

Don't Just Ask Me for Facts!

Measuring Political Sophistication using Open-Ended Responses

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Abstract

There is a broad consensus among scholars of political science and public opinion that the American electorate is not well informed about politics. However, there is no agreement in the discipline about *how to measure* how little citizens actually know. While many studies rely on simple factual political knowledge questions to assess political sophistication, others have criticized this approach from methodological and theoretical perspectives, claiming it does not provide a valid measure of the concept of interest. We propose a new measure of political sophistication based on open-ended survey responses about individual political attitudes and preferences. Using conventional political knowledge metrics and open-ended responses from the 2012 American National Election Study (ANES), we consider word count, response diversity, topic diversity, and a novel aggregate weighted measure to show that ...

Keywords: political sophistication, measurement, open-ended responses, structural topic models

Word Count: ...

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1 Introduction

One of the fundamental concepts in the study of political attitudes and behavior is political sophistication and knowledge (Converse, 1964; Delli Carpini and Keeter, 1996). While most scholars emphasize how little people know about politics, the question of how to assess individual knowledge has been subject to re-occurring scholarly debate (e.g. Mondak, 2000; Mondak and Davis, 2001; Sturgis, Allum, and Smith, 2008; DeBell, 2013; Pietryka and MacIntosh, 2013). Many analyses exclusively rely on individual levels of political knowledge measured by correctness of factual knowledge questions. However, recent research points to important differences between types of knowledge questions that have previously been disregarded (Barabas et al., 2014), such as distinguishing between policy-specific and general knowledge questions. Furthermore, scholars argue that factual political knowledge as measured in many surveys may not be theoretically relevant (Lupia, 2006, e.g., the question writer and respondent have differing world-views). Rather, the conceptualization of political sophistication should take into account how people structure their attitudes and beliefs (e.g. Luskin, 1987). As such, measuring sophistication solely based on answers to political trivia may misclassify respondents who cannot recall these facts, but do indeed have a coherent cognitive framework of political ideas.

We propose an alternative measure of political sophistication based on an individual's responses to open-ended questions about their attitudes towards major parties and presidential candidates. We make inferences about the respondents' level of political sophistication and belief constraints by focusing on *how* respondents describe their preferences and beliefs. More specifically, we consider the diversity in topics raised by respondents. Topic diversity will be measured using structural topic models (Roberts et al., 2014). Furthermore, we consider additional characteristics of individual open-ended responses, such as response length and diversity between opinions. Our aim is to assess the degree to which political attitudes are structured and expressed in a more complex manner than discernible from correctness on a factual questionnaire. We suspect that the diversity in topics a respondent discusses, or the detail with which they speak about the topics they mention, will covary with other political knowledge measures. We therefore compare the text-based measures to common factual knowledge items as well as the interviewer assessment of the respondent's political knowledge as benchmarks for political sophistication. This text based analysis will likely be conceptually closer to the actual structure and constraint of political belief

systems (see for example [Tetlock, 1983](#); [Luskin, 1987](#)) than fact based knowledge items can capture.

Overall, we hope to show that our measure of political sophistication can provide novel insights compared to conventional knowledge measures. Furthermore, developing valid measures of political sophistication based on open-ended responses will provide new opportunities for comparisons of political knowledge across time and contexts.

2 Political Knowledge and Sophistication

In his seminal study, [Converse \(1964\)](#) examined the degree to which citizens hold constrained belief systems about politics. In the paper, belief systems are defined as “a configuration of ideas and attitudes in which the elements are bound together by some form of constraint or functional interdependence” ([Converse, 1964](#), 207). The analyses showed that the majority of the electorate does not hold structured and constrained belief systems, understand abstract ideological concepts, or hold stable issue positions.

This pessimistic view regarding the competence of the US electorate has been supported in multiple subsequent analyses. [Delli Carpini and Keeter \(1996\)](#) showed that large parts of the American electorate are not sufficiently informed about politics. Furthermore, there are systematic differences in political attitudes and behavior between citizens who are well informed compared to those who are not. Such a finding is problematic from a normative perspective, since it indicates that differences in levels of information can result in unequal representation in the political system (see also [Althaus, 1998](#); [Kuklinski et al., 2000](#); [Gilens, 2001](#)). However, rather than relying on the degree to which individuals hold constrained belief systems, [Delli Carpini and Keeter \(1996\)](#), conceptualized knowledge as the awareness of key democratic values, which was measured using factual knowledge questions (see also [Carpini and Keeter, 1993](#)). A broad range of studies focused on similar factual knowledge measures as indicators of sophistication (e.g. [Zaller, 1991](#); [Jacoby, 1995](#); [Gomez and Wilson, 2001](#)). Most prominently, [Zaller \(1992\)](#) argued for the measurement of political awareness using tests of neutral factual information about politics, since they “more directly than any of the alternative measures, capture what has actually gotten into peoples minds” ([Zaller, 1992](#), 21). However, other research casts doubt on this assertion, both from methodological as well as theoretical perspectives.

Methodologically, many studies raised issues related to the validity of factual knowledge questions.

One fundamental problem discussed in the literature are potential biases due to guessing (Mondak, 2000, 2001; Mondak and Davis, 2001; Miller and Orr, 2008). Knowledge items that offer a “Don’t Know” option essentially convolute two very distinct concepts: the individual information level as well as the propensity to guess. Based on this argument, Mondak and Anderson (2004) showed that conventional knowledge measures overestimated the gender gap in political knowledge due to the fact that male respondents are more likely to take a guess if they are not fully informed (see also Pietryka and MacIntosh, 2013, for a more recent discussion of differential item functioning as an explanation for knowledge gaps). The conclusions drawn from these studies were to rely on closed rather than open-ended knowledge questions and omitting “Don’t Know” response options (but see Sturgis, Allum, and Smith, 2008; Luskin and Bullock, 2011). Other scholars further criticized open-ended factual knowledge questions such as those administered in the American National Election Study due to problematic coding rules, which do not accurately capture partial knowledge (Krosnick et al., 2008; Gibson and Caldeira, 2009; DeBell, 2013).

Focusing exclusively on factual political knowledge has also been criticized on theoretical grounds. For example, Lupia (2006) argued that the information asked for in the item batteries has no clear relevance for individual political participation. Instead, researchers should concentrate on knowledge and heuristics that directly help citizens to make competent political decisions (see also Lupia, 1994). Responses to factual knowledge questions have further been shown to be conditional on the respondents’ motivation, their partisanship, as well as monetary incentives in the survey (Prior and Lupia, 2008; Bullock et al., 2015; Prior, Sood, and Khanna, 2015). Conventional items also differ with regard to the specific dimension of political knowledge they measure (Barabas et al., 2014) and ignore important aspects such as visual cues (Prior, 2014).

Overall, the studies discussed so far suggest that the conventional item batteries have problematic measurement properties. More importantly, however, some authors raised doubts whether factual political knowledge actually captures the phenomena that are ultimately most interesting for scholars of public opinion. Converse (1964) initially discussed the level of constraint in political beliefs rather than isolated pieces of factual information about the political system. Other scholars emphasized similar conceptualizations of political sophistication. Tetlock (1983), for example, used the term *integrative complexity* to describe the variety and integration of considerations related to an issue. It is important to note that here, sophistication is not based on the content (or accuracy) of related considerations but rather on its *struc-*

ture. Luskin (1987) also defined political sophistication based on the structure of individual belief systems. More specifically, the author argues that belief systems 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. 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).

Such a conceptualization of political sophistication seems theoretically more interesting and useful than simple tests of factual information. However, why does such a large body of literature in political science and public opinion then only focus on knowledge questions? One answer to this question is provided in the early study by Converse (1964, 206), who stated: “what is important to study cannot be measured and that what can be measured is not important to study.” Factual political knowledge is much easier to assess (albeit not perfectly) than the structure of political belief systems. Indeed, Tetlock (1983) had to rely on manual coding of policy statements of US senators in order to assess their degree of integrative complexity. Such manual coding procedures, however, become increasingly infeasible with large amounts of text data (such as in large surveys). Advances in automated text analyses, on the other hand, provide us with the necessary tools to derive a measure of political sophistication that captures the theoretical arguments put forward by Converse (1964), Tetlock (1983) and Luskin (1987), without the necessity of human coders. In the following, we will derive and explore such a measure based on open-ended survey responses.

3 Measurement Approach

We propose that the the dimensions laid out by Luskin (1987) — size, range, and constraint of political belief systems — can be measured by directly examining how individuals describe their political attitudes and beliefs. More specifically, we will consider individual responses to a set of open-ended questions where respondents were asked to describe aspects that they liked and disliked about both major parties and presidential candidates before the 2012 US election. Considering likes and dislikes separately, there are a total number of 8 open-ended responses where individuals describe their beliefs and attitudes towards

political actors. Table 1 summarizes how different characteristics of open-ended responses can be matched to the aspects of political sophistication discussed previously.

Dimension of political belief system	Characteristic of open-ended response
Size (number of cognitions)	Overall length of responses
Range (dispersion of cognitions over categories)	Diversity in topics raised in responses
Constraint (interconnectedness of cognitions)	Diversity in response length between items

Table 1: Aspects of political sophistication and its measure in open-ended responses.

The size of the political belief system can simply be captured as the overall length of individual responses. If people possess a larger number of considerations related to political parties and candidates, then this should be reflected in the overall collection of their responses describing their attitudes and beliefs.

The range of cognitions over categories could be measured as the diversity in topics raised in individual responses. If individuals hold more diverse cognitions towards political actors, we should observe that they address a wider range of topics in their responses, rather than focusing on an isolated issue to describe their preferences.

The last dimension, the degree of constraint or interconnectedness of cognitions, is more difficult to capture in an automated way based on characteristics of an open-ended response. While we cannot directly measure the interconnectedness of cognitions, we argue that the diversity in response length between items could be used as a possible proxy. In order to see why this is the case, consider two hypothetical individuals who possess a belief system of similar size and range. Accordingly, we would expect that their open-ended responses should be of similar overall length and have a comparable degree of diversity in topics. Now, suppose that for one individual, the belief system is highly interconnected, and for the other individual it is not. Holding the overall length and topic diversity of their set of responses constant, higher interconnectedness allows individuals to spread their response topics more homogeneously across items. In other words, if considerations were not interconnected, then responding to likes as well as dislikes (for party/candidates of in/out-party), would require an increase in the overall length and diversity of the response. As such, distributing responses across different items indicates a higher diversity in opinions and can therefore be seen as a proxy for interconnectedness of cognitions.

Of course, the measurement strategy derived here makes strong implicit assumptions about the nature of political belief systems. However, the sole purpose of this short discussion was to suggest potential links

between the theoretical construct and measurable characteristics of open-ended responses. Ultimately, it is an empirical question, as to whether these characteristics provide valid measures of political sophistication. Before we turn to the issue of validation, we will discuss the data and methods used in the analyses in more detail.

4 Data and Methods

We use survey data from the 2012 American National Election Study in order to demonstrate and validate our measure of political sophistication. The dataset consists of 5914 adults (2054 of which participated in face-to-face interviews while the remaining 3860 participated in a representative online survey). While both samples differ slightly with regards to the inclusion of some specific variables, we will mostly rely on the pooled dataset purpose of our analysis.

The sophistication measure is based on open-ended questions in which respondents were asked 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 and were probed by the interviewer asking “anything else?” until the respondent answered no. All open-ended responses were pre-processed by correcting spelling errors using an implementation of the Aspell spell checking algorithm in R (www.aspell.net), and deleting individuals who responded in Spanish (228 individuals).

As discussed above, we consider three different aspects of the open-ended responses to capture the distinct dimensions of political sophistication discussed above: size, range, and constraint of the political belief system. The **size** of the belief system is measured as the word count for each individual over all prompts:

$$\text{size}_i = \log \left(\sum_{j=1}^J n_{ij} \right), \quad (1)$$

where n_{ij} is the number of words in the response of individual i in response to question j . J denotes the set of all likes/dislikes items. We use the log of the count linearize the distribution of responses. The **range** of the belief system is captured as the diversity in topics raised by each respondents. We conceptualize

diversity as the Shannon-entropy of topic proportions (Shannon, 1948; Munger et al., 2016):¹

$$\text{range}_i = \sum_{k=1}^K \theta_{ik} \log_2(\theta_{ik}), \quad (2)$$

where θ_{ik} denotes the predicted proportion of topic k in the collection of responses by individual i . The variable ranges from 0 (entire response focuses on single topic), to $\log_2(K = 72)$ (every topic has the same proportion). As a proxy for **constraint**, we rely on the same logic and measure the diversity in opinions raised across item by computing the Shannon-entropy of the proportions of response lengths for each likes/dislikes question:

$$\text{constraint}_i = \sum_{j=1}^J p_{ij} \log_2(p_{ij}), \quad (3)$$

where $p_{ij} = \frac{n_{ij}}{\sum_{j=1}^J n_{ij}}$ is the proportion of words in the response of individual i to question j relative to the overall size of the individuals' response. Again, the variable ranges from 0 (only one question was answered) to $\log_2(J = 8)$ (all questions were answered with the same word length per answer).

Together, the three measures form a composite metric of political sophistication. We decided to combine the measures in a multiplicative rather than an additive fashion, because sophistication can be seen as *conjunctive* (see Luskin, 1987). In other words, the separate elements are only effective in combination and are not simple substitutes of each other:

$$\text{sophistication}_i = (\text{size}_i + 1) * (\text{range}_i + 1) * (\text{constraint}_i + 1). \quad (4)$$

Note that we added +1 to each term in order to assure that the minimum of each individual variable is 1 rather than 0. This way, we are still able to capture variation in sophistication if one of the elements is at its minimum.

We consider a number of conventional political knowledge measures for comparison with our metrics. The variables are summarized in Table 2. The first three measures are based on additive scales indicating

¹The structural topic model was estimated using the `stm` package in R (Roberts et al., 2014). The number of topics was selected using the algorithm of Lee and Mimno (2014) and the model was estimated via spectral initialization to address the issue of multi-modality (see Roberts, Stewart, and Tingley, 2014, for details). We 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 is equivalent to the procedure model specification described in Roberts et al. (2014). We estimated a total number of 72 topics. While we cannot discuss the topics in detail due to limited space, it is worth noting that the results reported hereafter are robust for model specifications with fewer numbers of topics.

Canonical Political Knowledge Metric	Abridged Sample Questions	Name in Figures
Knowledge of Office Recognition	Who is the Speaker of the House? Who is the Vice President?	Political Knowledge: Office Recognition
Knowledge of U.S. Political Facts	How many times can someone be elected president? What is the size of the federal deficit?	Political Knowledge: Factual Knowledge
Knowledge of Majorities in Congress	What party has the most members in the U.S Senate?	Political Knowledge: Majorities in Congress
Pre-Interview Political Knowledge Interviewer Evaluation	—	Political Knowledge: Knowledge Pre Evaluation
Post-Interview Political Knowledge Interviewer Evaluation	—	Political Knowledge: Knowledge Pre Evaluation
Pre-Interview Intelligence Interviewer Evaluation	—	Political Knowledge: Intelligence Pre Evaluation
Post-Interview Intelligence Interviewer Evaluation	—	Political Knowledge: Intelligence Pre Evaluation
Education Level	(1) Less than high school credential (2) High School credential ... (5) Graduate School	Political Knowledge: Education Level

Table 2: Methods: Feature Extraction

the number of correct responses. The interviewer evaluation (only available in face-to-face sample) is based on a five-point scale that was recorded after the interviews (pre-election and post-election wave).

Furthermore, the analyses outlined below will include several control variables such as media exposure, frequency of political discussions, gender, age, race, religiosity, ideology, party identification, and interview mode (face-to-face vs. online).

5 Descriptive Results

As a first step, we will examine the characteristics of open-ended responses our measure of political sophistication is composed of. Figure 1 displays the word count as well as the logged word count of the collection of open-ended responses for each individual.

The distribution of raw word count is highly skewed. Most respondents only provide very 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)

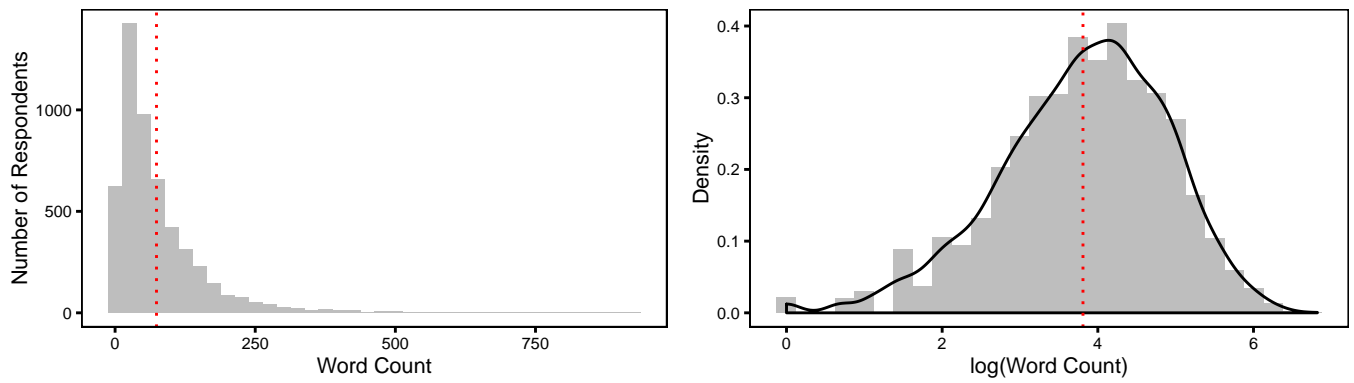


Figure 1: Distribution of Response Lengths

Figure 2 presents histograms of the remaining two diversity measures as well as the composite index of political sophistication. Diversity across topics (left panel) is skewed and overall relatively large. Only few respondents appeared to focus on a very selective number of topics. As we will further discuss below, this finding can be partly attributed to the way topic proportions are estimated in the structural topic model. The distribution of response diversity (or opinion/item diversity, see middle panel), on the other hand, indicates that a large proportion of respondents only answered on open-ended question, which leads to a response diversity of 0. Looking at the histogram on the right in Figure 2, we can see that the

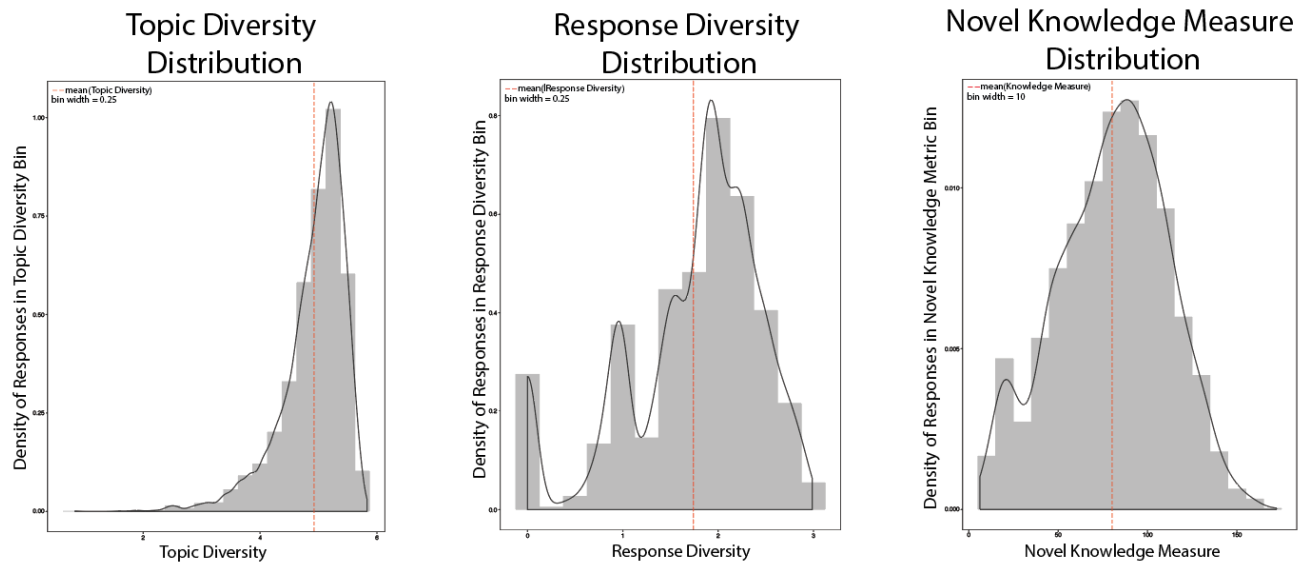


Figure 2: Diversity Distributions and Sophistication Measure

combined measure of sophistication is approximately normally distributed and captures a large amount of variance between individuals. In the following section we will examine whether this variance is conceptually meaningful.

6 Validation Performance

As a first step, we want to compare our measure with conventional knowledge indices. Figure 3 displays a correlation matrix of traditional measures as well as the individual open-ended response characteristics and the composite measure of sophistication.

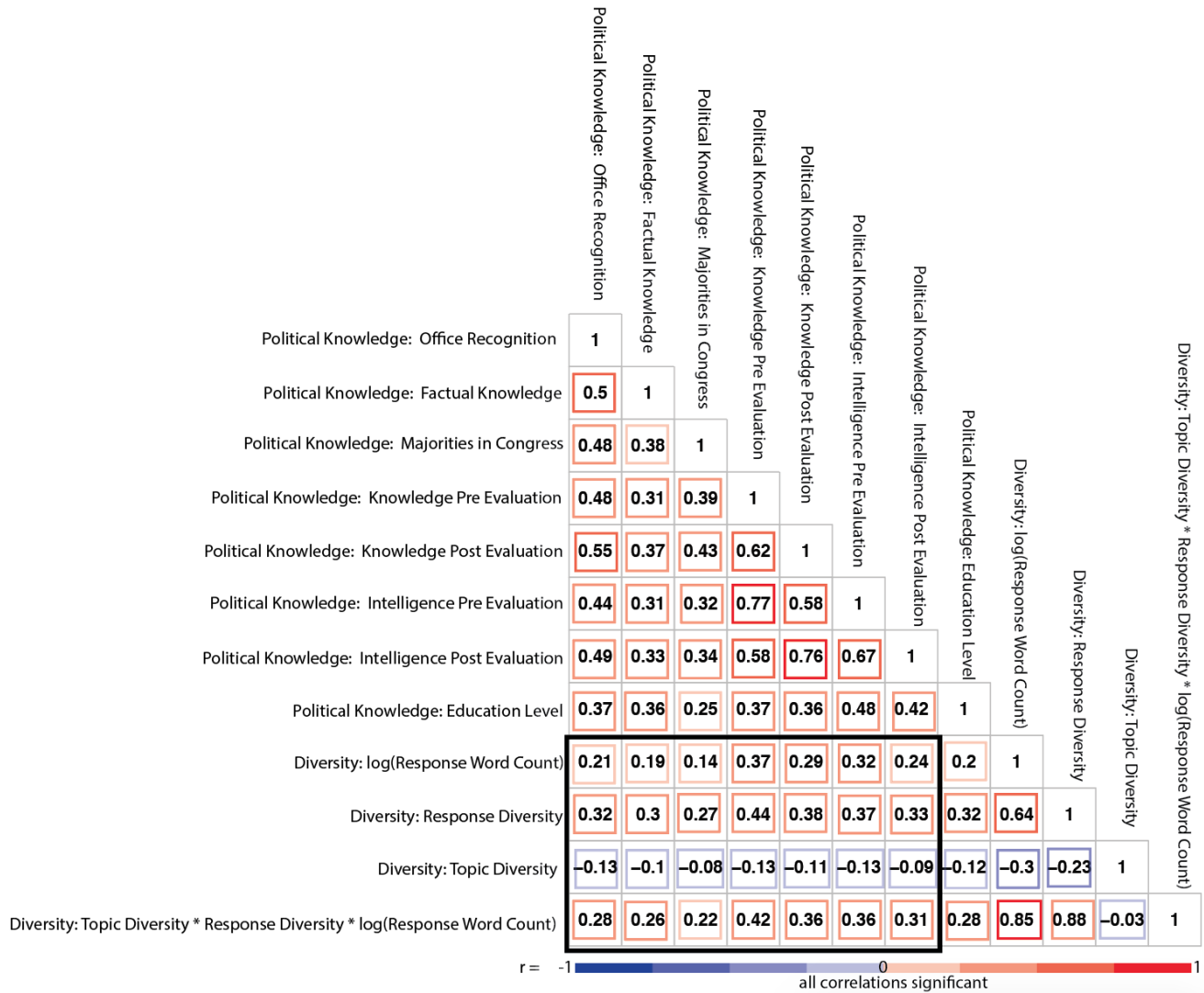


Figure 3: Correlation Plot of Knowledge Measures

The bold black box highlights the correlations between the political knowledge measures and the calculated diversity measures. Our first observation is that political knowledge measures are modestly to strongly correlated with on another. This finding is interesting; while it confirms that these measures do covary to some degree, they are not all capturing the same types of knowledge, as might be expected. Next, we see that Topic Diversity has low negative correlation with all other measures. This suggests that

topic diversity alone, in this context, is not an appropriate measure of political knowledge. We also see the Response Diversity and the composite final diversity metric have stronger correlations with the political knowledge measures than $\log(\text{Response Word Count})$, suggesting that these two diversity measures are not strictly due to the length of the open-ended responses. Finally, we see that our final composite diversity score correlates across other political knowledge measures on the same order of magnitude as Factual Knowledge and Majorities in Congress, yet don't have especially high correlation with either. This is evidence that our composite diversity score is worthy of consideration among standard political knowledge measures, and captures independent information.

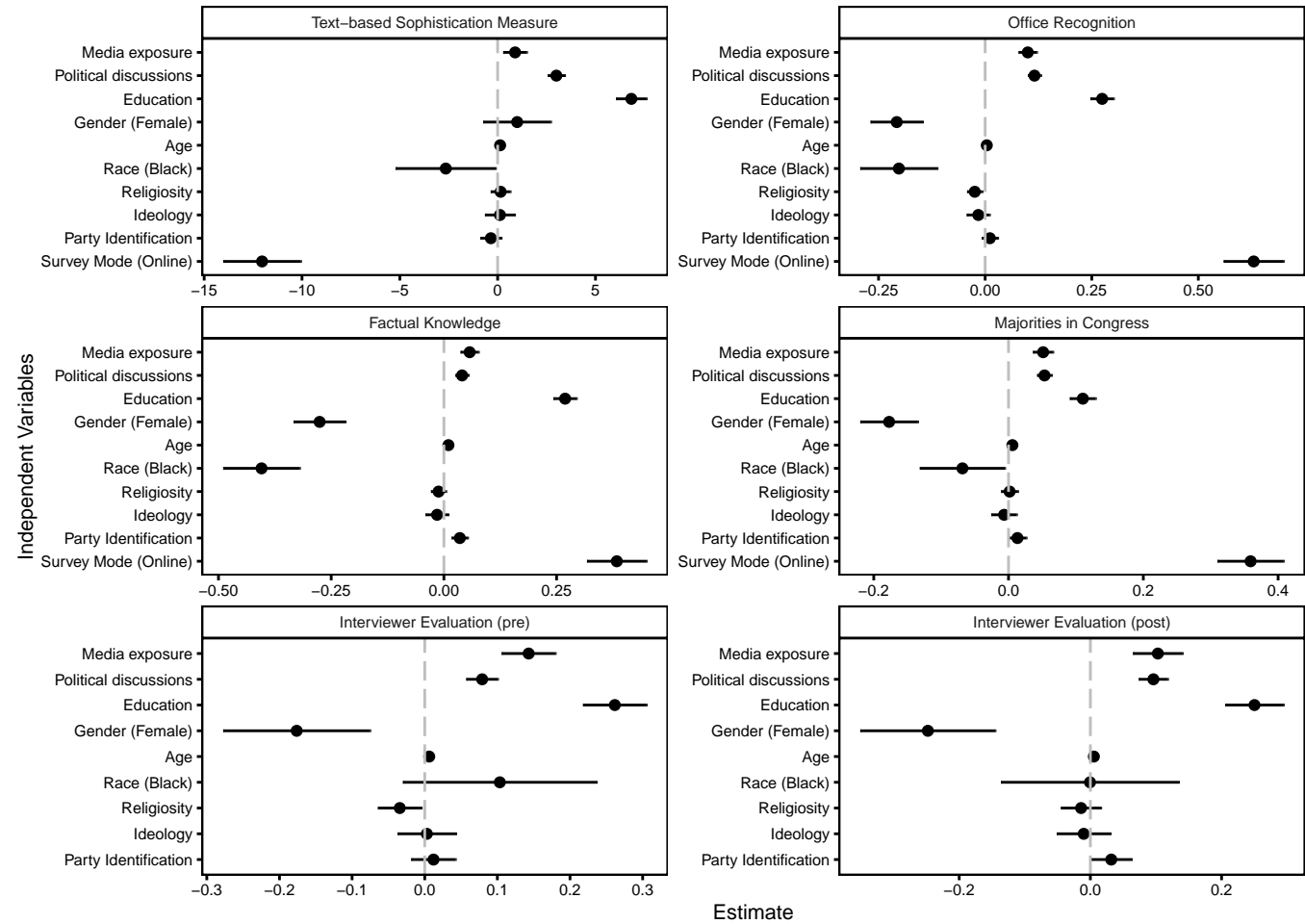


Figure 4: Comparing Determinants of Political Sophistication

7 Discussion and Conclusion

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Appendix: Samples of Open-Ended Responses for High/Low Sophistication

	Minimum	Maximum
Case ID	4258	1905
Obama (likes)	-1 Inapplicable	He's more likely to continue to support biomedical research as president, I think he's stronger on domestic issues, funding domestic programs, less likely to be influenced by corporate lobby, as President has shown not to be, less likely to make poor decisions regarding our occupation of other countries which we can ill afford, he'd be inclined to support education and infrastructure and more likely to support seeking alternative energy sources
Obama (dislikes)	-1 Inapplicable	I don't think that he is a realist with regards to the terrorist threats, he's attempted to be too diplomatic with his foreign policy with regard to terrorism and terrorist threats, He's a very good politician and that's sort of a detriment, his 1st term he tried too much to work 'across the aisle' and didn't realize the how steadfast and polarized the opposition was, I would like to see more strength in his resolve of his views, he was too willing to compromise his beliefs to get things done, I don't necessarily agree with the way he's handling his support of Israel, could be more openly supportive than he is
Romney (likes)	-1 Inapplicable	He has consistently been openly supportive of Israel and the Israeli state. Israel is right to exist in that region. I believe that his experience in economics and investment probably did prepare him to be an efficient leader and someone who knows a lot about economic policy. He seems like a nice family man, politically I can't think of a lot more than that.
Romney (dislikes)	-1 Inapplicable	I don't trust him at all. I think he's an out of touch wealthy politician who would say anything to get elected and has been caught on tape essentially admitting in so many words that he is a racist. He chose Paul Ryan as a running mate, that decision in and of itself was enough to make me know I don't want to vote for him. He fundamentally believes that more than 50 percent percent of this country are shiftless layabouts who aren't interested in working. That's obviously the view of someone whose mind is out of touch with what's going on in this country. He's a misogynist.
Democratic Compassion party (likes)		They generally are supportive of domestic spending, specifically on research and technology, and education. They tend to lean toward a more reserved approach to foreign policy, less aggressive, they tend to be people who are more empathetic and care for their fellow man, which is mostly good
Democratic party (dislikes)	-1 Inapplicable	They tend to be faster to raise taxes. They have a tendency toward extreme idealism. That can be dangerous because not everyone wants to be or can be saved by entitlement programs.
Republican party (likes)	-1 Inapplicable	They have adopted this systematic approach towards the support of Israel. Their logic and reason behind it are poor, but I agree with the support. Fiscal conservatism, in theory, is a good thing. It's good to make smart decisions about spending and not frivolously spend money. The stance to support small businesses is encouraging, but a disingenuous party platform.
Republican party (dislikes)	-1 Inapplicable	I think the modern Republican party has been hijacked by Christian conservatives who set policy based on their religious beliefs. In addition, a wave of back lash political support in opposition to Obama spawned this tea party movement, which is just an anti-entitlement, anti-gay, pro-guns and God grassroots campaign that has taken over.

Table 3: Example of open-ended responses for minimum and maximum score of political sophistication measure (among all responses). Note that these are the raw responses without any pre-processing (such as spell-checking, removal of terms like "-1 Inapplicable", removal of punctuation, stemming, etc.),

	Minimum	Maximum
Case ID	3093	4115
Obama (likes)	-1 Inapplicable	i think he has done well so far
Obama (dislikes)	Shady. He left his spot in Illinois and someone is in prison for trying to sell it. Wonder how he got it. Probably the same way he got the Nobel. Who's in charger of USDA school program? Who is surgeon General? How they get there? What are their true credentials prior to current positions? Reeks.	way things are going with education
Romney (likes)	-1 Inapplicable	his health policy outlooks, but it also hinders itself as well. his pro-life opinion
Romney (dislikes)	-1 Inapplicable	personality a lot of his policies
Democratic party (likes)	-1 Inapplicable	i like their ideas they are for the people
Democratic party (dislikes)	They care about the stupidest stuff	sometimes i wonder if progress can occur
Republican party (likes)	-1 Inapplicable	my religious beliefs of Christianity tend to follow many of their thoughts
Republican party (dislikes)	Stewards for the rich and big business	soemtimes they don't make sense or have just never been 'the right mix' to make me want to vote for them

Table 4: Example of open-ended responses for minimum and maximum score of political sophistication measure (only responses between total length of 50 and 100 words). Note that these are the raw responses without any pre-processing (such as spell-checking, removal of terms like "-1 Inapplicable", removal of punctuation, stemming, etc.).