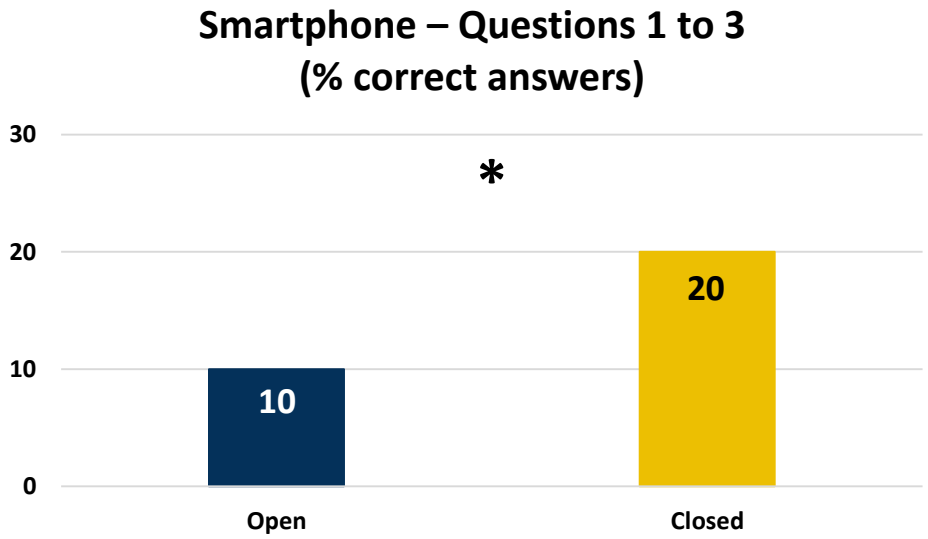
Note.*p < 0.05. Result of a chi-square test.

Results: Correct Answers

RQ2: Prevalence of correct answers.



Note.*p < 0.05. Result of a chi-square test.



Note.*p < 0.05. Result of a chi-square test.

Results: Correct Answers

RQ3: Determinants of correct answers.

Independent variables	Regression coefficients	Robust standard errors
Switching (1 = yes)	2.36*	0.07
PC participation (1 = yes)	-0.15*	0.07
Open format (1 = yes)	-1.00*	0.06

Observations: ***9,462***
Pseudo R^2 : ***0.39***

Note. *p < 0.05. Logistic regression. We treated each question as single observation and adjusted for clustering observations within respondents. Dependent variable: correct answer. The intercept is statistically significant. We additionally controlled for age, education, gender, the political knowledge questions using the first one as reference, survey difficulty, survey enjoyment, need for cognition, and PC and smartphone usage.

Discussion and Conclusion

- There is a high prevalence of optimization errors in political knowledge questions.
- Switching and self-reports come to different conclusions.
- Prevalence of correct answers varies across devices and response formats.
- Optimization errors in political knowledge questions inflate political knowledge scores.
- Paradata are a promising method to explore optimization errors in web surveys.

Future Research Perspectives

- Using OnBlur functions in response time outlier definitions.
  - *Accounting for on-device media multitasking.*
  - *"On-time" instead of response time.*
- Connection between switching and data quality.
  - *For instance, satisficing response behavior.*
- Providing immediate (real-time) feedback.
  - *Responsive survey designs.*
  - *Asynchronous paradata transfer.*

I am curious what the research community suggests!

Many thanks for your attention!

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