Looking Up Answers to Political Knowledge Questions in Web Surveys

Jan Karem Höhne
University of Mannheim (Germany)
Universitat Pompeu Fabra (Spain)

Carina Cornesse
University of Mannheim (Germany)

Stephan Schlosser
University of Göttingen (Germany)

Mick P. Couper
University of Michigan (USA)

Annelies G. Blom
University of Mannheim (Germany)

Abstract

Political knowledge can affect measures obtained in public opinion research and political science. When asked political knowledge questions, some respondents look up the answers online, inflating political knowledge scores. This response behavior is detectable in web surveys using paradata. We investigate whether and to what extent respondents switch away from the survey to search for answers online using JavaScript "OnBlur" functions. We randomly assigned respondents to device types (PC or smartphone) and response formats (open or closed) and additionally employed a self-report question. The results reveal that about 30% of the respondents look up answers, depending on the device type and response format. They also reveal that switching away and correct answers are significantly associated with the response format. Our findings provide new insights on looking up answers online and show that paradata are a promising new method to detect response behavior that may lead to incorrect inferences about respondents' political knowledge. The findings also show that paradata and self-reports complement each other and that both measures should be combined in future web surveys measuring political knowledge.

Keywords: looking up answers, mixed-device survey, paradata, political knowledge, response format

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Introduction

Research has shown that political knowledge is an important determinant of outcomes in public opinion research and political science. These outcomes can have an impact on governmental decisions (Brewer 2003; Prior and Lupia 2008; Robinson 2015). Many social surveys employ questions that measure respondents' political knowledge. For instance, the American National Election Study (ANES) regularly asks respondents the following question in the post-election interview: *"Do you happen to know which party had the most members in the U.S. Senate before the election?"* In general, political knowledge questions can be asked with an open response format where respondents enter the answer or with a closed response format where respondents select an answer from a list of options.

The principles of standardized interviewing assume that researchers aim to elicit respondents' "true" answers, uncontaminated by the interviewer, the data collection mode, or – as it applies to this study – knowledge available online (see Groves et al. 2009; Prior and Lupia 2008). This implies that respondents are supposed to retrieve information from memory when answering political knowledge questions (see Tourangeau, Rips and Rasinski 2000 for a discussion of the cognitive response process). More specifically, respondents are expected to consciously search their declarative memory, which consists of fact-based information (Prior and Lupia 2008).

In self-administered web surveys, respondents who do not know the correct answer can simply switch away from the browser tab or window that hosts the survey and use search engines to look up the answer online. The use of external sources when answering political knowledge questions, such as the internet, is often referred to as "cheating" (see Berinsky, Huber and Lenz 2012; Clifford and Jerit 2014, 2016; Diedenhofen and Musch 2017; Jensen and Thomsen 2014; Motta, Callaghan and Smith 2017; Permut, Fisher and Oppenheimer 2019; Shulman and Boster 2014; Strabac and Aalberg 2011) because the answers are not drawn from declarative memory (Prior and Lupia 2008). Since looking up answers usually happens without the researcher's knowledge, it inflates the number of correct answers (Luskin and Bullock 2011; Prior and Lupia 2008).

In this study, we investigate the prevalence of respondents who use the internet when answering political knowledge questions as well as the determinants of switching away and correct answers. A key contribution of our study is that we use an indirect method to detect whether respondents look up the answers online. This is achieved by collecting paradata in the form of JavaScript "OnBlur" functions informing about switching away from the web survey. We compare the results of paradata with a self-report question asking respondents whether they searched for the answers online. In an experiment, we also randomly assign respondents to device types (PC or smartphone) and response formats (open or closed).

Previous research and expectations

Most studies rely on self-report questions to determine whether respondents look up answers to political knowledge questions. A key weakness of self-reports in estimating the proportion of respondents engaging in this response behavior is that they may be prone to social desirability

bias, which may lead to underreporting (Clifford and Jerit 2016).[1] Therefore, Diedenhofen and Musch (2017) and Perlmut et al. (2019) suggested using JavaScript "OnBlur" functions – which provide information on browser tab and window switching – to collect more objective information on whether respondents look up answers online.[2] In line with this argument, we expect self-reports to result in lower proportions of looking up answers – indicating an underreporting – than switching events detected by JavaScript "OnBlur" functions (*Hypothesis 1*).

As argued by Diedenhofen and Musch (2017) and Gummer and Kunz (2019), the difficulty of a (political) knowledge question may affect whether respondents look up the answer. One aspect affecting the level of difficulty is the response format used (Gummer and Kunz 2019). Responding to questions with an open response format is generally viewed as more difficult than responding to questions with a closed response format. The reason is that closed response formats are not simply "measurement devices"; respondents use the options as a "frame of reference" (Schwarz, Hippler, Deutsch and Strack 1985) for building and evaluating their answer. Open response formats, in contrast, do not provide such a frame and, thus, require more concentration, consideration, and cognitive effort from respondents (Bradburn, Sudman and Wansink 2004). We therefore expect looking up answers to be more common for open response formats than for closed response formats (*Hypothesis 2a*). Consequently, we also expect that open response formats yield more correct answers than closed response formats (*Hypothesis 2b*).

Method

Experimental design

We used a 2-by-2 between-subject design with four experimental groups that are defined by device type (PC or smartphone) and response format (open or closed). Table 1 illustrates the four experimental groups.

Before the start of the survey, respondents were randomly assigned to a PC or smartphone condition. Respondents who attempted to access the survey using a device type other than the one we requested were prevented from starting the survey and asked to use the correct one. At the beginning of the survey, respondents were randomly assigned to an open or closed response format. This was done within both PC and smartphone conditions.

Political knowledge and self-report questions

We developed three political knowledge questions about the European Union that address the following issues: 1) member states of the European Union, 2) president of the European Commission, and 3) delegates of the European Parliament. While the questions with an open

[1] Some other studies compare the proportion of correct answers with the expected proportion by chance (see Berinsky et al. 2012), compare the number of correct answers between self-administered and interviewer-administered survey modes (see Schulman and Boster 2014), use response times as an indicator of looking up answers (see Ansolabehere and Schaffner 2011; Jensen and Thomsen 2014; Strabac and Aalberg 2011), or employ difficult questions (called "cheating items") that respondents certainly cannot know without consulting external sources (Motta et al. 2017) to detect this kind of response behavior.

[2] The "OnBlur" property is a JavaScript EventHandler for processing blur events. It is triggered when a browser tab or window loses focus. Its opposite is the EventHandler "OnFocus".

response format included a text field for entering an answer, the questions with a closed response format included five answer options. All questions included an instruction asking respondents to answer as accurately as possible and were presented on separate survey pages (single presentation). Figure 1 illustrates the question design.

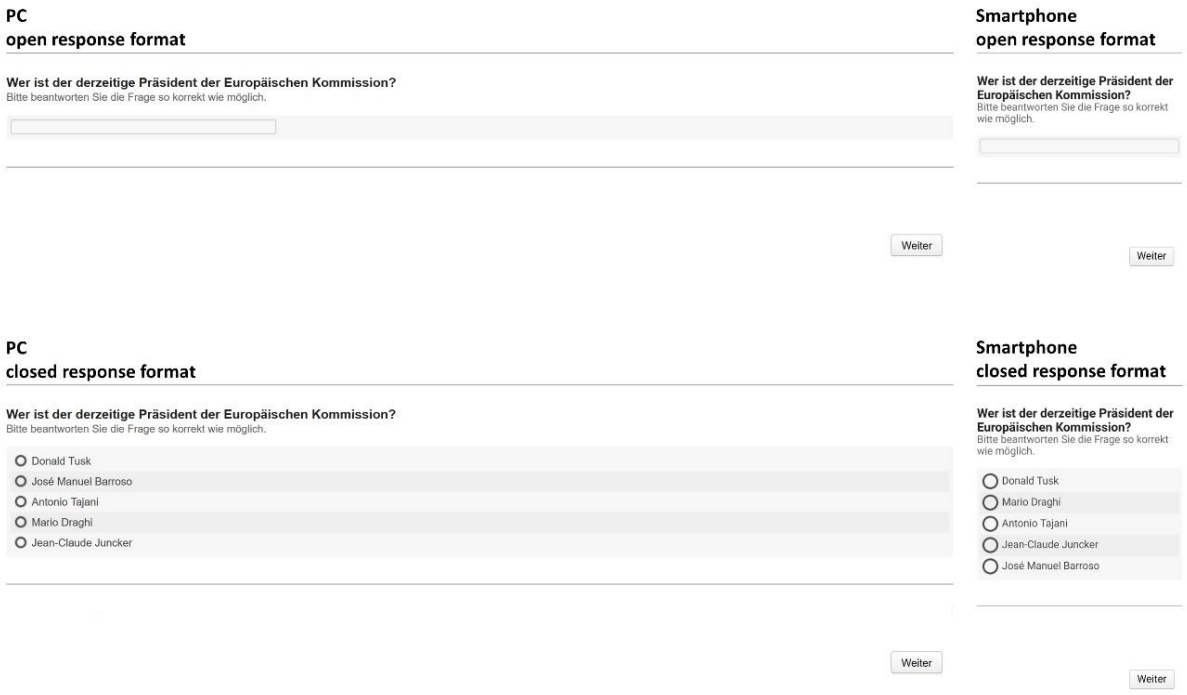

Figure 1. Examples of the designs of the question on the president of the European Commission
Note. We randomized the order of the answer options in the closed response format to limit order effects.

We did not offer non-substantive answer options, such as "don't know", because they may discourage respondents from providing substantive answers, causing shifts in response distributions and political knowledge scores (for a detailed discussion of non-substantive options in political knowledge questions, we refer readers to Mondak and Davis 2001).

We also developed a self-report question, which was asked right after the three political knowledge questions. It asked respondents whether they searched for the answers online and it included an instruction asking respondents to answer truthfully. Appendix A provides English translations of all questions.

Study procedure

Data collection was conducted by the survey company Respondi (Germany) and took place in September and October 2018. Respondi drew a quota sample from their opt-in panel based on age, education, and gender, resulting in a 3×3×2 quota plan designed to represent the German population. In total, Respondi invited 36,585 panelists to participate in the survey, out of which 9,401 panelists were screened out because the quotas were already achieved or because these panelists tried to access the survey with the wrong device type. A total of 3,829 panelists started the survey. Among these, 327 dropped out before being asked any experimental questions and 170 were excluded because German was not their mother tongue. This leaves us with 3,332 respondents available for statistical analyses. Table 1 summarizes group size information.

Table 1. Experimental groups and number of respondents

Experimental group	Device type	Response format	Group size
1	PC	Open	823
2	PC	Closed	834
3	Smartphone	Open	830
4	Smartphone	Closed	845

Paradata in the form of JavaScript "OnBlur" functions were collected using the open-source tool "Embedded Client Side Paradata (ECSP)", which was developed by Schlosser and Höhne (2018, 2020).[3] Prior informed consent for the collection of paradata was obtained by Respondi. Respondents received financial compensation for their participation from Respondi.

Sample

In total, 3,332 respondents participated in the experiment. This corresponds to a participation rate of 9.1%. These respondents were aged between 18 and 70 years, with a mean age of 47.1, and 50.2% of them were female. In terms of education, 37.0% had completed lower secondary school (low education level), 30.4% intermediate secondary school (medium education level), and 32.6% college preparatory secondary school or university-level education (high education level).

To evaluate the effectiveness of the random assignment and the sample composition between the experimental groups, we conducted chi-square tests. There were no significant differences regarding age, gender, and education.

Results

Hypothesis 1

We compared the proportions of respondents with "OnBlur" switching events and respondents' self-reports on searching for the answer online for at least one of the three political knowledge questions. The two measures do not perfectly line up. Contrary to our expectation, we find that the proportion of switching events (31.7%) is slightly lower than the proportion of self-reports (33.1%). The result of a directional Z-test (in accordance with the postulated direction in *Hypothesis 1*: $p_{switching} > p_{self\text{-}report}$) reveals no significant differences [$Z = -1.18$, $p = 0.877$].

Taking a closer look at the two measures, device-related differences can be observed. While PC respondents show more switching events (43.2%) than indicated by self-reports (36.4%), smartphone respondents show fewer switching events (20.4%) than indicated by self-reports (29.8%). The results of directional Z-tests (in accordance with the postulated direction in *Hypothesis 1*: $p_{switching} > p_{self\text{-}report}$) reveal significant differences for PCs [$Z = 4.00$, $p = 0.001$], but not for smartphones [$Z = -6.29$, $p = 1$]. Thus, we find partial evidence for *Hypothesis 1*. We address this point further in the discussion and conclusion section.

[3] Permut et al. (2019) also developed an open-source JavaScript code for gathering browser tab and window switching in web surveys.

Hypothesis 2a

We conducted a multilevel logistic regression using switching as the dependent variable. We treated each of the three political knowledge question as a single observation, resulting in three observations per respondent. The model included dummy variables for the political knowledge questions. We used open response format, PC participation, and self-report as independent variables and controlled for education (medium and high with low as reference), age (in years), and gender (female). We also included an interaction term for response format by device type. Table 2 displays the results (see Appendix B for a model without self-report).

The results show that the open response format is significantly positively associated with switching. This implies that switching away is more common for open than closed response formats. This provides supporting evidence for *Hypothesis 2a*. Switching away is also significantly more common among respondents using a PC for survey completion and those self-reporting looking up answers online. This is indicated by the two significant positive coefficients.

The interaction term open response format × PC participation is negatively associated with switching. This implies that the positive effect of the open response format on switching is more pronounced on smartphones than PCs.

Table 2. Multilevel logistic regression parameters (estimated coefficients and robust standard errors) on the dependent variable switching (1 = yes)

Independent variables	Estimated coefficients	Robust standard errors
Open response format (1 = yes)	0.61***	0.14
PC participation (1 = yes)	1.51***	0.13
Self-report (1 = yes)	2.50***	0.09
First question as reference		
Second question (1 = yes)	–0.42***	0.05
Third question (1 = yes)	–0.21***	0.04
Low education as reference		
Medium (1 = yes)	0.55***	0.11
High (1 = yes)	0.74***	0.10
Age (in years)	–0.02***	0.00
Female (1 = yes)	–0.10	0.09
Open response format × PC participation	–0.39*	0.18
Intercept	–2.86***	0.20
Observations	9,783	
Wald $\chi^2(10)$	1,060.00	
Pseudo R^2 (McFadden's)	0.28	

Note. *p < 0.05, **p < 0.01, ***p < 0.001.

Hypothesis 2b

Again, we conducted a multilevel logistic regression using the provision of a correct answer as dependent variable. All model specifications were identical to the previous model (see *Hypothesis 2a* section; Table 2) with the exception that we now add switching to the independent variables in the model. Table 3 displays the results (see Appendix C for a model without switching and self-report).

As Table 3 reveals, the open response format is significantly associated with providing a correct answer. However, in contrast to our expectation, correct answers are more common for closed than open response formats, as indicated by the negative coefficient. A correct answer is also significantly more common among respondents switching away from the web survey (detected by paradata) and those self-reporting searching for the answer online. This is indicated by the significant positive coefficients. There is no effect of PC participation on correct answer. Finally, the interaction term open response format × PC participation is not statistically significant.

Table 3. Multilevel logistic regression parameters (estimated coefficients and robust standard errors) on the dependent variable correct answer (1 = yes)

Independent variables	Estimated coefficients	Robust standard errors
Open response format (1 = yes)	–1.02***	0.08
PC participation (1 = yes)	0.01	0.08
Switching (1 = yes)	1.76***	0.08
Self-report (1 = yes)	1.48***	0.07
First question as reference		
Second question (1 = yes)	1.04***	0.06
Third question (1 = yes)	–1.34***	0.06
Low education as reference		
Medium (1 = yes)	0.08	0.07
High (1 = yes)	0.32***	0.07
Age (in years)	0.01***	0.00
Female (1 = yes)	–0.34***	0.06
Open response format × PC participation	–0.17	0.11
Intercept	–1.02***	0.13
Observations	9,783	
Wald $\chi^2(11)$	1,936.45	
Pseudo R^2 (McFadden's)	0.28	

Note. *p < 0.05, **p < 0.01, ***p < 0.001.

Discussion and conclusions

The results of this study reveal that a substantial minority of web survey respondents search for the answers online. Interestingly, we found some device-related differences. As mentioned earlier, while PC respondents seem to underreport looking up answers (as postulated in *Hypothesis 1*), smartphone respondents seem to overreport doing so. Other possible explanations are that smartphone respondents did not use the same device as for web survey completion, but a different one, or they asked third parties. These response behaviors are not detectable by JavaScript "OnBlur" functions. The reasons for using another device or asking third parties may be related to device properties, such as screen size and input capabilities, which impede looking up answers on smartphones (see Höhne, Schlosser, Couper and Blom 2020). Future research should investigate where the mismatches occur; i.e., which respondents show mismatches and in which direction.

We found evidence supporting *Hypothesis 2a*. The results reveal that searching for the answer online is more common for open than closed response formats (see Table 2). It seems that open response formats require greater effort, which, in turn, may foster the occurrence of

looking up answers when answering political knowledge questions. Thus, open response formats should be used with caution when measuring political knowledge in web surveys.

We found no evidence supporting *Hypothesis 2b*. Contrary to our expectation, closed response formats yield more correct answers than open response formats. This finding is supported by the results of the multilevel logistic regression (see Table 3). One explanation is that the answer options in the closed response format indeed provide a frame of reference on which respondents can base their answer. For instance, if respondents are not certain whether Jean-Claude Juncker is the president of the European Union, but see his name among the answer options provided, this helps them to come up with the correct answer. Another explanation is that closed response formats allow respondents to guess. We followed Shulman and Boster (2014, p. 183) and corrected for guessing, but the overall conclusions did not change. All in all, the results of our study provide evidence that the response format matters when it comes to helping respondents to arrive at the correct answers to political knowledge questions.

There are four limitations associated with our study that offer future research opportunities. First, we surveyed respondents drawn from a non-probability opt-in access panel. This does not decrease the internal validity of our study, but it might limit the generalizability of our findings. There is some evidence suggesting that looking up answers when answering political knowledge questions varies across samples (Clifford and Jerit 2016). Thus, future research should explore this response behavior across different samples and respondent groups. Second, our study employed three political knowledge questions dealing with a single topic (European Union). It would be interesting if future research employs multiple questions on different topics that systematically vary the level of difficulty. This may help drawing more robust conclusions about the rate of looking up answers in relation to specific political knowledge questions and their content. Third, like other surveys asking political knowledge questions, we did not explicitly instruct respondents not to use external sources, such as the internet. Instead, we instructed respondents to answer as accurately as possible, which means that (some) respondents may have not been fully aware that they should not search for the answers. It would be interesting to investigate the impact of different instructions on looking up answers in future studies. Finally, the field setting of our study may decrease internal validity of our results. There is a chance that respondents simply engaged in on-device media multitasking, such as checking emails or social media notifications, which would also result in switching events (see Höhne and Schlosser 2018; Höhne et al. 2020; Revilla and Couper 2018; Sendelbah, Vehovar, Slavec and Petrovčič 2016). We therefore conducted a pretest to determine the minimum off-time necessary to look up an answer online and used this as a minimum threshold for the likelihood of looking up answers. We also tested a variety of other off-times as thresholds but the main results did not change. Nonetheless, there is a need for more refined research to better distinguish between looking up answers and on-device media multitasking determined by JavaScript "OnBlur" functions.

One might ask why undertaking all the additional effort of collecting, preparing, and analyzing paradata when self-reports seem to do a sufficient job? The main reason is that most social surveys ask multiple political knowledge questions throughout the survey. However, to precisely determine whether respondents look up the answer to a specific question – e.g., to correct for this response behavior at the question-level – it is usually necessary to employ one

self-report question for each political knowledge question. This artificially inflates the number of questions, which, in turn, substantially increases survey completion time and respondent burden. The passive collection of paradata, in contrast, indicates whether respondents looked up answers on a question-level without increasing survey completion time or respondent burden at all. Paradata represent an efficient and low burden method so that they offer several benefits from a researcher and a respondent perspective.

Considering the increasing importance of web survey modes for national and international social surveys, coupled with the importance of measuring knowledge in political science and related research fields, it is necessary to develop appropriate methods to account for looking up answers online. Paradata in the form of JavaScript "OnBlur" functions are a promising new method to detect respondents searching for answers online without increasing respondent burden. Note, however, that these functions are no panacea. Considering our results, it seems wise to combine them with other established methods, such as self-reports. We encourage future research to make use of JavaScript "OnBlur" functions to detect searching for the answers online and to improve the measurement of political knowledge in web surveys.

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Appendix A

English translations of the three political knowledge questions on the European Union (questions with a closed response format only) and the self-report question.

Knowledge question 1: Member states of the European Union
How many member states does the European Union consist of?
Please, answer the question as accurately as possible.
Answer options: 12; 19; 26; 28; 33 (correct answer: 28)

Knowledge question 2: President of the European Commission
Who is the current President of the European Commission?
Please, answer the question as accurately as possible.
Answer options: José Manuel Barroso; Mario Draghi; Jean-Claude Juncker; Antonio Tajani; Donald Tusk (correct answer: Jean-Claude Juncker)

Knowledge question 3: Delegates of the European Parliament
How many delegates does the European Parliament currently have?
Please, answer the question as accurately as possible.
Answer options: 498; 553; 631; 702; 751 (correct answer: 751)

Self-report question
Did you search for the answers to any of the three previous questions on the European Union on the internet?
It is very important for our research that you answer this question truthfully.
Answer options: yes, one answer; yes, two answers; yes, all three answers; no, none of the answers

Note. The order of the questions corresponds to the presentation order in Appendix A. For the second political knowledge question, we randomized the order of answer options. For the other two questions we did not randomize the order, because this would violate the logical succession. The original German wordings of the questions are available from the first author upon request.

Appendix B

Table B1. Multilevel logistic regression parameters (estimated coefficients and robust standard errors) on the dependent variable switching (1 = yes) without controlling for self-report

Independent variables	Estimated coefficients	Robust standard errors
Open response format (1 = yes)	0.72***	0.13
PC participation (1 = yes)	1.42***	0.12
First question as reference		
Second question (1 = yes)	–0.32***	0.04
Third question (1 = yes)	–0.18***	0.03
Low education as reference		
Medium (1 = yes)	0.54***	0.10
High (1 = yes)	0.79***	0.10
Age (in years)	–0.02***	0.00
Female (1 = yes)	–0.04	0.08
Open response format × PC participation	–0.49**	0.16
Intercept	–1.74***	0.18
Observations	9,996	
Wald $\chi^2(9)$	403.86	
Pseudo R^2 (McFadden's)	0.09	

Note. *p < 0.05, **p < 0.01, ***p < 0.001.

Appendix C

Table C1. Multilevel logistic regression parameters (estimated coefficients and robust standard errors) on the dependent variable correct answer (1 = yes) without controlling for switching and self-report

Independent variables	Estimated coefficients	Robust standard errors
Open response format (1 = yes)	–0.61***	0.08
PC participation (1 = yes)	0.38***	0.08
First question as reference		
Second question (1 = yes)	0.75***	0.04
Third question (1 = yes)	–1.05***	0.04
Low education as reference		
Medium (1 = yes)	0.24**	0.07
High (1 = yes)	0.56***	0.07
Age (in years)	0.00	0.00
Female (1 = yes)	–0.26***	0.06
Open response format × PC participation	–0.17	0.11
Intercept	–0.21	0.13
Observations	9,996	
Wald $\chi^2(9)$	1,525.55	
Pseudo R^2 (McFadden's)	0.11	

Note. *p < 0.05, **p < 0.01, ***p < 0.001.