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 measure political sophistication based on open-ended survey responses. *Discursive sophistication* utilizes quantitative text analysis methods to capture the complexity of individual attitude expression. 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 the measure can help refine previous insights from the literature such as the oft-cited gender gap in political knowledge.

Keywords: political sophistication, open-ended responses, text analysis, gender gap

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One of the most important tasks for citizens in modern democracies is to vote for candidates who represent their interests and hold their elected officials accountable. While there have been longstanding debates about whether citizens are sufficiently informed to fulfill this task, fundamental issues regarding the measurement of knowledge continue to plague the discipline (Mondak, 2001; Sturgis, Allum, and Smith, 2008; Pietryka and MacIntosh, 2013). Most analyses rely on batteries that assess individuals' factual knowledge about political institutions and officeholders (e.g., Delli Carpini and Keeter, 1996). However, such recall-based measures, cannot capture directly how people structure their attitudes and beliefs (e.g., Luskin, 1987) and thus may not be appropriate indicators of informed preferences (Gilens, 2001; Lupia, 2006).

Survey items measuring political knowledge should cover information that is necessary and/or sufficient to successfully engage in politics. Yet, determining such a set of items proves to be extremely difficult, especially since there are systematic differences in types of knowledge (Barabas et al., 2014). Even within a given policy area, people may disagree about which facts are crucial for political competence due to inherent value differences (c.f., Lupia, 2015). Despite these difficulties, most empirical studies rely on a set of off-the-shelf knowledge questions rather than justifying their choices theoretically. As Lupia (2006, 219) points out, "[m]ost 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."

Lupia (2006) argues that researchers should concentrate on information relevant to a specific political task that enable citizens to make competent decisions (see also Lupia, 1994, 2015). In a similar vein, Druckman (2014) describes individual levels of political information as inadequate to measure "quality opinion" since there is no consensus about what information is necessary in the first place. Instead, Druckman advocates "*less* focus on the *content/substance* of opinions [...] and *more* on the *process* and specifically the *motivation* that underlies the formation of those opinions" (2014, 478, emphasis in the original).

The framework proposed herein follows this call by using a person's expressed considerations as an indicator of their political sophistication in a given context. 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. Specifically, it assess whether politically relevant beliefs and opinions are expressed in a more elaborate manner—a question that is not directly discernible when employing off-the-shelf factual knowledge items.

I validate the measure across multiple data sets by comparing it to conventional factual knowledge scores as predictors of various indicators of competence. 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 metrics. 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.

Opinion Formation and Attitude Expression

Citizens have to engage in many decisions in democratic politics. For example, they 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 concerned with the ability of citizens to make high quality decisions in accordance with their preferences. Accordingly, scholars should

concentrate on whether people are motivated to engage in elaborate reasoning when forming their opinions rather than trying to assess their level of factual knowledge (Druckman, 2014). In previous research, scholars have induced people to engage in elaborate reasoning by asking them to *justify* their opinions (e.g., by providing specific reasons; Kunda and Sinclair, 1999; Redlawsk, 2002; Bolsen, Druckman, and Cook, 2014a; Druckman, 2014). In an analogous way, we can examine *how* citizens justify their preferences in order to evaluate their level of sophistication. If 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 (c.f., Cappella, Price, and Nir, 2002). Rather than trying to develop recall items that presupposes a set of facts as necessary for political competence, I therefore analyze *how* individuals discuss their preferences related to a given political task.

This approach is consistent with influential theoretical accounts of political sophistication which focus on the *structure* of belief systems. For example, 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). According to this body of work, 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 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 considers "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 measured by manually coding the content, elaboration, and complexity of open-ended responses.

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 also be implemented in settings involving various types of political tasks such as choosing between candidates or parties. To measure sophistication related to those tasks, I propose to examine how individuals discuss and justify their preferences in their own words. 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 labor-intensive and requires extensive contextual knowledge, such as high levels of language proficiency.[1] Furthermore, knowledge assessments can be biased by the level of political agreement between individuals (Ryan, 2011). As such, I present an 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.

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

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 $\mathcal{T}_i^*$ 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 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. Highly descriptive word choice is conceptualized as the sum of term likelihoods $P(w|t^*)$ given topic assignments over the entire set of words in $\mathcal{W}_i$:

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

[2] See below for more information on the set of open-ended responses, pre-processing choices, as well as on 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).

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, sophisticates 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:

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

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 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.[4]

[4]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 survey focuses on sophistication in the context of distinct political tasks, namely the evaluation of (1) candidates running for public office, (2) broad issue areas such as health care and gun legislation, and (3) policy referenda. The data sets and items used to compute discursive sophistication are briefly described below.[5]

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.

[5] See Appendix A for descriptive information on open-ended responses in each dataset, structural topic model results, and individual components of discursive sophistication. Appendix B contains further details on pre-processing steps and modeling choices for the structural topic models as well as robustness checks, which include preText analyses proposed by Denny and Spirling (2018).

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.[6] 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:

- 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. Respondents who did not provide an answer to any of the open-ended questions were removed from the analysis (48).

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

Swiss Referendum Survey

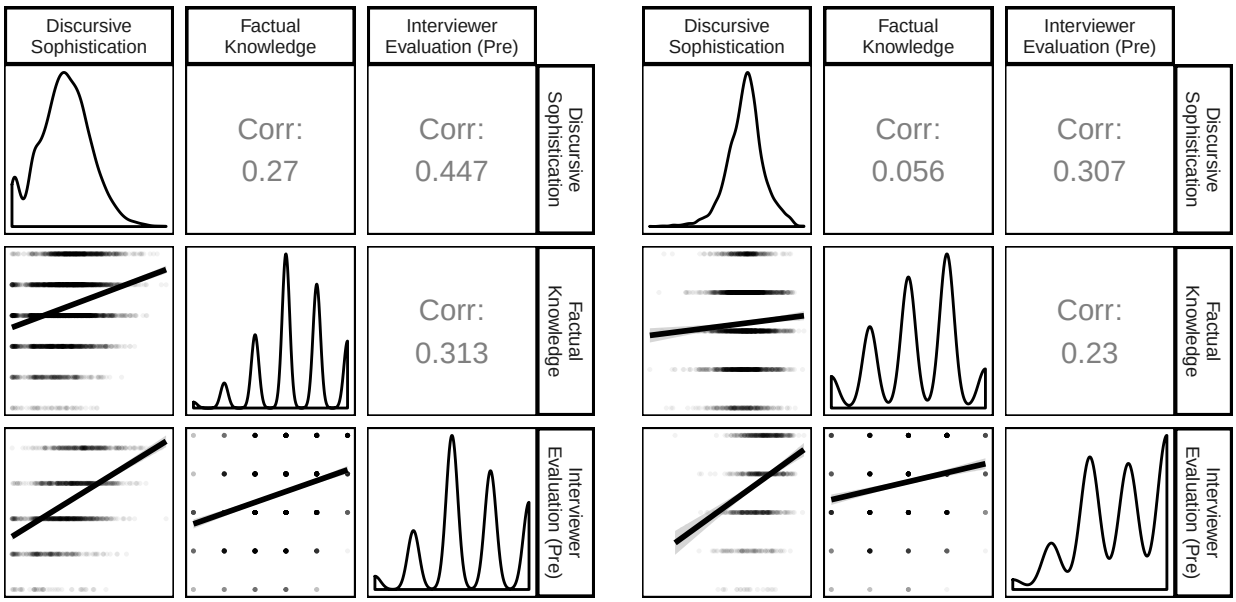
Lastly, I examine survey data on Swiss citizens justifying their vote choices on multiple referenda used in the analyses presented by Colombo (2016). The author compiled a data set from cross-sectional surveys that were conducted in Switzerland after national popular votes on multiple policy propositions. 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.

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 surveys include 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 form a standard additive measure of *factual knowledge* about politics. Additionally, the in-person samples of the ANES include *interviewer assessments* of each respondent's political sophistication.

Figure 1 compares discursive sophistication to the conventional knowledge metrics for both surveys. Each 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.



(a) 2012 ANES (b) 2016 ANES

Figure 1: 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 $p < .05$.

Interestingly, there is a stronger correlation between discursive sophistication and interviewer evaluations than between factual knowledge and interviewer evaluations ($r = .445$ vs. $r = .271$). The open-ended measure therefore captures characteristics that influence subjective assessments of sophistication. Interviewers certainly form their impressions throughout the entire survey, but a respondent's verbatim answers seems to be more influential for subsequent knowledge assessments than a respondent's 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 in the 2016 ANES who identified as Republicans and

scored equally on the factual knowledge score (3 out of 4 correct responses), but varied highly in discursive sophistication. The results are presented in Table 1.

	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.).

Each row in the table represents one of the open-ended responses (like/dislike for each candidate/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 a narrow range of issues, and only reported attitudes on two items. Irrespective of whether one agrees with the specific statements or whether they are factually accurate (e.g., Clinton's connection to Al-Qaeda), A's response pattern is suggestive of a less sophisticated political belief system and a lower level of motivation to engage in in-depth processing about both parties and candidates. Overall, this initial result suggests that the variation in discursive sophistication captures meaningful differences in response behavior that overlaps with traditional knowledge metrics while displaying some unique variation. The following sections will show that this variation is also politically consequential.

Discursive Sophistication and Political Competence

I validate the measure of discursive sophistication by directly examining its effects on individual competences to perform political tasks in modern democracies (c.f., Lupia, 2006, 2015). 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 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 2 presents the effects of discursive sophistication and factual knowledge in the 2012 and 2016 ANES on four dependent variables commonly related to political sophistication: turnout, non-conventional participation, internal efficacy, and external efficacy. The results for the model predicting turnout is estimated using logistic regression while the effects on the three remaining dependent variables are based on OLS. Each model equation includes both sophistication measures while controlling for gender, education, income, age, race, religiosity, survey mode (face-to-face vs. online), as well as the Wordsum vocabulary score measuring verbal intelligence.

Each plot in the figure displays the difference in the expected value of the respective dependent variable for a two standard deviation increase in each sophistication measure, while holding all other variables at their means. Overall, discursive sophistication is a stronger predictor of turnout, non-conventional participation, as well as (to a lesser extent) internal and external efficacy. In the 2012 ANES, the positive effect of factual knowledge on participation is statistically indistinguishable from zero when controlling for discursive sophistication. This finding is especially noteworthy since items measuring factual political knowledge are often selected and validated based on their relationship with outcomes like turnout and participation (c.f., Lupia, 2015). In the 2016 ANES, there is a negative effect of factual knowledge on external efficacy. In contrast,

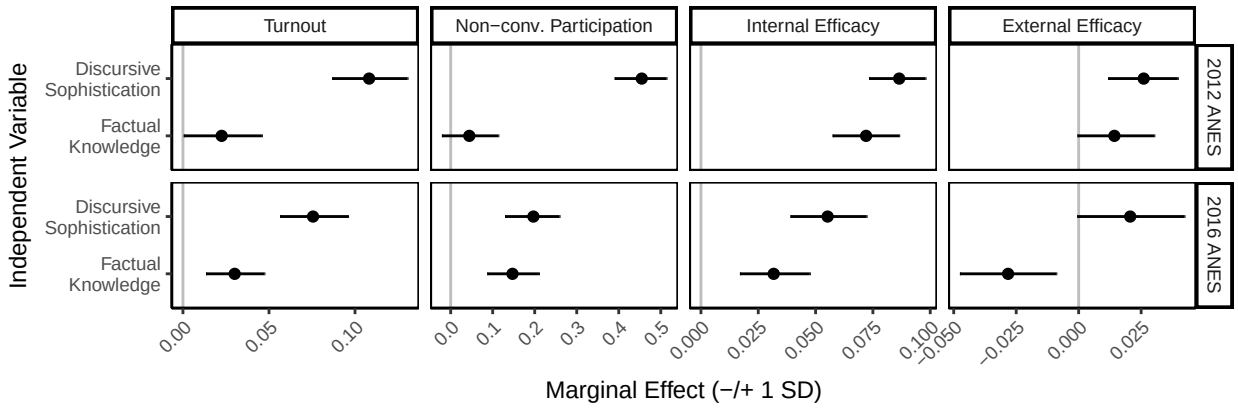


Figure 2: Effects of sophistication on internal efficacy, external efficacy, non-conventional participation, and turnout in the 2012 and 2016 ANES. For each dependent variable, the figure displays the change in expected values after increasing each sophistication measure from -1 to +1 standard deviation from its mean (including 95% confidence intervals). Model estimates are based on logistic regression (turnout) or OLS (internal efficacy, external efficacy, non-conventional participation). Both sophistication measure are included simultaneously while controlling for gender, education, income, age, race, church attendance, survey mode, and Wordsum vocabulary scores.

the positive effect of discursive sophistication on external efficacy appears to be more consistent with previous research.

Incorporation of New Information

Political competence does not only imply that citizens are able to cast votes that are consistent with their preferences. Beyond voting correctly—which may be driven largely by heuristics like party cues—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 administered 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.

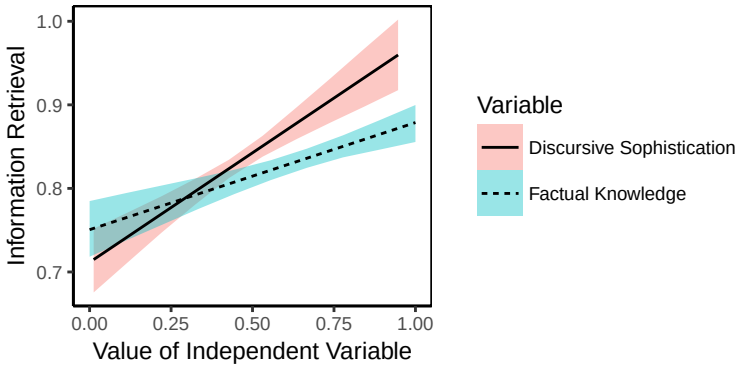


Figure 3: Expected disease information retrieval in the 2015 YouGov Study as a function of political sophistication (including 95% confidence intervals). Estimates are based on a linear regression model controlling for education, income, age, religiosity, gender, and race.

Figure 3 displays the effect of political sophistication on disease information retrieval in the 2015 YouGov study. Estimates are based on a linear regression model 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 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 are stronger for discursive sophistication than for factual knowledge scores. The degree to which citizens are able and motivated to discuss their own political beliefs in a more elaborate manner is not only a stronger predictor of stable and precise candidate assessments but also serves as a better proxy for the ability to incorporate new information.

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 4 presents the results of multiple heteroskedastic regressions where the error variance in candidate placements on multiple issues included in both ANES waves (general ideology, 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 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 (self-placement, education, income, age, religiosity, gender, race, and survey mode), Z denotes the covariates predicting the error variances σ (discursive sophistication, factual knowledge, Wordsum score), and β and γ are the parameters to be estimated.

The figure displays the estimated reduction in error variances of candidate placements when each sophistication measure is increased by two standard deviations. Larger negative values indicate a stronger reduction in error variances and hence more precise candidate placements. Both factual knowledge and discursive sophistication significantly decrease error variances in policy placements of presidential candidates. Some interesting differences, however, emerge when comparing both waves of the ANES. In the 2012 election, discursive sophistication in open-ended responses was a stronger predictor of precise candidate placements than performance on factual knowledge quizzes across multiple issues. This picture appears to be reversed in the 2016 election, where more elaborate open-ended responses were only weakly predictive of precise candidate placements. This finding may be attributed to idiosyncrasies related to how citizens discuss their preferences for Clinton or Trump as compared to previous candidates, or to higher

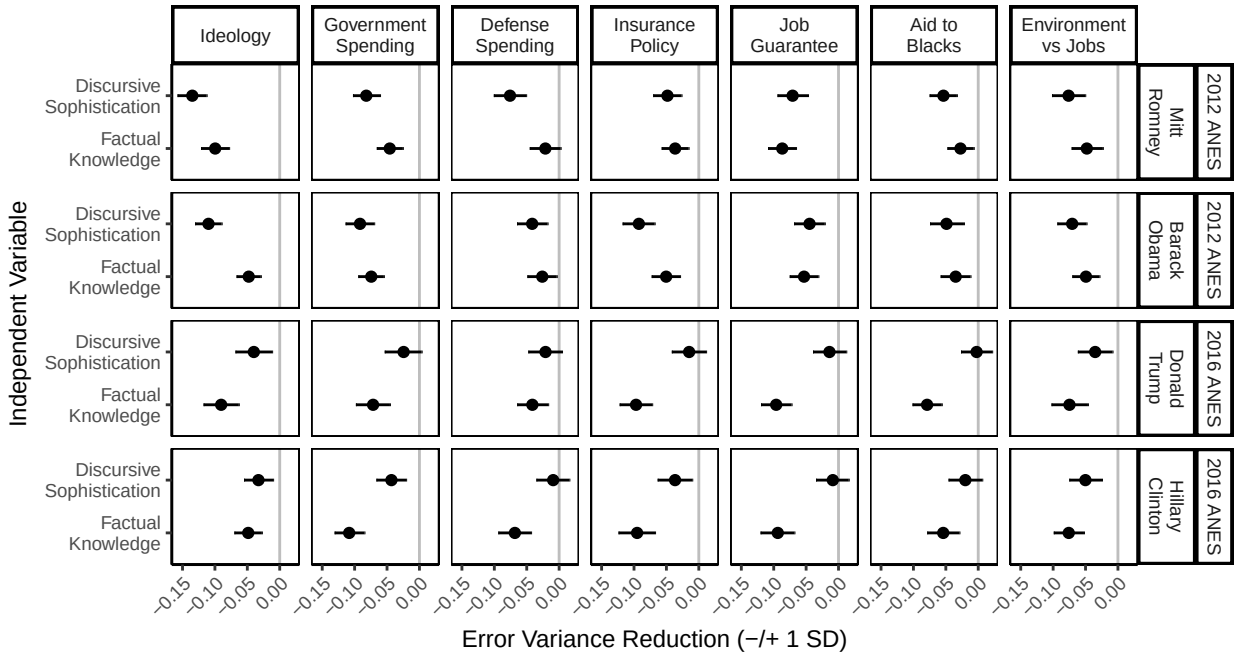


Figure 4: Error variance reduction in candidate placements on multiple issues in the 2012 and 2016 ANES. The figure displays the difference in estimated error variances after increasing each sophistication measure from -1 to +1 standard deviation from its mean (including 95% credible intervals). Models are estimated in Stan using non-informative priors.

overall uncertainty about their respective policy positions. Notwithstanding these contextual variations, both factual knowledge and discursive sophistication appear to increase the precision with which individuals place candidates on various policy issues.

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 5. 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 ($r = 0.29, 0.25,$ and 0.35, 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.

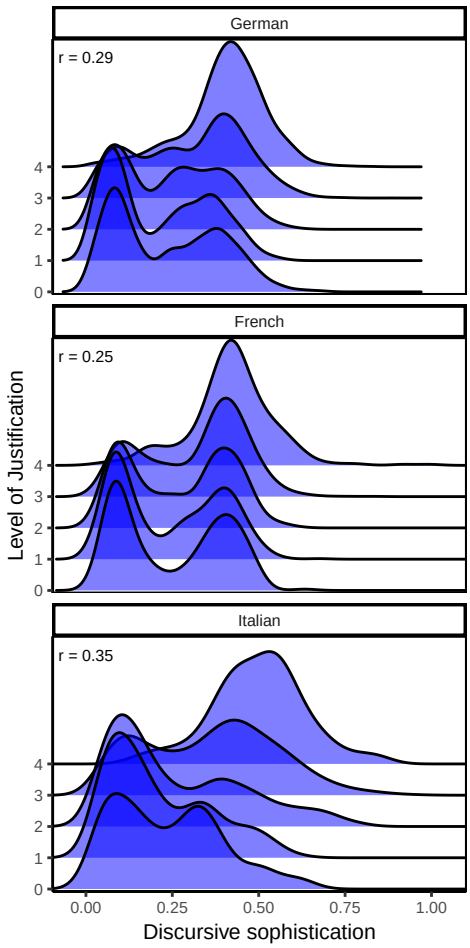


Figure 5: Discursive sophistication and manually coded level of justification (Colombo, 2016) in Swiss post-referendum surveys. The plot compares kernel densities of discursive sophistication for each manually coded level of justification.

Stable Candidate Preferences and Correct Voting

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 stable vote choice early in a campaign (e.g., Gelman and King, 1993; Nir and Druckman, 2008). Respondents in both ANES surveys were asked about their vote intention for the presidential election during the pre-election wave 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.

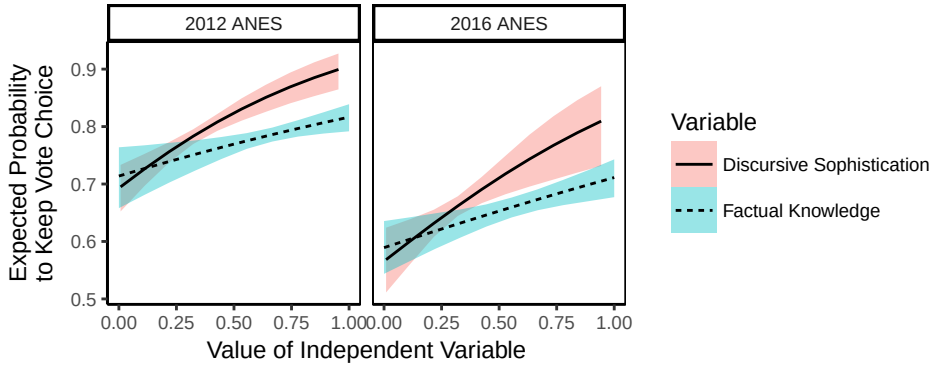


Figure 6: Predicted probability to cast a vote consistent with initial intentions reported in the pre-election wave of the 2012 & 2016 ANES as a function of political sophistication while holding all other variables constant at their respective means (including 95% confidence intervals). Estimates are based on logit models controlling for education, income, age, religiosity, gender, race, survey mode, and Wordsum vocabulary scores.

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. In both the 2012 and 2016 ANES, the effect of discursive sophistication is larger than the effect of factual knowledge scores. The degree to which individuals provide more elaborate responses discussing their political preferences about both parties and candidates is therefore a better predictor of early and stable voting preferences than the ability to recall facts about political institutions

that are relatively unrelated to the task at hand.

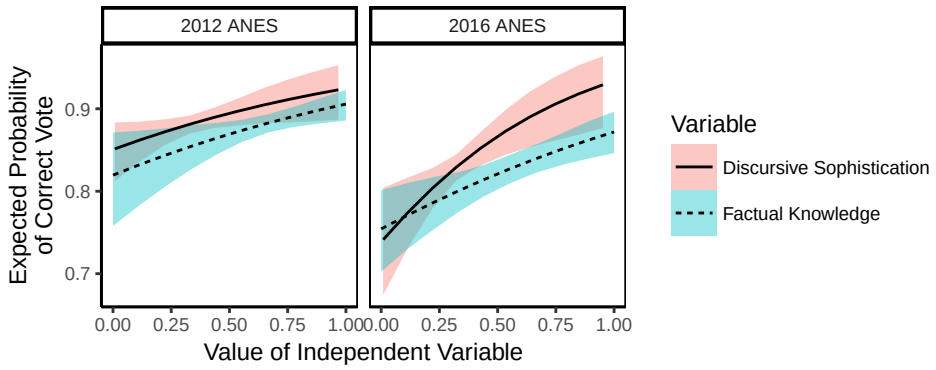


Figure 7: Predicted probability to cast a correct vote as a function of political sophistication while holding all other variables constant at their respective means (including 95% confidence intervals). Estimates are based on logit models controlling for education, income, age, religiosity, gender, race, survey mode, and Wordsum vocabulary scores.

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, or preference stability) than conventional knowledge scores. In the following, I turn to an 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 public opinion research is the fact that women have lower levels of observed political knowledge 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 largely by socialization (see also Wolak and McDevitt, 2011). Indeed,

Dow (2009, 117) describes the systematic gender differences in knowledge "[o]ne of the most robust findings in the study of political behavior."

The discussion revolving around this apparent gender gap is closely intertwined with the methodological debate about measuring political knowledge. For example, Mondak and Anderson (2004) suggest that women are more likely to report that they do not know the answer to a recall question whereas men are more inclined to guess. Correcting for the systematic differences in the propensity to guess, however, mitigates the gender gap in knowledge but does not eliminate it completely (see also Lizotte and Sidman, 2009). Other aspects of the survey context have 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 (see also Graber, 2001; Fraile, 2014; Jerit and Barabas, 2017). 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 surveys analyzed in the present study? Figure 8 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 in both ANES surveys, this difference disappears for discursive sophistication. These results are replicated in the 2015 YouGov survey. As before, we observe a significant gender gap in factual knowledge which disappears using the discursive measure. It is important to examine whether this absence of a gender gap in discursive sophistication is theoretically meaningful or rather an artifact of the measurement approach itself. Recall that Colombo (2016) manually coded levels of justification in Swiss referendum surveys. The bottom half of Figure 8 displays her manually coded measure as well as discursive sophistication comparing both genders. Crucially, there are no significant gender differences on *both* metrics across all three languages in the Swiss referendum surveys. The absence of a gender gap is consistent whether open-ended responses are coded manually or using the proposed measure of discursive sophistication.

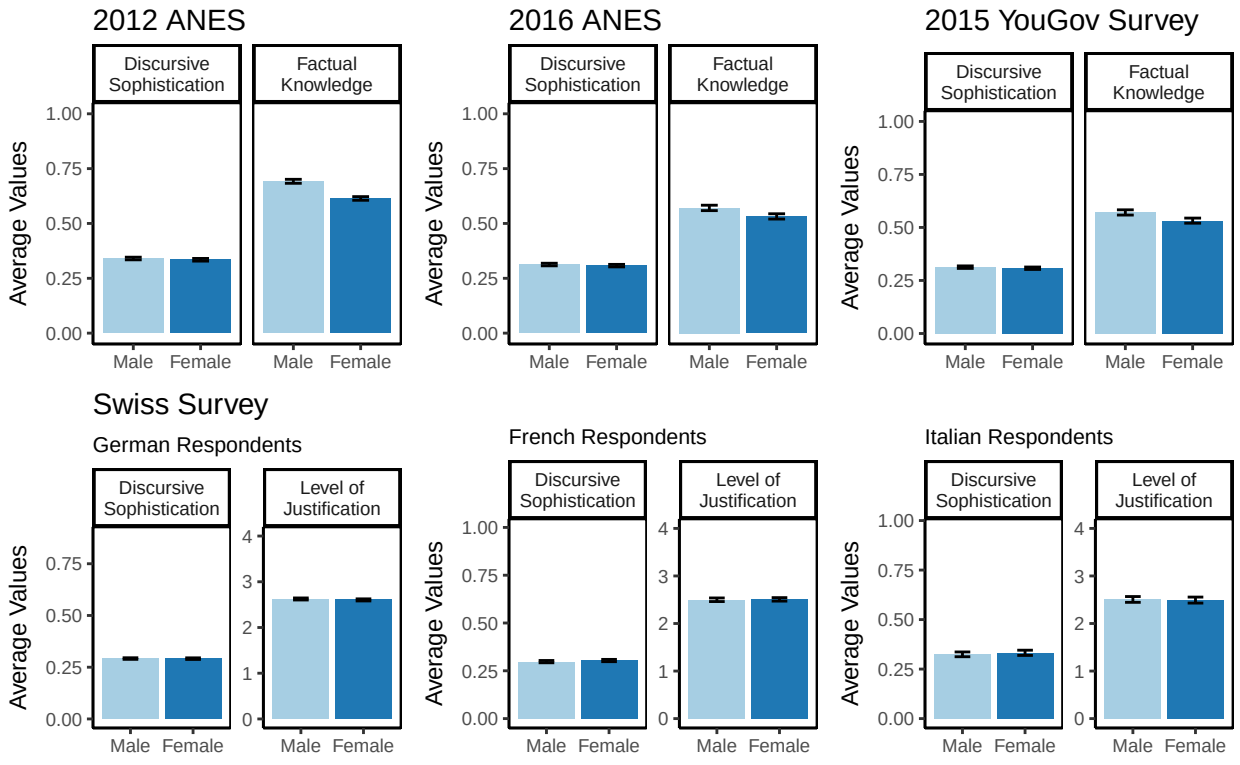


Figure 8: The gender gap in political sophistication. The figures display mean levels of sophistication for each measure comparing men and women (including 95% confidence intervals). Gender differences in factual knowledge are statistically significant with $p < .05$.

Controlling for Alternative Explanations

Prior research suggests that 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 9 displays the coefficients of regression models with each knowledge/sophistication measure as the dependent variable.

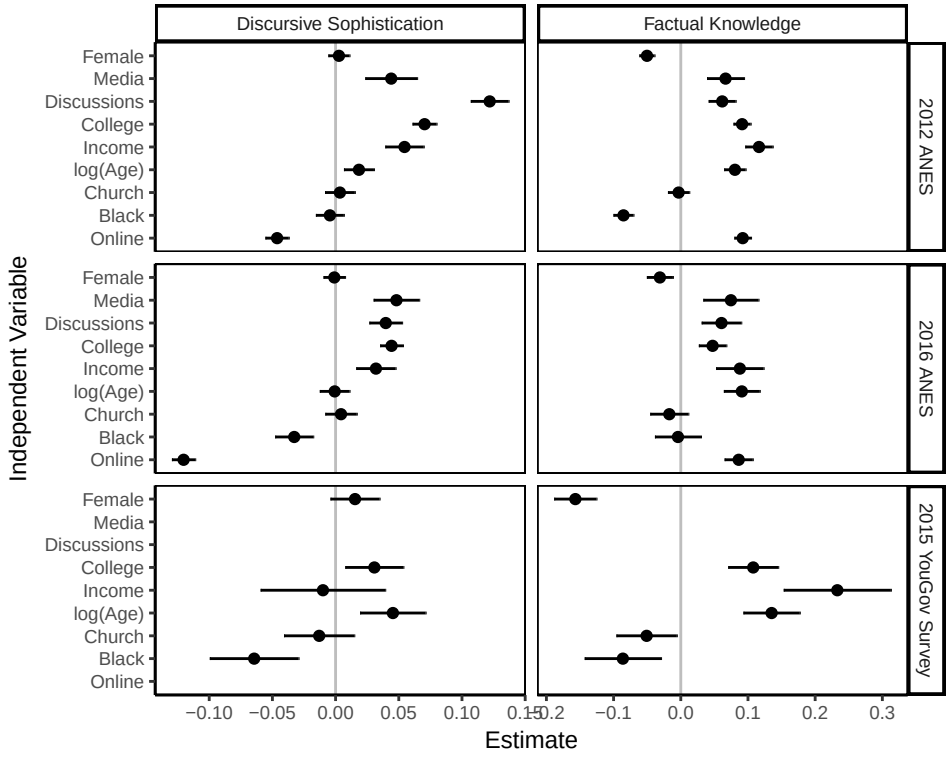


Figure 9: Common determinants of political sophistication. Estimates are OLS regression coefficients with 95% confidence intervals. Dependent variables are discursive sophistication as well as conventional metrics of political knowledge.

After controlling for common determinants in the 2012 and 2016 ANES, discursive sophistication again reveals no significant differences between men and women. On the other hand, we still observe the gender gap using conventional political knowledge metrics. As such, women

might not score as highly on political quizzes, 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.[7] Overall, the finding that determinants of political sophistication are consistent across models lends additional validity to the open-ended measure. As before, this result is replicated when examining data from the 2015 YouGov survey: men do not perform better than women on discursive sophistication in a multivariate setting. The gender gap in factual political knowledge, however, persists and is substantively as well as statistically significant. The remaining determinants of sophistication/knowledge are largely similar across measures.

To summarize, we only observe a significant gender gap when looking at conventional recall-based measures, a result that previous research (at least partly) attributed to the content (i.e., focusing on issues that are less relevant to women) and format (i.e., stereotype-threat and guessing) of the question batteries. For the alternative measure—discursive sophistication—any evidence for systematic differences between men and women disappears.

Explaining the (Lack of the) Gender Gap

If it is the case that women are able to close the gender gap in discursive sophistication because they are able to focus on different considerations that are salient to them when discussing their political preferences, we should observe systematic variation in the issues men and women discuss in open-ended responses. Based on the structural topic model used to compute discursive sophistication, Figure 10 displays a subset of topics that showed the largest absolute gender difference

[7] An interesting deviation, however, is the effect of survey mode. Respondents in online surveys score significantly higher on factual knowledge than in face-to-face interviews. This difference can be attributed to the fact that individuals are able to look up answers for factual knowledge questions while taking an online survey (c.f., Clifford and Jerit, 2016). For discursive sophistication, on the other hand, individuals perform better in the face-to-face survey. Open-ended answers in online surveys may be less elaborate because respondents have to manually type their responses.

in topic prevalence in the 2012 and 2016 ANES.

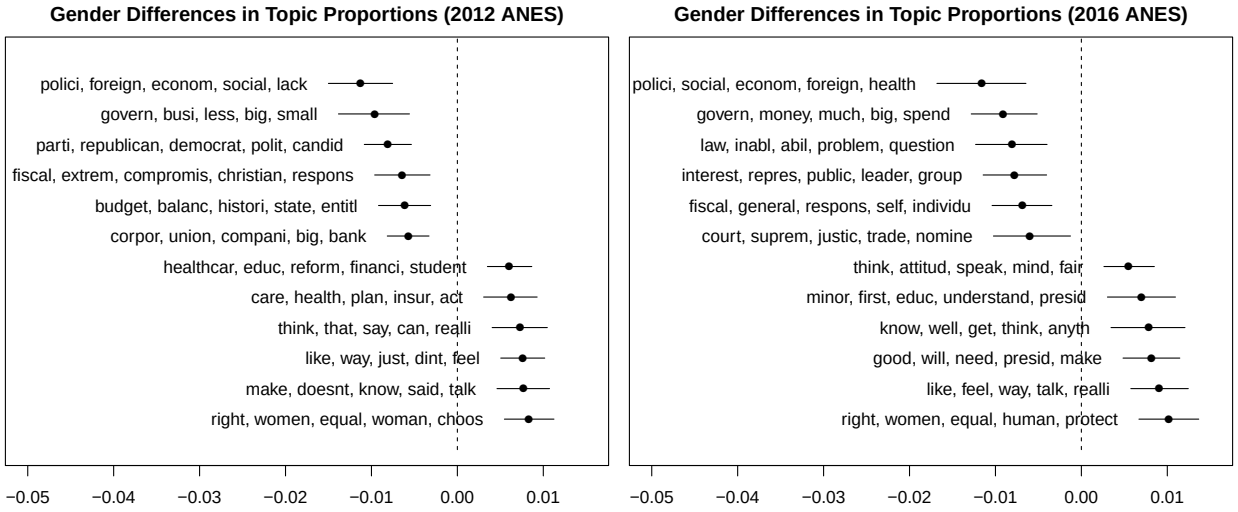


Figure 10: Gender differences in topic proportions based on the structural topic model used to compute discursive sophistication (including 95% confidence intervals). Coefficients indicate the difference in predicted topic prevalence among men and women; positive values indicate higher prevalence among women. Labels are based on the five highest probability terms related to the topic.

Positive coefficients indicate that women are more likely than men to mention a given topic, and vice versa. As such, the top five topics are more prevalent among men and the bottom five have a higher probability to be mentioned by women. Each coefficient is labeled with the five highest probability terms related to the topic to illustrate its content. Across both ANES studies, women were less likely than men to discuss foreign affairs, economic issues, or the Supreme Court. Instead, they focused on issues related to women's rights, equality, or health care. The considerations taken into account by women when discussing their political preferences are therefore clearly different from men's and—crucially—the issues raised by men happen to be more aligned with what political scientists often deem as necessary information (i.e., pertaining to the economy, institutions, elites, etc.). Yet, from a normative perspective, there is no reason to assume that one set of issues should be more important for citizens when forming their political preferences and making competent voting decisions.

Conclusion

Political scientists should worry less about pure levels of *information* and instead 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 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. In his seminal book, Zaller (1992, 21) argued that tests of factual information provide the best measure of political awareness as they "capture what has actually gotten into people's minds, which, in turn, is critical for intellectual engagement with politics." The results presented in this paper suggest that a direct examination of open-ended responses provides a viable alternative approach.

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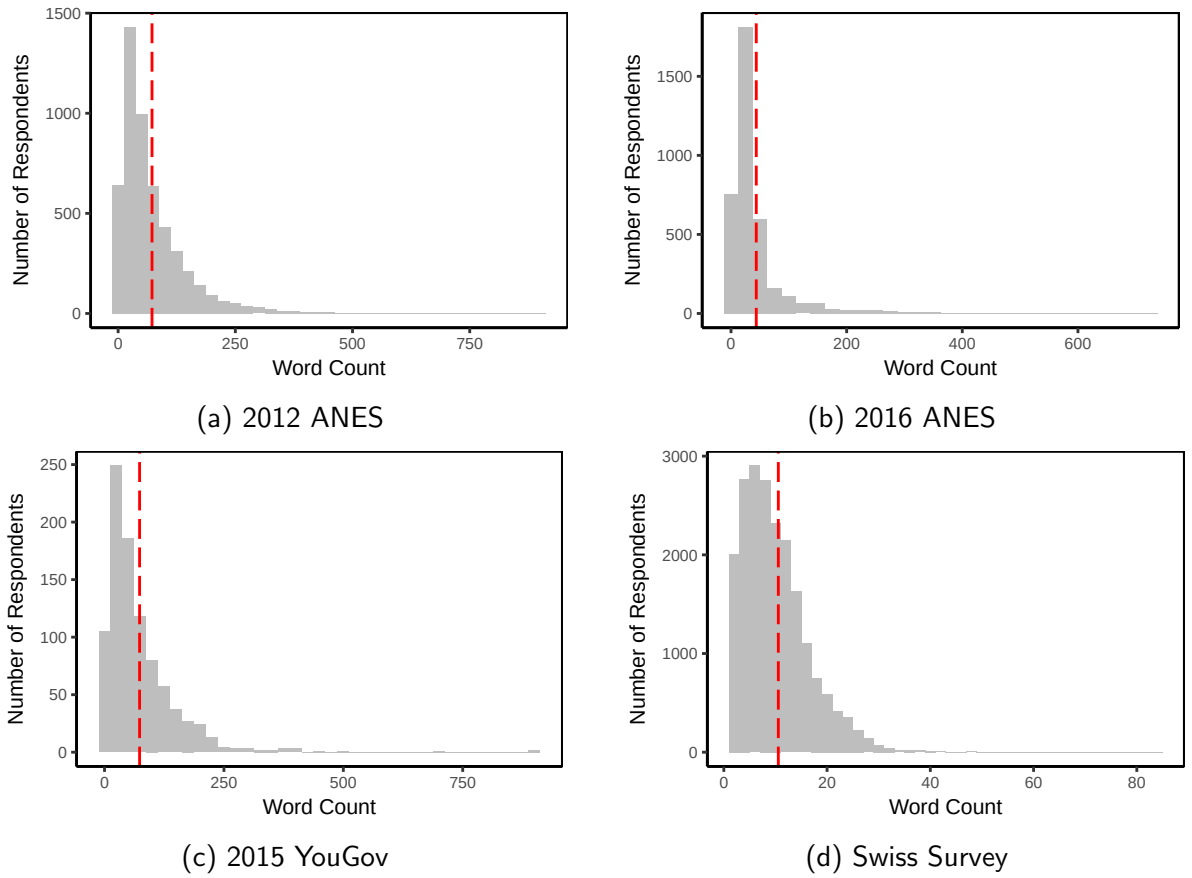
Appendix A: Detailed Information on Open-Ended Responses and Discursive Sophistication Components



(a) 2012 ANES

(b) 2016 ANES

(c) 2015 YouGov

(d) Swiss Survey

Figure A.1: Histograms of total word count in the collection of open-ended responses for each individual. The dashed red lines indicate the average response lengths in each survey.

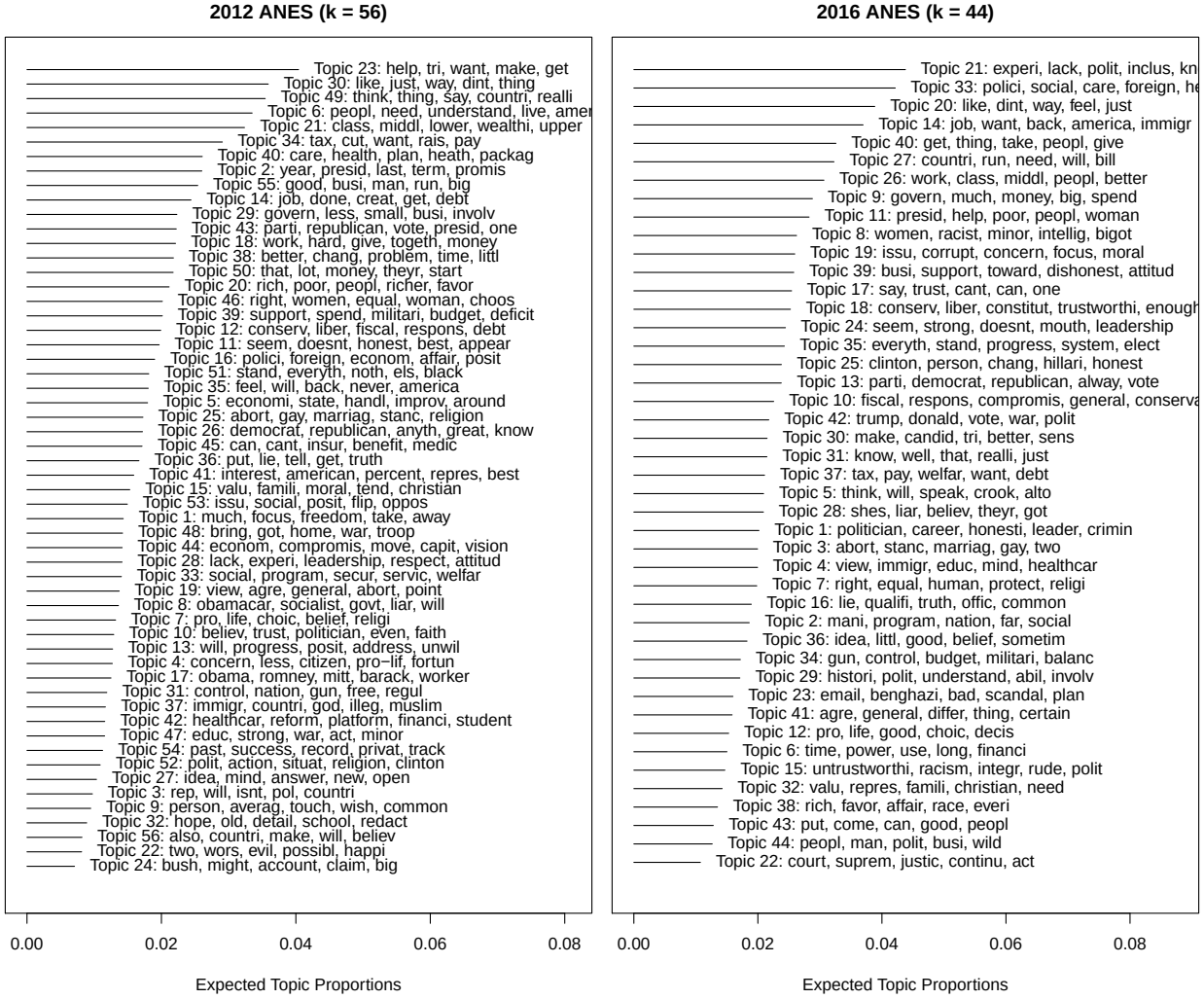


Figure A.2: Estimated topic proportions in the 2012 and 2016 ANES based on the structural topic model. See Appendix B for details on the model specification.

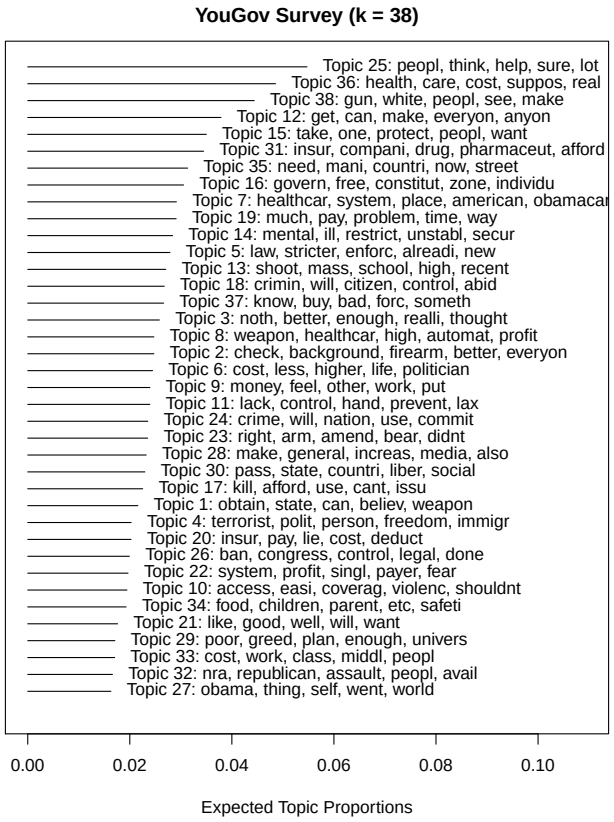


Figure A.3: Estimated topic proportions in the 2015 YouGov survey based on the structural topic model. See Appendix B for details on the model specification.

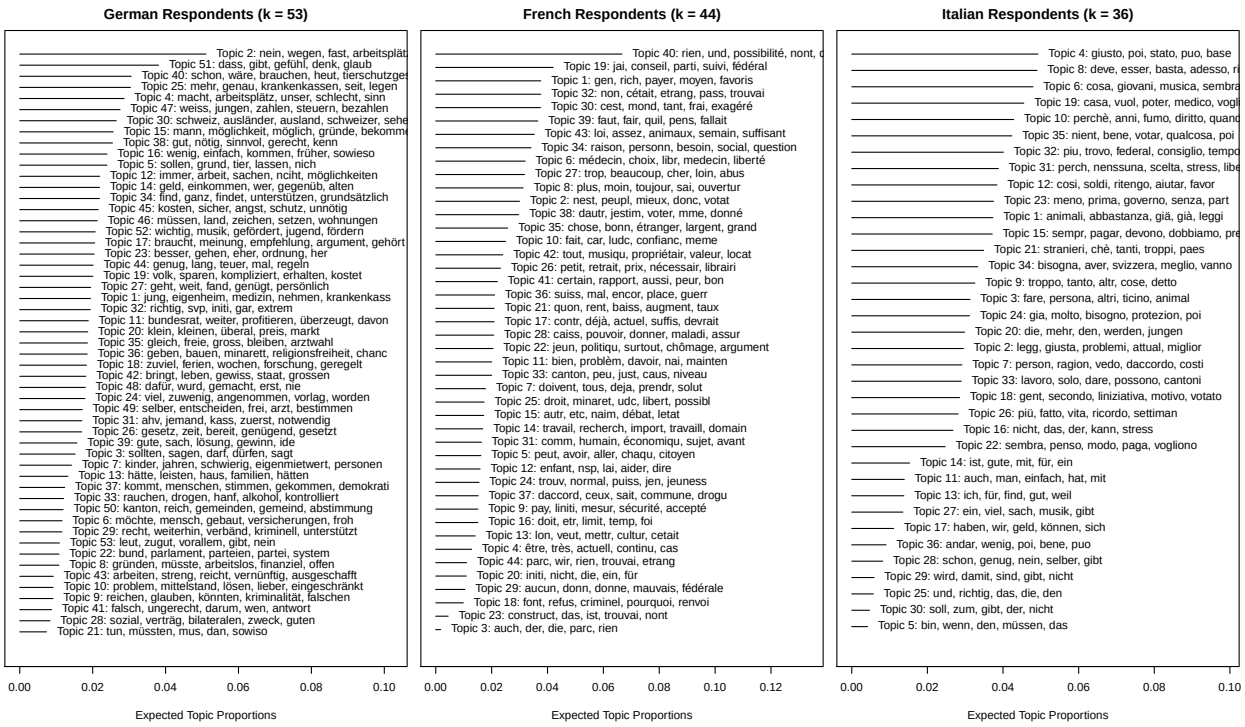
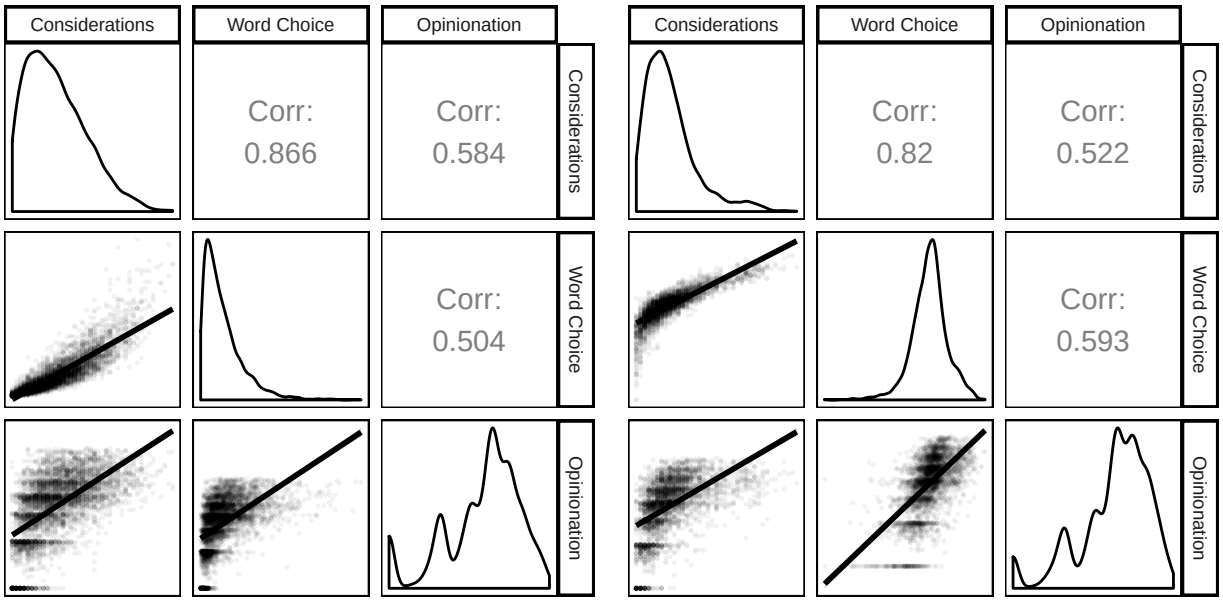
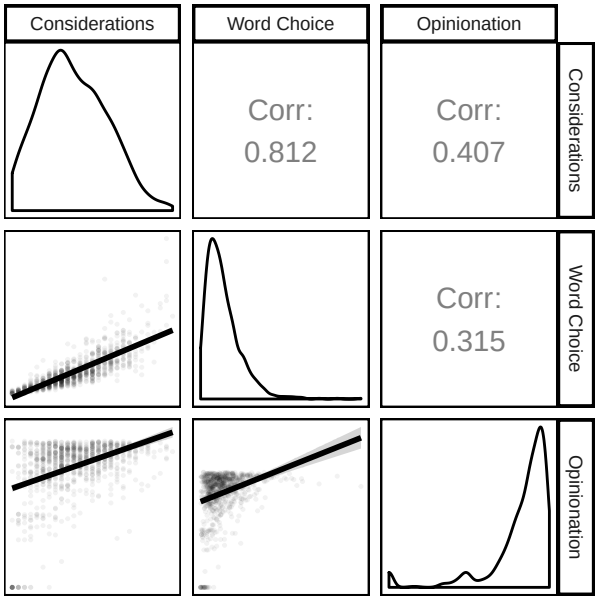


Figure A.4: Estimated topic proportions in the Swiss survey based on the structural topic model. See Appendix B for details on the model specification.

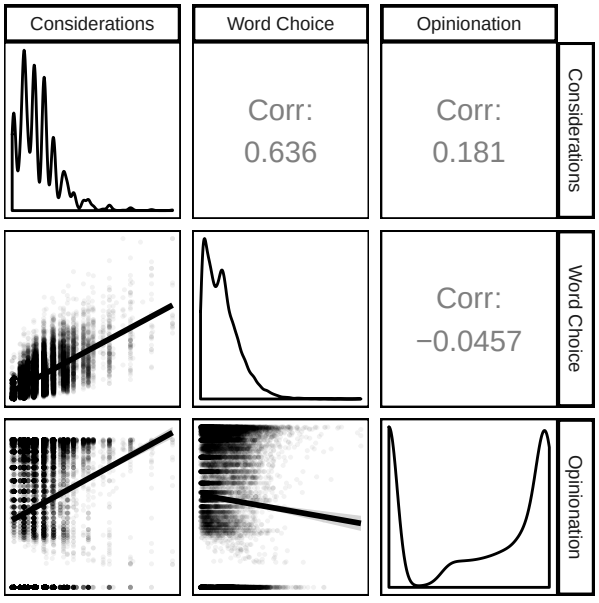


(a) 2012 ANES

(b) 2016 ANES



(c) 2015 YouGov



(d) Swiss Survey

Figure A.5: 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.

Appendix B: 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 approach, 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 (c.f., 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.

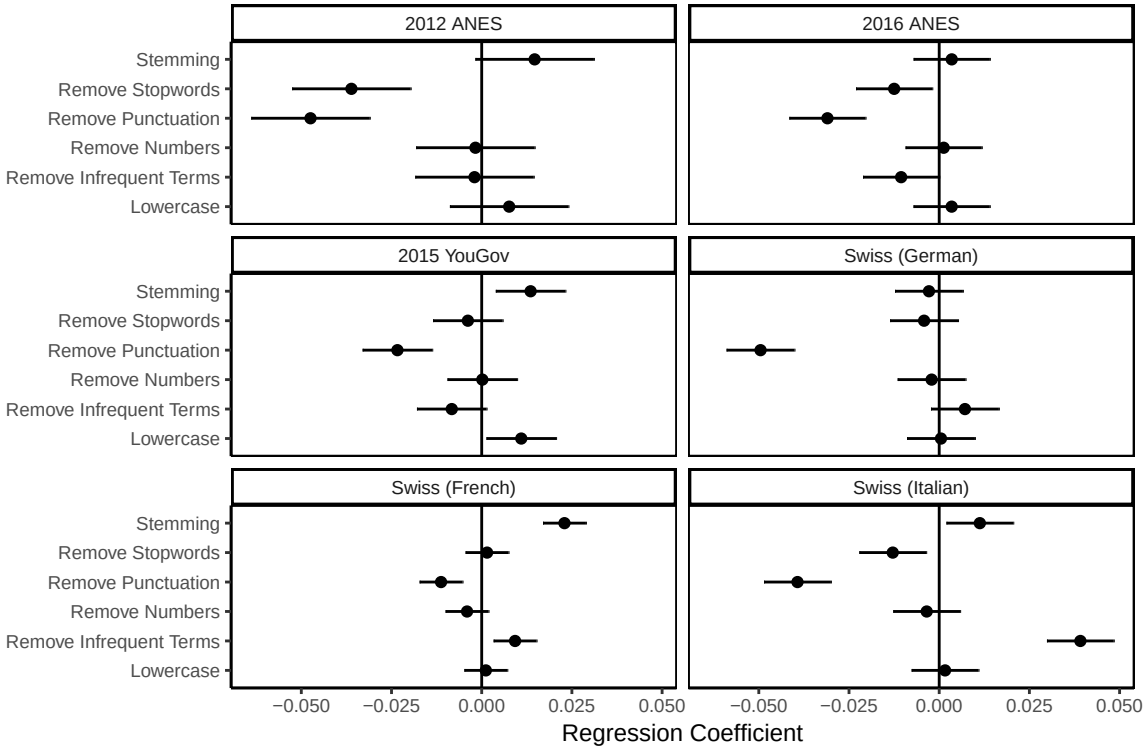


Figure B.1: PreText analysis of pre-processing decisions of open-ended responses across all datasets. Regression coefficients display the effects of each of the six pre-processing choices on the resulting preText score.

Following the procedure outlined in Denny and Spirling (2018), Figure B.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. Given that

the purpose of the topic model is to extract considerations related to political preferences, there are 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 resulting document term matrix to a computationally more manageable size 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 estimated. For all 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 B.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 plots results for alternative specifications. The upper panels compare the preferred specification 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 in the manuscript are based on this preferred specification, the substantive results are robust for alternative pre-processing regimes or varying numbers of topics.

[8] I used measures for age, gender, 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).

[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`).

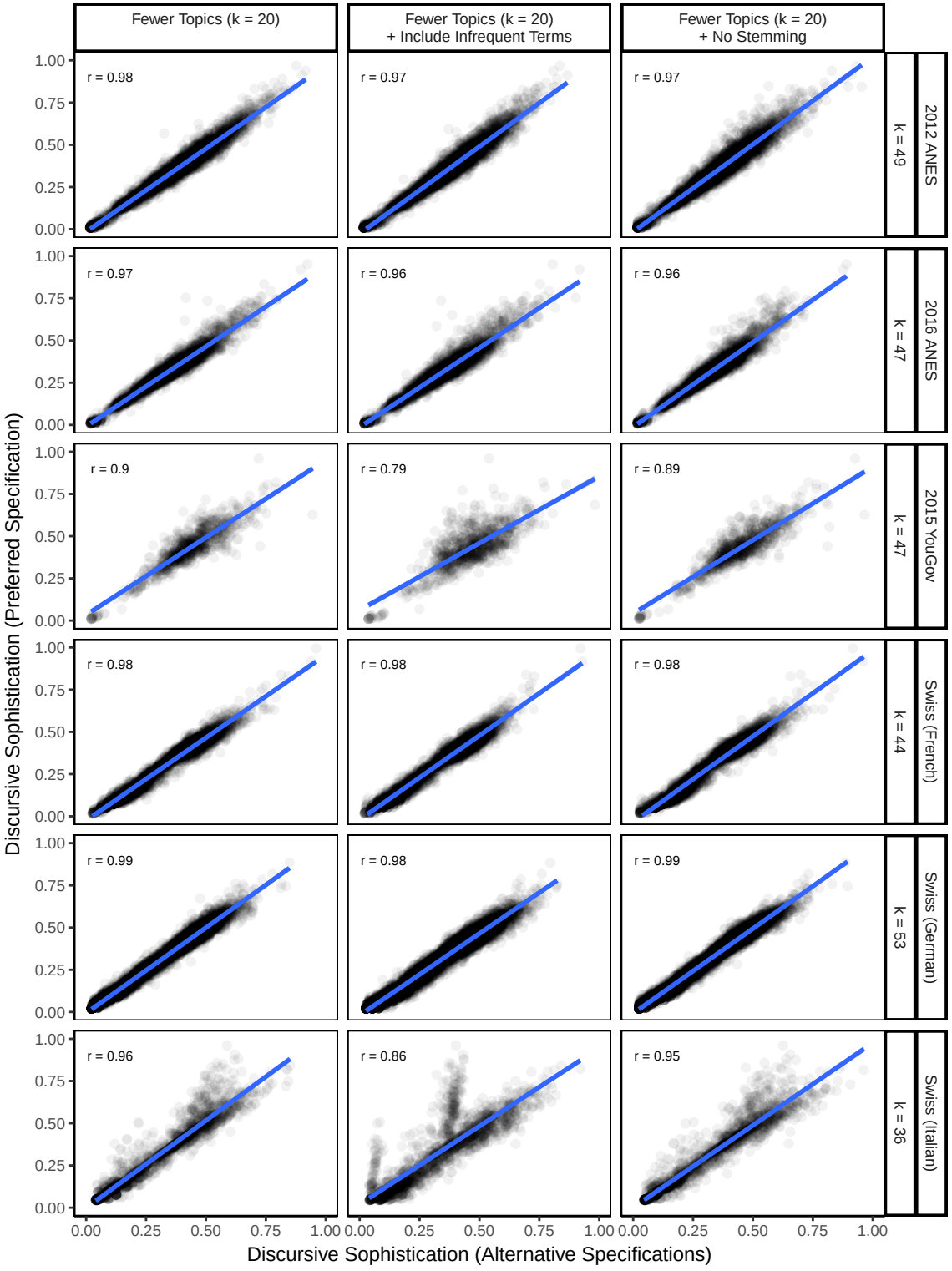


Figure B.2: Robustness of discursive sophistication measure for different pre-processing choices and topic model specifications.