

Much of politicians' perceptual error is domain-general processing of proportions

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Abstract

Elected politicians make frequent judgments about their constituents: who they are, what they care about, and where they stand on the issues of the day. While politicians rely on these perceptions about their constituents when enacting policy, advocating for their constituents, and communicating with the public, research has documented large and pervasive errors in politicians' perceptions (1; 2; 3). Attempts to explain these errors with reference to politicians' experience, personal skill, or institutional positions have invariably failed (4). Here, combining data from many past studies with new surveys of elected politicians, we show that a domain-general tendency to hedge perceptions toward a moderate midpoint accounts for much of politicians' error. This "midpoint hedging" tendency holds across seven countries, all levels of government, and all perceptual tasks: constituents' policy preferences, policy priorities, and demographic characteristics. Our results suggest that domain-general patterns of human perception – such as social projection (5; 6), stereotyping (7), and midpoint hedging (8; 9) – offer a more powerful starting point for explanations of politicians' behaviour than do explanations rooted in politicians' individual characteristics. However, these domain-general tendencies are especially important and consequential in the domain-specific setting of politicians' work as representatives and legislators; politicians must understand their constituents to represent them well, and a perception-distorting cognitive tendency may undermine politicians' performance as representatives. We anticipate that our findings will serve as a basis for wider theories of elite political behaviour grounded in domain-general mechanisms.

Most theories of democratic representation assume that politicians have strong incentives to learn about their constituents and to carefully monitor public opinion (10; 11; 12), and empirical research has shown that politicians devote substantial time and resources to learning about public opinion (13; 14; 2). In recent years, however, research on politicians' knowledge of their constituents has documented large, pervasive, and systematic errors in politicians' perceptions of citizens' preferences, attitudes, and characteristics (15; 1; 16; 17; 18; 19; 20; 2). For example, when politicians are asked where their constituents stand on policy issues, their perceptions are consistently far from the mark. Attempts to explain these errors in relation to features of politicians' political settings or roles have generally failed: politicians' perceptual errors are not a function of their seniority (3), issue-specialization (21), shared demographic characteristics (22), or ideological positions (1; 23), nor do they relate to the type of constituency they are asked to assess (2).

The repeated failure of these domain-specific accounts of politicians' persistent perceptual errors suggests that researchers may be looking for answers in the wrong places. Human judgment is subject to a host of well-documented cognitive processes prevalent across decision domains – that is, mental shortcuts people use no matter the subject (24). In the field of politics, these domain-general biases have taken an increasingly central explanatory role. Today, important political phenomena, such as polarization, voting decisions, and support for undemocratic practices, are often seen as arising not only from domain-specific political factors, such as ideology and partisan identity, but also from domain-general reasoning heuristics such as future time discounting and status quo bias, among others (25; 26; 27; 28; 29). And, importantly, citizens' well-documented misperceptions of the size of social and political groups (30; 31; 32; 33) appear to be explained primarily by domain-general human difficulties in processing extreme proportions, rather than domain-specific mechanisms such as threat or social contact (9).

Building on this tradition, and especially recent advances in research on political perception among the general public (9) and political elites (34), we argue that politicians' systematic misperceptions of key characteristics and beliefs among their constituents originate primarily in a single domain-general phenomenon: a tendency to “hedge” perceptions toward a moderate prior. This “midpoint hedging” results in overestimating small proportions (assuming minorities are larger than they actually are) and underestimating large proportions (assuming majorities are smaller than they actually are). This tendency has been documented in perceptual tasks across many social and non-social domains (35; 36), and has been theorized as a Bayesian (9; 37), heuristic (8), or memory-based (38) response to uncertainty on social-perceptual tasks.

If politicians judge their constituents using this same process (39; 40), we should expect midpoint hedging to explain a substantial share of their perceptual error. This expectation runs against an influential view that political elites, by virtue of selection, experience, or expertise, are better equipped than ordinary citizens to overcome common cognitive biases (41). A growing body of evidence suggests otherwise; across many domains, politicians reason and process information much like the constituents they represent (42; 43; 29). Politicians deploy the same heuristics as ordinary citizens, but they do so in a consequential setting: their perceptions of constituents feed directly into agenda-setting, position-taking, and the drafting of binding legislation. Because these judgments are institutionalized in law-making, a domain-general perceptual bias might become a mechanism of unequal or distorted representation rather than an isolated individual error of judgment.

Our analysis, which synthesizes 70,470 unique perceptions from 12,860 politicians, provides strong support for this domain-general mechanism. A striking and highly consistent feature of our findings is that politicians are more likely to misperceive constituents' demographic characteristics, policy priorities, and policy attitudes when proportions are lopsided. In other words, it is in precisely the instances in which politicians might be expected to perceive the strongest signal from constituents – such as extremely low or high support for a policy proposal – that these representatives are most likely to misperceive true levels among the public, assuming that support is more equivocal than is in fact the case.

Our argument offers a domain-general explanation for a pervasive and puzzling phenomenon among elected politicians around the world. However, we emphasize that the social and normative implications of domain-general human tendencies vary dramatically across contexts. Politicians' errors of perception are especially important because politicians rely on perceptions about constituents' policy priorities (44; 45; 46) and policy preferences (47; 12) within the policy-making process, and have the means and authority to translate those perceptions into binding legislation. Politicians may misperceive constituents' characteristics and attitudes primarily because they are unable to escape domain-general cognitive tendencies, but understanding these patterns of misperception is especially important precisely because it is *politicians*, in positions of political and legal authority, who are making these perceptual errors.

In short, these perceptual errors matter because perception is central to representation. To govern well, politicians must perceive their constituents with tolerable accuracy across several distinct domains at once: who their constituents are (ascriptive representation), which issues their constituents care about (issue salience), and where their constituents

stand on those issues (substantive representation). Each of these is often a judgment about a proportion. Because the same tendency operates across all three domains, its effects do not cancel out or remain confined to a single issue or country. They can accumulate into a systematic distortion of the perceptual foundation on which representation rests. The threat to representation thus arises not from politicians' inattention to the public, but from a domain-general feature of human cognition that makes majorities and minorities difficult to perceive accurately.

Midpoint hedging also has potential implications for policy responsiveness. If politicians respond to the direction and intensity of public preferences, a tendency to perceive lopsided opinion as more evenly divided implies that responsiveness will tend to be under-supplied precisely when citizens demand it most. The same tendency could also shape what politicians believe is politically possible. A politician who perceives lopsided opinion as more evenly split will see a persuadable electorate and a margin worth contesting – an impetus to campaign, to frame, and to try to move voters who may, in fact, already be decided. More accurate perceptions might dampen this impulse. In this sense, a domain-general perceptual tendency may quietly fuel the very activities – persuasion, mobilization, and position-taking – that sharpen elite polarization. Taken together, politicians' misperception of public signals carries the potential to distort democratic representation, which itself is associated with lower trust in democratic institutions (48; 49) and erosion of democratic norms (17).

Politicians' Domain-General Perceptual Errors

To measure domain-general perceptual tendencies among elected politicians, we draw from a proliferation of recent studies of elite perceptual accuracy, integrating and re-analyzing data from every study in which proportion estimates about constituents are elicited from candidates or politicians, and for which data are publicly available (53,730 unique perceptions from 9,701 politicians on 202 distinct tasks; see Supplementary Table SM1). We supplement these data with three original surveys of Canadian local politicians, adding 16,740 unique perceptions from 3,159 politicians on 109 perceptual tasks. This provides a total of 70,470 unique perceptions from 12,860 local, regional, or national politicians in seven countries.

In each perceptual "task," politicians estimated the proportion of their constituents who fall into one of four perceptual task categories: support for a specific policy statement among all constituents (*Policy Attitude*, 42% of tasks), support for a specific policy statement among supporters of a politician's own party (*Policy Attitude (Own Party)*, 20%

of tasks), holding an opinion (as opposed to no opinion) on a specific policy issue (*Policy Salience*, 35% of tasks), and membership in a specific demographic group (*Demographics*, 3% of tasks). This diversity in estimation tasks is especially valuable for testing a domain-general account of politicians’ perceptual errors.

We find clear evidence that politicians are susceptible to the domain-general tendency to overestimate small proportions and underestimate large proportions, hedging their perceptions in both instances toward a moderate value. In each panel in Figure 1, positive vertical-axis values indicate overestimates of constituents and negative vertical-axis values indicate underestimates. Overall trends, captured by locally weighted scatterplot smoothing (LOESS) curves, indicate a persistent tendency to overestimate constituents’ demographics, policy salience, or policy attitudes when actual proportions are small, and to underestimate these quantities when actual proportions are large.

This general pattern of minority overestimation and majority underestimation is consistent. It appears when we calculate average perceptual errors for each of the 318 perceptual tasks (Figure 1, Panel A), and when we subset the task-level estimates for each data source with more than three distinct perceptual tasks (Figure 1, Panel B). The pattern also persists when we group and then average politicians’ individual-level perceptual errors (i.e. politicians’ errors on each of the 70,470 available perceptions) in 5% bins (Figure 1, Panel C), and when we plot individual-level perceptual errors by data source (Figure 1, Panel D). Finally, the same pattern occurs across domains. Figure 1 Panel E confirms that, despite differences in the distribution of actual values across tasks, politicians exhibit the same pattern of minority overestimation and majority underestimation when asked about their constituents’ demographic characteristics, their policy attitudes (in general and in their own party), or the proportion of constituents for whom a policy is salient. The evidence across these panels supports an interpretation of politicians’ errors as a domain-general phenomenon.

A Domain-General Model of Politicians’ Perceptions

For well over a century, social scientists have recognized the wide-ranging human tendency to overestimate small magnitudes and underestimate large magnitudes (50; 51), a tendency that is especially pronounced when humans perceive proportions (8; 52; 53; 36). An especially important recent approach (9; 37) has advanced a domain-general uncertainty-based model, in which an individual i ’s perception of proportion y reflects a combination of prior expectations, the available information about the proportion under consideration, and the uncertainty of both the prior and the available information:

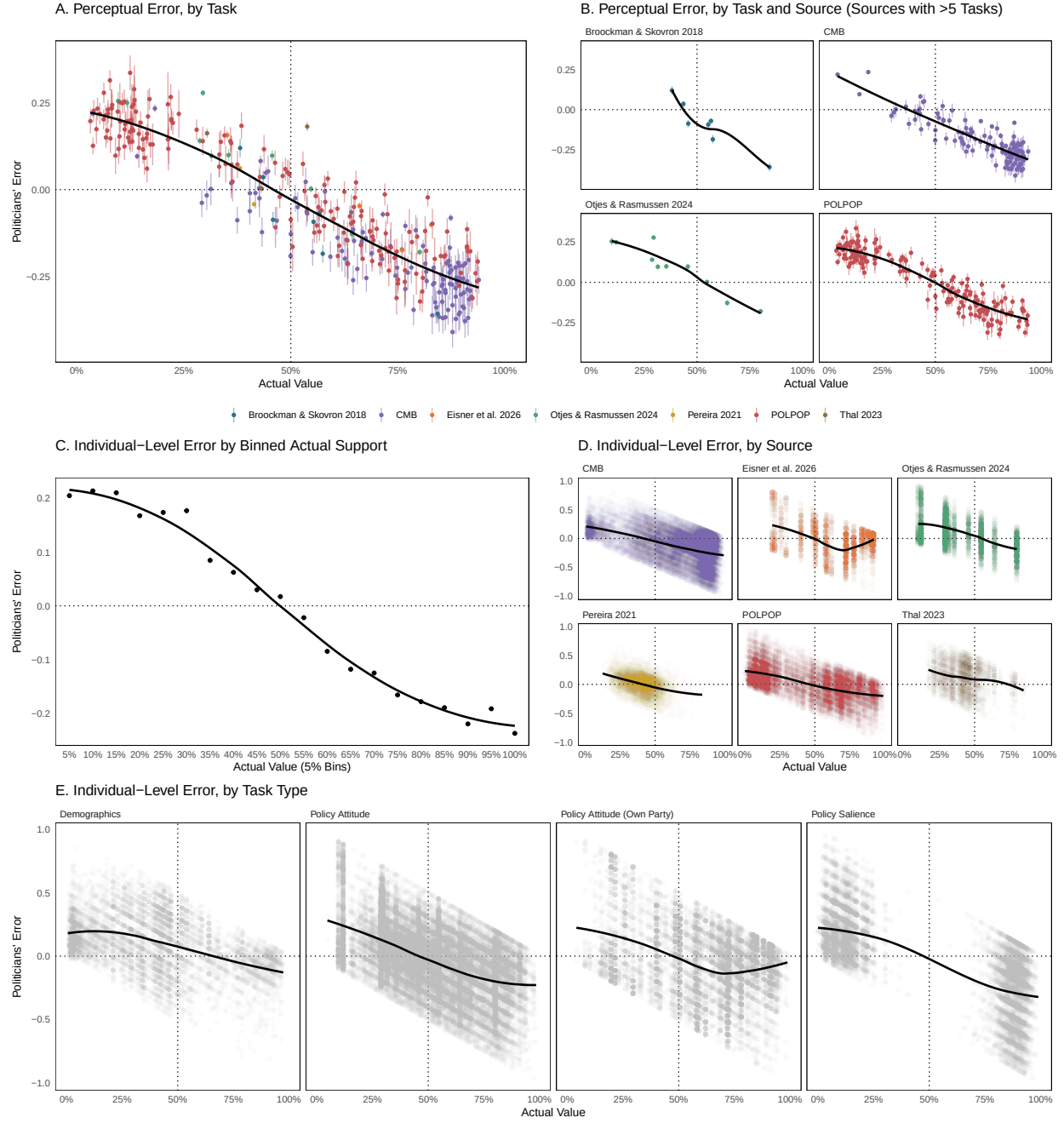


Figure 1: Politicians Consistently Overestimate Small Proportions and Underestimate Large Proportions among Constituents. Panel A: Average overestimation or underestimation (vertical axis) of constituents for each perceptual task, with 95% confidence intervals. Panel B: task-specific errors, by data source. Panel C: Average individual-level error, in 5% bins. Panel D: Individual-level error by data source. Panel E: Individual-level error by task type. All black lines are locally weighted scatterplot smoothing (LOESS) curves.

$$y_{ik} = \gamma x_k + (1 - \gamma) \delta \quad (1)$$

In our setting, y_{ik} is politician i 's perception of their constituents on perceptual task k , and x_k is the actual value of k among those constituents. We interpret δ as a prior toward which individuals hedge their perceptions (expected to be near the midpoint of the scale), and γ as a weighting parameter which determines the relative weight of the task-specific information and the general moderate prior (9; 37). Both γ and δ range between zero and one.

In keeping with a large body of past research, we assume that individuals process proportions as log-odds and that the midpoint-hedging model is “linear in log-odds” (52; 9; 54; 35; 36); we thus fit the model in equation 1 after transforming the model into probability space. We use these parameters in order to provide further evidence as observable implications of our argument: first, that the model parameters should behave similarly across task types, thereby weakening domain-specific interpretations of the parameters; and, second, that the parameters should be responsive to task-specific information, supporting a Bayesian uncertainty-responsive interpretation against other domain-general alternatives, such as response-scale artifacts (55; 53).

Our results strongly support the hypothesis that much of politicians' perceptual error originates in a domain-general process of midpoint hedging. The model's δ parameter ($\hat{\delta}=0.491$, 95% CI [0.488,0.494]), which captures politicians' general prior expectations, indicates that politicians sensibly adopt an overall prior near 50% across all perceptual tasks. The model's γ parameter ($\hat{\gamma}=0.347$, 95% CI [0.341,0.352]), which captures the relative weight of actual values (of policy attitudes, salience, or demographics) relative to the respondent's prior, indicates a strong tendency for politicians to draw their perception toward the prior: politicians place roughly twice as much weight on their prior as on the actual value. Practically speaking, this means that a group actually consisting of 10% of constituents would be perceived as consisting of about 31%, and a 90% majority as about 68%.

Moreover, the uncertainty-based rescaling model fits the data well, despite containing just two parameters and no domain-specific assumptions (Figure 2). At the individual level, the model explains one-fifth of the individual-level variation in politicians' perceptions of their constituents (Bayesian $R^2=0.22$). At the aggregate level, before accounting for midpoint hedging, actual levels among constituents explain 84% of the variation in politicians' average perceptual error across issues (reflecting the patterns observed in Figure 1). After accounting for hedging, this drops to 12%, indicating that the model accounts for most of the systematic relationship between actual opinion and politicians' perceptual

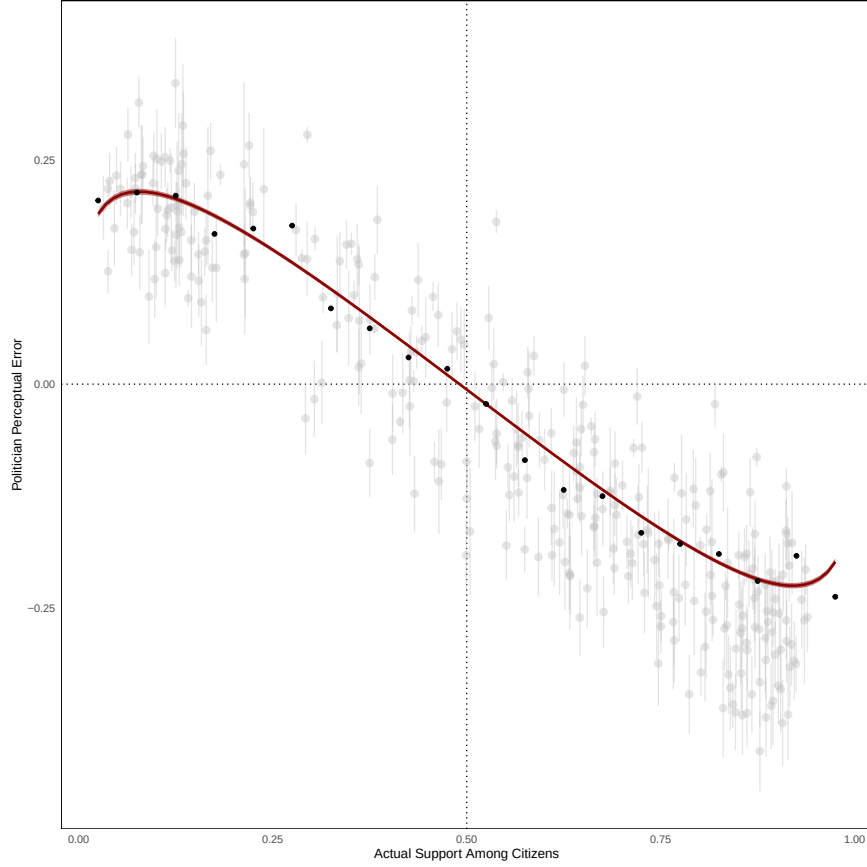


Figure 2: **Politicians' Perceptual Error, with Model Predictions.** Gray coefficients are task-level estimates of politicians' overestimates or underestimates, with 95% confidence intervals (From Figure 1A). Black circles are 5% binned average errors (From Figure 1C). Red line and shaded area is predicted values and 95% credible intervals from uncertainty-based rescaling model (Equation 1).

errors. Finally, we can compare the magnitude of errors predicted by the model with the magnitude of errors we actually observe from politicians. The mean absolute error predicted by the model amounts to 65% of politicians' actual mean absolute error, indicating that a model that incorporates the domain-general tendency of respondents to hedge their estimates toward a moderate prior accounts for more than three-fifths of the average magnitude of politicians' perceptual error.

As a more substantive comparison, we find that the midpoint hedging mechanism explains as much variance in politicians' perceptual error as does social projection. Social projection is the widely documented tendency for individuals to assume that others share their own views. It is the most consistent, and arguably the *only* well-established, predictor of politicians' perceptual error in existing work: politicians tend to see their own opinions reflected in their constituents (56; 6). Social projection is typically measured

by including politicians' own opinions as a predictor of their perception of constituent opinion, an approach we follow here. Restricting our data to the policy-attitude tasks to which projection applies (48,063 perceptions from 10,662 politicians), midpoint hedging explains 22% of the variance in politicians' perceptual error and projection 23%; together they explain 31% (Supplementary Table SM7). The two operate independently: adding politicians' own opinions to the model does not attenuate midpoint hedging, but instead increases the extent to which politicians hedge their perceptions toward a midpoint prior. We therefore view midpoint hedging as resting comfortably alongside social projection as a foundational domain-general mechanism of elite perception.

Additional analysis provides further support and robustness tests for the hedging mechanism. Our main findings for both the γ and δ parameters – a prior expectation near the middle of the distribution, and a strong tendency to weight perceptions toward that prior – are consistent across countries, levels of government, perceptual task type, and other features of tasks, indicating a domain-general mechanism (Supplementary Figure SM1).

Discussion

Politicians exhibit large and systematic perceptual errors when asked about their constituents' policy attitudes, policy priorities, and demographic characteristics. We have shown that much of this error can be explained by a simple domain-general model of midpoint hedging: politicians, like humans in general, systematically overestimate small proportions and underestimate large proportions, hedging both extremes toward a more moderate prior value. This tendency is consistent across countries, levels of government, and perceptual tasks.

More specifically, the strong explanatory power of this domain-general process also helps clarify the long and at times frustrating search for explanations of the perceptual errors that politicians make when asked about their constituents. Despite decades of effort, no domain-specific predictors – role perceptions (57), seniority, institutional position (3), political party or ideology (1; 23) – have reliably explained variation in politicians' perceptual errors. Indeed, it is striking, in light of our findings, that the most consistent empirical regularity in politicians' perceptual tendencies, social projection, reflects a general tendency observed across many domains of social life (56; 58; 6). It is also striking that politicians' apparent tendency to overestimate their constituents' conservatism may, in fact, stem from a combination of midpoint hedging and survey error (40). Our approach helps to make sense of this pattern of results; when a domain-general process accounts

for a substantial portion of the systematic variation in a phenomenon, domain-specific predictors will appear weak and unstable, not necessarily because the measurements are inadequate or the theories misguided, but instead because those domain-specific tendencies are hidden amidst more general mechanisms that must be accounted for first.

One potential domain-specific mechanism that *could* generate similar patterns of minority overestimation and majority underestimation is anticipatory perception. When support is lopsided on a policy issue, politicians may perceive it as more equivocal because they are thinking about *future* patterns of opinion on the issue, rather than its present state (59; 10). Politicians may anticipate that opinion will change as an issue debate becomes more salient or more subject to political mobilization – processes that reinforce opinion sorting according to existing, often balanced, partisan and ideological blocks (60; 61), generating a gap between present-day opinion and their perception of (more evenly-split) future opinion. However, this domain-specific mechanism does not predict errors consistent with midpoint hedging when asked about constituency demographics or issue salience, which are not subject to the same future opinion dynamics.

While this systematic perceptual error originates in a domain-general human tendency, that tendency takes on particular significance when *politicians* make the errors. In many advanced democracies, commentators and policy activists often lament the absence of action on issues for which polling and other data suggest strong overall public support – issues like gun control in the United States (62) or redistributive taxation policy in Europe (63; 64). Our model suggests one important general source of this phenomenon: politicians systematically perceive a world in which citizen support is more moderate – and thus policy attitudes are generally more divided – than is in fact the case.

Since politicians' choices are heavily influenced by these perceptions, several distortions to democratic representation and responsiveness could follow. If policymakers simply wish to be responsive to the intensity and substance of public preferences (65), midpoint hedging entails that policy responsiveness would tend to be under-supplied exactly when citizens demand it most, with potential downstream consequences for satisfaction with democracy and policy output.

Broader representation could also suffer: erroneously believing an issue to be closely contested when actual public opinion leans heavily in a given direction could incentivize politicians to invest resources in persuading voters on an issue that has already been decided – a problem for those who already have the public on their side *and* for those who think majority support is within reach. Moreover, rather than political polarization naturally subsiding after policy competition is settled (66; 67), distorted perceptions of persistent dispute or heightened issue salience may lead politicians to continue to engage

in activities such as persuasion and mobilization, thereby amplifying polarization. And systematically misperceiving the demographic characteristics of the constituency may be an overlooked source of resource misallocation. The implications of the domain-general tendency to hedge towards the midpoint, and the specific circumstances in which it can be overcome with domain-specific interventions (such as lobbying activity or concrete information provisions), are a critical priority for future research.

Our findings, and the broader framework in which we have situated them, also have implications for social science research. When explaining any social phenomenon, researchers must be attentive to the potential for domain-general explanations for two important but distinct reasons. First, inattention to domain-general explanations can lead researchers to incorrect domain-specific explanations for patterns of behavior that, in fact, originate in domain-general tendencies. In the case of elected politicians, for example, researchers have sought explanations for systematic misperception in a number of domain-specific mechanisms. That this search has so far not returned strong and consistent predictors rooted in politicians' unique institutional environments illustrates the value of research that considers possible domain-general accounts alongside domain-specific explanations, which can help more precisely identify the role of the former once domain-general variation has been accounted for.

Second, and equally important, researchers must be aware of the varying *implications* of domain-general patterns in specific social settings or institutional roles. We have emphasized, for example, that while politicians' tendency to overestimate small proportions and underestimate large proportions reflects a well-established domain-general human tendency, the presence of this tendency is particularly important precisely because the group under examination is elected politicians. Much the same argument applies to other possible applications of domain-general explanation: domain-general forecasting errors may be especially important when thinking about the role of intelligence officials in policymaking processes; domain-general stereotyping behavior may have especially worrying implications for law enforcement or border control officers; and so on. In other words, identifying a pattern as originating in a domain-general mechanism does not in any way deny that the pattern itself may be especially important in specific social roles or political institutions.

Methods

Overview of Data Sources

We use data from two sources: *pre-existing data* available in replication archives for refereed articles on politicians' (or political elites') perceptual accuracy, along with *original data* from surveys of Canadian local politicians. We describe each of these data sources in turn, and provide a study-by-study account of the pre-existing data in Supplementary Section SM.1.2.

Pre-existing data. Several studies have examined political elites' perceptual accuracy since the topic was revived, with modern statistical methods, by Broockman and Skovron (1). We reviewed each of these studies and identified all studies in which (a) researchers elicited a proportion estimate from political elites and (b) replication data were available with which to reanalyze politicians' perceptions. We provide a full list of the research articles that we considered for inclusion, along with a rationale for inclusion or exclusion, in Supplementary Table SM.1, and more information about each of the included studies, including sample size, countries of study, and perceptual tasks, in Supplementary Table SM.2. ***Original data.*** In addition to the pre-existing data described above, we add data from the Canadian Municipal Barometer (CMB), an annual survey of local politicians (mayors and councillors) in the 1,000 largest municipalities in Canada. Each year, the CMB research team compiles a contact list of all elected politicians in these municipalities and invites those politicians (by email) to complete an online survey via Qualtrics. Response rates for these annual surveys range between 20–25% – very high response rates for surveys of North American political elites (68; 69). These politicians are broadly representative of the larger population from which they are drawn. Supplementary Table SM.3 provides a comparative breakdown of the sample and population on three important observable characteristics: province, municipal population size, and politician gender.

Measuring Actual Values and Perceived Values

To measure politicians' perceptual accuracy, we need their perceptions, as well as a ground truth or an estimated ground truth against which those perceptions can be compared. Supplementary Table SM.4 provides an overview of how these ground truth or “actual” values are estimated across studies.

We used Multilevel Regression and Poststratification (MRP) to estimate actual municipal-level values of average issue salience and issue position in Canadian municipalities. This approach has become common in past studies of political representation and elite be-

haviour at the local level (70; 71; 72). We provide the full model specification in Supplementary Section SM.1.5.

Midpoint Hedging Model: Specification and Implementation

As we noted in the main text, our domain-general model follows the model used by Guay and colleagues (9):

$$y_{ik} = \gamma x_k + (1 - \gamma) \delta \quad (2)$$

In our setting, y_{ik} is politician i 's perception of their constituents on perceptual task k , and x_k is the actual value of k among those constituents. We interpret δ as a prior toward which politicians hedge their perceptions, and γ as a weighting parameter which determines the relative weight of the task-specific information and the general moderate prior. Both γ and δ range between zero and one.

As Guay and colleagues (9) explain, transforming this model (in log-odds space) into probability space yields the following:

$$y_{ik} = \frac{\delta^{(1-\gamma)} x_k^\gamma}{(1 - x_k)^\gamma + \delta^{(1-\gamma)} x_k^\gamma} \quad (3)$$

We fit this model in a Bayesian setting in R using BRMS, with the following weakly informative priors:

$$\begin{aligned} \delta &\sim \mathcal{N}(0.5, 1), \quad \delta > 0 \\ \gamma &\sim \mathcal{N}(0.5, 0.5), \quad 0 < \gamma < 1 \\ \sigma &\sim \text{Student-}t(3, 0, 2.5), \quad \sigma > 0 \end{aligned}$$

We fit the model with four chains of 4,000 iterations each, discarding the first 1,000 iterations of each chain as warmup. This model generates large effective sample sizes for all parameters, along with $\hat{R}$ values of 1.0 for δ , γ , and σ . The model thus shows strong evidence of convergence.

We provide our R implementation of the model in Supplementary Section SM.1.6.

Statistics

As noted above, two samples underpin our analyses: pre-existing data and original data. Task-level descriptive results (Figure 1, Panels A and B, and the gray estimates in Figure 2) summarize 318 perceptual tasks. These include seven tasks from Broockman and Skovron

(1), for which we extracted published aggregate error estimates because individual-level replication data are not available. All individual-level analyses, including every estimate from the midpoint hedging model, use 70,470 perceptions from 12,860 politicians across 311 perceptual tasks.

Analyses from the midpoint hedging model are Bayesian, and we therefore report posterior medians together with 95% credible intervals. We report no P values or significance tests in this paper. The midpoint hedging model yields $\hat{\delta}=0.491$ (95% credible interval [0.488,0.494]) and $\hat{\gamma}=0.347$ (95% credible interval [0.341,0.352]), with a Bayesian R^2 of 0.22. Posterior estimates and credible intervals for every subset model are reported in Supplementary Table SM.6.

Error bars and shaded regions in Figure 1 are defined as follows. In Figure 1, Panel A, and for the gray task-level estimates in Figure 2, error bars are 95% confidence intervals around the mean directional error for each perceptual task. Black lines in Figure 1 are locally weighted scatterplot smoothing (LOESS) curves, and black circles in Figure 2 are mean directional errors within 5% bins of the actual value. The red line and shaded region in Figure 2 are posterior predicted values and their 95% credible interval from the midpoint hedging model.

Data and code availability

Data and code to replicate the analysis in this paper are [available at this link](#). During peer review, these materials are provided solely for the purpose of evaluating this manuscript; upon publication, they will be made publicly available without restriction.

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