Let's Talk Politics

A Naive Approach for Measuring Political Sophistication*

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– WORK IN PROGRESS –

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Abstract

This paper proposes a simple but powerful framework to assess political sophistication in verbatim responses to open-ended survey questions using quantitative text analysis methods. The measure aims to capture the complexity of individual attitude expressions by examining their underlying number of considerations, characteristics of word choice, and the level of opinionation. I validate the approach by comparing it to conventional political knowledge metrics in multiple studies using different batteries of open-ended items. The paper proceeds to illustrate how discursive sophistication can help refine previous insights from the literature such as the oft-cited gender gap in political knowledge.

*Previous versions of this manuscript have been presented at Polmeth 2016, MPSA 2017, EPSA 2017, and ISPP 2017. I thank Jason Barabas, Scott Clifford, Andy Delton, Peter DeScioli, Stanley Feldman, Fabrizio Gilardi, Bill Jacoby, Jennifer Jerit, and Yanna Krupnikov for helpful comments on previous versions of this manuscript. Special thanks to Céline Colombo, Scott Clifford, and Jennifer Jerit for sharing their data. The manuscript and code are available on GitHub: https://github.com/pwkraft/knowledge.

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Alarmingly high levels of voter ignorance have been one of the major recurring themes in public opinion research. Not too long ago, for example, Bartels (2005) attributed public support for the Bush administration's 2001 and 2003 tax cuts to a substantial lack of political information among voters (but see Lupia et al., 2007; Bartels, 2007). Similarly, Delli Carpini and Keeter's (1996) seminal book on political knowledge warned that widespread ignorance might jeopardize equal representation of citizens. Early influential scholars such as Converse (1964) also emphasized that large parts of the public lack a sufficient understanding of abstract ideological concepts and do not hold stable issue positions. Indeed, the finding that citizens know little about politics seems to go as far back in history as the systematic study of public opinion itself.

Yet, not everyone agrees with this pessimistic assessment. Indeed, there has been a lively debate about how to accurately assess political knowledge in the first place (e.g. Mondak, 2000; Mondak and Davis, 2001; Sturgis, Allum, and Smith, 2008; DeBell, 2013; Pietryka and MacIntosh, 2013). Most analyses rely on standard item batteries that assess individuals' factual knowledge about political institutions and officeholders (e.g., Delli Carpini and Keeter, 1996). Recent research, however, points to important distinctions in types of political knowledge that have previously been disregarded (Barabas et al., 2014). Scholars furthermore argue that recall-based measures of political knowledge do not necessarily capture how people structure their attitudes and beliefs (e.g., Luskin, 1987) and may not be theoretically relevant for the development of informed preferences (e.g., Lupia, 2006; Gilens, 2001).

This article develops an alternative measure of political sophistication that addresses this disconnect. Normative democratic theory suggests that voters should hold informed opinions about available candidates and relevant issues before casting a vote. Rather than relying on factual knowledge that is potentially unrelated to the task at hand, I examine how respondents discuss their political preferences and beliefs in their own words. For a given set of verbatim responses, the measure assesses political sophistication based on the number of considerations raised by individuals, the relative descriptiveness in word choice, as well as the level of opinionation. The approach is therefore *naive* in that it does not presuppose pieces of information as necessary

for political competence but rather examines the respondents' justification of their preferences at face value. The goal is to assess whether political attitudes relevant to perform a specific task are expressed in a more elaborate manner—a question that is not directly discernible when examining off-the-shelf factual knowledge items.

The proposed measure is validated across multiple data sets by comparing it to conventional factual knowledge scores as predictors of competences relevant to perform political tasks. While the measures share a considerable amount of variance, they are far from equivalent. Indeed, discursive sophistication is a stronger predictor of turnout and other forms of political participation than traditional measures. After validating the measurement approach, the paper illustrates how discursive sophistication can help refine previous insights in the literature by re-examining an oft-cited finding in empirical research—the gender gap in political knowledge. Contrary to previous research, I find no evidence for such a gap based on open-ended responses. While women might score lower than men on factual knowledge about political institutions and elites, there are no differences in the complexity of expressed political attitudes. More generally, the results suggest that developing valid measures of political sophistication based on open-ended responses can provide new opportunities to examine political knowledge across time and contexts.

Factual Knowledge and Political Competence

The most important task for citizens in modern democracies is to vote for candidates who represent their interests and thereby hold their elected officials accountable. Arguably, survey items measuring political knowledge should therefore cover information that is necessary and/or sufficient to perform this essential task. However, determining such a set of items proves to be extremely difficult (if not impossible), especially since there are systematic differences in types of knowledge (Barabas et al., 2014) and survey questions typically cannot capture important aspects such as visual cues (Prior, 2014). In conceptualizing political knowledge, Barabas et al. (2014) distinguished both a temporal dimension (i.e., whether it is static or more contemporary) as well

as a topical dimension (i.e., whether it is general or more policy-specific). Importantly, varying the types of questions on these dimensions leads to different conclusions regarding the nature and determinants of political knowledge. However, even within a given category, people may disagree about which facts are important due to inherent value differences (c.f., Lupia, 2015). As such, even if we had strong theoretical reasons to focus on a certain set of questions according to the typology developed by Barabas et al. (2014) there would still be uncertainty about the specific set of facts deemed as necessary to perform a political task. Despite these difficulties, most empirical studies simply relied on a set of off-the-shelf knowledge questions that have been used in previous research rather than justifying their choices from a theoretical perspective. As Lupia (2006, 219) explains, "Most political knowledge questions are not derived from a replicable or transparent logic about how their answers bear on a voter's ability to make decisions of a particular quality." As such, information requested in conventional survey items often have no clear relevance to political participation.

Lupia (2006) argues that instead of focusing on potentially irrelevant factual knowledge, researchers should concentrate on heuristics that directly help citizens to make competent political decisions or focus only on knowledge relevant to a specific task (see also Lupia, 1994, 2015). After all, there is no need for individuals to know all available facts, but only to possess the skills and resources to be able to *find* the information required in a specific context (Prior and Lupia, 2008). Druckman (2014) makes a similar argument in a recent review of research on public opinion and democratic responsiveness. Since there is no apparent consensus about the precise measurement of political knowledge and it is unclear what information is necessary in the first place, the author proposes to direct the attention away from individual levels of political information as a measure of "quality opinion." Instead, Druckman (2014, 478, emphasis in the original) advocates "*less* focus on the *content/substance* of opinions (e.g., are they informed, constrained, based on strong frames, etc.?) and *more* on the *process* and specifically the *motivation* that underlies the formation of those opinions." The framework proposed herein follows this call in attempting to measure political sophistication based on expressed attitudes related to a specific political task.

Opinion Formation and Attitude Expression

Rather than trying to develop a new item battery that presupposes a set of facts as necessary for political competence—a task that is difficult to achieve—I propose to analyze how individuals discuss their attitudes and preferences related to a political task in their own words. Citizens have to engage in a lot of choices in democratic politics. For example, they can vote in local, state, or federal elections. Depending on the institutional setup, they may also directly decide on specific policies through referenda. In these contexts, we are often concerned whether citizens are able to make high quality decisions in accordance with their preferences. According to Druckman (2014), scholars should concentrate on whether individuals are motivated to engage in accurate and objective processing when forming their opinions rather than trying to assess their level of factual knowledge. Importantly, a major approach to induce accuracy motivations discussed by Druckman (2014, 478) involves asking individuals to "justify/provide reasons for one's opinions" (see also Tetlock, 1983; Kunda and Sinclair, 1999; Redlawsk, 2002; Bolsen, Druckman, and Cook, 2014a). Conversely, we may directly examine *how* citizens justify their preferences in order to evaluate their level of sophistication in attitude expression. To the extent that respondents are motivated and able to engage in in-depth processing to form quality opinions, they should discuss multiple considerations related to a political issue and show awareness of arguments for and against certain positions.

Such a perspective resembles influential theoretical accounts of political sophistication which focus on the *structure* of belief systems rather than the content (or accuracy) of related considerations. In his seminal article, Converse (1964) emphasized the importance of the level of conceptualization as the main characteristic of sophistication rather than isolated pieces of factual information. Similarly, Tetlock (1983) used the term *integrative complexity* to describe the degree to which considerations related to an issue are interconnected. Luskin (1987) also defined political sophistication based on the structure of individual belief systems, arguing that they can vary on three separate dimensions: (1) their *size* – i.e. the number of cognitions, (2) their *range* – i.e. the dispersion of cognition over categories, and (3) their *constraint* – i.e. the extent to

which cognitions are interconnected in a meaningful way. Political sophistication, in turn, is seen as the conjunction of these dimensions: "A person is politically sophisticated to the extent to which his or her [political belief system] is large, wide-ranging, and highly constrained." (Luskin, 1987, 860). These differences in sophistication should be reflected in the way individuals describe, discuss, and justify their political beliefs.

Colombo (2016) makes a similar argument when investigating the level of competence of Swiss citizens voting in policy referenda. Examining data from thirty-four ballot decisions, the author analyzes how voters justify their individual decision in favor or against a certain policy in open-ended survey responses. More specifically, she proposes to "consider the capacity to justify political decisions with policy-related arguments as a possible conceptualization of citizen competence in direct democracy" (Colombo, 2016, 3). Levels of justification are thereby measured based on a manual coding of each answer's content, elaboration, and complexity. Colombo (2016) finds that while Swiss citizens are indeed able to provide policy-related arguments to justify their decisions, their level of competence is influenced by the political context and individual resources.

Examining individual levels of justification in open-ended responses as a measure of political competence is not only applicable to referenda in direct democracies. Indeed, it can be implemented in diverse settings involving various types of political preferences. From a theoretical perspective, the same arguments regarding the structure of individual belief systems holds when examining different types of open-ended responses, for example when respondents discuss their attitudes toward candidates running for office. In order to measure sophistication and competence related to a political task of interest, I therefore propose to examine how individuals discuss and justify their related preferences in their own words instead of relying off-the-shelf knowledge items. However, manual coding of open-ended responses as employed by Colombo (2016) is not always feasible in the context of large-scale surveys, since it can be very labor-intensive, requires a large amount of contextual knowledge, and–depending on the country–necessitates high levels of language proficiency.[1] Furthermore, knowledge assessments can be biased by the level of political

[1]The Swiss surveys in Colombo's (2016) study were conducted in three different languages: German, French, and Italian.

agreement between individuals (Ryan, 2011). As such, I now present a simple but powerful alternative approach that relies on quantitative text-analysis methods and can be applied in multiple contexts and different languages.

Measuring Discursive Sophistication

How would a politically sophisticated person who engages in in-depth processing discuss his or her views compared to a less informed individual? Consider a survey where respondents are asked to describe their attitudes toward specific policies or candidates running for office in a set of open-ended items. In such a scenario, the structure of individual political belief systems (i.e., size, range, and constraint) as well as the level of motivation to engage in accurate opinion formation should be reflected in their verbatim responses. In the following, I discuss three different attributes of open-ended survey responses that should be indicative of individual political sophistication as described by previous scholars.

First of all, sophisticated individuals should be able to elaborate more on their political attitudes. If people possess a large, wide-ranging, and constrained belief system, they should be able to recall a large number of **considerations** related to political actors or issues. I rely on the structural topic model framework (Roberts et al., 2014) to extract the number of topics mentioned by each respondent in a survey.[2] First, denote $\mathcal{W}_i$ as the set of words contained in a response of individual i. Each word $w \in \mathcal{W}_i$ is assigned to a topic $t^* \in \{1, ..., T\}$, such that $P(t^*|w, X_i) > P(t|w, X_i) \forall t \neq t^*$.[3] In other words, each unique term in a response is assigned to the topic that has the highest likelihood of having generated that term, given the model. The set of topics that are mentioned by respondent i across all words in $\mathcal{W}_i$ can then be denoted as

[2] See below for more information on the pre-processing of open-ended responses as well as the topic model specification.

[3] Note that $P(t|w, X_i) = \frac{P(w|t)P(t|X_i)}{P(w|X_i)}$. In the context of structural topic models, X_i denotes the covariates used to predict individual topic prevalence (see Roberts et al., 2014, for details).

$\mathcal{T}_i^*$ and the number of considerations can be written as:

$$\text{considerations}_i = \frac{|\mathcal{T}_i^*|}{\max_i |\mathcal{T}_i^*|}. \tag{1}$$

The measure is re-scaled to range from zero to one by dividing raw count of topics by the maximum number of topics observed across individuals.

However, sophisticated respondents should not only be able to mention a larger number of raw considerations when discussing politics. The level of sophistication should also be reflected in the **word choice** describing the underlying issues. Individuals who possess a wide-ranging and constrained system of beliefs should be more inclined to use terms that are highly descriptive of a given topic (e.g., the *economy* or *taxes*) rather than broad terms that could be attributed to any topic. Words that are very descriptive of a topic have a high likelihood to appear if that topic is mentioned. Highly descriptive word choice is therefore conceptualized as the sum of term likelihoods $P(w|t^*)$ given topic assignments over the entire set of words in $\mathcal{W}_i$:

$$\text{word choice}_i = \frac{\sum_{\mathcal{W}_i} P(w|t^*)}{\max_i \left[\sum_{\mathcal{W}_i} P(w|t^*)\right]} \tag{2}$$

Again, the measure is re-scaled to range from zero to one by dividing all values by the empirical maximum observed across all individuals in the data.

Lastly, sophisticated individuals should hold opinions about each political actor or policy that they are asked to discuss. As such, shophisticates should be able to express their attitudes towards each open-ended probe in terms of both approval or disapproval. Responses that reflect high levels of sophistication should therefore display a greater level of **opinionation**, which is conceptualized as the diversity of relative lengths for each open-ended response (specified as the Shannon entropy):

$$\text{opinionation}_i = \frac{-\sum_{j=1}^{J} p_{ij} \ln p_{ij}}{\ln J} \tag{3}$$

where p_{ij} is the proportion of words in the response of individual i to question $j \in \{1, ..., J\}$

relative to the overall size of the individuals' response. The variable ranges from 0 (only one question was answered) to 1 (all questions were answered with the same word length per answer).

Together, the three measures form a composite metric of political sophistication by calculating their respective average for each respondent. Like each individual component, the resulting **discursive sophistication** score ranges from 0 to 1:

$$\text{discursive sophistication}_i = \tfrac{1}{3}(\text{considerations}_i + \text{word choice}_i + \text{opinionation}_i). \quad (4)$$

Overall, a highly sophisticated individual can be expected to respond to a set of open-ended items by giving a more elaborate response that focuses on multiple considerations or topics using terms that are highly descriptive of each topic and addresses his or her attitudes towards all relevant political actors or policies more or less equally. It is important to note that this approach differs from recent work on sophistication in speeches and other sources of political texts (e.g., Spirling, 2016; Benoit, Munger, and Spirling, 2017) as it explicitly tries to capture complexity independent of pure linguistic style.

An Overview of Data Sources and Open Ended Items

The measure of discursive sophistication is validated using multiple surveys employing different sets of open-ended questions. Each data set and the respective items used to compute discursive sophistication are briefly described below.

2012 & 2016 American National Election Study

The main analyses are based on the 2012 and 2016 wave of the American National Election Study (ANES), which consist of a representative survey of about 5000 adults in the months before the US Presidential election in each year. About 2000 respondents in both waves participated in face-to-face interviews while the remaining respondents filled out the survey online. For the

purpose of the present analyses, I rely on the pooled datasets while controlling for differences in survey mode. The measure of discursive sophistication is based on open-ended questions in which respondents were asked in the pre-election wave of the survey to list anything in particular that they like/dislike about the Democratic/Republican party as well as anything that might make them vote/not vote for either of the Presidential candidates. They were probed by the interviewer asking "anything else?" until the respondent answered "no". Overall, there are a total number of 8 open-ended responses where individuals described their beliefs and attitudes towards political actors. Individuals who did not respond to all of the open-ended items (420 in 2012; 204 in 2016), or who responded in Spanish (228 in 2012; 43 in 2016), were excluded from the analysis.[4]

2015 YouGov Survey

In order to replicate and extend the main analyses, I rely on a separate nationally representative survey employing an alternative set of open-ended responses. The data was collected by YouGov in December 2015 and contains responses of 1000 U.S. citizens.[5] As part of this study, respondents were asked to describe their attitudes towards two prominent political issues that were discussed frequently in the media. First, they were asked in a closed format whether they favor or oppose stricter gun laws. Subsequently, they were asked to respond to the following two questions:

- Still thinking about the question you just answered, what thoughts came to mind while you were answering that question? Please try to list everything that came to mind.
- Thinking about the mass shootings that have occurred in the U.S. in the last few years, what factors do you think are responsible for the shootings?

Second, the respondents reported on their attitudes towards the Affordable Care Act in a closed format and were then asked to elaborate in their own words by answering the following questions:

[4] See Appendix A for more details on the structural topic model and descriptive information on the individual components of discursive sophistication.

[5] See Clifford and Jerit (2016) for details on the study.

- Still thinking about the question you just answered, what thoughts came to mind while you were answering that question? Please try to list everything that came to mind.
- For decades, experts have observed that the United States spends far more per person on health care than any other country. However, the U.S. falls behind on most measures of health care outcomes, such as life expectancy. What factors do you think are responsible for the state of our health care system?

Here, discursive sophistication is computed based on the verbatim responses to the four preceding questions using the same procedures described above. Compared to the open-ended likes/dislikes items included in the 2012 and 2016 ANES, the questions directly address considerations related to specific policy issues that were prominent in the political discourse at the time of the survey.[6] 48 respondents who did not provide an answer to any of the open-ended questions were removed from the analysis.

Swiss Referendum Survey

Lastly, I examine survey data on Swiss citizens justifying their vote choices on multiple referenda used in the analyses presented by Colombo (2016). The author compiled a data set from cross-sectional surveys that were conducted in Switzerland after national popular votes on multiple policy propositions. The original surveys were conducted as representative samples after each of thirty-four national policy votes that were held between 2008 and 2012 resulting in a total of 26,621 observations. However, respondents were only asked to justify their decision for or against a given proposition in verbatim if they participated in the vote in the first place. As such, 4,917 individuals in the data set did not provide an open-ended response. The remaining respondents were asked to describe the main reason as well as additional justifications for their decision in two separate items. As before, discursive sophistication is computed based on the verbatim responses to both questions.[7]

[6] See Appendix B for descriptive information on the individual components of discursive sophistication.

[7] See Appendix C for descriptive information on the individual components of the measure of discursive sophistication.

Pre-Processing and Topic Model Specification

Two components of discursive sophistication (considerations and word choice) rely on quantities extracted from structural topic models (Roberts et al., 2014). As with any other text-as-data method, a necessary first step before estimating the topic model is to pre-process the raw text and convert it into a document term matrix (DTM, see for example Manning et al., 2008). Common pre-processing procedures include stemming and lowercasing, as well as the removal of numbers, punctuation, stopwords, and infrequent terms. However, topic models and other unsupervised learning techniques can be sensitive to these pre-processing choices (Denny and Spirling, 2018).

To address this issue, Denny and Spirling (2018) recommend that researchers compare DTMs under all possible pre-processing regimes. The authors propose *preText scores* as a measure to quantify the extent to which varying pre-processing regimes may yield unusual results compared to a baseline without any pre-processing.

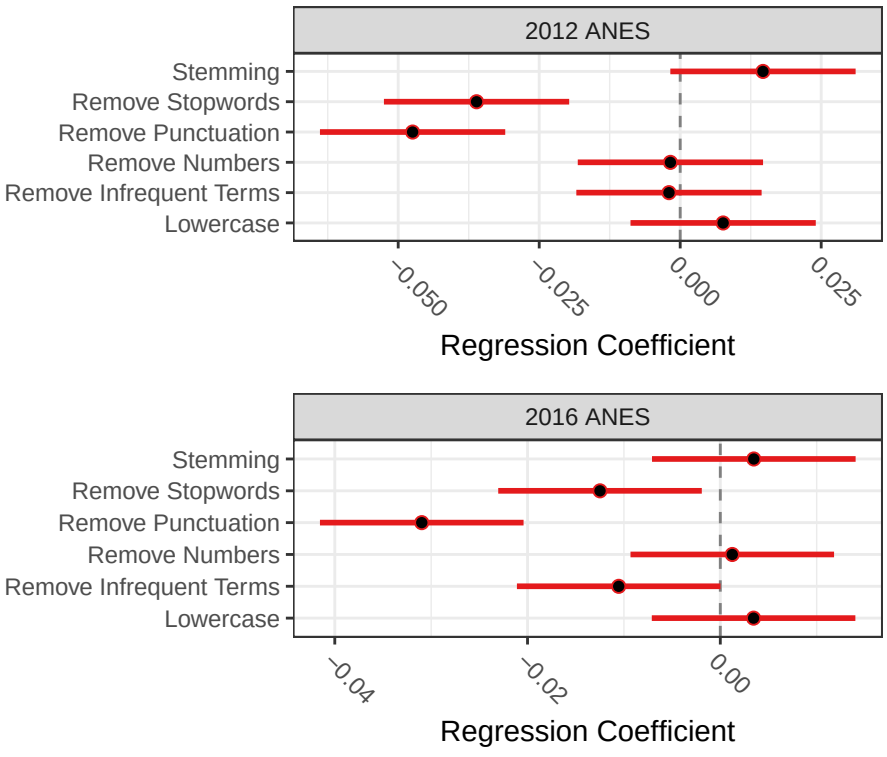


Figure 1: PreText analysis of pre-processing decisions of open-ended responses in the 2012 & 2016 ANES. Regression coefficients display the effects of each of the six pre-processing choices on the resulting preText score.

Following the procedure outlined in Denny and Spirling (2018), Figure 1 displays the results of a linear model regressing preText scores resulting from all possible pre-processing regimes on each individual step for a random subset of 500 open-ended responses in the 2012 and 2016 ANES. Significant coefficients indicate that the topic model results my be sensitive to the respective pre-processing step. As such, removing stopwords and punctuation, as well as removing infrequent terms (at least in 2016) might be problematic. Denny and Spirling (2018), however, emphasize that the most important consideration in choosing pre-processing steps are theoretical. Since the purpose of the topic model is to extract considerations related to political preferences, we have strong theoretical reasons to remove stopwords and punctuation from open-ended responses as they do not contain any relevant content. Furthermore, I apply lowercasing and stemming of terms to reduce the size of the resulting document term matrix and since these pre-processing steps should not be influential according to the preText analysis.

It is less obvious from a theoretical perspective whether to remove infrequent terms from open-ended responses, although it is preferred in order to make the estimation of the discursive sophistication components computationally efficient. Since the preText analysis for 2016 suggests that this pre-processing step might be influential, I compare discursive sophistication for both alternative regimes below (c.f., Denny and Spirling, 2018). Before turning to this sensitivity check, however, I consider another crucial modeling choice when working with topic models: determining the total number of topics k to be extracted. For the analyses reported below, the number of topics was selected using the algorithm proposed by Lee and Mimno (2014) and implemented in the `stm` package in **R** (Roberts, Stewart, and Tingley, 2014).[8]

Figure 2 examines whether the proposed measure of discursive sophistication is sensitive to the removal of infrequent terms as well as the chosen number of topics k. The x-axis depicts the preferred pre-processing regime including all steps discussed above while the y-axis shows the results for alternative specifications. The upper panels compare the preferred specification

[8] I used measures for age, education, party identification, as well as an interaction between education and party identification as covariates for topic prevalence. This variable selection—with the exception of including gender—is equivalent to the procedure model specification described in Roberts et al. (2014).

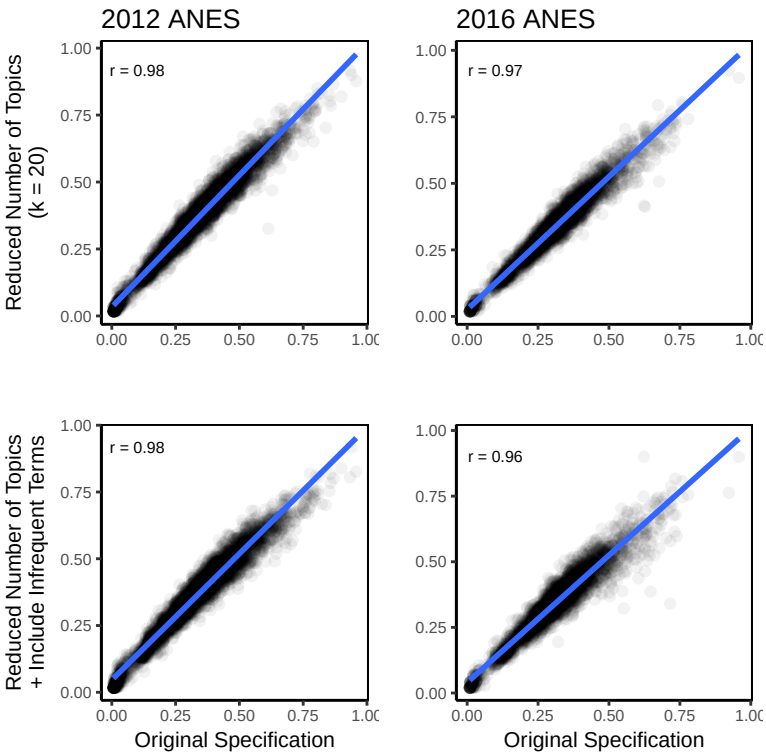


Figure 2: Robustness of discursive sophistication measure for different pre-processing choices and topic model specifications.

to discursive sophistication based on a reduced number of topics ($k = 20$). The lower panels additionally include infrequent terms instead of removing them.[9] Results for the 2012 ANES are displayed on the left and results for the 2016 ANES are displayed in panels on the right. Across all four panels, discursive sophistication scores are highly correlated and therefore insensitive to pre-processing choices and varying numbers of topics.

In summary, open-ended responses in the analyses reported below are pre-processed by stemming and lowercasing, as well as the removing numbers, punctuation, stopwords, and infrequent terms (i.e., terms that appear in fewer than 10 responses).[10] While the results discussed below are based on the preferred specification, the substantive results are robust for alternative pre-processing regimes or varying numbers of topics.

[9] Calculating discursive sophistication with large numbers of topics while including infrequent terms is computationally prohibitive.

[10] Prior to applying these pre-processing steps, open-ended responses in the 2012 & 2016 ANES as well as the 2015 YouGov survey are cleaned by correcting spelling errors using an implementation of the Aspell spell-checking algorithm (www.aspell.net).

A First Look at Discursive Sophistication

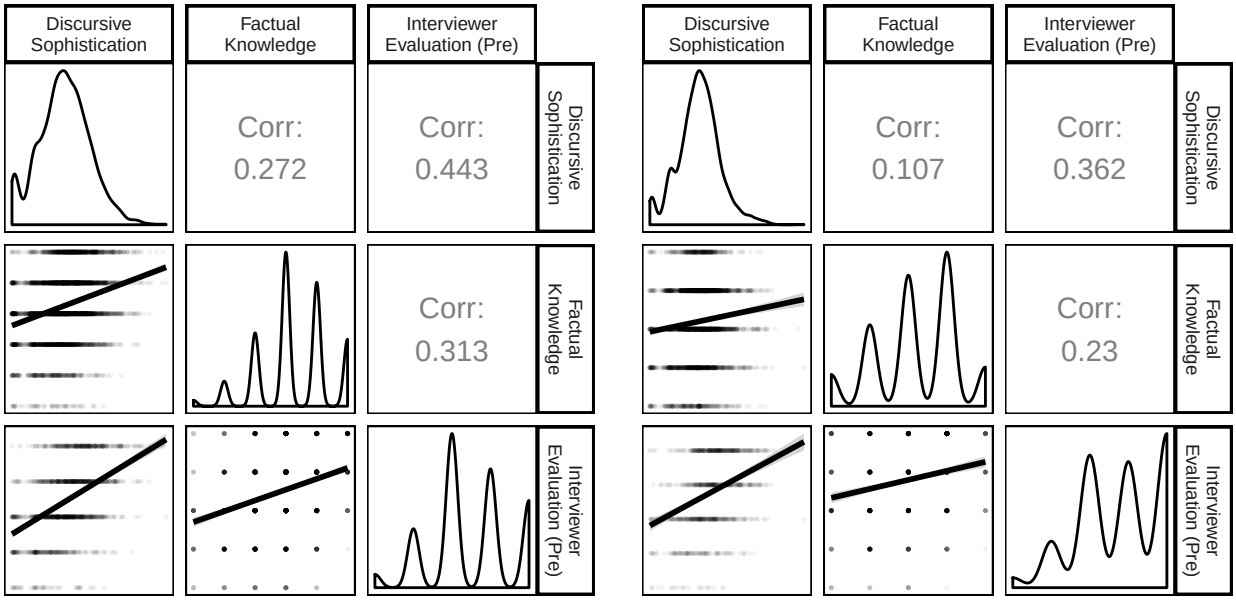
Before turning to the validation, I begin by directly comparing discursive sophistication to alternative metrics of political knowledge in the 2012 and 2016 ANES. The most common way to measure political knowledge in surveys is to ask a set of factual questions about political institutions. The ANES includes such a basic item battery, inquiring for example about the number of times an individual can be elected President of the United States, or how the current U.S. federal budget deficit compares to the deficit in the 1990s. I combine individual responses on these items to a standard additive measure of **factual knowledge** about politics. Additionally, the in-person sample of the 2012 ANES includes **interviewer assessments** of each respondent's political sophistication.

Figure 3 compares discursive sophistication to the conventional knowledge metrics. The figure presents scatterplots between individual measures (lower triangular), univariate densities (diagonal), and correlation coefficients (upper triangular). The measure of discursive sophistication is positively correlated with both conventional metrics while capturing some additional variation.

Interestingly, we observe a stronger correlation between discursive sophistication and interviewer evaluations than between factual knowledge and interviewer evaluations. The open-ended measure therefore appears to capture characteristics that influence subjective assessments of sophistication. The interviewers certainly form their impressions throughout the entire survey, but the complexity of a respondent's verbatim answers seems to be more influential than their performance on the factual knowledge questions.

Overall, while discursive sophistication and the alternative measures are clearly correlated, the relationship between each metric is far from perfect. To provide some intuition whether the variation in discursive sophistication is theoretically meaningful, I present an example of open-ended responses of two individuals who scored equally on the factual knowledge score (3 out of 5 correct responses), but varied highly in discursive sophistication. The results are presented in Table 1.

Each row in the table represents one of the open-ended responses (like/dislike for each can-



(a) 2012 ANES (b) 2016 ANES

Figure 3: Correlation matrix of conventional political knowledge metrics and discursive sophistication. The plots on the diagonal display univariate densities for each variable. The panels in the lower triangular display the scatter plot of two measures as well as a linear fit. The upper triangular displays the correlation coefficient. All correlations reported are statistically significant with $p < .05$.

didate/party). Column A displays the responses of an individual who scored low on discursive sophistication and column B displays the responses of a high scoring individual. Cells are empty if a respondent refused to provide a response. Even though both individuals are measured to have equal factual political knowledge, there are systematic differences in their response behavior that can be attributed to their political sophistication. Overall, respondent A provided a less elaborate response, only focused on two issues (health care and student loans), and did not report attitudes on multiple items. Compared to respondent B, such a response pattern is suggestive of a less sophisticated political belief system. Overall, this initial result suggests that the variation in discursive sophistication captures meaningful differences in response behavior that clearly overlaps with traditional knowledge metrics while displaying some unique variation.

	A: Low Sophistication Response	B: High Sophistication Response
Clinton (+)		Politician.
Clinton (-)	The fact that she has links to Al-Qaeda.	Caught in lies.
Trump (+)		Says what he thinks.
Trump (-)	He is going to start a civil war. I feel like he is racist.	Reality TV star, poor businessman
Democrats (+)		Middle class minded.
Democrats (-)		Too many handouts.
Republicans (+)		Economic growth conscious.
Republicans (-)		For the big business.
Disc. Soph.	0.159	0.465

Table 1: Example of open-ended responses for low and high scores on discursive sophistication with equal factual knowledge scores (3 out of 4 correct responses). Column A displays the verbatim responses of an individual who scored low on discursive sophistication and column B displays the verbatim responses of an individual who scored high on the open-ended measure. Each row represents one of the likes/dislikes items included in the analysis. Note that the responses in this table were slightly redacted for readability (spelling errors removed, etc.).

Discursive Sophistication and Political Competence

Following the arguments outlined by Lupia (2006, 2015), I proceed to validate the measure of discursive sophistication by directly examining its effects on individual competences to perform political tasks in modern democracies. More specifically, I consider the potential role of political sophistication in promoting (1) engagement and participation in politics, (2) precise positioning of parties and candidates, (3) early preferences about candidates, (4) incorporation of new information, and (5) well-justified political decisions. In the following, each point will be addressed individually using one of the three data sets described above.

Engagement and Participation in Politics

Political sophistication is often argued to promote individual engagement and participation in politics. Figure 4 presents the effects of discursive sophistication and factual knowledge in the 2012 ANES on four dependent variables commonly related to political sophistication: internal efficacy, external efficacy, non-conventional participation, and turnout. The results for the first three dependent variables are based on linear regressions while the effects on turnout are esti-

mated using a logit model. Each model equation includes a single sophistication measure while controlling for gender, education, income, age, race, religiosity, and survey mode (face-to-face vs. online).

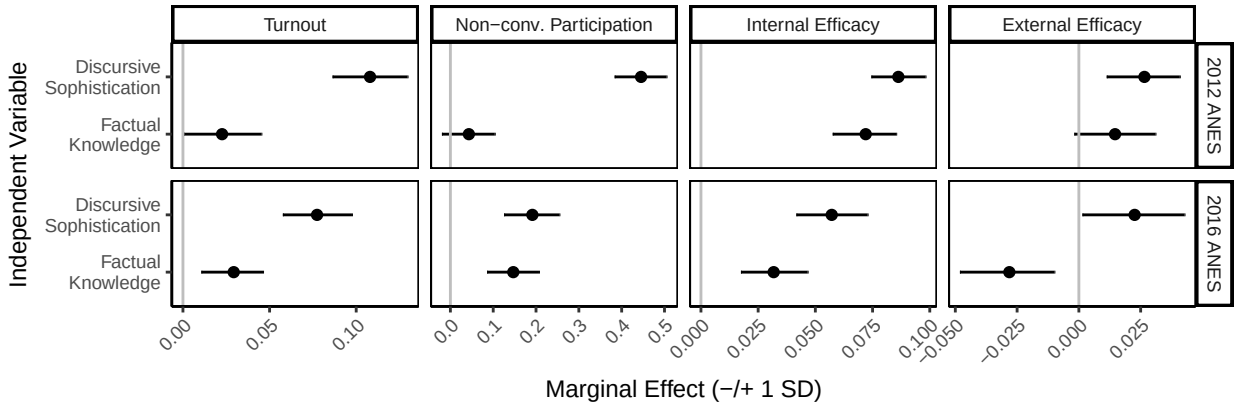


Figure 4: Effects of sophistication on internal efficacy, external efficacy, non-conventional participation, and turnout. For each dependent variable, the figure displays the change in expected values after increasing each sophistication measure from -1 standard deviation from its mean to +1 standard deviation (including 95% confidence intervals). Model estimates are based on OLS (internal efficacy, external efficacy, non-conventional participation) or logistic regressions (turnout). Each sophistication measure is included in a single equation while controlling for gender, education, income, age, race, church attendance, and survey mode.

Each plot in the figure displays the difference in the expected value of the respective dependent variable for maximum and minimum values of each sophistication measure, while holding all other variables at their means. Overall, the sophistication metrics perform similarly as predictors of internal efficacy, external efficacy, non-conventional participation, and turnout. However, the effect of discursive sophistication on the participation measures is substantially stronger than the effect factual knowledge. This finding is especially noteworthy since item batteries to measure factual political knowledge are often selected and validated based on their strong relationship with turnout and participation (c.f., Lupia, 2015).

Precise Positioning of Parties and Candidates

Sophistication should not only foster engagement and participation, but also improve the quality of individual decision-making in politics. The most direct way for citizens in representative

democracies to influence policy outcomes in their favor is to cast votes for candidates who best represent their interests. In order to accomplish this essential task, citizens need to possess precise information about the candidates' positions on policy issues.

Figure 5 presents the results of multiple heteroskedastic regressions where the error variance in candidate and party placements on multiple issues included in the 2012 ANES (government spending, defense spending, health insurance policy, job guarantee) is a modeled as a function of discursive sophistication as well as factual knowledge (see Jacoby, 2006, for a similar procedure). More formally, each model for a given party/candidate placement on a specific policy issue takes the following form:

$$y \sim \mathsf{N}(\mu, \sigma) \tag{5}$$

$$\mu = X\beta \tag{6}$$

$$\log(\sigma) = Z\gamma, \tag{7}$$

where y is the vector of policy placements of all respondents, X is a matrix of covariates predicting average party/candidate placements μ (including self-placement, education, income, age, religiosity, gender, race, and survey mode), Z denotes the covariate predicting the error variances σ (i.e., one of the sophistication measures and a constant), and β and γ are the parameters to be estimated.

The figure displays the estimated reduction in error variances of party/candidate placements when each sophistication measure is increased from its respective minimum to maximum value. It can be observed that both, factual knowledge and discursive sophistication significantly decrease error variances in policy placements of both presidential candidates and parties. While the effects are marginally larger for factual knowledge for some policies, there are no systematic differences between both measures. As such, factual knowledge and discursive sophistication increase the precision with which individuals are able to place parties and candidates on various policy issues.

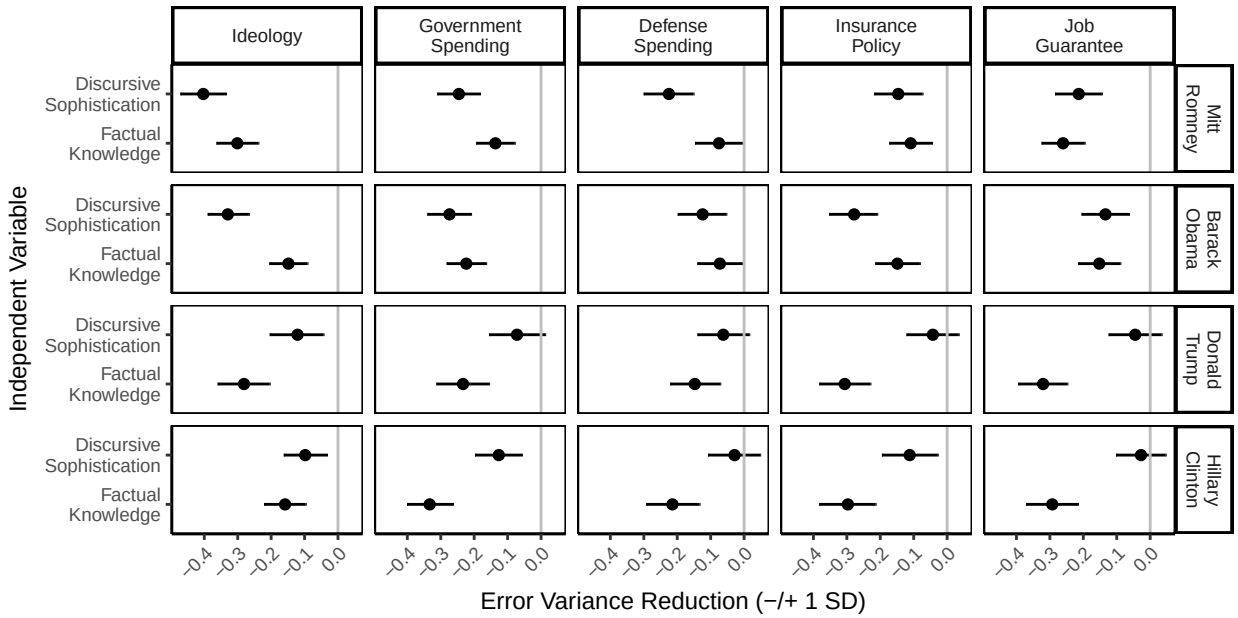


Figure 5: Error variance reduction in party and candidate placements on multiple issues in the 2012 ANES. The figure displays the difference in estimated error variances between maximum and minimum levels of sophistication observed on each measure (including 95% credible intervals). Models are estimated in Stan using non-informative priors.

Early and Stable Preferences about Candidates

To the extent that citizens are sufficiently informed about the positions of political candidates well before the election, they should be able to form a vote choice early in a campaign. Respondents in the 2012 ANES were asked about their vote intention for the presidential election during the pre-election wave of the study and later reported their actual vote choice in the post-election wave. Figure 6 examines the effect of political sophistication on the probability that individuals keep their vote intention from the pre-election wave to their actual vote choice reported in the post-election wave. Estimates are based on logit models where the dependent variable indicates whether initial vote intentions remained unchanged between both time points.

Both, discursive sophistication as well as factual knowledge significantly increase the probability that citizens voted according to their initial intention at the time of the pre-election interview. While the effect appears to be slightly larger for discursive sophistication, the difference is relatively small and not statistically significant.

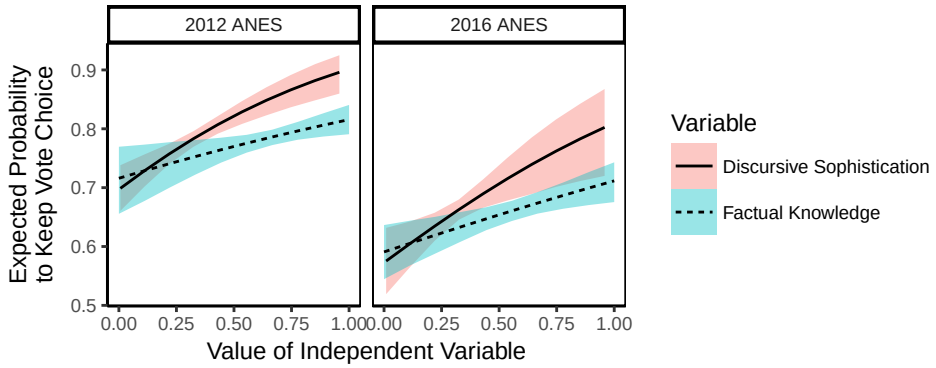


Figure 6: Predicted probability to cast a vote consistent with initial intentions reported in the pre-election wave of the 2012 ANES as a function of political sophistication (including 95% confidence intervals). Estimates are based on separate logit models controlling for education, income, age, religiosity, gender, race, and survey mode.

Incorporation of New Information

Political competence does not necessarily imply that citizens always stay consistent with their initial preferences. After all, individuals should be attentive to their media environments and incorporate potentially relevant new information. Here, I conduct an additional analysis based on the 2015 YouGov survey which included open-ended questions about two political issues that were prominent in the media discourse at the time (gun control and health insurance). Additionally, the study included a task where respondents read a newspaper article about a fictional infectious disease and were subsequently asked to recall information provided in the article (e.g. regarding symptoms, modes of contraction etc.). I compute an additive index counting the pieces of information that were correctly recalled (**information retrieval**) as a measure of the ability to retrieve information from a news article on a non-partisan issue that is related to public health policies.

Figure 7 displays the effect of political sophistication on disease information retrieval in the 2015 YouGov study. Estimates are based on OLS models controlling for education, income, age, religiosity, gender, and race. As a benchmark for discursive sophistication, I again consider the effect of **factual knowledge** based on a battery of eight items similar to the knowledge questions in the ANES. Again, we observe that both, discursive sophistication as well as factual knowledge

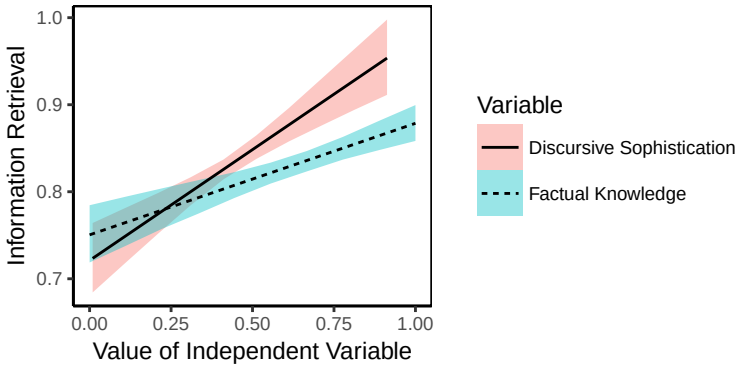


Figure 7: Expected disease information retrieval in the 2015 YouGov Study as a function of political sophistication (including 95% confidence intervals). Estimates are based on separate OLS models controlling for education, income, age, religiosity, gender, and race.

increase the amount of information individuals are able to recall from a news article discussing a fictional disease. Similar to the previous results, the effects appear to be slightly stronger for discursive sophistication.

Well-Justified Political Decisions

Ultimately, political sophistication should enable citizens to make high-quality decisions based on informed preferences about the issue at hand. Colombo (2016) manually coded open-ended responses of Swiss citizens who were asked to explain why they voted in favor or against a given proposition in multiple policy referenda. The author developed a measure of individual *levels of justification*, which combines dimensions of answer content, elaboration, and complexity.

As a last step of the validation effort, I compare discursive sophistication with Colombo's (2016) original measure. The results are presented in Figure 8. Since the Swiss post-referendum surveys were conducted in three different languages (German, French, and Italian), I computed the measure of discursive sophistication for each group of respondents. The figure displays the distribution of discursive sophistication for each level of justification captured by Colombo (2016) as well as the correlation coefficients for both respective variables. Discursive sophistication is systematically higher among respondents with the highest level of manually coded justification and both measures are positively correlated across all three language groups ($r = 0.34, 0.32,$

and 0.31, respectively). The measure proposed in this paper therefore shows a high degree of correspondence with manual coding of individual levels of justification across three languages.

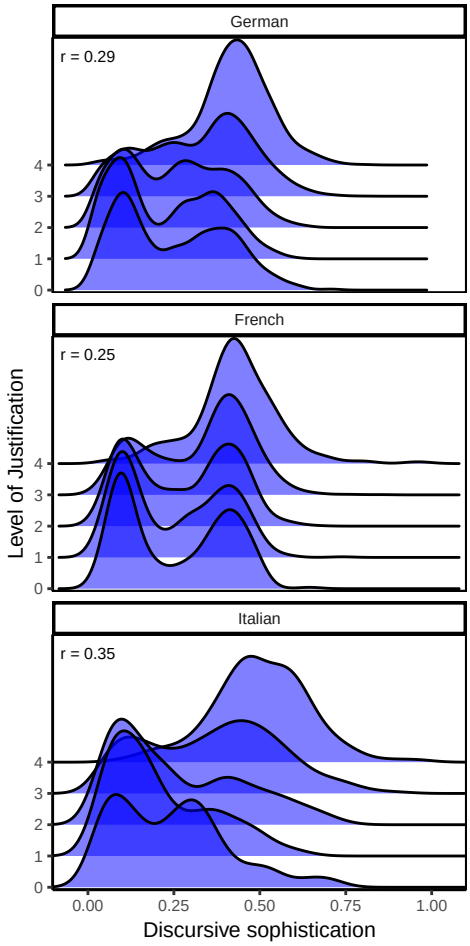


Figure 8: Discursive sophistication and manually coded level of justification (Colombo, 2016) in Swiss post-referendum surveys. The plot compares kernel densities of discursive sophistication for each manually coded level of justification.

Overall, the results presented thus far indicate that discursive sophistication shares common characteristics with factual political knowledge measures. Compared to conventional metrics, the proposed measure performs as least as well as a predictor of essential competences that allow citizens to engage successfully in politics. In fact, discursive sophistication is a stronger predictor of certain outcomes (such as political participation) than conventional knowledge scores. In the following, I turn to a brief application to examine how discursive sophistication can help refine important previous insights from the literature on political knowledge.

Application: The Gender Gap in Political Knowledge

A common finding in research on political sophistication is the fact that women appear to be less knowledgeable about politics than men. For example, Verba, Burns, and Schlozman (1997) report that women score lower on political information, interest, and efficacy, which decreases their respective levels of political participation. Since gender differences in political information and interest can only partly be explained by resource-related factors such as individual levels of education, the authors diagnose a "genuine difference in the taste for politics" between men and women, which they suspect to be driven by socialization (see also Wolak and McDevitt, 2011).

Another explanation for the finding that disparities in resources (e.g., education) cannot fully account for gender differences is the fact that men and women benefit differently from the factors that increase political information (Dow, 2009). As such, the gap is not only due to varying resource levels, but also due to differential gains from the resource itself. More broadly, this finding suggests that men and women consume political information through different channels (see also Pietryka and MacIntosh, 2013). Nevertheless, recent research showed that the gender gap can be substantially decreased given exposure to sufficient information (e.g. Jerit and Barabas, 2017) or through deliberation (Fraile, 2014).

Other scholars focused more closely on issues related to the measurement of political knowledge in order to explain the apparent gender gap. For example, Mondak and Anderson (2004) suggest that women are more likely to report that they do not know the answer to a knowledge item if they are not completely certain, whereas men are more inclined to guess. Correcting for the systematic differences in the propensity to guess mitigates the gender gap in knowledge but does not eliminate it completely (see also Lizotte and Sidman, 2009). Based on their empirical evidence, Mondak and Anderson (2004) elaborated on best practices regarding the measurement of political knowledge (e.g., using closed rather than open-ended knowledge items and discouraging 'Don't Know' responses). Other related aspects of the survey context have also been shown to affect gender differences in political knowledge. For example, McGlone, Aronson, and Kobrynowicz (2006) present evidence that the gender gap is exacerbated in an environment that induces

stereotype threat, for example if women are aware of the fact that the study focuses on gender differences or if they are interviewed by a male interviewer. However, gender differences are not only induced by *how* researchers ask their questions, but also by the question *content* itself. For example, Dolan (2011) argues that the gap can be closed by focusing on gender-relevant political knowledge items such as information about women's representation in the federal government. Similarly, Stolle and Gidengil (2010) report that the gender gap disappears when people are asked about more practical issues related to the government (e.g., benefits and services).

Overall, the gender gap has been shown to be influenced by how we ask for political information in surveys, as well as the kind of knowledge that is required for a correct response. Indeed, a comprehensive cross-national analysis of election studies in 47 countries between 1996 and 2011 suggests that question format and content account for large portions of the variance of gender disparities in political knowledge (Fortin-Rittberger, 2016).

Descriptive Results

How do men and women compare on the different metrics of political sophistication in the 2012 ANES? Figure 9 displays the average levels of discursive sophistication as well as conventional metrics comparing both genders. While we observe a sizable gender gap for factual knowledge and interviewer assessments, the difference is substantially smaller (and statistically indistinguishable from zero) for discursive sophistication.

The results regarding the gender gap are replicated in the YouGov data. Figure 9 also compares the alternative measures of political knowledge and sophistication for men and women. As before, we observe a significant gender gap in factual knowledge (middle panel), which disappears using the discursive measure (left panel). Furthermore, there is no apparent gender gap in disease information retrieval. If anything, women are able to recall slightly more accurate information about the infectious disease described in the news article. This result is consistent with recent research by Jerit and Barabas (2017), which suggests that knowledge gaps between men and women disappear upon receiving sufficient information.

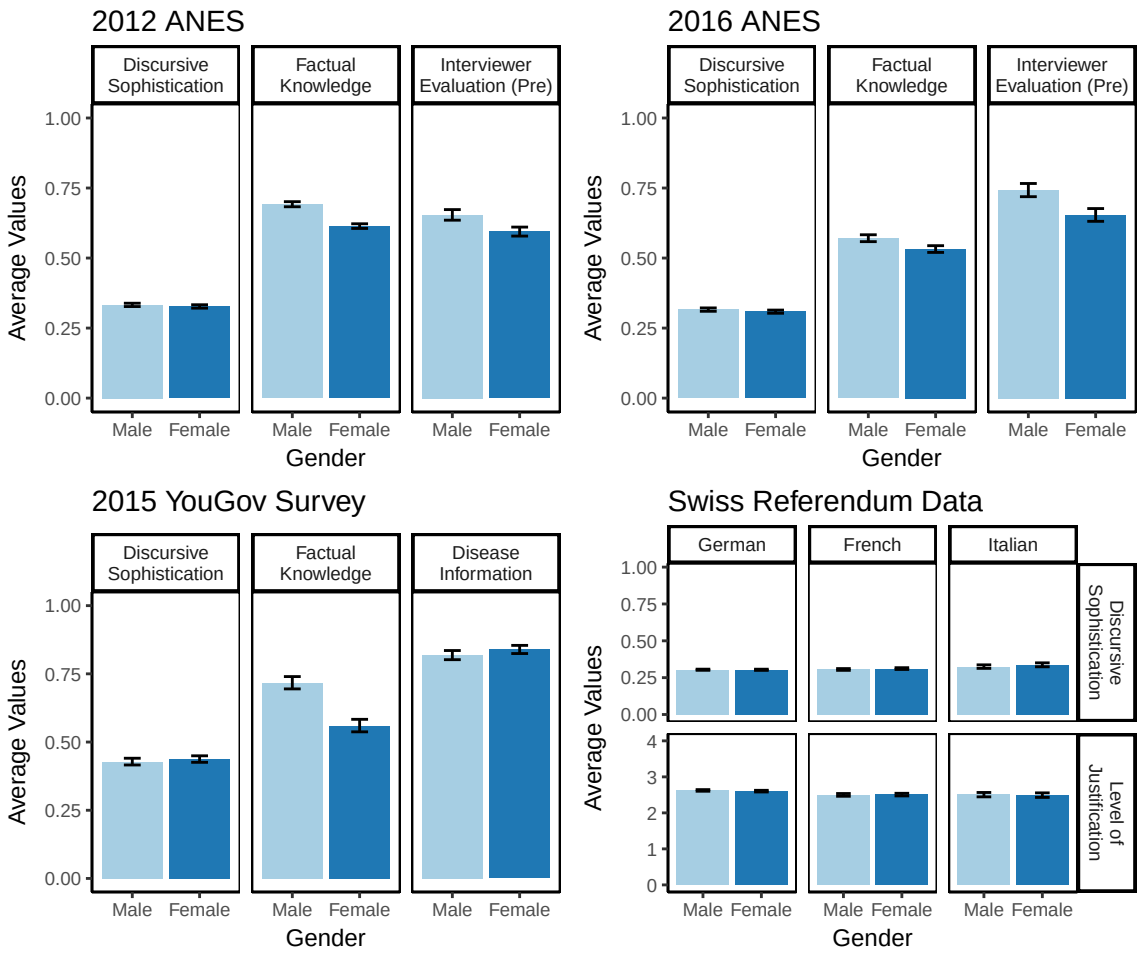


Figure 9: The gender gap in political sophistication. The figure displays mean levels of sophistication for each measure comparing men and women (including 95% confidence intervals). The y-axis is scaled to range up to the maximum value observed in the data for each sophistication metric. The gender differences in factual knowledge and interviewer evaluations are statistically significant with $p < .05$.

Controlling for Alternative Explanations

As described above, at least part of the gender gap can be attributed to real differences in resources relevant to political information (e.g., education). Accordingly, we need to control for common determinants of political knowledge across all available measures to provide a more comprehensive examination of potential gender differences. Previous studies consistently showed that political knowledge is positively related to high media exposure, frequent political discussions, education, and income. Furthermore, I include age, race, religiosity, and survey mode (face-to-

face vs. online) as additional control variables. Figure 10 displays the coefficients of regression models with each knowledge/sophistication measure as the dependent variable.

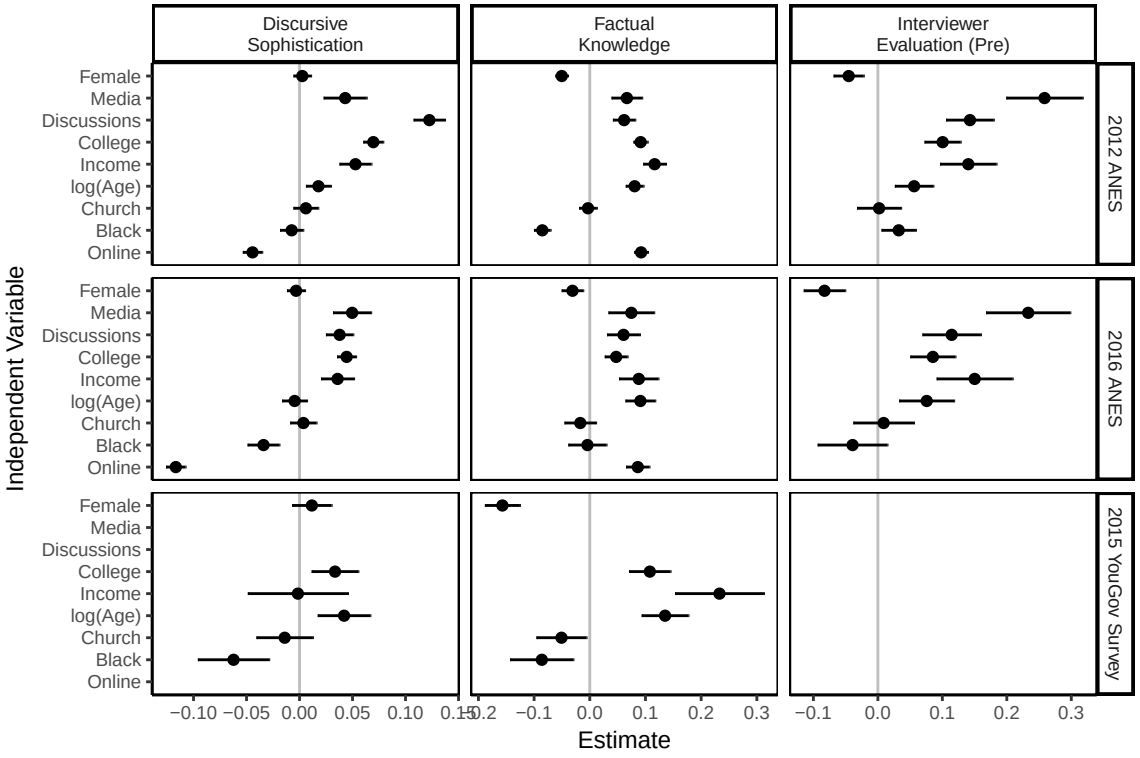


Figure 10: Common determinants of political sophistication. Estimates are OLS regression coefficients with 95% confidence intervals. Dependent variables are discursive sophistication as well as conventional metrics of political knowledge.

After controlling for common determinants, discursive sophistication reveals no significant differences between men and women. On the other hand, we still observe the gender gap using the remaining political knowledge metrics considered here. As such, women might not score as highly on political quizzes (partly because they are less likely to guess rather than express lack of knowledge), but they do not differ substantially in complexity and sophistication when they describe their political preferences.

The patterns for the remaining determinants are quite similar across different dependent variables. Knowledge and sophistication is significantly higher among respondents who are more exposed to political news media, discuss politics frequently, are more educated, and have higher income. An interesting deviation, however, is the effect of survey mode. For factual knowledge

questions, we observe that respondents in online surveys score significantly higher than individuals in face-to-face interviews. This difference could be explained by the fact that individuals are able to look up responses to factual knowledge questions while taking an online survey (see also Clifford and Jerit, 2016). For discursive sophistication, on the other hand, we see that individuals appear to score lower on sophistication in online surveys. Respondents in online surveys therefore seem less willing to elaborate on their attitudes. Overall, the fact that the determinants of political sophistication are very consistent across models lends additional validity to the open-ended measure.

Again, this result is replicated when looking at data from the 2015 YouGov survey: men do not perform better than women on discursive sophistication or disease information retrieval in a multivariate setting. However, the gender gap in factual political knowledge persists and is substantively as well as statistically significant. The remaining determinants of sophistication/knowledge are similar across measures (except for family income). Interestingly, the observed pattern of effects on discursive sophistication is strikingly similar to the effects on information retrieval about the fictional disease. This result reinforces the conclusion that discursive sophistication and disease information retrieval in the YouGov study share common characteristics in the sense that they capture how individuals recall considerations that are relevant to their own attitudes rather than inquiring about facts related to political institutions and elites that are extraneous to the issues at hand.

Explaining the (Lack of the) Gender Gap

Conclusion

Political scientists should worry less about pure levels of *information*, but rather focus on the necessary conditions for individuals to make *competent* decisions. Competence in the context of political decision-making and voting requires citizens to hold informed attitudes about their representatives. Factual knowledge about political institutions might be a useful proxy for competence

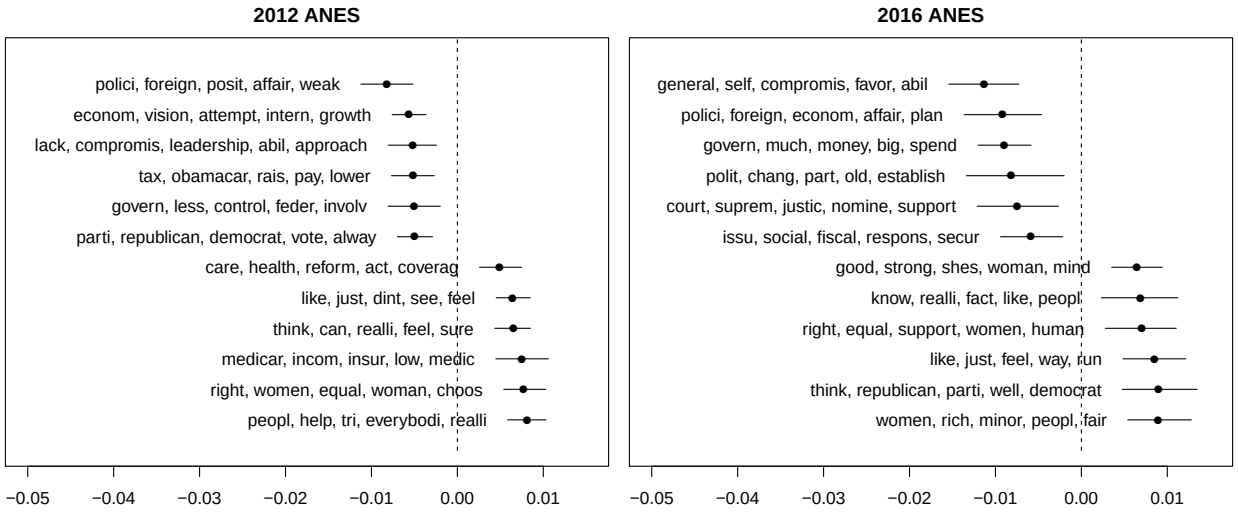


Figure 11: Gender Differences in Topic Proportions

in certain scenarios. However, it cannot address directly whether individuals hold well-considered opinions about political actors they try to hold accountable. In comparison, the measure of discursive sophistication proposed here is agnostic about the specific contents of individual beliefs, but directly captures the complexity of individual attitude expressions.

The findings presented in this paper show that conventional knowledge indices and the discursive measure share a substantial amount of variance. However, they are far from being identical and capture different aspects of sophistication. Most importantly, using the discursive measure, any evidence for the gender gap commonly reported using factual knowledge scales disappears. Women might know fewer facts about political institutions, but they do not differ substantively in the complexity of their expressed political beliefs. The fact that women perform just as well as men on discursive sophistication across various surveys can be attributed to the fact that they focus on different considerations when evaluating political parties and candidates. This issue has long been recognized in the literature (e.g., Graber, 2001; Dolan, 2011), but it cannot be properly addressed while relying exclusively on off-the-shelf political knowledge batteries. Directly examining how individuals justify their political preferences, in turn, provides a solution that does not rely on strong assumptions about what citizens ought to know.

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Appendix A: Open-ended Responses in the 2012 & 2016 ANES

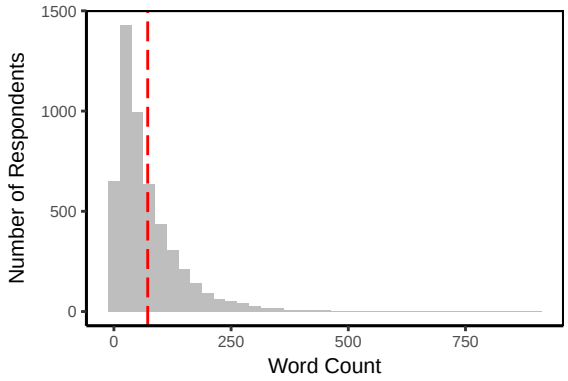

Figure A.1: Histogram of total word count in the collection of open-ended responses for each individual. The dashed red line indicates the average response length. Most respondents provide brief statements when they describe their attitudes towards political parties and candidates. The mean response length to all 8 questions is about 75 words, so an average response to a single question consisted of less than 10 words, omitting respondents who did not provide any information.

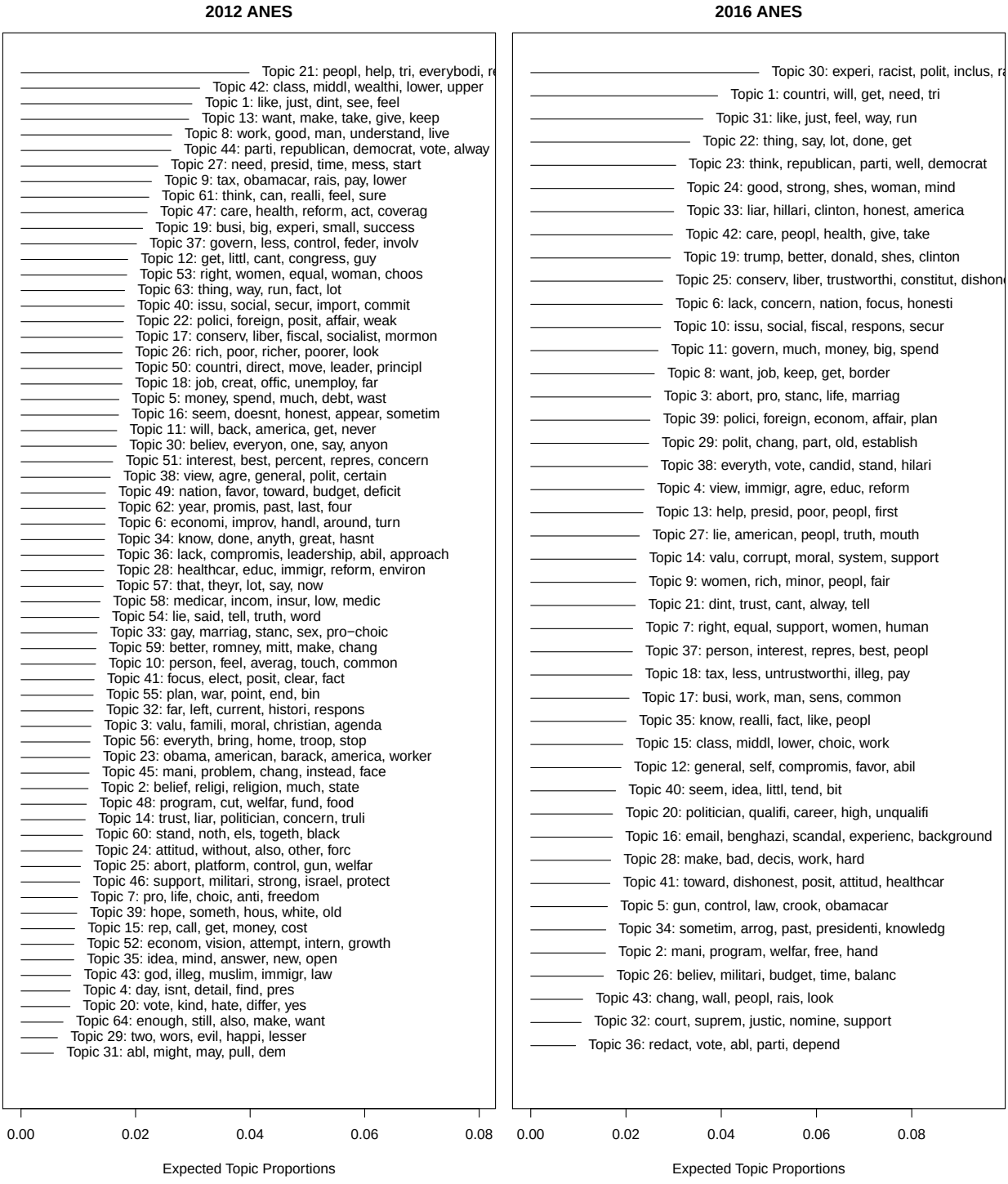

Figure A.2: Estimated topic proportions based on the structural topic model. The number of topics k for the structural topic model is selected using the algorithm proposed by Lee and Mimno (2014). I use measures for age, gender, education, party identification, as well as an interaction between education and party identification as covariates for individual topic prevalence, which is similar to the model specification described in Roberts et al. (2014). The results in the paper are robust for alternative specifications of k (e.g., setting the total number of topics to 20.

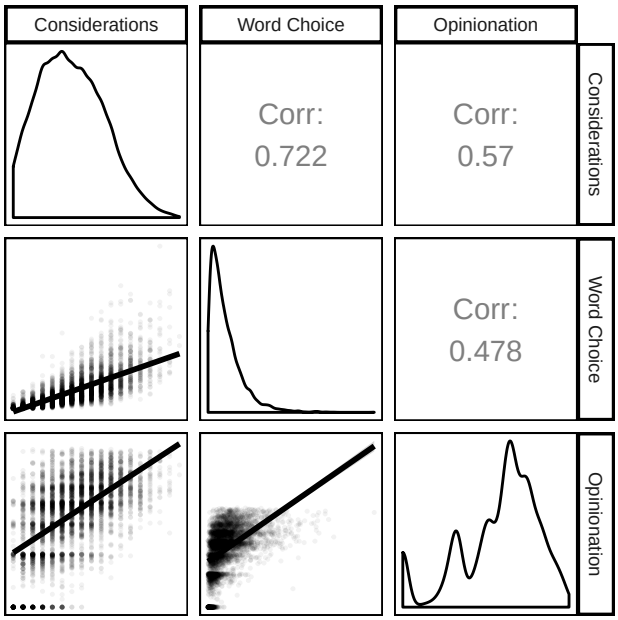

Figure A.3: Correlation matrix of individual components of discursive sophistication. The plots on the diagonal display univariate densities for each component. The panels in the lower triangular display the scatter plot of two measures as well as a linear fit. The upper triangular displays the correlation coefficient. The spike at 0 for opinionation is due to the fact that some respondents only answered a single open-ended question.

Appendix B: Open-ended Responses in YouGov Data

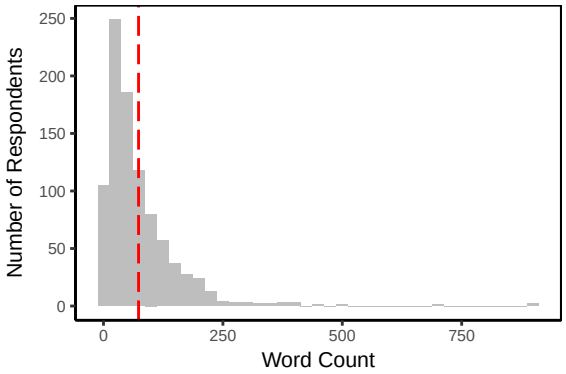

Figure B.1: Histogram of total word count in the collection of open-ended responses for each individual. The dashed red line indicates the average response length. Most respondents provide brief statements when they describe their attitudes towards political parties and candidates. The mean response length to all 4 questions is about 73 words, so an average response to a single question consisted of approximately 18 words, omitting respondents who did not provide any information.

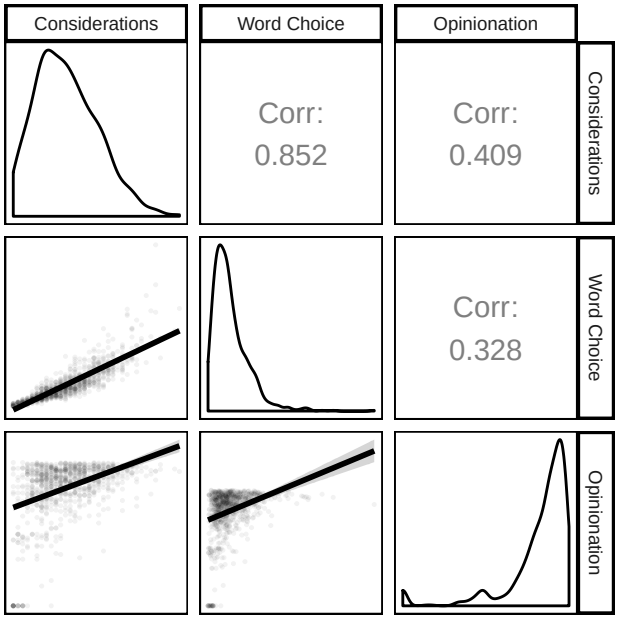

Figure B.2: Correlation matrix of individual components of discursive sophistication. The plots on the diagonal display univariate densities for each component. The panels in the lower triangular display the scatter plot of two measures as well as a linear fit. The upper triangular displays the correlation coefficient. The number of topics k for the structural topic model is set to 20. I use measures for age, education, party identification, as well as an interaction between education and party identification as covariates for individual topic prevalence, which is equivalent to the model specification described in Roberts et al. (2014). The results in the paper are robust for alternative specifications of k (e.g., selecting k using the algorithm proposed by Lee and Mimno (2014) results in total number of 73 topics). The spike at 0 for opinionation is due to the fact that some respondents only answered a single open-ended question.

Appendix C: Open-ended Responses in Swiss Referendum Data

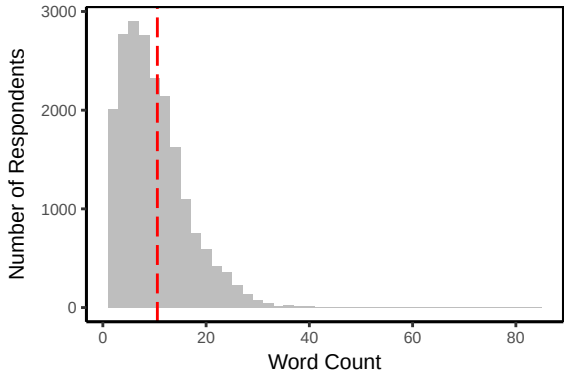

Figure C.1: Histogram of total word count in the collection of open-ended responses for each individual. The dashed red line indicates the average response length. Most respondents provide brief statements when they describe their attitudes towards political parties and candidates. The mean response length to both questions is about 11 words, so an average response to a single question consisted of approximately 5 words, omitting respondents who did not provide any information.

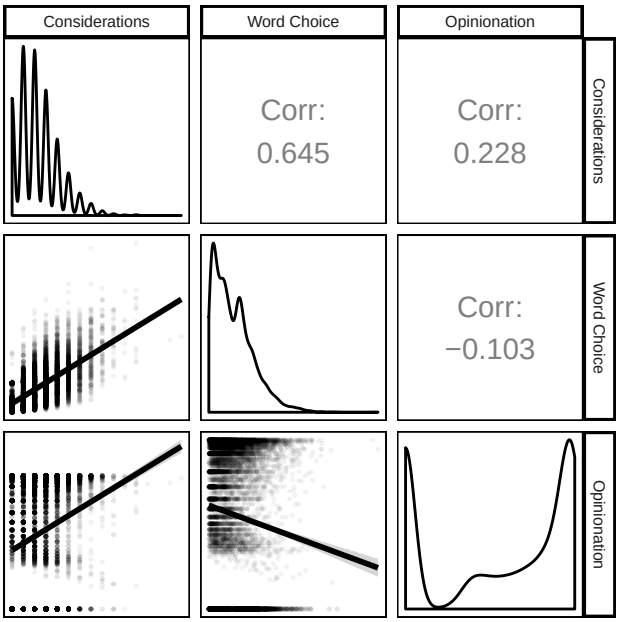

Figure C.2: Correlation matrix of individual components of discursive sophistication (German respondents). The plots on the diagonal display univariate densities for each component. The panels in the lower triangular display the scatter plot of two measures as well as a linear fit. The upper triangular displays the correlation coefficient. The number of topics k for the structural topic model is set to 30. I use measures for age, education, party identification, as well as an interaction between education and party identification as covariates for individual topic prevalence, which is equivalent to the model specification described in Roberts et al. (2014). The results in the paper are robust for alternative specifications of k (e.g., selecting k using the algorithm proposed by Lee and Mimno (2014) results in total number of 45 topics). The spike at 0 for opinionation is due to the fact that a large portion of respondents only answered a single open-ended question.

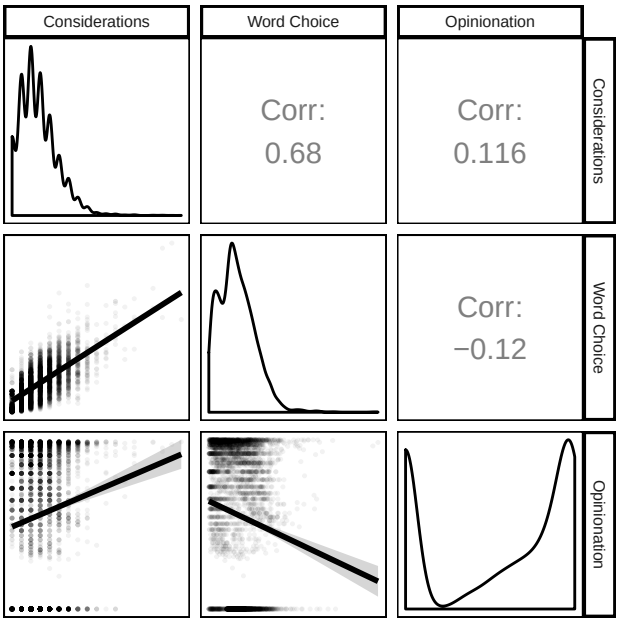

Figure C.3: Correlation matrix of individual components of discursive sophistication (French respondents). The plots on the diagonal display univariate densities for each component. The panels in the lower triangular display the scatter plot of two measures as well as a linear fit. The upper triangular displays the correlation coefficient. The number of topics k for the structural topic model is set to 30. I use measures for age, education, party identification, as well as an interaction between education and party identification as covariates for individual topic prevalence, which is equivalent to the model specification described in Roberts et al. (2014). The results in the paper are robust for alternative specifications of k (e.g., selecting k using the algorithm proposed by Lee and Mimno (2014) results in total number of 43 topics). The spike at 0 for opinionation is due to the fact that a large portion of respondents only answered a single open-ended question.

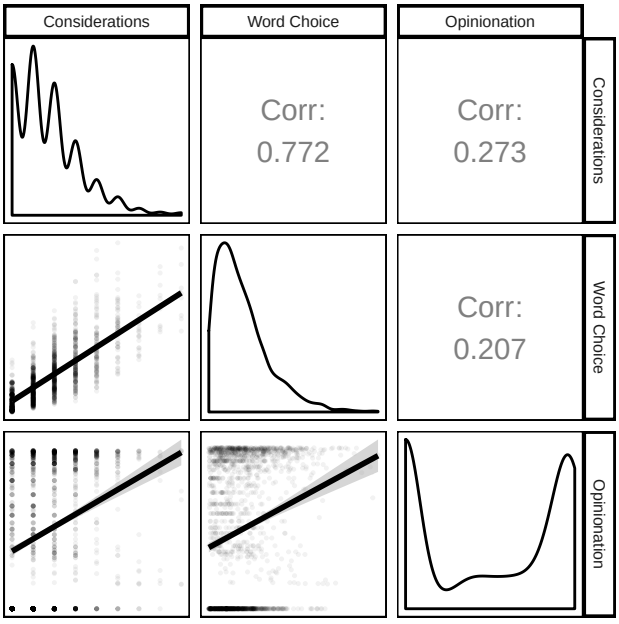

Figure C.4: Correlation matrix of individual components of discursive sophistication (Italian respondents). The plots on the diagonal display univariate densities for each component. The panels in the lower triangular display the scatter plot of two measures as well as a linear fit. The upper triangular displays the correlation coefficient. The number of topics k for the structural topic model is set to 30. I use measures for age, education, party identification, as well as an interaction between education and party identification as covariates for individual topic prevalence, which is equivalent to the model specification described in Roberts et al. (2014). The results in the paper are robust for alternative specifications of k (e.g., selecting k using the algorithm proposed by Lee and Mimno (2014) results in total number of 47 topics). The spike at 0 for opinionation is due to the fact that a large portion of respondents only answered a single open-ended question.

Appendix D: YouGov Correlation Matrix

Figure D.1 examines the distribution of each measure of political knowledge as well as their respective correlations in the YouGov data. Again, we observe that discursive sophistication and factual political knowledge are positively correlated, which indicates that discursive sophistication overlaps with traditional knowledge metrics while capturing unique variation in individual response behavior. Interestingly, there appears to be a stronger relationship between discursive sophistication and disease information than between factual political knowledge and disease information.

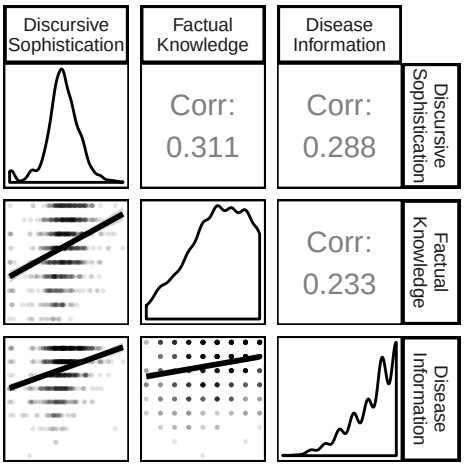

Figure D.1: YouGov data – Correlation matrix of discursive sophistication, a conventional political knowledge metric, and disease information retrieval. The plots on the diagonal display univariate densities for each variable. The panels in the lower triangular display the scatter plot of two measures as well as a linear fit. The upper triangular displays the correlation coefficient. All correlations reported are statistically significant with $p < .05$.

Recall that the disease information score can be interpreted as an indicator of the ability to retrieve specific information provided in a news article about a public health issue. It could be argued that discursive sophistication is more similar to the disease information score in that it captures the extent to which participants were able to recall political information that is relevant to their own attitudes. Conventional knowledge scores, on the other hand, inquire about specific that are not necessarily relevant to derive well-informed attitudes about political issues.