ONLINE APPENDIX: ESTIMATING INDIVIDUALS' POLITICAL PERCEPTIONS WHILE ADJUSTING FOR DIFFERENTIAL ITEM FUNCTIONING

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A1. Description of Vignette Items

This appendix presents survey question wordings for the vignettes used in the paper. It also briefly describes the motivation behind this particular set of vignette descriptions and suggests some possible future avenues for research about the most appropriate and useful specifications for these types of vignette items.

For each of the six vignette rating questions, respondents were presented with a seven point response scale on which to rate the hypothetical individual's ideology. The response options for this scale were the same as those used for rating the ideology of actual political actors and also for rating their own ideology: 1=Very Liberal, 2=Liberal, 3=Somewhat Liberal, 4=Middle of the Road, 5=Somewhat Conservative, 6=Conservative, 7=Very Conservative. The names given to each of the hypothetical vignette individuals were independently randomized (without replacement) from the following list: Robert Moser, Patrick McDonald, Brian Roberts, Bethany Albertson, John Bullock, and Wendy Hunter. As discussed in the paper (see footnote 4), the assignment of these names to specific vignettes did not appear to have any discernible impact on respondents' ratings.

The question wordings, including the introductory text for this part of the survey, are below.

In this section, we will describe the political views of several different individuals.

On each of the following pages, please read the description of the individual's views then tell us how you would rate the individual's ideology on a scale ranging from "Very Liberal" to "Very Conservative".

[NAMERAND1] has the following policy positions:

- opposes building a wall along the Mexico-US border
- supports raising the federal minimum wage to $12 an hour by 2020
- supports always allowing a woman to obtain an abortion as a matter of choice
- opposes repealing the Affordable Care Act of 2009 (also known as Obamacare)
- supports giving the Environmental Protection Agency power to regulate Carbon Dioxide emissions

[NAMERAND2] has the following policy positions:

- supports a ban on assault rifles
- supports admitting refugees from Syria
- supports allowing gays and lesbians to marry legally
- opposes making all abortions illegal in all circumstances
- opposes using affirmative action to ensure a diverse workplace or educational setting

[NAMERAND3] has the following policy positions:

- opposes a ban on assault rifles
- opposes raising the federal minimum wage to $12 an hour by 2020
- supports allowing gays and lesbians to marry legally
- supports eliminating mandatory minimum sentences for non-violent drug offenders
- supports giving Environmental Protection Agency power to regulate Carbon Dioxide emissions

[NAMERAND4] has the following policy positions:

- opposes requiring background checks for all gun sales, including at gun shows and over the internet
- opposes admitting refugees from Syria
- supports eliminating mandatory minimum sentences for non-violent drug offenders
- opposes raising the required fuel efficiency for the average automobile from 25 mpg to 35 mpg
- supports using affirmative action to ensure a diverse workplace or educational setting

[NAMERAND5] has the following policy positions:

- opposes a ban on assault rifles
- opposes granting legal status to all illegal immigrants who have held jobs and paid taxes for at least 3 years, and not been convicted of any felony crimes
- opposes always allowing a woman to obtain an abortion as a matter of choice
- supports repealing the Affordable Care Act of 2009 (also known as Obamacare)
- supports raising the required fuel efficiency for the average automobile from 25 mpg to 35 mpg

[NAMERAND6] has the following policy positions:

- opposes requiring background checks for all gun sales, including at gun shows and over the internet
- opposes allowing gays and lesbians to marry legally
- supports making abortions illegal in all circumstances
- supports repealing the Affordable Care Act of 2009 (also known as Obamacare)
- opposes giving Environmental Protection Agency power to regulate Carbon Dioxide emissions

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The particular mix of policy positions described for each of the six vignettes were chosen primarily with the aim of covering a relatively wide range of ideological types. For example, there are vignettes that are described as taking the same side (either liberal or conservative) on all of the policies listed for them as well as those who take mostly liberal, mostly conservative, and the same number of liberal and conservative positions.

The goal here was to have respondents rate an ideologically diverse set of hypothetical individuals so that each respondent would indicate how she would use the ideological scale to rate each of a wide variety of political stimuli. Had these vignettes all held similarly liberal or conservative positions, it would be more difficult to estimate, for example, the relationship between a stimulus's true underlying ideology and a respondent's rating of the stimulus.

One avenue for future study regarding these vignette designs could be how people respond to different combinations of policy stances. For example, one could examine the actual positions taken by either political elites (e.g. legislators, candidates, etc.) or by ordinary citizens (for example, by looking at the stated positions across a variety of policies of respondents to surveys such as the CCES). It is likely that for a given set of six different policies, there are certain combinations of positions (e.g. liberal position on policies 1, 2 and 3; conservative positions on policies 4, 5, and 6) that are more or less common than other combinations, even among those with the same number of liberal stances. It might be interesting to see

whether respondents respond differently when evaluating more or less typical mixes of positions. Furthermore, it could be interesting to see how much respondents' ratings are driven simply by the number of liberal and conservative positions described for a given vignette and to what extent this depends on the specific policies on which these positions are taken. In the present study, there were vignettes that took the conservative position on 0, 1, 2, 3, 4, and 5 out of 5 policies. For example, would respondents have rated a vignette differently that took 4 of 5 liberal positions, but where the policies listed were different than the particular ones described for that vignette in this study? This could show to what extent people think of ideology in terms of "percent liberal" versus a more nuanced conception that might take into account how liberal or conservative particular policies are.

Overall, the results here represent a first cut at these sorts of analysis. Future work can propose different types of vignettes. To the extent that these studies show different results, this could provide other useful findings about how people perceive the ideological space of American politics.

A2. Comparing Aldrich-McKelvey Vignette Anchors Estimates to Policy-Based Ideal Point Estimates

As a test of how much the estimates of the vignette anchors model differ from policy-based estimates of ideology for politicians and vignettes, I used data on the positions taken by Clinton, Trump and Obama on various policies included in the UT CCES module (policies that were also those on which the hypothetical individuals described in the vignettes took positions on) from Dun and Jessee (N.d.), who code presidential candidates' stances the specific policies that respondents to the 2012 and 2016 CCES were asked to take binary positions on. This allows for the estimation of policy-based ideology for these candidates as well as for each of the six hypothetical individuals described in the vignettes using a standard ideal point model. The vignette ideal points are estimated based on the positions each vignette describes on the five policies listed (see Section A1 above). A matrix of the positions of respondents, political actors, and each of the six vignettes on all of the binary policy items available from the 2016 CCES was constructed and used to estimate a one-dimensional ideal point model with the `ideal` function in the `pscl` R package (Jackman, 2009).

It should be noted that because the other political actors used in the paper's survey (the Democratic Party, the Republican Party, and the Supreme Court) are not individuals, it is harder to describe their policy positions in this way and they were not included in this ideal point analysis. Furthermore, because the policy positions taken by Obama were coded based on data collected for the 2012 CCES items (the University of Texas module of the 2016 CCES is used for analyses in the paper), Obama has fewer of the 40 policies coded (9) than Clinton (28) and Trump (31). Each of the vignettes is listed as taking a position on 5 policies.[1]

[1]For some reason, the item on affirmative action, while listed in the preliminary common content for the 2016 CCES, appears to have been dropped from the final version of the survey. Although vignettes 2 and 4 were described to respondents as having positions on

The goal here is to assess how similar the perception-based measures from the vignette anchors model are to those estimated based on actual policy positions rather than perceptions. Figure A1 plots these estimates from both models. Specifically, the left pane shows the average estimated perception of Obama, Clinton, and Trump across all respondents as well as the estimated positions of each of the vignettes, all from the vignette anchors model in the paper (recall that each respondents' perception of each politician is estimated in this model, so we plot the average perception here). The right pane shows estimated ideological positions (ideal points) for Obama, Clinton and Trump as well as each of the vignettes, all based on actual positions taken on the specific policies in the 2016 CCES. To allow for easier comparison to the estimates from the vignette anchors model, the ideal point model is identified by fixing the mean and variance of the vignette positions to 0 and 1.

Overall, these estimates are quite similar. Obama and Clinton are estimated to take liberal positions, while Trump is estimated to be conservative in both of the models. The positions estimated for each of the vignettes are also similar between the two models, albeit with Vignette 5 being estimated as more liberal than Vignette 4 in the policy-based ideal point model, while these are reversed in the vignette anchors model. There is, however, a significant amount of uncertainty for the relative ordering of these two parameters.[2] Moreover, the positions of the politicians relative to those of the vignettes is similar between the two models, with Obama and Clinton being estimated to take positions close to Vignette 1 and Trump taking a position close to Vignette 6. In the vignette anchors model, Trump's position is actually estimated to be closer to Vignette 5 than to Vignette 6, but again it is unclear

this policy, these positions are not coded for the purposes of the ideal point model in this appendix since no respondents were asked about this policy.

[2]The posterior probability under the policy-based ideal point model that Vignette 5 is more liberal than Vignette 4 is .69.

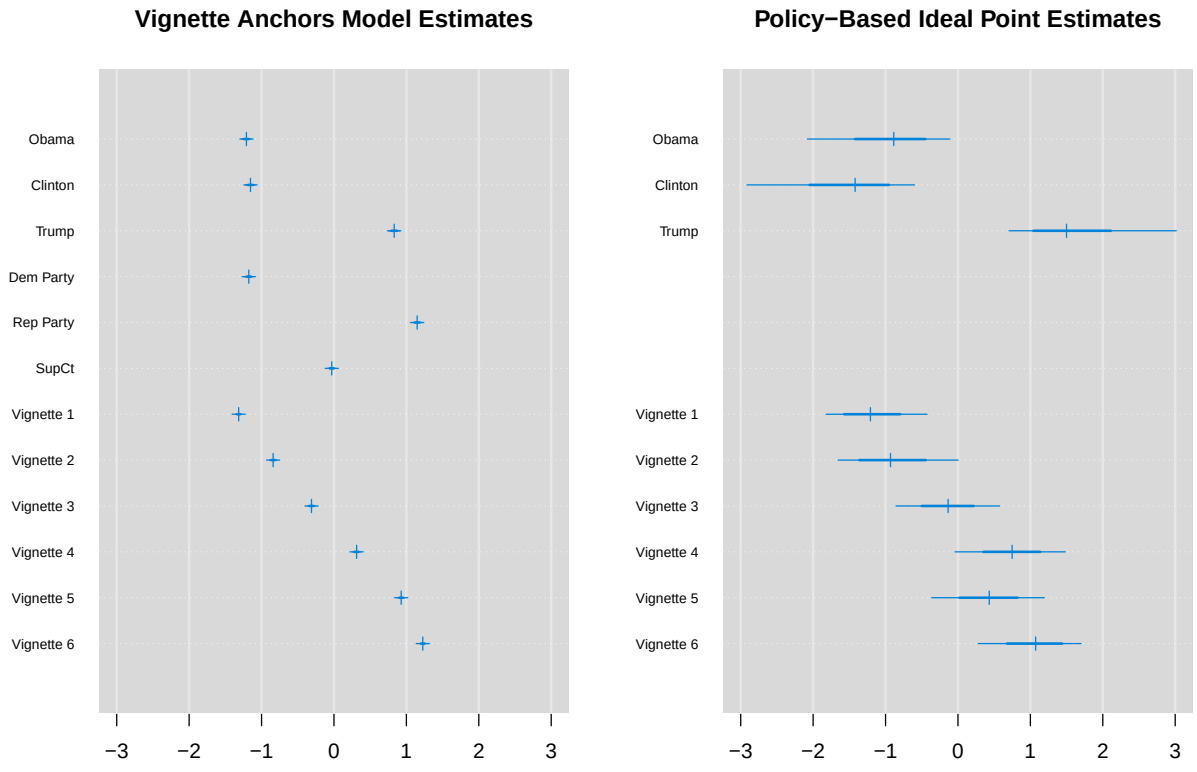

FIGURE A1. Comparing Estimated Positions from Politician Anchors Model and Policy-Based Ideal Point Model. *Left pane shows averages of estimates (posterior medians) of respondent perceptions of each politician as well as estimates (posterior means) for vignette positions, all from the vignette anchors model. Right pane shows estimated positions (posterior means) for Obama, Clinton, Trump, and each of the vignettes based on their positions on CCES policy items. Vertical tick marks show estimates with 95% and 68% credible intervals shown by thin and thick horizontal bars, respectively.*

whether this difference is simply reflective of the additional uncertainty in the policy-based ideal point estimates.[3]

In addition to these comparisons, it is also interesting to note how much more precisely the positions of the vignettes are estimated under the vignette anchors model. This is likely due to several factors. First, the seven-point ratings can provide more information

[3]The posterior probability, based on the policy-based ideal point model, that Trump is closer to Vignette 6 than to Vignette 5 is .78.

about a stimulus's position than a simple binary policy stance. Second, each vignette is only described as having five specific policy positions, which is the only information used to estimate their positions in the policy-based ideal point model. In the vignette anchors model, by contrast, each of the vignettes is rated by all respondents in the survey ($n = 840$). It is also important to note that the estimates shown for the vignette anchors setup for each political actor are averages of the estimated perception across all respondents. Therefore, simply looking at the relative uncertainty of the vignette estimates and the policy-based ideal point estimates is not an apples to apples comparison.

Obviously, this does not make the perception-based measures universally better. Researchers should choose a measure that corresponds to what they are interested in—either how people perceive a politician or hypothetical individual or, alternatively, what ideological position is implied by a politician or hypothetical individual's policy stances. But it is important to note how much more precisely these positions are estimated under the assumptions of the perception-based approach as compared to the policy-based approach.

A3. Predicting Shift and Stretch Terms by Respondent Characteristics

In order to assess whether the individual respondents' DIF terms—the shift term α_i and the stretch term β_i—are related to relevant factors other than party identification, this section estimates several linear regression models predicting these DIF terms. These exploratory analyses can shed light on the factors related to individuals' scale use characteristics and may prompt future theorizing in this area.

In addition to party identification, which was used to predict these DIF terms in the main paper, I consider several variables. First, ideology, measured through the policy-based ideal point model described in Appendix section A2 above, is included.[4] Second, I include a political interest variable based on the answer to the question "Some people seem to follow what's going on in government and political affairs most of the time, whether there's an election going on or not. Others aren't that interested. Would you say you follow what's going on in government and public affairs..." with response options "Most of the time", "Some of the time", "Only now and then", and "Hardly at all." Finally, education is measured using responses to an item reading "What is the highest level of education you have completed?" with response options "No HS", "High school graduate", "Some college" , "2-year", "4-year", and "Post-grad". To make interpretation of the models' coefficients more straightforward, both the political interest and education variables are standardized to have mean zero and standard deviation one, with higher values indicating more politically interested or more educated respondents, respectively.

[4]Note that as described in the paper and also pointed out by Hare et al. (2015), ideological scale self-ratings are determined in part by these very DIF parameters, so putting them on the righthand side of a regression predicting them is problematic. Furthermore, the regressions here using the policy-based ideology measure show whether this more objective measure of individuals' policy positions relates to their scale usage in characterizing the more subjective ideological scale ratings.

Dependent Variable:	α_i (Shift)				β_i (Stretch)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	4.28	4.27	4.28	4.28	1.08	1.11	1.11	1.11
	(.06)	(.06)	(.06)	(.06)	(.10)	(.10)	(.09)	(.09)
Party ID	-.06	-.05	-.05	-.05	.01	.01	.01	.01
	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
Policy-Based Ideal Point	-.01	-.02	-.03	-.03	.11	.13	.10	.09
	(.06)	(.06)	(.06)	(.06)	(.11)	(.11)	(.11)	(.10)
Political Interest		.02	.09	.09		.22	.36	.33
		(.02)	(.03)	(.03)		(.03)	(.05)	(.05)
Party ID × Political Interest			-.02	-.02			-.04	-.04
			(.01)	(.01)			(.01)	(.01)
Education				.02				.17
				(.02)				(.03)
n	828	807	807	807	828	807	807	807
residual SE	.44	.44	.43	.43	.78	.74	.74	.72
R^2	.07	.07	.08	.08	.002	.08	.09	.14

TABLE A1. Predicting Shift or Stretch Parameters from Vignette Anchors Models. *Table shows estimates from linear regression models predicting either shift (α_i) or stretch (β_i) terms from vignette anchors models.*

Table A1 shows the results of several linear regression specifications predicting either respondents' estimated shift (α_i) or stretch (β_i) parameters from the vignette anchors model. Models (1) and (5) shows that the findings in the body of the paper about the relationship between party identification and DIF terms (found in the two rightmost columns of Table 1) are very similar even after controlling for respondents' policy-based ideologies. In both cases, the coefficient estimates and also standard errors remain nearly identical to those in the paper and the new coefficients estimated for ideal point are not remotely close to conventional significance levels. This shows that partisanship is far more predictive of these scale use characteristics than is ideology.

Models (2) and (6) in Table A1 present estimates adding self-reported political interest to the model. There is little evidence of a strong relationship between political interest and the shift term, but there is strong evidence of a positive relationship for the stretch term. This implies that perceptions of politicians are more responsive to the politicians' actual ideological positions for respondents who are more politically interested.

We can also consider whether the impact of political interest is conditional on partisanship. To this end, Model (3) adds an interaction between party identification and political interest. This interaction is statistically significant, with a 95% confidence interval of (-.03, -.004). This suggests partisanship is a stronger predictor of the shift term for more politically interested respondents. Republicans have more negative shift terms than do Democrats—in other words, Republicans are more likely to use the more liberal end of the rating scale than are Democrat. And the highly significant negative coefficient on this interaction term shows that this partisan difference in α_i is larger among the more politically interested than among those who follow politics less closely.

Model (7) predicts respondents' stretch terms (β_i) with the addition of this same interaction term. This interaction term between party identification and political interest is estimated to be negative and is highly significant. This implies that the relationship between political interest and respondents' stretch terms (β_i) is strongest for strong Democrats (estimated coefficient of .32 with a 95% confidence interval of (.21, .41)). In fact, the implied coefficient on political interest for strong Republicans is much smaller in magnitude (.09) and narrowly fails to achieve significance at the .05 level. This means that it is unclear whether the extra information received by more politically interested Republicans results in their ratings of political stimuli being more strongly related to the stimulus's actual underlying ideology.

An interesting follow up to these results would be to look at whether people's primary sources of political information (e.g. *Fox News* or *MSNBC*) are related to their interpretation or use of these ideology rating scales. Unfortunately, the 2016 CCES does not include the sorts of media use questions that would be necessary to conduct this sort of analysis. This remains a possible question for future studies.

Finally, Models (4) and (8) add education as a predictor. Overall the existing coefficients are essentially unchanged in both models. The Model (4) coefficient on education is relatively small in magnitude and highly insignificant. By contrast, in Model (8) the coefficient on education is highly significant and relatively large in magnitude. Importantly, though, in

both Models (4) and (8) we see that the coefficients on political interest as well as those on the interaction between political interest and party identification remain quite similar whether education is included in the model or not. It should also be noted that adding an interaction between education and party identification (which is not shown here) results nearly identical coefficient estimates to those in Models (4) and (8), with very small and highly insignificant coefficients on this new interaction when both shift and stretch terms are the dependent variable.

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