# Supplementary Material for *Ideology as topic correlation structure: Inference method and example application to carbon tax public opinion*

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## 1 Survey Methods

### 1.1 *Not sure* Response Type

The central choice question in the survey and the whose related open-ended response we analyzed was if the respondent supported, opposed, or was unsure about the carbon tax. Here, we provide a brief analysis of *not sure* responses sufficient to justify our decision to exude them and focus on presentation a comparison between support/oppose responses in the presentation in the main text. First, the not sure responses took up 11% of the dataset, 357 in all. Of these, we found by direct inspection that the majority of responses are akin to "I don't know enough to answer". The dominant presence of "know" in the word clouds corroborates this focus on not knowing.

### 1.2 Collapse of metadata categories

We applied the following reductions of the categories from the dataset.

1. Ideology: .
   (a) $< 5 \rightarrow$ 'Left'
   (b) $> 5 \rightarrow$ 'Right'
   (c) $5 \rightarrow$ 'None'
2. Partisanship
   (a) {'Conservative Party','People's Party'}$\rightarrow$ 'Conservative'
   (b) {'Liberal Party', 'NDP', 'Green Party'}$\rightarrow$ 'Progressive'
   (c) {'I would not vote', 'other'}$\rightarrow$ 'No vote'
3. Residence environment
   (a) {'Within a suburb, adjacent to a large city','In a smaller regional city'}$\rightarrow$ 'suburban'
   (b) {'In a rural area','In a remote area'}$\rightarrow$ 'ruralremote'
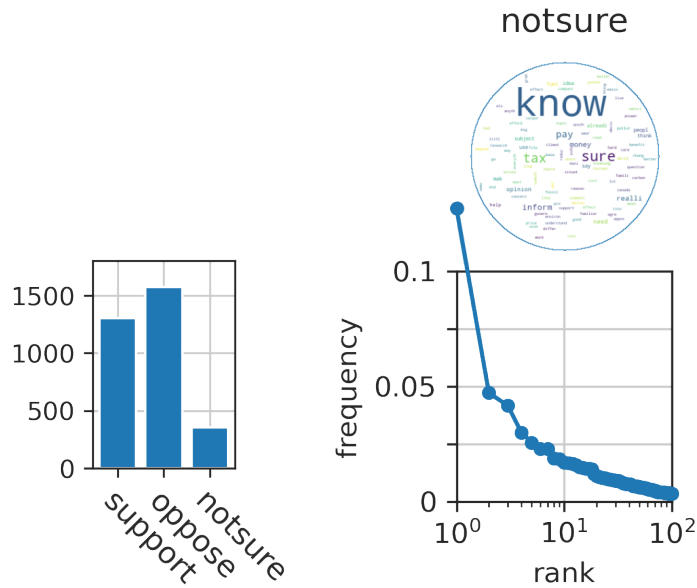4. Car use

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*mptouzel.github.io

Figure 1: Response counts over response type and word cloud for *not sure* response type.

(a) {'Transit', 'Walk', 'Cycle', 'Work/Study at home', 'This doesn't apply to me'}→ 'none'
(b) {'In a rural area', 'In a remote area'}→ 'ruralremote'

## 2 Top responses for topics

We can pull up the responses whose word content projects onto strong components of a given topic. Here, we show 3 top responses for each topic for the combined model for $K = 7$ topics.

## 3 Distances

Here, we plot the average pairwise distances between all $\mu$, using the empirical distribution from all respondents $\mu_d = \Gamma \boldsymbol{x}_d$.

Table 1: Some top oppose, support, and not sure responses for the $K = 7$ combined model.

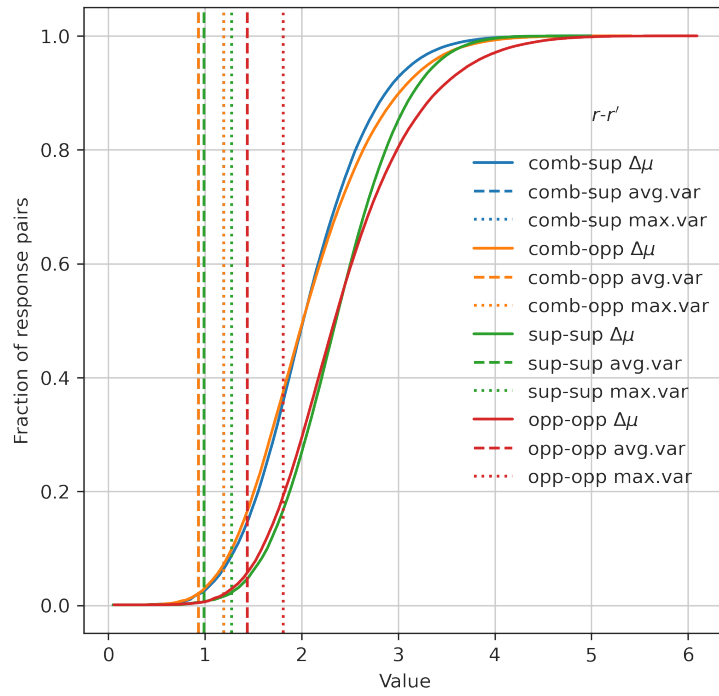| Topic label | Top responses |
| --- | --- |
| a | pay, alreadi, cost, enough, know, live, much, work, afford, sure<br>• "Je ne suis pas assez au courant pour me prononcer et je ne suis pas certaine que cela sera bien géré"<br>• "I don' Know enough ..I don't watch news or read paper.Only sad news now"<br>• "Je n'ai pas assez d'informations pour me prononcer."<br>• "Je ne me suis pas informé sur le sujet alors je n'en connais pas spécialement les enjeux principaux."<br>• "Je n'ai pas beaucoup entendu parler, donc mon opinion est neutre pour l'instant. Je devrais m'informer un peu plus Sur La question." |
| c | money, mak, think, way, get, make, consum, anyth, take, big<br>• "Because it seems that historically the prices have fluctuated for other reasons. This seems as a money grab with no clear way to see if it makes a difference"<br>• "I just don?t think this will make a difference to how people will want to make a difference with this tax"<br>• "Current federal proposal is not equitable to all provinces. Provinces should have realistic targets for reducing their carbon emissions, with penalties for not reaching those targets."<br>• "Because everything else goes up and how are people to afford anything for example I make $1385.00 a month on Disability Rent $900.00 Cell phone $120.00 Cable/internet $80.00 Bus pass $25.00 I only h"<br>• "It's just a way for taxpayers to pay more; the money usually isn't used in a beneficial way, but spent needlessly." |
| d | canada, effect, countri, believ, world, problem, caus, one, heat, oil<br>• "Canada has a population base smaller than two of the world's largest cities. We also have the largest land mass of any country in the world. So what possible effect will our pathetic contribution do t"<br>• "I am against it because it doesn't deal with the massive pollution problems in other countries. In fact, it ignores the world's worst offenders while going after the fossil fuel industry in Canada."<br>• "We hardly have any coal plants in Canada and when it comes to the world foot print we are at the bottom where we are compared to other countries."<br>• "Because it doesn't do a damn thing. China and other polluting countries need to do more. Canada is a carbon sink because of our forests. We are killing our economy when the rest of the world takes adv"<br>• "Climate has ALWAYS changed. We have consistently gone from here ce age to global warming. My biggest pet peeve is the majority of pollution is caused elsewhere, or by natural events such as volcanoes!" |
| e | tax, govern, anoth, grab, noth, price, increa, put, canadian, still<br>• "just another tax on the ordinary person to fill the coffers of government"<br>• "This is just another tax by the federal govt to which does nothing for climate change but adds more money for the govt to blow away."<br>• "It it was a fair tax imposed evenly across all sectors. This is just another money grab by the federal government to pay for their various projects that the majority of Canadians do not agree with."<br>• "The Carbon Tax is not collected fairly or evenly per capita. I am a senior on a fixed income and cannot afford additional carbon taxes. What exactly is the BC govt doing with the money collected ? No"<br>• "Taxing fuel can not solve or reduce climate change but CAN and DOES increase the cost of living. Really is just an excuse to raise taxes, a very poor substitute for learning how to properly husband ou" |
| f | need, use, like, thing, drive, car, electr, someth, option, vehicl<br>• "we still need fuel for our transportation, but I would like a monetary incentive to help with the purchase of the very expensive electrical cars. Why not do more to build solar powered cars, it has be"<br>• "it will likely not cause a visible change in what it will require for me to drive, heat my house and such. I agree we need to do something but the thing is we cant all drive electrical vehicles tomorr"<br>• "Until we come up with some alternative, fossil fuels are a nessesity. I have purchased a hybrid vehicle, but it only runs on battery for 40 km, then I need electricity to charge it again."<br>• "I somewhat agre and disagree. I disagree because the people on a fixed income would not be able to do what is needed. Example being doctors appointments and such. I agree because the companies do need"<br>• "Because relatively speaking these things are still inexpensive, and we need motivation to move towards 'greener' resources, and a way to fund research towards these." |
| 7 | use, environ, energi, altern, less, pollut, peopl, encourag, consumpt, compani<br>• "il faut que, ceux qui produise des GES soient pénalisés pour qu'ils trouvent des solutions pour que les GES diminuent rapidement avec qu'il soit trop tard."<br>• "Il faut à terme arriver à ne plus en utiliser ou du moins, le moins possible ou trouver des alternatives vertes."<br>• "Les usines vont peut-être se rendre compte qu?il faut moins polluer l?environnement"<br>• "Afin de favoriser le transport en commun et réduire la consommation. En autant que ces sommes soient réinvesti pour les énergies renouvelables."<br>• "DIMINUER LA DEMANDE TOUT EN AUGMENTANT L INTERET POUR L ENERGIE RENOUVLABLE" |

Figure 2: **Magnitude comparison of variance parameters and pairwise distances between mean parameters**. $r - r'$ denotes model and conditioning on response type, respectively. average variance is computed as $\det(\Sigma)^{1/(K-1)}$.