

# The Structure of Municipal Voting in Vancouver

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## Abstract

In this paper, we offer a new interpretation of the structure of municipal electoral competition in Vancouver, focusing on the city’s high-profile municipal election in 2018. Using novel “cast vote records” – a dataset containing each of the 176,450 ballots cast in the city’s municipal election – we use a Bayesian multidimensional scaling procedure to estimate the location of every 2018 candidate and voter in Vancouver in a shared two-dimensional political space. We then match observed votes from the cast vote records to survey responses in the Canadian Municipal Election Study (CMES), a large election survey undertaken in Vancouver in 2018, using 96 CMES variables to interpret our two measured dimensions of electoral competition. We find evidence of a single primary dimension of competition, structured by left-right ideology, along with a secondary dimension dividing establishment from upstart parties of the right. Our paper supplies a new interpretation of Vancouver’s electoral landscape, clarifies our understanding of the role of left-right ideology in Canadian municipal political competition, and demonstrates the promise of cast vote records for research on municipal elections and voting.

**Keywords:** Vancouver politics; municipal elections; municipal politics; measurement; multidimensional scaling; Bayesian estimation

# 1 Introduction

Political scientists on the hunt for generalization often ignore the odd and idiosyncratic – and in the world of Canadian city politics, there are few places more idiosyncratic than Vancouver. In most cities, voters choose their preferred councillor from among a handful of competitors; in Vancouver, they select up to ten councillors from a cacophonous list of forty or fifty names. In most cities, political parties are absent from local elections; in Vancouver, candidates compete in one of the most durable municipal party systems in the world. In most cities, voters elect a council to oversee the bulk of the metropolitan region; in Vancouver, with a population only slightly larger than Brampton, Ontario, the elected council speaks for just a quarter of the metropolitan area. Other Canadian cities, like Calgary and Toronto, entice political scientists with their typical institutional structures and standard patterns of electoral competition. Vancouver, strange and exotic, enjoys considerably less attention.

Yet no one would deny that Vancouver is an important and often puzzling case. When most big Canadian cities were moving to single-member ward elections, Vancouver stood alone in retaining at-large competition. When local political parties were fading into extinction in other cities, they surged back into vigorous life in Vancouver. Nestled inside Canada’s third-largest metropolitan area, with a legacy of local policy achievements that are the envy of many, Vancouver is one of Canada’s most interesting cities (Taylor 2019). Political scientists cannot claim to understand Canadian urban politics without grappling with Vancouver’s fascinating and distinctive politics.

In this paper, we offer a new interpretation of the structure of municipal voting in Vancouver, focusing on the city’s competitive and high-profile municipal election in 2018. Using novel “cast vote records” – a dataset containing each of the 176,450 ballots cast in the city’s municipal election – we employ a Bayesian multidimensional scaling procedure to estimate the location of each Vancouver voter and candidate in a shared two-dimensional political space. We then match these spatial locations to individual survey responses in the Canadian Municipal Election Study (CMES), a large-scale survey of eligible voters in Vancouver in 2018, allowing us to use survey data to better interpret the two dimensions we have uncovered. We find strong evidence that municipal electoral competition in Vancouver is primarily structured by a single dimension, one that is strongly related to voters’ ideology, policy issue positions, and partisanship. However, we also uncover a secondary dimension of voting related to voters’ preferences for “establishment” versus “upstart” parties, which subdivides Vancouver voters on the ideological right. This second dimension reflects emerging tensions in Vancouver’s longstanding centre-right party, the Non-Partisan Association, but may also reflect a more general “united left, divided right” phenomenon that has been observed in the wider comparative politics literature.

Our principal purpose in this article is to provide a quantitative case study, using

novel data and methods, of the structure of electoral politics in one of Canada’s most important cities. However, our findings also have more general implications for urban political scientists. Above all, our findings demonstrate that municipal voters can and do think about their vote choices in coherent and ideologically structured terms; in fact, despite some recent discussion about the collapse of the left-right divide in cities like Vancouver, we find strong evidence that much of Vancouver voting can be accounted for by a single left-right axis of competition. Our use of cast vote records – the first time, to our knowledge, that such data have been employed in a study of municipal elections – also provides a concrete methodological demonstration of the value of such data for urban political science.

## 2 Municipal Elections in Vancouver

Two institutions are at the heart of Vancouver’s electoral distinctiveness: a robust municipal party system and at-large council elections. Each of these institutions has a history that stretches back nearly a century. Figure 1 summarizes this history by plotting political party vote share in Vancouver municipal elections from 1936, the first year that at-large elections were implemented, to the present.<sup>1</sup> To simplify the presentation, we group political parties into four general types: parties of the left, parties of the right (sometimes called “alphabet” parties because of their tendency to use acronym-style names, such as NPA or CGA), urban reform parties, and other parties. Any remaining white space at the top of each bar represents vote share received by independent candidates.

Within figure 1, we can discern four main phases of Vancouver’s party system. In the first phase, which began in 1936 and continued until shortly after the end of the Second World War, Vancouver’s municipal elections were battles between the Cooperative Commonwealth Federation (CCF) on the left and the Non-Partisan Association (NPA) on the right. As in other western Canadian cities, labour representatives sought positions on city council as part of a larger strategy of labour activism, and business leaders, frightened by the labour threat, quickly mobilized to form “non-partisan” slates to oppose the labour candidates.<sup>2</sup> While parties like the NPA regularly denied that they were “ideological” in character, and even denied that they were political parties at all, political competition in this period had a recognizably left-right character. The NPA enjoyed consistent success during this first period, but labour representatives also figured prominently as an important minority voice on city council (Tennant 1980).

The second phase, which stretched from the mid-1950s to the mid-1960s, was one of

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<sup>1</sup>Vancouver had at-large elections in the 1920s owing to a brief flirtation with a Single Transferable Vote electoral system, but this experiment was quickly abandoned. See Lucas (2020b).

<sup>2</sup>For a survey of this history in Vancouver, see Gutstein (1983), Madden (2003), and Tennant (1980). For Calgary, see Bright (1998); for Winnipeg, see Epp-Koop (2015).

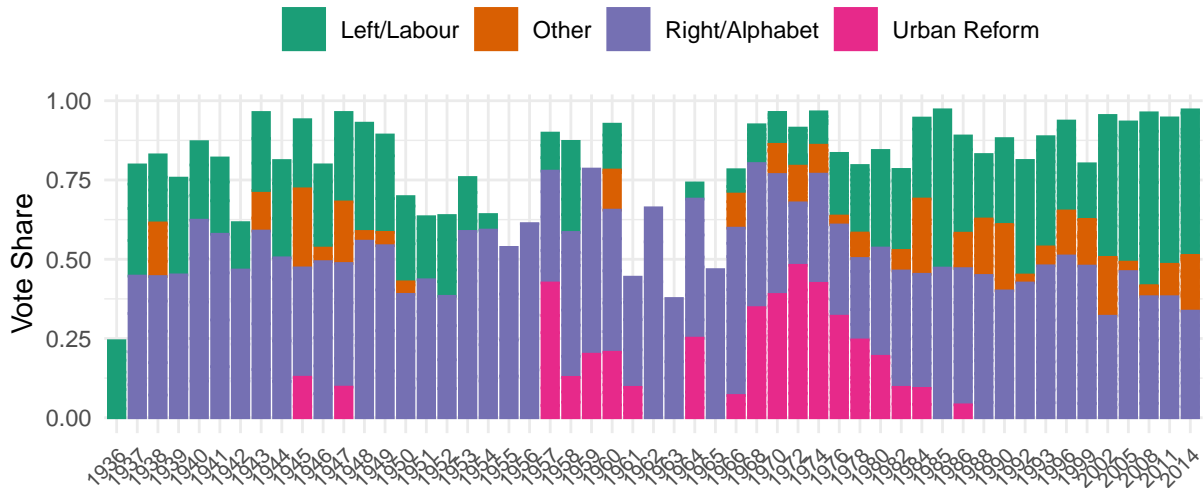


Figure 1: Vancouver Party System, 1936-2018

single-party dominance – what Trounstine (2008) has called “political monopoly” – by the Non-Partisan Association. Canny moves by the NPA to incorporate moderate labour candidates into their own slates, together with an increasingly fractured labour movement, gave the NPA consistent and dominant majorities on city council. Here, too, Vancouver’s party system development resembled similar patterns in other western Canadian cities, such as Calgary and Winnipeg, and like those cities, an increasing share of the vote during this period went to candidates with no party affiliation. By the 1960s, party-affiliated candidates in Vancouver regularly received fewer than half of the total votes in municipal elections, and what had once been a system of vigorous party competition appeared to be headed toward extinction.

In the gradual decline of its party system, first by single-party dominance and then in the rise of independent candidates, Vancouver closely resembled other large western Canadian cities. In Vancouver, however, the rise of a vibrant middle-class urban reform party, The Electors Action Movement (TEAM), sparked a highly distinctive resurgence of party competition in the late 1960s and early 1970s. In this third phase, political competition focused on characteristic “urban reform” issues, such as freeway construction, neighbourhood protection, and urban “livability,” few of which could be easily characterized as standard left-right disagreements.<sup>3</sup> While TEAM faded as a major force in Vancouver politics by the early 1980s, it helped to rejuvenate the city’s party system, setting the city on a course completely unlike other Canadian cities (Tennant 1980).

Around the same time that TEAM was born, a new party of the left, the Coalition of Progressive Electors (COPE), had also emerged, and by the 1980s, COPE had grown into an importance force in the city’s elections. While the exact configuration of political parties has varied widely since then, the basic structure of the system – a thoroughly

<sup>3</sup>See Magnusson (1983a) and Magnusson (1983b) for a persuasive argument about the essentially conservative character of the Canadian urban reform movement during this period.

partisan environment grounded in competition between a party of the right (NPA) and an evolving array of parties on the left – has persisted (Vogel 2003). The result, since the 1980s, has been a robust municipal party system quite unlike any other city in Canada, and perhaps unlike any city in the Anglo-American world.<sup>4</sup>

## 2.1 The 2018 Election in Vancouver

By 2018, many careful observers of Vancouver’s municipal politics had come to think that the city’s traditional party system, and its longstanding pattern of left-right party competition, was beginning to come unglued. The housing affordability issue, which had reached crisis levels in Vancouver, was thought to have fractured traditional patterns of electoral competition on both sides of the ideological spectrum. On the right, internal disputes within the Non-Partisan Association led to a new pro-development party, YES Vancouver, as well as a self-described “populist party” called Coalition Vancouver. The proximate cause of the two new parties was intra-partisan resentment and frustration among two candidates – Hector Bremner, founder of YES Vancouver, and Wai Young, founder of Coalition Vancouver – whose interest in seeking the NPA’s mayoral nomination had been informally discouraged (Young) or formally rejected (Bremner). Beneath the personal slights, however, were deeper tensions about the appropriate position of a “centre-right” party in one of Canada’s most progressive cities: YES Vancouver embracing a market-friendly, pro-development platform in the name housing affordability; Coalition Vancouver embracing a car-friendly populist agenda; and the Non-Partisan Association advocating a more establishment-friendly platform of fiscal prudence and modest intensification.

On the left, partisan wrangling in early 2018 was equally fraught. A council by-election in 2017 in which an NPA candidate had won election with 28% vote share, benefiting from a vote split among four progressive candidates, sparked fears of a similar outcome in the 2018 general election.<sup>5</sup> As a result, the Vancouver and District Labour Council, long an important player in Vancouver civic politics, sought to coordinate the city’s four progressive parties – Green, Vision Vancouver, COPE, and OneCity – to select a congenial mayoral candidate and coordinate to field an optimal slate of candidates for the at-large council, park board, and school board races. Coordination on a mayoral candidate soon fell apart – after incumbent Gregor Robertson announced he would not run, the temptation of an open race proved too great to resist, and several high-profile progressives soon entered the contests – but negotiations were more successful for the at-

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<sup>4</sup>In one other province, Quebec, candidates in big-city elections also compete as members of political parties. In Quebec, however, parties are typically built around mayoral candidates – “Équipe Denis Coderre,” “Équipe Labeaume,” and so on – making the party system much less durable than in Vancouver. Nowhere else in Canada do we find parties like NPA or COPE: durable parties with long histories, recognizable coalitions of support, and consistent policy agendas.

<sup>5</sup>See *Vancouver Province* 2018-02-14, A4; *Vancouver Sun* 2018-03-24, A3.

large contests, and the parties agreed to limit their slates to prevent mutually destructive vote-splitting.<sup>6</sup> Even for the at-large races, however, coordination was far from perfect; the local Green Party, emboldened by strong results in local polls, abandoned its initial pledge and chose to run more candidates for council than it had promised.<sup>7</sup>

By the time of the 2018 municipal election, Vancouver voters faced a dizzying array of options – some 21 mayoral candidates and 71 council candidates. To make sense of this complex ecology of candidates and parties, some local observers suggested that a second axis of political disagreement, which Allen Pike (2018) described as an “urbanist-conservationist” dimension, had emerged in Vancouver politics. Along this new axis, Vancouver’s parties could be distinguished by their interest in preserving the city’s existing development (conservationism) versus aggressive new housing construction, densification, and active transportation (urbanism). A crowd-sourced survey by Ian Bushfield and Stewart Prest, which asked participants to score parties on several policy dimensions, provided apparent support for the two-dimensional structure that Pike described (Bushfield and Prest 2018).

In the end, however, the results of the 2018 election proved to be more evolutionary than revolutionary. In the mayoral race, Kennedy Stewart, a former NDP Member of Parliament, narrowly defeated Ken Sim, the Non-Partisan Association’s mayoral candidate. In the at-large races, each of the progressive parties had some success, with the exception of the incumbent party, Vision Vancouver, which was shut out of both the council and the park board. Despite the pre-election drama, neither YES Vancouver nor Coalition Vancouver performed well, and the Non-Partisan Association remained the only centre-right party with representation in any of the city’s local offices.

How should we describe the structure of this complex local political environment? One preliminary means by which to approach this question is to simply plot the geographic patterns of each party’s support in Vancouver in 2018. We do so in figure 2, summarizing support by voting location for nine political parties.<sup>8</sup> We shade each voting station by party performance, with the party’s worst-performing location in dark purple, its best-performing location in dark green, and median-performance locations in white; this allows us to understand patterns of electoral support for each party while ignoring the parties’ very different baseline levels of support. As is clear in the map, voting patterns in Vancouver are geographically patterned, with the four progressive parties (COPE, Green, OneCity, and Vision) performing well in the downtown and inner core neighbourhoods and the NPA performing well in the city’s outer neighbourhoods, particularly the wealthy

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<sup>6</sup>See *Vancouver Sun* 2018-03-17, A6; *Globe and Mail* 2018-03-26, A8; *The Province* 2018-05-09 A6; *The Province* 2018-06-05 A10.

<sup>7</sup>*Vancouver Sun* 2018-07-03 A1.

<sup>8</sup>Readers should note that voters could cast their ballot at any voting station in the city. We must therefore be cautious not to over-interpret these results. This is one of many reasons to turn to the individual-level data, as we do in the next section.

southwestern region. These geographic patterns closely resemble federal voting tendencies in Vancouver: strong Conservative support in the region where NPA dominates, overwhelming NDP support in the northeastern region, where progressive municipal parties dominate, and mixed support in the southeast and downtown areas, where elections are highly competitive at both the municipal and federal levels.

Overall, then, the geographic patterns in figure 2 offer clear hints that Vancouver’s municipal competition is structured in ways that resemble the left-right competition we find in contemporary federal elections. However, careful inspection of figure 2 also suggests that a single dimension of competition does not exhaust the geographic variation in 2018 results. YES Vancouver, for example, the centre-right party whose platform focused almost entirely on new housing development, relied more on support in the downtown region than did other right-leaning parties, such as Coalition Vancouver and the NPA. Patterns of support for Coalition Vancouver also differ somewhat from those of the NPA. Our analysis below will enable us to measure and interpret these patterns of competition.

## 2.2 The Structure of Municipal Elections

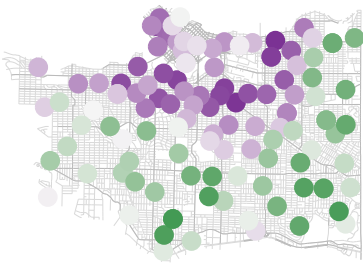
However distinctive Vancouver’s electoral institutions and party system may be, local discussions about the structure of political disagreement in Vancouver bear a striking resemblance to broader debates about the character of municipal elections, and especially the role of unidimensional left-right ideology as an organizing principle of local political competition. One aspect of this debate concerns the character and dimensionality of municipal policy attitudes themselves; after all, if municipal policy attitudes are not meaningfully structured by ideology, it would be unlikely that ideology would serve as an organizing principle of municipal electoral competition.<sup>9</sup> Some have argued that it is appropriate, at least in the United States, to characterize municipal ideology on a standard, unidimensional left-right axis Tausanovitch and Warshaw (2014); Lucas and Armstrong (2021) have made a similar argument in Canada, demonstrating that municipal residents’ general left-right policy attitudes are strongly related to their elected representatives’ left-right positions on specifically municipal issues. However, other researchers have suggested that municipal policy attitudes are more contingent and geographically specific (J. Eric Oliver 2012) or structured by a second dimension of disagreement related to the role of the market in land use policy (Cann 2018). The general structure of municipal policy disagreement, and the relationship between local policy attitudes and ideological disagreement at other levels of government, remains a subject of active debate (Hopkins 2018; Anzia 2021).

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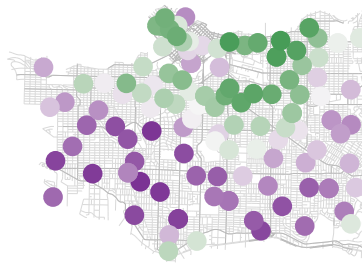
<sup>9</sup>Of course, in conditions of extremely nationalized politics, the absence of ideological structure for municipal issues would not prevent ideological structure for municipal political competition. We will argue below that municipal issues in Vancouver appear to sit comfortably within larger left-right debates. See Hopkins (2018) for a detailed treatment of the nationalization issue.



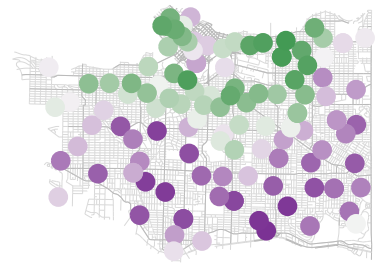
Coalition Vancouver



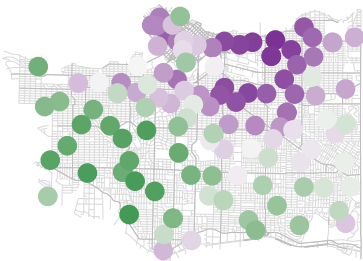
COPE



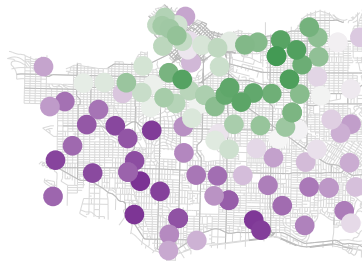
Green



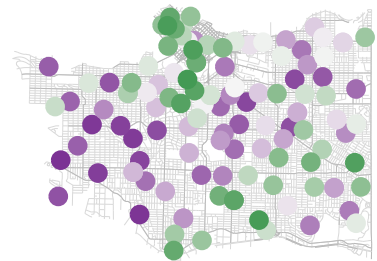
NPA



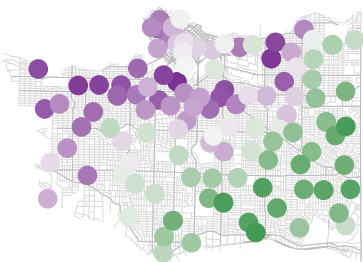
OneCity



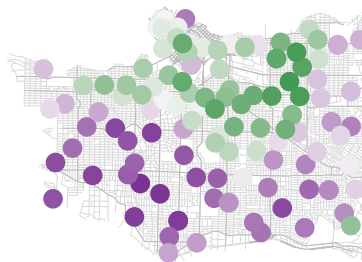
ProVancouver



Vancouver 1st



Vision



Yes Vancouver

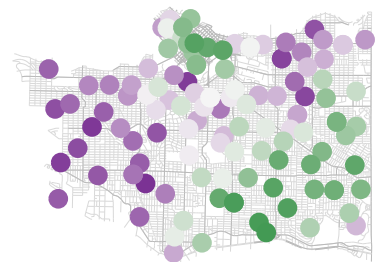


Figure 2: Council Election Performance by Voting Station



In the more specific context of municipal *electoral* politics, a large body of research has found that standard ideological and partisan positions are clearly relevant to municipal vote choice in Canada and the United States (Lucas 2020a; Lucas and McGregor 2020; Sances 2018), but other factors, such as race (Hajnal and Trounstein 2014; Kaufmann 2004) and local policy issues (J. E. Oliver and Ha 2007) also affect municipal voting. Two excellent studies of mayoral voting in Vancouver, covering the 2002 and 2018 elections, have argued that ideology and policy issue attitudes were crucial predictors of mayoral vote choice (Cutler and Matthews 2005b; de Rooij, Matthews, and Pickup 2020), though it is not yet clear if these findings apply to non-mayoral vote choice as well.

In general, then, despite the distinctive characteristics of Vancouver’s electoral context, our assessment of the structure of municipal voting in Vancouver has considerable broader relevance. In the analysis below, we extend past research on the structure of municipal competition in at least three ways. First, we use cast vote records to build our interpretation of Vancouver’s electoral competition from observed votes themselves – and the similarities and differences among voters that these votes imply – rather than beginning with survey-based measures. Like studies of legislative roll call voting in the United States (Poole and Rosenthal 1997) and Canada (Godbout 2020), our analysis of Vancouver’s cast vote records allows us to begin by estimating the structure of electoral competition from observed votes and then use additional data to interpret that structure.

Second, our analysis builds on past research by estimating each voter’s spatial location using a summary of *all* votes cast in Vancouver’s municipal election. For all that we have learned from excellent municipal election studies in Canada and the United States, the overwhelming majority of those studies have been focused on *mayoral* vote choice, and it may be the case that mayoral elections are quite distinctive relative to lower-information contests for municipal council and elected special purpose bodies (J. Eric Oliver 2012). Our analysis allows us to incorporate these important “down-ballot” elections into a more general interpretation of municipal electoral competition, one that includes not only mayoral competition but also competition for council and an elected special-purpose board.

Finally, we extend past research by combining our measure from the cast vote records with the most extensive individual-level survey of municipal voters ever undertaken in Vancouver. Because our survey data include each respondent’s choices for mayor, council, and park board, we can measure survey respondents’ spatial positions on exactly the same scale as the voters in the cast vote records.<sup>10</sup> We then interpret those positions using nearly 100 election-related CMES variables including ideology, partisanship, retrospection, place identity, and policy issue attitudes. This allows to measure and visualize the structure of electoral competition in Vancouver and then interpret that structure

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<sup>10</sup>Note that we do not include school board votes in our measure, because we lack school board votes from CMES respondents.

using a rich suite of relevant individual-level predictors.

### 3 Data and Methods

To measure and interpret the structure of municipal voting in Vancouver, we rely on two data sources. The first is the “anonymized ballot marking” dataset provided by the City of Vancouver.<sup>11</sup> This dataset is an example of an emerging data format called “cast vote records” (CVR), which provide an anonymized record of the full population of ballots cast in an election. In Vancouver, for example, the dataset provides complete information on the mayor, council, park board, school board, and plebiscite votes cast on each of the 176,450 ballots in the 2018 municipal election. Vancouver is the first city in British Columbia to make such a dataset publicly available; in fact, based on our review of Canadian municipal websites and conversations with municipal clerks in cities across Canada, it is the first jurisdiction in Canada to do so.

While CVR data are new to Canadian politics, several studies in the United States have made use of these data to explore political representation (Gerber and Kollman 2004), split-ticket voting and partisanship (Agadjanian and Robinson 2019; Kuriwaki 2019), and to understand the outcomes of unusual or especially close elections (Herron and Lewis 2007; Bafumi et al. 2012). Some of these analyses have employed IRT models (Herron and Lewis 2007) to explore latent patterns in the data, and Shiro Kuriwaki, a leading scholar in the collection and use of CVR data in the United States, has proposed a measurement approach for CVR data that enables clearer understanding of split-ticket voting (Kuriwaki 2019). We build on this emerging research in two ways. First, we introduce Bayesian multidimensional scaling as a practical measurement approach for CVR data; we explain this approach in more detail below. Second, as we noted above, we match our measurements from the CVR dataset to individual-level survey data, allowing us to combine the strengths of CVR and survey data. We hope that both of these advances will be useful for other researchers, particularly as both CVR data and large-N surveys become available at all levels of government, including municipal elections.

Some readers may wonder why we use CVR data at all – after all, if we have mayor, council, and park board vote choices available in our survey dataset, why not simply use the survey data to measure each respondent’s location in political space? While there are several advantages to using the full population of votes, the most important has to do with the ability to estimate spatial locations for every voter regardless of their exact combination of votes – including voters with idiosyncratic voting patterns. As Herron and Lewis (2007) point out, survey data are often unhelpful when researchers are interested in uncommon vote choices or vote combinations, such as third-party voting in the United

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<sup>11</sup>This dataset is available on the city’s open data platform at this link: <https://opendata.vancouver.ca/explore/dataset/anonymous-ballot-marking/information/>

States. In Vancouver, more than 100,000 distinct combinations of mayor, council, and park board votes were cast in the 2018 election, of which some 88,000 were unique to a single voter. Each of these combinations helps to reveal more general patterns of similarity and difference among candidates and voters, and the full CVR dataset enables us to measure voters’ spatial positions even when they support candidates who received few votes – candidates whose supporters would be unlikely to appear in any numbers in survey data.

### 3.1 Survey Data

Our second data source is the Canadian Municipal Election Study (CMES) Vancouver survey. The Canadian Municipal Election Study project is a comparative study of eight big-city elections in Canada in 2017 and 2018, and includes 1,642 responses from Vancouver. The Vancouver CMES survey was a two-wave panel survey consisting of a pre-election wave (N=1,642) collected between September 28 and October 20, 2018, and a post-election wave (N=903) collected between October 22 and November 21, 2018. Respondents were recruited by Forum Research using a mix of random digit dial (N=999) and online panel (N=643) recruitment. Having agreed to participate, respondents then completed the survey instrument online. Because we are interested in the structure of municipal voting in Vancouver, we focus here on the post-election survey respondents who voted in the 2018 municipal election (N=660).

The Canadian Municipal Election Study was conceived as an omnibus comparative election survey, akin to well-known national election studies, and thus includes a wide range of questions on vote choice, attitudes, and behaviour. In Vancouver, the CMES post-election survey included questions on respondents’ vote choices for mayor, council, and park board elections, which allow us to measure CMES respondents’ spatial positions alongside the anonymized ballots in the CVR data.

Because our goal is to use the CMES data to help interpret the spatial structure that we recover from the CVR analysis, we cast a wide net in selecting CMES variables for our exploratory analysis. This allows us to understand how a wide range of attitudes, behaviours, and identities relate (or do not relate) to the main dimensions of political competition in Vancouver. We selected a total of 96 variables for our exploratory analysis, which we organize into nine general “families.” We note, however, that we use these “families” only for the purposes of organization and visualization rather than analysis.

Our first family of variables captures *socio-demographic* variables. While the general importance of socio-demographic predictors for vote choice in Canada and elsewhere remains an important area of research, urban political scientists have long emphasized the role of these factors in municipal politics, with a particular focus on race (Hajnal and Trounstein 2014; Kaufmann 2004) and home-ownership (Fischel 2005; McGregor

and Spicer 2016). Past studies in Vancouver have found that gender, age, income, and home-ownership were informative predictors of mayoral vote choice in 2018 (de Rooij, Matthews, and Pickup 2020). We include each of these variables in our analysis below.

A second family of variables captures respondents' *place identity* and civic pride at the neighbourhood, city, provincial, and federal scales. These variables have been employed in studies of vote choice and policy attitudes in the United States (Gimpel et al. 2019; Kal Munis 2021; Wong 2010), and recent research in Canada has suggested that place identity may be related to municipal political participation and policy attitudes (Borwein and Lucas 2021).

We also include a family of variables that capture respondents' *knowledge of, interest in, and attention to politics* at both the municipal and provincial/federal scales. Past research in other Canadian cities has found that knowledge and attention are related to incumbent vote choice (Moore, McGregor, and Stephenson 2017), and individuals' interest and attention may also be associated with their electoral preferences, and thus their spatial position, in Vancouver's municipal elections as well.

*Retrospective voting* is an especially well-established predictor of individual voting behaviour, including at the municipal scale (Anderson et al. 2015; Hopkins and Pettingill 2018). We include a suite of variables related to respondents' satisfaction with their mayor and councillors' performance in office, as well as assessments of the direction of the local economy over the past year. We also include variables that capture respondents' feelings toward, and ideological placements of, *mayoral candidates* in the 2018 election, along with a series of feeling thermometer measures of respondents' *feelings toward social groups*. These are not only related to individuals' ideological positions but may also play a role in political behaviour and politically salient social identities (Wong 2010).

Our three remaining "families" of variables are the factors that we expected to be most valuable for interpreting the structure of municipal voting in Vancouver. *Partisanship* is a well-known predictor of municipal vote choice, even in non-partisan elections, and past research on mayoral vote choice in Vancouver (Cutler and Matthews 2005a) and other Canadian cities (Lucas and Santos 2020; Stephenson, McGregor, and Moore 2018) have found that individuals' provincial and federal partisanship often predicts their support for mayoral candidates even when those candidates are not themselves explicitly aligned with a provincial or federal party. In Vancouver, the candidate who became mayor, Kennedy Stewart, had been a Member of Parliament for the New Democratic Party, and some speculated that the divide between Stewart and Shauna Sylvester, his main progressive competitor, was partly a contest between those who supported the federal NDP and those who supported the federal Liberals (Bula 2018). We thus have good reason to explore the role of provincial and federal partisanship in municipal voting behaviour in Vancouver.

Given the extraordinary emphasis on housing and affordability in the 2018 election, along with the role of housing in the "urbanist-conservationist" axis discussed above, we

also have good reason to explore the role of *policy issues* in Vancouver’s municipal voting. CMES data include questions on the importance of six issues, including homelessness and housing affordability, in Vancouver, as well as issue position questions concerning the gender and racial composition of council, immigration policy, and the role of government in home prices. These questions are particularly valuable for assessing whether a second dimension of electoral competition was distinctively structured by disagreement related to housing, land use planning, and affordability.

Finally, we are especially interested in the role of *ideology* as a structuring principle for Vancouver’s municipal elections. We know from past research in Vancouver that ideology is an important factor for mayoral vote choice (de Rooij, Matthews, and Pickup 2020), and more general research on Canadian municipal politics has shown that ideology plays a role in municipal political representation (Lucas 2020a; Lucas and Armstrong 2021) and voting behaviour (Lucas and McGregor 2020). We strongly suspected that the same would be true in Vancouver – in fact, we suspected that the two-dimensional competition discussed by close observers may have been perceived by ordinary voters as a more unidimensional left-right axis. To assess these possibilities, we use respondents’ ideological self-placement, as well as a latent measure of their policy ideology, in our exploratory analysis below.<sup>12</sup>

### 3.2 Measurement and Modeling

Vancouver’s anonymized ballot marking data provides us with a complete record of municipal votes in the 2018 municipal elections. We can conceptualize these ballot records as providing a picture of the spatial structure of the election, with voters whose ballots are similar to one another being “closer” in some multidimensional space, and voters with very dissimilar ballots being more “distant” in that space. Our measurement challenge is to reduce this complex multidimensional space into a more readily interpretable two-dimensional picture while preserving, as much as possible, the original distances among voters and the candidates they support.

To carry out this measurement task, we employ a multidimensional scaling technique called *unfolding* (Armstrong and Lucas 2021). The idea behind this method is that we can conceive of the main axes of competition (two in this case) as defining a plane. Further, we could place both voters and candidates as points on this plane. To do so, we position them in such a way that the candidates’ points are spatially proximate to the voters who chose them, and more distant from voters who chose other candidates. More formally,

$$Pr(v_{ij} = 1) = f(d_{ij})$$

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<sup>12</sup>To measure respondents’ latent policy ideology, we combine fourteen issue importance and issue position questions (all of which load strongly on a single dimension in a standard factor analysis) and measure respondents’ latent policy ideology using a Bayesian factor analysis model.

where  $v_{ij}$  is a binary indicator of individual  $i$ 's vote for party  $j$ . Further,  $d_{ij} = \sqrt{(x_{i1} - y_{j1})^2 + (x_{i2} - y_{j2})^2}$ , the Euclidean distance between voter  $i$ 's position ( $x_{ik}$ ) and candidate  $j$ 's position ( $y_{jk}$ ) across each of the  $k$  dimensions. The probability of voting for a candidate is a decreasing function  $f(\cdot)$ . That is, the closer a candidate is to a voter, the more likely the voter is to choose that candidate.

We estimate the  $x$  and  $y$  points with a Bayesian model. We specify  $f(\cdot)$  as the CDF of the logistic distribution, making this essentially a logistic regression of vote choice based on distance. We use standard normal priors for the ideal points of both candidates and voters. The voter ideal points are standardized to have zero mean and unit variance in each posterior draw. This identifies the scale of the ideal points. We identify the direction of the scale with a post-estimation rotation of the two-dimensional space to maximize the interpretability of the results.<sup>13</sup>

We characterize the posterior distribution of the parameters using Automatic Differentiation Variational Inference (ADVI) (Kucukelbir et al. 2017). This is much more computationally efficient than Gibbs sampling, which approximates the multivariate posterior with draws from the marginal distribution of each parameter, or Metropolis-Hastings, which draws from the full multivariate posterior. Variational inference tries to find a more tractable approximation of the posterior distribution. Again, for computational efficiency, we use a mean field approximation, which assumes the posterior distribution is well-approximated by independent normal distributions. This is generally not problematic for uni-dimensional measurement models because all parameters are assumed to be independent in the theoretical model. These properties should extend to  $k$ -dimensional settings as well.

We use the PyMC3 library (Salvatier, Wiecki, and Fonnesbeck 2016; Martin 2018) in Python to estimate the model. We run the ADVI algorithm for 50,000 iterations, at which point the loss function appeared to have flattened out, indicating that an appropriate approximation had been reached. We are encouraged by the general similarity between the Bayesian results and those from frequentist unfolding methods.<sup>14</sup>

## 4 Results

We begin with figure 3, which summarizes the spatial locations of candidates and parties in Vancouver's 2018 election. In the top panel, we plot the two-dimensional location of

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<sup>13</sup>More specifically, we rotate the raw results by 30 degrees to capture the ideological structure of the first dimension of competition. Note that this rotation changes nothing about the distances between the points, it simply aligns the major axis of competition (ideology) with the horizontal axis of the graph to enhance interpretability.

<sup>14</sup>For example, comparing results from our Bayesian procedure with a frequentist multidimensional scaling procedure using an optimization approach known as stress majorization, we find that our first dimension placements are correlated at  $r=0.93$ , and the second dimension placements are correlated at  $r=0.79$ .

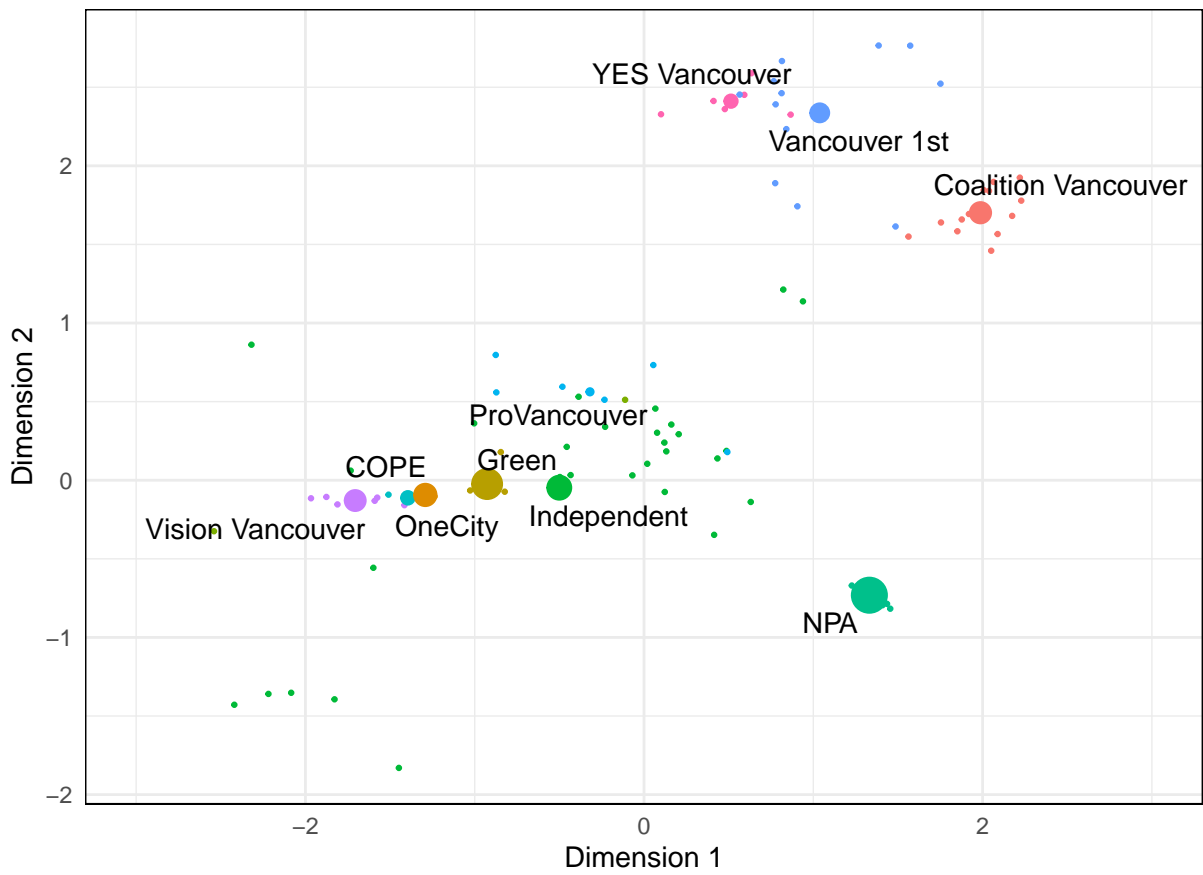
each council and park board candidate (the small circles) as well as the average location of each party (the larger circles, sized, by number of votes received). To enable easier party-by-party comparisons, we also provide separate plots of mean party locations for each dimension in the two bottom panels.

These results provide a valuable overall picture of the structure of electoral competition in Vancouver in 2018. The first dimension is recognizably ideological: a cluster of progressive parties on the left (OneCity, COPE, Vision Vancouver, Green), and more conservative parties on the right (Non-Partisan Association, YES Vancouver, Vancouver 1st, Coalition Vancouver). On the right, the first-dimension spatial locations align well with contemporary descriptions of the parties, with Coalition Vancouver as the most conservative, YES Vancouver in a more moderate position, and the NPA between the two. On the left, the spatial arrangement is similarly intuitive, with OneCity and COPE to the left of the more moderate Greens. Vision Vancouver’s position at the leftward end of the scale is somewhat curious – recall that Vision Vancouver was originally created as a *moderate* alternative to COPE – but may reflect the fact that the party’s 2018 slate was notably more youthful and progressive than would have been typical for the party in previous election cycles. Still, if we zoom out from the specific placements and focus on the first dimension as a whole, it is quite clear that party locations reflect a recognizable left-right structure. As we will soon see, this interpretation is well supported by the individual-level CMES data.

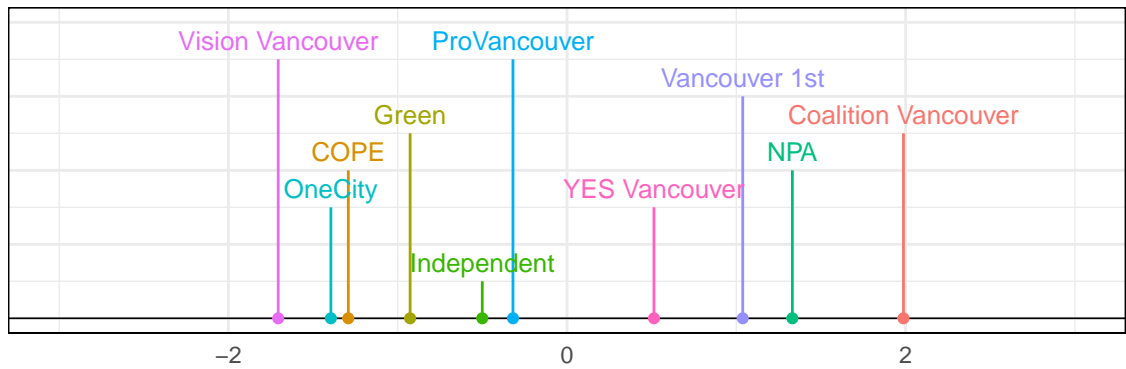
The second dimension in figure 3 is equally straightforward to interpret, clearly capturing a divide between established and upstart parties of the right. At one pole is the Non-Partisan Association, the city’s oldest political party. At the other pole are the new parties of the right, two of which (Coalition Vancouver and YES Vancouver) were contesting elections for the first time in 2018. Among these upstart parties, YES Vancouver and Vancouver 1st are closer to one another, which reflects those parties’ shared emphasis on a socially moderate, pro-business, pro-development policy agenda. Coalition Vancouver, whose campaign came to be associated with a populist, pro-automobile, anti-bike-lane platform, is more distant. Importantly, we observe no difference on the second dimension among any of the city’s four progressive parties, all of whom are positioned in a mutually indistinguishable middle position. Whatever it is that animates the second dimension of competition, in other words, it is not especially relevant to understanding how voters distinguished among the progressive parties.

Taken together, the results in figure 3 illustrate that we have much to learn about the structure of municipal political competition from cast vote records, even when individual-level survey data are not available for further analysis. The figure reveals two emergent dimensions of electoral competition: a recognizably ideological left-right divide on the first dimension, and, on the second dimension, an intra-ideological divide between establishment and upstart parties of the right. These results take us some distance toward

### Two-Dimensional Candidate and Party Placement



### First Dimension, by Party



### Second Dimension, by Party

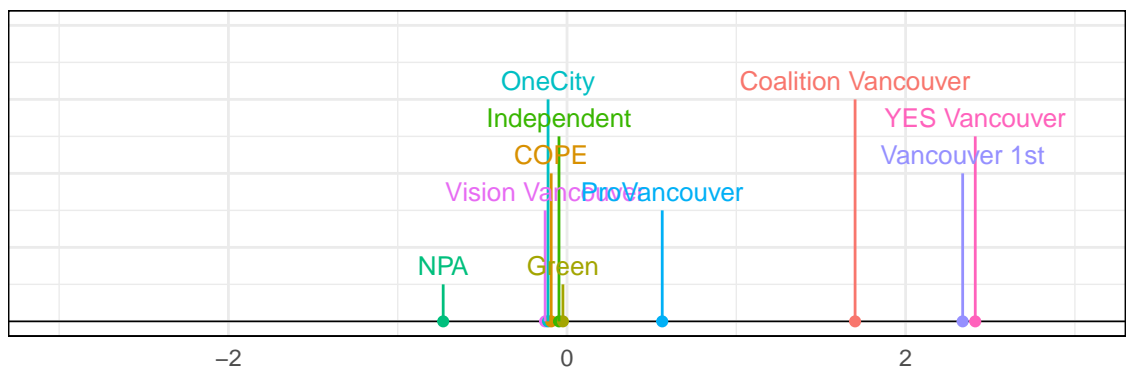


Figure 3: Spatial Location of Candidates and Parties in Vancouver



clarifying the sources and structure of electoral competition in Vancouver municipal politics.

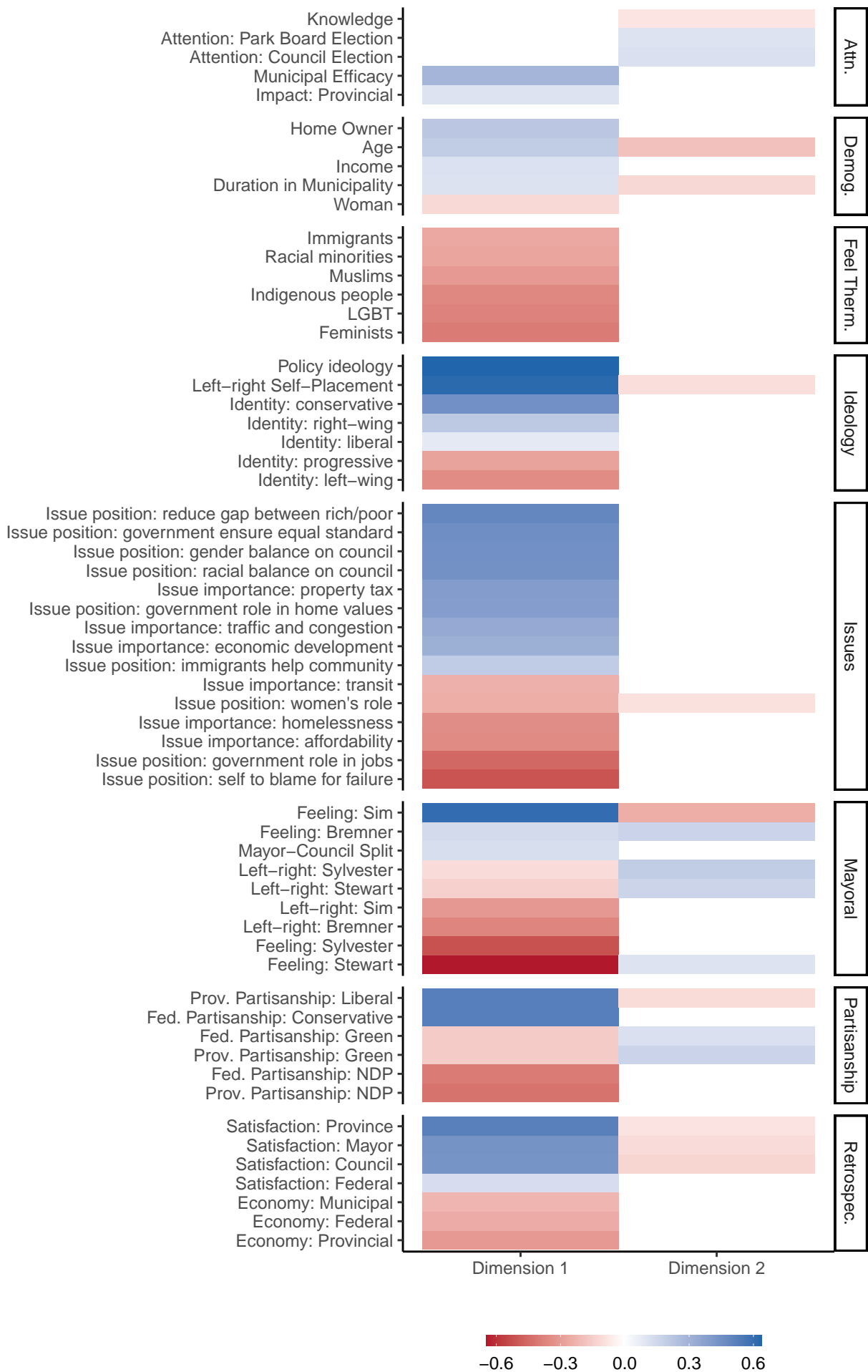
Fortunately, we need not stop here. Our CMES data allow us to probe these emergent dimensions in considerably greater depth. As we explained above, we measured CMES respondents' vote choices within the measurement model that also included each of the 176,450 anonymized ballots, allowing for a measure of CMES respondents' spatial positions on the same scale as, and fully informed by, the cast vote records. By folding these spatial locations back into the CMES data, we can explore the individual-level features that are associated with respondents' positions on the two dimensions, producing a considerably more detailed interpretation of the two dimensions than would be possible with the CVR data alone.

Figure 4 summarizes this analysis. We began by standardizing each of the 96 variables in the nine "families" of factors described in the previous section, and then calculated the correlation between respondents' positions on each variable and their ideal points on each of the two dimensions. In figure 4, we report results for any variable whose correlation coefficient was statistically significant for either of the two dimensions. Positive correlations are in blue, and negative correlations are in red, with stronger correlations in a deeper shade of each colour. To ease interpretation, variables are organized by the "families" described earlier.

The results displayed in figure 4 have much to teach us. Notice, first, that the number of coloured variables is larger, and the shade of those variables is darker, for the first dimension than the second. This indicates that electoral competition in Vancouver is largely unidimensional; that is, many of the attitudinal and demographic variables that political scientists consider relevant to vote choice align strongly with the first dimension.

Inspecting the shaded variables for the first dimension more closely, we can see a number of distinct families of variables that are clearly important for interpreting respondents' spatial locations. In the ideology category, the two variables that capture respondents' ideological positions at the highest level of generality – their left-right self-placements and latent policy ideologies – are more strongly associated with the first dimension than any other variable in the figure. As expected, those who position themselves on the ideological right, and those whose latent policy attitudes are ideologically conservative, fall on the rightward end of our first-dimension measure. Relatedly, near the bottom of the figure, we can see that provincial and federal partisanship variables are also strongly associated with first-dimension positions. These relationships are equally intuitive: federal Conservatives and provincial Liberals on the right, Green and NDP partisans (both provincial and federal) on the left. Clearly, "left" and "right" on our measured spatial dimension align well with "left" and "right" in a more general ideological sense.

The strength and consistency of the associations in the "issues" family of variables is equally striking. All of the fourteen issue variables in the CMES study are associated



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 Figure 4: Correlations: CMES Vancouver Variables and Measured Dimensions

with respondents' first-dimension positions, and all are related in the directions we would expect from more general ideological preferences. Importantly, issue questions related to specifically *municipal* policy debates are neither stronger nor weaker than more general questions. For example, a question about the government's role in home values (an extremely salient issue in the 2018 election) is no more strongly related to first-dimension scores than a more general question about the government's role in creating jobs. Issue relationships are strong across *all* policy questions, not just the municipal issues, which suggests that issue positions are connected to respondents' spatial locations by a more general policy ideology.

In addition to ideology, partisanship, and issue attitudes, several other variables are strongly associated with first-dimension scores. Feeling thermometer ratings for a variety of social groups are consistently related to first-dimension positions; in general, those on the rightward end of the first dimension have lower feeling thermometer scores when asked about historically marginalized groups than those on the left. Retrospection variables are also important, with those at the rightward end of the spectrum holding less optimistic economic views, and lower satisfaction ratings, than those on the left. These variables reflect the incumbent position of the Vision Vancouver council. Finally, several demographic variables are also associated with the first dimension, with older, male, wealthier, higher-income, longer-duration residents to the right, and their opposites to the left. These demographic relationships are also in keeping with what we would expect from an ideologically structured first dimension of municipal electoral competition.

Turning to the second dimension, notice first that fewer variables are associated with respondents' ideal points on this dimension, and of those variables, relationships tend to be weaker (i.e. lighter shades) than on the first dimension. This is consistent with our interpretation of the second dimension as a genuinely *secondary* component of Vancouver's political structure, one that is primarily valuable for understanding intra-ideological divides on the right between NPA supporters (low scores on the second dimension) and the right-leaning upstart parties (higher values on the second dimension). In general, the correlation coefficients suggest that those with lower scores on the second dimension were older, longer-duration Vancouver residents, placed themselves further to the right on the ideological spectrum, and held more traditional positions on women's role in society. Unsurprisingly, feelings toward Ken Sim (the NPA mayoral candidate) and Hector Bremner (the YES Vancouver candidate) are also strongly associated with positions on this dimension. More interesting are the statistically significant correlations for respondent's left-right placements of Stewart and Sylvester, the two leading progressive mayoral candidates; candidates who position those candidates further to the right had higher values on the second dimension, suggesting that NPA supporters believed Stewart and Sylvester to be more extreme "left-wingers" than did those who supported the newer right-leaning parties. In other words, among those who positioned themselves on

the ideological right, supporters of the upstart parties felt less distant from the leading progressive mayoral candidates than did supporters of the NPA.

Of the correlations in the second-dimension results, just three variables are significantly associated with the second dimension but not the first: knowledge, council attention, and park board attention. Respondents' overall knowledge of Canadian politics (measured by a four-item battery of factual questions), together with their self-reported attentiveness to the city's council and park board elections, were *not* associated with their position on the main left-right axis of electoral competition. They were, however, associated with the second dimension, with more knowledgeable respondents closer to the NPA, and higher-attention respondents closer to the upstart parties. Past research in Canadian municipal politics has suggested that citizens may attend more closely to municipal politics when they are seeking out alternatives to incumbent candidates (Moore, McGregor, and Stephenson 2017), and the same may be true in relation to establishment versus upstart political parties. With the Non-Partisan Association comfortably occupying a role as the "default" party of the right for nearly a century, it is hardly surprising that those who were closer to the upstart parties on the second dimension were also more likely to report that they had paid close attention to the election.

## 5 Discussion

Our goal in this paper has been to use novel cast vote records to measure the locations of Vancouver's 2018 voters and candidates in a shared two-dimensional political space, and then interpret that structure using nearly 100 individual-level survey variables from the Canadian Municipal Election Study. We have sought to develop a measurement strategy that allows us to grapple with an exceptionally complex electoral system, one in which Vancouver voters have the opportunity to select a mayoral candidate, ten councillors, seven park board commissioners, and nine school board trustees at each election. To properly interpret the structure of political competition in Canada's big cities, we believe it is important to move beyond mayoral elections and assess what local residents' full array of choices tells us about the local political environment. Our approach has provided us with a means with which to do just that in one of Canada's most interesting and important cities.

What have we learned from this new approach? First, our findings suggest that municipal electoral competition in Vancouver is structured primarily by a single dimension of competition – one that is strongly related to general patterns of ideology, partisanship, and issue positions. While Vancouver's party system is unique, the dimension on which those parties compete for votes is not. Those on the "left" of this first dimension in Vancouver municipal politics are recognizable as ideologically "left" in provincial or federal politics: they adopt left-of-centre ideological self-placements, hold recognizably

progressive issue positions, and identify more closely with provincial and federal parties of the left. The same is true, in mirror image, of those on the rightward end of our first-dimension measure.

To the extent that a second dimension of competition *is* active in Vancouver municipal politics, our analysis suggests that it primarily divides those on the ideological right into supporters of the well-established NPA versus those who support newer centre-right parties. At first glance, we might suspect that this intra-ideological divide on the right is connected to a more general phenomenon, observed in many advanced democracies, of a united “left” and a more ideologically fragmented “right” (Cochrane 2013); however, it is important to recognize that Vancouver residents’ issue positions, and even their more general ideological self-placements, are only very weakly related to their second-dimension locations. Instead, the divide appears to be more generational in character: older, long-time Vancouver residents who are dissatisfied with council’s performance are more likely NPA supporters, and younger residents who are ideologically conservative but feel less distant from the city’s progressive candidates and council are more tempted by the newer parties. The small overall size of this second demographic group – young, highly attentive, ideologically conservative residents – in the progressive city of Vancouver may help account for the upstart parties’ notable lack of success in 2018.

More generally, our analysis suggests that the ideological and issue disagreements that animate Canadian politics at the provincial levels are fully active in Vancouver’s municipal politics as well; however, these divides take on a distinctive complexion at the municipal level as a result of Vancouver’s electoral institutions and generally left-leaning public. At-large elections, linked with a majoritarian electoral formula, create low barriers to entry for new political parties, and when those parties are willing to coordinate with one another, even only partially, multiple parties occupying a similar ideological space can each run candidates while still avoiding sub-optimal outcomes from excessive vote-splitting. What is most distinctive about Vancouver’s politics, in other words, appears to have less to do with the fact that the elections are *municipal* – that the elected representatives will be responsible for a very particular array of policy tasks – and more to do with the ideological composition of the city’s electorate and the strategic incentives of its distinctive electoral institutions.

## 6 Conclusion

Our analysis in this paper suggests several new lines of research for scholars who are interested in Canadian urban politics. One interesting puzzle relates to Vancouver’s centre-left parties: why do we see four progressive parties in Vancouver, given that the parties are positioned at very similar points in our measured political space? One answer is historical; Vision Vancouver emerged as a moderate alternative to the “hard left” COPE,

creating new party loyalties and “brands” even as many progressive voters are now happy to support candidates from both parties. Much the same is true of OneCity, whose birth owed as much to intra-party tensions within COPE as to deep ideological disagreement. A second important line of explanation may be the sheer abundance of progressive voters in Vancouver; in a city whose residents are mostly left of centre in the larger Canadian context, parties can cater especially to particular varieties of the larger progressive whole: Green as the home for environmentally-conscious moderates; COPE as the home for progressives outraged by the city’s stark economic inequalities; OneCity as COPE with a friendlier, younger, and more “new left” appeal. Provided that these parties are able to coordinate to some degree in the candidates they field for Vancouver’s at-large offices, all can persist, and enjoy some success, without threatening the overall strength of progressive representation on city council. Whatever the precise cause, our analysis illuminates the puzzle – four parties, all closely related on the primary dimension of competition and indistinguishable on the secondary dimension – and illustrates the need for additional research on party strategy, candidate entry, and vote choice on the progressive side of Vancouver’s ideological spectrum.

We also see considerable value in additional research on Vancouver’s right-of-centre parties. Since 2018, tensions within the Non-Partisan Association have only increased; the NPA recently announced that John Coupar, a longtime party member and park board commissioner who unsuccessfully sought the NPA’s mayoral nomination in 2018, would be the party’s mayoral candidate in 2022, provoking surprise, and then outrage, among many party members. Councillors Lisa Dominato, Colleen Hardwick, and Sarah Kirby-Yung soon resigned from the NPA and now sit as independents; their party affiliation in the 2022 election, should they choose to run, remains unclear. Ken Sim, NPA’s narrowly defeated 2018 mayoral candidate, has launched a new party and also intends to run for mayor in 2022. Perhaps, like The Electors Action Movement in the 1970s, one of these emerging alternatives will come to serve as a genuine challenge to the more traditionalist NPA. Perhaps they will instead evolve into competing parties of the right, embodying the alternative right-of-centre visions – automobile-friendly populism, pro-development market liberalism, anti-development conservationism – that have been visible in other Canadian cities (Magnusson 1983b; Silver, Taylor, and Calderón-Figueroa 2020) and in comparative politics research on right-of-centre policy platforms in multi-party electoral systems (Cochrane 2013). Whatever the outcome, our analysis serves as a basis for additional work on the sources of intra-ideological tensions on Vancouver’s ideological right.

Finally, we hope that our work illustrates the potential for cast vote records – anonymized records of every vote cast in an election – to provide new insights on the structure of political competition in Canadian cities. At the beginning of this research project, we searched the open data platforms of the fifty largest cities in Canada and contacted mu-

municipal clerks and election administrators to locate CVR data in other cities. At present, Vancouver is the only municipality in Canada to make these data publicly available. However, as increasing numbers of municipalities adopt electronic vote tabulators, the opportunity to access CVR data will increase, and in our experience, many municipal election administrators are not yet aware that researchers have an interest in these data. We encourage urban political scientists across Canada to advocate for publicly available CVR data in their cities.

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