**Supplementary Materials 1**

Any procedure which attempts to identify the preference-aligned party for a given voter will be noisy – some participants will combine their preferences in a way that differs to the presumptions of the model, and there will be an error component to measured preferences too. The amount of noise for a given procedure can be thought of as the probability that its assumptions will not apply to a given voter. Call the amount of noise *z* and the number of parties *Np*. The procedure can assign parties correctly via two routes: firstly, if the assumptions do hold, which occurs with p = 1 – z. Secondly, if the assumptions do not hold, which occurs with p = z, *and* the assigned party happens to be correct by chance, which occurs with p = 1/Np; this conjunction occurs with p = z \* 1/Np = z/Np. Thus, the overall probability of correct assignment is the sum of the probabilities of each individual route: 1 – z + z/Np. The value of this expression decreases as *Np* increases so long as *z* > 0. Therefore, as Figure 1 shows, all procedures where noise > 0 will correctly assign fewer parties as the number of parties increases, even among a population of perfectly preference-aligned voters.

Chart

Description automatically generated

**Figure 1.** *Probability of correct assignment by number of parties and noise.*

This has serious consequences for measuring the effect of the number of parties on levels of preference-alignment. Measures of preference alignment can differ in terms of their *average error size*, which is the magnitude of the average difference between the scores assigned to those who vote for the party that the assignment procedure determines they should (‘correct’ voters), and those who vote for another party (‘incorrect’ voters). With a binary measure, voters score 1 if they vote for the party they should, and 0 otherwise, meaning the average error size is always 1. With a continuous measure, the score a voter receives is proportional to how closely the party they vote for matches the ‘correct’ party along a given dimension, like left-right ideology.

Since the probability that the procedure assigns the correct party to a given voter is 1 – z + z/Np, the probability of assigning an incorrect party is z – z/Np. Further, for a policy alignment measure with average error size *e*, incorrect voters score an average of 1 – *e*, whereas correct voters always score 1. Therefore the level of correct voting one would expect to measure among a sample of citizens who always vote perfectly in accordance with their preferences is the average error size multiplied by the probability of incorrect assignment, subtracted from 1, or 1 – (1 – e)(z – z/Np). Figure 2 shows the average policy alignment scores assigned to a population of perfectly policy-aligned voters using this formula across noise levels of 0.1 to 0.9. It shows that when a binary alignment measure is used (“average\_error” = 1, in yellow), the mean score is a sharp negative function of Np even among perfectly policy-aligned voters. However, with continuous alignment measures, the mean score becomes a shallower function of Np as the average error decreases. The sharpness of the function indicates the level of bias the procedure has towards detecting a negative effect of the number of parties upon preference-aligned voting. Thus binary measures of policy alignment are biased towards detecting negative effects of ENEP on policy alignment, and continuous measures, possessing less bias, are therefore more valid measurement instruments.

Chart

Description automatically generated

**Figure 2.** *Mean assigned score by number of parties, noise and average error.*