Ballot-Level Observations about Vermont's 2014 General Election

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Abstract

Using actual ballots cast in Vermont's 2014 General Election, this work demonstrates the value of ballot-level analysis in answering a variety of interesting questions, including identifying groups of voters, measuring partisan voting, investigating voter confusion between the Liberty Union and Libertarian parties, and demonstrating that strategic undervoting in multi-member districts is common. The analysis is complicated somewhat by several factors including electoral fusion, the presence of candidates from four major parties and a number of independents, the fact that no race featured candidates from every party, and the fact that many legislative districts are multi-member districts.

Introduction

Vermont's 2014 General Election had the lowest voter turnout in at least 40 years, with 44.59 percent of registered voters casting ballots. The second lowest turnout was in 1978, with 44.66 percent. Given that it was a midterm election, it was not completely surprising that the Republican Party gained several seats in the Legislature, but the Republicans did not pick up enough seats to dislodge the Democratic supermajority. The race for Governor, however, was much closer than the media and pollsters forecast. The narrowest poll (from early September) showed the Democratic incumbent Peter Shumlin with a 10-point lead over Republican challenger Scott Milne (New York Times 2014), which widened as the election drew nearer. In the actual election, Shumlin won only by a 1.1% margin. Because Shumlin did not win a majority and Milne did not concede, the Vermont Constitution required the Legislature to cast their own ballots to elect the governor when they convened in January 2015. They later elected Shumlin roughly along party lines. While there do not seem to be any immediate answers to the question of the narrowness of the governor's race, there are several other interesting features of the recent election discussed herein that may be helpful in better understanding all of the races.

There is little prior research evaluating the political properties of an election and voter behavior using actual individual ballot data. One significant work using ballot-level data is Landé's detailed evaluation of political behavior in a specific region of the Phillipines (1973). A second work considering ticket-splitting in two elections in the 1970s compared aggregate election results with ballot data and found that using the aggregate data significantly understates the amount of ticket-splitting (Gitelson and Richard 1983). Two other papers evaluate actual ballots for patterns in votes for and against various California ballot propositions (Dubin and Gerber 1992; Mueller 1969). Actual ballot information has also been used to determine how

often interesting theoretical events occur (Chamberlin, Cohen, and Coombs 1984; Tideman and Plassman 2010).

In the absence of actual ballots, other works typically rely on aggregate election results, exit poll data, surveys, or mock elections. A brief sampling of other research finds aggregate data used to study split-ticket voting in the UK (Railings and Thrasher 1998) and the US (Burden and Kimball 1998; Lewis-Beck and Nadeau 2004), incumbency advantage in single- and multi-member state legislative districts (Carey, Niemi, and Powell 2000), and links between voter behavior in gubernatorial and senatorial races (Carsey and Wright 1998). Works using state-level survey data include a study of partisanship (Wright, Erikson, and McIver 1985). Mock elections that produce individual ballot data have been used to evaluate, for example, voting rules (Van der Straeten, Laslier, and Blais 2013) and voter biases (Sigelman and Sigelman 1982).

To evaluate the 2014 Vermont General Election, this study uses 6,669 actual ballots cast in the election from six towns in Vermont: East Montpelier, Fayston, Manchester, St. Johnsbury, Westminster, and Wolcott. The 6,669 ballots represent every ballot cast in those towns in the 2014 General Election. These six towns span five of Vermont's fifteen counties, five of Vermont's thirteen state Senate districts, six state Representative districts, and the ballots account for roughly 4.6% of all ballots cast in Vermont. Ballots from these towns (and only these six towns) were collected and scanned as part of a legally-mandated routine audit done by the Vermont Secretary of State's office (Condos 2014), the results of which were requested under Vermont's Public Records Law.

Every two years in Vermont, all statewide and legislative seats come up for re-election. In 2014, Vermonters cast votes for their Representative to the U.S. House; statewide positions including Governor, Lieutenant Governor, State Treasurer, Secretary of State, Auditor of

Accounts, and Attorney General; state legislative positions (the number of which varies by town) in the House and Senate; countywide positions of Probate Judge, Assistant Judge, State's Attorney, Sheriff, and High Bailiff; and the Towns' Justices of the Peace. For this analysis, the county- and town-level offices where party affiliations are less meaningful are ignored and only data from statewide and legislative races are evaluated. Tables 1 and 2 list the candidates for statewide races (on all towns' ballots) and a partisan breakdown of the legislative races under investigation, respectively.

Table 1: Vermont's 2014 statewide partisan candidates. All incumbents (in bold) were re-elected, and independent candidates were left off for space considerations.

Race	**Name**	**Party**
U.S. House	Matthew Andrews	Liberty Union
U.S. House	Mark Donka	Republican
U.S. House	**Peter Welch**	Democratic
Governor	Pete Diamondstone	Liberty Union
Governor	Dan Feliciano	Libertarian
Governor	Scott Milne	Republican
Governor	**Peter Shumlin**	Democratic
Lt. Governor	Marina Brown	Liberty Union
Lt. Governor	Dean Corren	Progressive/Democratic
Lt. Governor	**Phil Scott**	Republican
Treasurer	Murray Ngoima	Liberty Union
Treasurer	**Beth Pearce**	Democratic
Treasurer	Don Schramm	Progressive
Secretary of State	**Jim Condos**	Democratic
Secretary of State	Ben Eastwood	Progressive
Secretary of State	Mary Alice Herbert	Liberty Union
Auditor	**Doug Hoffer**	Democratic/Progressive
Attorney General	Rosemarie Jackowski	Liberty Union
Attorney General	Shane McCormack	Republican
Attorney General	**William Sorrell**	Democratic

Table 2 2014 legislative candidate breakdown for six Vermont towns. Parties are indicated as follows: Democratic (D), Independent (I), Liberty Union (LU), Progressive (P), and Republican (R).

Town	**Sen. Seats**	**Candidates**	**Rep. Seats**	**Candidates**
E. Montpelier	3	1 D, 2 P/D, 3 R	1	1 D
Fayston	3	1 D, 2 P/D, 3 R	2	1 D, 3 I
Manchester	2	2 D, 1 R	2	2 D, 2 R
St. Johnsbury	2	1 D, 1 D/R, 1 R	2	2 D, 2 R
Westminster	2	2 D, 2 LU, 1 I	2	2 D
Wolcott	2	1 D, 1 D/R, 1 R	2	2 D, 2 R

Several factors complicate analysis of elections in Vermont, in large part because many races in the state do not feature strictly binary Democrat-versus-Republican matchups as might be more common in other states. Other specific complicating factors include:

1. Vermont allows electoral fusion, whereby qualifying candidates run with the labels of multiple parties.[1]
2. As of the 2014 election, there were four major parties: Democratic, Liberty Union, Progressive, and Republican.[2]
3. There was no race that featured candidates from all of the four major parties.
4. Independent candidates ran in many of the races.
5. Many state Senate and state Representative districts are multi-member districts.

Keeping these factors in mind, several observations are made here:

1. Cluster analysis of the ballots can identify groups of similar voters.
2. Split-ticket voting is common.
3. Voters may be confusing the Liberty Union and Libertarian parties.
4. Strategic undervoting in multi-member districts is common.

Using individual ballot data avoids the well-known “ecological fallacy” that affects conclusions about individual behavior drawn from aggregate data (Robinson 1950). This effect contaminates

conclusions drawn from populations which may be made up of two or more subpopulations, as often found in any population of voters. Behaviors and trends that may appear to be significant for the entire voting population may break down when only (say) Republicans are examined. It also avoids the misreports problem, where voters participating in surveys report having voted for the winner more often than the actual results show (Carsey and Wright 1998, 996).

Though using ballot data is fairly novel, it is not without drawbacks, especially considering the limited number of available ballots. The conclusions reached in this work are limited by the following caveats. First, the ballots are a non-representative sample of the ballots cast for statewide elections. The towns to be audited were chosen ad hoc[3] by the Vermont Secretary of State's office. For that reason, conclusions may be drawn about each of the towns, but not reliably extended to the state as a whole. Second, given the 2014 election had extremely low turnout, extending the results to other elections may be problematic. Third, many of the races (particularly the State Senate, Treasurer, Secretary of State, and Auditor of Accounts) were not competitive, so voter behavior in those races should not be used to draw conclusions about more competitive races. Fourth, ballots from some towns outside the available sample may have shown less ticket splitting because of a stronger partisan presence. Last, it may not be appropriate to aggregate results from down-ticket races in different towns due to different race dynamics. Because legislative races can differ so much, data for individual towns are broken out whenever possible and appropriate.

Even with these caveats in mind, there seem to be a number of interesting conclusions to be made. While a number of statistical techniques might be used, including factor analysis and regression analysis, the correlation analysis tool that seemed most relevant was cluster analysis, which uses the similarities between ballots to group voters. Within the 6,669 ballots, there are

only 1,023 unique arrangements of votes for the seven statewide races (and counting write-in votes within the same race as votes for the same candidate), so the complexity of the data is considerably reduced. Observation 1 below explains the cluster analysis in more detail. Tests for correlation between candidates in different races were done, but if the connections were not already obvious, it quickly became apparent that they were quite strong no matter which two races were paired.[4] Observations 2, 3, and 4 feature little correlation, but instead use descriptive statistics to draw conclusions.

This data provides several exciting opportunities to understand voter behavior in a much more detailed manner than has previously been explored. While there are undoubtedly more questions to explore and more rigorous analyses to make than the above, and while the ballots' anonymity does not allow them to be correlated with individuals, this work will briefly demonstrate the usefulness of ballot-level data in analyzing voter behavior in a variety of ways.

Observations

Observation 1: Cluster Analysis of Ballots can Identify Groups of Voters

Cluster analysis is a statistical method used to identify logical subgroupings (clusters) of objects within a larger group. Each object is assigned to one of *k* clusters such that a particular object is more similar to the other objects in the same cluster than in other clusters. In the case of ballot data, clusters represent collections of similar ballots cast by (arguably) similar voters. Similarity between two ballots in this case is a simple count of how many differences there are between the votes in the seven statewide races appearing on the ballots (Gower 1971).

In order to do these comparisons, each of the 6,669 ballots was converted to a single observation with seven nominal variables, one for each of the statewide races. Each race could have a vote for one of the printed candidates, a written-in vote, or an abstention. For example,

with the variable representing the three-way race for Secretary of State, there are five possible values: “Condos”, “Eastwood”, “Herbert”, “Write-In”, and “None”. One of the actual observations in the data set (in ballot order), for example, is: *Donka, Feliciano, Scott, Write-In, Herbert, None, McCormack*

It is not at all clear how many clusters there should be, though the two-party nature of American elections suggests that two, Democrats and Republicans, would be a reasonable, if uninteresting option. The analysis began with the R software tool NbClust (Charrad, et al. 2014), which tested the ballot data using thirty different indices to provide suggested numbers of clusters. Using its “complete” aggregation method[5] produced conflicting results with its suggestion for both k=2 and k=15. As that result seemed unusual, other aggregation methods were tested. The tool’s “ward.D2” method[6] suggested k=2 and k=3, while its “centroid” method[7] suggested k=2 and k=4. Without any conclusive results other than k=2, it seemed appropriate to start with k=2, examine the results, increase k and repeat.

The R tool pam[8] assigns each observation to a particular cluster, which are structured around a particular exemplar observation (the *medoid*) that is at the “center” of each cluster. Listing the exemplars produced by pam seems to be a simple method for categorizing similar voters. The observations returned as medoids for k=2 seemed to align with the “uninteresting” outcome mentioned earlier:

1. *Donka, Milne, Scott, Pearce, Condos, Hoffer, McCormack*
2. *Welch, Shumlin, Corren, Pearce, Condos, Hoffer, Sorrell*

Medoid 1 above represents a straight Republican ticket with votes cast for the incumbents Pearce, Condos, and Hoffer, who were unopposed by any Republican candidate. Medoid 2

represents a straight Democratic ticket. The results for *k*=3 are interesting: they share the two medoids of *k*=2 but add one more:

3. Donka, Milne, Scott, None, None, None, McCormack

This third medoid represents a straight Republican ticket with abstentions for the offices for which there was no Republican candidate. One might argue that the voters in cluster 3 represent extremely partisan Republicans who are unwilling to vote for non-Republican candidates. Increasing *k* to 4 keeps the previous three medoids and adds this:

4. *Welch, Shumlin, Scott, Pearce, Condos, Hoffer, Sorrell*

This new medoid represents a straight Democratic ticket except for the Lieutenant Governor race, where a vote was cast for the incumbent Republican. This arrangement represents the incumbents, who were all re-elected. Nonpartisan voters or voters happy with the current incumbents would presumably find their ballots in this cluster. Increasing *k* to 5 adds one medoid to the previous four:

5. *Donka, Milne, Scott, Schramm, Eastwood, Hoffer, McCormack*

This arrangement is nearly the same as medoid 1, but the votes for incumbent Treasurer and Secretary of State were replaced with votes for the Progressive candidates, who both finished the election in second place. These Republican voters may not have been willing to vote for a Democrat when they had the option not to, but wanted to cast a vote for some candidate. Setting k=6 added another:

6. *Welch, Milne, Scott, Pearce, Condos, Hoffer, Sorrell*

A variation of medoid 4, this arrangement has votes for all incumbents except incumbent Governor Shumlin, who was not particularly popular going in to the election and nearly lost.

Further increases to k result in increasingly small new cluster sizes, with harder-to-justify candidate arrangements.

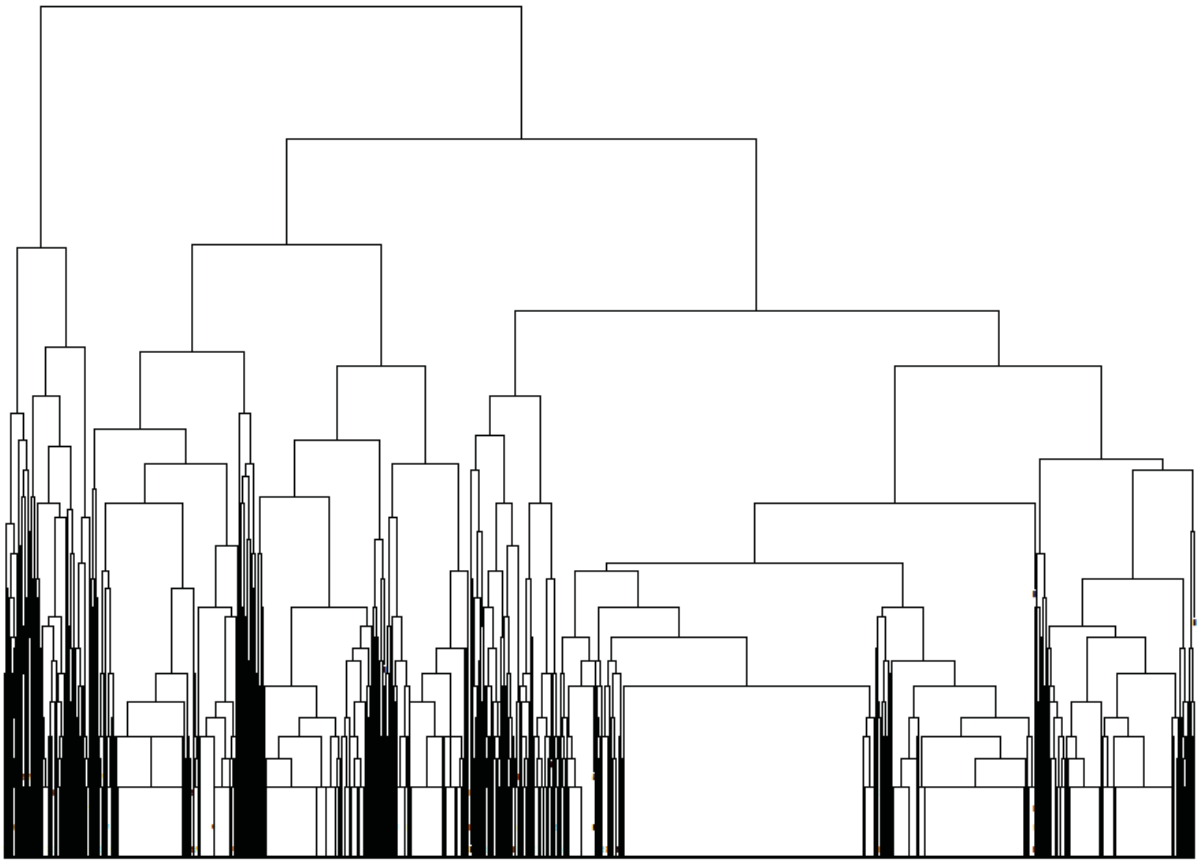

Figure 1 Dendrogram of ballot data produced by the agnes tool with Ward's clustering method. The dendrogram represents the joining of similar observations (starting at the bottom) into clusters, then joining clusters together until all observations are joined at the top. When clusters are joined, the position of that merger on the vertical axis represents how different the clusters are. More similar clusters are joined closer to the bottom, while less similar clusters are joined farther from the bottom.

Where pam requires a decision about the number of partitions into which the data should be divided before it begins, R software tools like agnes[9] do not, and instead group similar observations with an approach called *hierarchical clustering*. One of the most interesting

products of agnes is its dendrograms, as seen in Figure 1, which may provide visual insights into clustering of the data.

Observation 2: Split-Ticket Voting is Common

The amount of partisan voting in an election is often calculated by measuring (or estimating) the amount of ticket splitting that occurred. That is, voters are typically divided into two groups: those who vote for only a single party and those who vote for multiple parties. Because of the complicating factors previously mentioned, counting the number of voters engaged in partisan voting requires a different approach than previous analyses. This is especially the case considering that there were no races that featured candidates from every party, so even partisan voters would have been likely to engage in what would elsewhere be called split-ticket voting (Burden and Kimball 1998). Even after appropriately redefining partisan voting and defining anti-partisan voting in light of these complications, split-ticket voting remains a common phenomenon in this election.

Partisan Voting

Previous analyses of partisan behavior in elections did not take advantage of ballot-level data, and instead relied on self-reported information from surveys and aggregate election results (Keith et al. 1992; American National Election Studies 2008). The ANES surveys ask voters to identify the party with which they feel most closely aligned and to indicate the strength of their attachment to the party. Based on their responses, voters are classified as one of seven possible identifications on a Likert-like scale: Strong Democrat, Weak Democrat, Independent Democrat, True Independent, Independent Republican, Weak Republican, and Strong Republican. By looking at the actual ballots that voters cast, strong conclusions about the intensity of each voter's partisanship may be drawn.

Here a *partisan* is redefined as a voter who always votes for candidates of a particular party when they appear on the ballot. This definition was selected with the expectation that a partisan with a strong attachment to their party would be sure to support their party's candidates. Given the complicating factors, however, a partisan may choose to cast a vote for a candidate of a different party only if their preferred party does not field a candidate, or in the case of multi-member districts, does not field as many candidates as there are seats available. Initially, all party affiliations for fusion candidates were counted for this analysis. If a candidate is on the ballot as "Progressive/Democratic," both Democratic and Progressive partisans would vote for that candidate. A second analysis was performed using only the candidates' first party designation, which produced a slightly higher percentage in most of the samples, with a few striking anomalies, described below.

Table 3 Partisan voting, demonstrated by the percentage of ballots in each town that feature votes for all available candidates of the Democratic (D), Liberty Union (LU), Progressive (P), and Republican (R) parties. Numbers in parentheses indicate the "first party" percentage– the number of partisan ballots when candidates are only considered with their primary party affiliation. Missing parentheses mean there was no change.

Town	**D %**	**LU %**	**P %**	**R %**	**Total %**
E. Montpelier	10.5 (27.7)	N/A	1.8 (2.2)	12.1	24.4 (42.0)
Fayston	8.1 (23.3)	N/A	0.2 (0.4)	8.6	16.9 (32.3)
Manchester	9.4 (11.3)	0.1	1.1	11.6	22.1 (24.0)
St. Johnsbury	8.5 (10.4)	0.1	1.6 (1.8)	11.4 (19.1)	21.5 (31.4)
Westminster	24.3 (27.7)	0.1	3.4 (3.9)	14.6	42.4 (46.3)
Wolcott	4.7 (9.1)	0.2	0.9 (1.3)	6.6 (12.3)	12.3 (22.9)
Total	**10.9 (16.8)**	**0.0**	**1.6 (1.8)**	**11.4 (14.1)**	**23.9 (32.8)**

Table 4 Each party's share of partisan ballots (as shown in Table 3). Numbers in parentheses indicate the "first party" percentage–the number of partisan ballots when candidates are only considered with their primary party affiliation.

Party	**Percentage of all partisan ballots**
Democratic	45.5 (51.2)

Liberty Union	0.0 (0.0)
Progressive	6.7 (5.6)
Republican	47.5 (43.0)

Table 3 shows all six towns and their partisan vote percentages. Across all ballots analyzed with the initial approach, almost 24 percent of them featured votes for all possible candidates of a single party. Overall, there were slightly more partisan votes for Republicans than Democrats, many fewer for Progressives, and almost none[10] for Liberty Union, as shown in Table 4. Using only first party designations, the number of partisan voters increases to 33 percent and Democratic partisans become more prevalent than their Republican counterparts.

Westminster's ballots show interesting results, with the highest occurrence of first-party partisan ballots at 46.3 percent. Westminster also had the highest single-town single-party vote, with nearly a quarter of all ballots cast having votes for all the Democratic candidates. This high percentage seems to be due to there being only Democratic candidates for state Representative and no Republican candidates for state Senate. (Notice that East Montpelier also had no Republican state Representative candidates and a similar Democratic first-party result, despite having Republican state Senate challengers.) Republican partisan voters in Westminster who cast their votes for Republican statewide candidates may have also voted for the Democratic or other legislative candidates, with no risk of jeopardizing a Republican candidate's chances of winning.

Among the interesting results for first-party partisan ballots (versus using all fusion candidates' parties) is East Montpelier and Fayston, which see substantial increases in its Democratic partisan percentage. This is likely due to there being fewer Democratic candidates. Because two of the six state Senate candidates ran as Progressive/Democratic, considering only their first party drops their Democratic designation and reduces the number of overall Democratic candidates by two. This leaves a single (non-fusion) Democratic Senate candidate.

Wolcott's Republican partisan percentage increases significantly due entirely to Senator Robert Starr, who ran as a "Democratic/Republican" candidate because there was no second Republican challenger in his race and he received enough write-in votes in the Republican primary. As a well-known politician, he was unlikely to be considered a true "fusion" candidate or one that collected large numbers of votes from Republican partisans, though.

Table 5 The percentage of ballots in each town that are anti-partisan, that is, those that feature votes for no candidates of the specified parties: Democratic (D), Liberty Union (LU), Progressive (P), and Republican (R).

Town	**D %**	**LU %**	**P %**	**R %**
E. Montpelier	7.5	89.7	12.9	26.1
Fayston	8.3	91.2	14.8	24.2
Manchester	12.6	83.7	29.4	30.5
St. Johnsbury	7.0	83.1	16.4	3.3
Westminster	6.6	74.2	11.1	62.0
Wolcott	5.4	83.9	14.1	14.3
Total	8.3	83.8	17.9	24.4

Anti-Partisan Voting

Following the observation of the extremely high number of partisan ballots in Westminster, it became clear that measuring partisan voting as above may miss nuances in the ballot data. Rather than measuring those voters who will only support a single party, a parallel question arises about how many *anti-partisan* ballots were cast. Such ballots feature no votes at all for candidates of one or more parties, the intuition being that some voters might be flexible in terms of which party they will support, but there may be one or more parties for which they will never cast a vote. All party affiliations are counted in this analysis, so that a ballot with a vote for a candidate running with the "Democratic/Republican" label could not be considered an anti-Democratic or anti-Republican ballot. Table 5 breaks those results down. It is not clear how to compare anti-partisanship with the more conventional measurement of partisanship, but it seems

likely that extremely partisan Democrats, for example, would be anti-Republican, anti-Progressive, and anti-Liberty Union.

The low percentage of anti-Democratic ballots overall seems to be in part due to political leanings of the voters, but also in part due to six out of seven statewide incumbents being Democrats. Aside from Governor Shumlin, none of the incumbents had a particularly bad reputation, so even voters who typically leaned Progressive or Republican might have been willing to keep them in office. The numbers for anti-Democratic and anti-Progressive are also likely skewed somewhat due to Doug Hoffer (D/P) running unopposed for Auditor.

An incredibly high rate of anti-Republican ballots (62.0%) appeared in Westminster, which can be explained the same way as with partisan voting there—no Republican candidates were running for the Senate or House there, so Republicans were easy to avoid if the voter chose to.[11] St. Johnsbury, on the other hand, shows virtually no anti-Republican ballots. This stems from Senator Jane Kitchel opting to run under both Democratic and Republican labels in the same manner as Senator Starr, as noted previously. Removing her from the list of Republican candidates moves the anti-partisan percentage in St. Johnsbury from 3.3% to 19.6%, which matches the other towns more closely. Removing Senator Starr from the list of Republicans increases Wolcott's anti-Republican ballot percentage from 14.3 to 22.5%. Manchester's anti-Democratic and anti-Progressive percentages seem fairly high, but their cause is not immediately clear. Disregarding the results for the less popular Liberty Union and Progressive parties, anti-partisan voting seems to be no more prevalent than partisan voting. Indeed, there is probably substantial overlap between partisans and anti-partisans.

Multi-Member Districts

To get a better idea of the behavior of other voters who may not be partisans or anti-partisans, the votes cast for candidates for seats in multi-member state Senate and state Representative districts are examined.[12] As before, fusion candidates are counted as either of their parties, so a ballot with votes for a Democrat and a Progressive/Democrat can be considered as either a ballot with votes for two Democrats or a vote for two Progressives.

One might argue that since the down-ticket statewide offices (e.g. Treasurer, Auditor, and so on) require distinct skill sets, voters might be more willing to cast votes regardless of party labels. What is clear from the multi-member district data that voters are frequently willing to vote for candidates from multiple parties even *within a single race*. Table 6 shows the percentages of each town's state Senate or state Representative ballots that had at least two votes and were cast for candidates of the same party. For example, in Fayston about 45% of voters voted for state Senate candidates from *different* parties on the same ballot. Fayston and East Montpelier are in the same state Senate district, so it makes sense that the proportions of partisan voting for that race in both towns are quite similar, differing by only 2.3%. In the multi-member districts examined here, the frequency of partisan voting may be explained by fairly small districts[13] where candidates from the same party often campaign together.

Table 6 Partisan voting within multi-member districts, demonstrated by the percentage of ballots in each town having both votes for at least two candidates and those votes going to candidates from the same party.

Town	**Race**	**Partisan %**
E. Montpelier	Senate	57.2
Fayston	Senate	54.9
Manchester	House	63.3
St. Johnsbury	House	72.5
Westminster	Senate	74.2
Wolcott	House	89.1
Wolcott	Senate	87.5

Top-of-the-Ticket Affinity

The party a particular voter most identifies with is often determined by assigning them the party of the top-of-the-ticket (and arguably the most important) candidate for whom they cast a vote. In the case of Vermont's 2014 General Election, the race for U.S. Congress was the top of the ticket, and the down-ticket races under consideration here are the state Senate, state House, and other statewide seats. In part because of the previously-identified complexities of Vermont's election, it seems to make sense to classify partisan voting in three ways: those voters who only voted for a single party (partisans), voters who voted for a single party in every race but one (single defections), and the rest who split their votes (ticket splitters). These counts, paired with the voters' major party choices for U.S. Congress are shown in Table 7.

Table 7 Partisan voting behavior by U.S. House candidate choice.

Candidate (Party)	# Partisans	# Single Defections	# Ticket Splitters
Andrews (LU)	4	6	62
Donka (R)	759	624	495
Welch (D)	736	780	2,731

One interesting result is that, across parties, the number of partisans and single defections are fairly close. The very high number of ticket splitters voting for Welch could be explained either by voters' ideological preferences or Welch's incumbency. Otherwise independent voters who recognized his name might have preferred to vote for someone they know instead of a relatively new candidate.

Observation 3: Voters May be Confusing the Liberty Union and Libertarian Parties

Despite the far-left Liberty Union Party (LUP) having run candidates since the 1970s, it only rarely achieves double-digit percentages of vote totals in recent elections.[14] In 2014, the LUP fielded candidates for every statewide office except Auditor of Accounts. Ballot-level data

suggest that many of the votes they do receive may be due to voters confusing them with the (nationally) more popular and more conservative Libertarian Party, which has a similar-sounding name. Three features of the data support this proposition. The first is that voters who cast their ballots for Libertarian gubernatorial candidate Dan Feliciano were more likely than the average voter to vote for at least one Republican or Liberty Union statewide candidate. These same voters were less likely to vote for at least one Democratic or Progressive statewide candidate. The second, least convincing, feature is that voters in Westminster, Vermont, who cast votes for both of the two Liberty Union state Senate candidates (rather than for the two Democrats or the independent candidate in the race) were less likely to vote for individual Democratic statewide candidates than for those of any other party. The final feature is that Republican partisans were much more likely to vote for Liberty Union candidates than for Democratic or Progressive candidates in the two statewide races where there was not a Republican running.

The only Libertarian appearing on all 6,669 ballots was gubernatorial candidate Dan Feliciano. While some voters undoubtedly found common ground between Feliciano and the LUP candidates, most of their platforms are diametrically opposed.[15] A more plausible explanation is that voters are being confused by the similar-sounding party names. Surveys have shown self-reported libertarians make up 12 percent of Republicans surveyed, but only 6 percent of Democrats surveyed (Pew 2014). That result is itself probably not significant, but it does suggest that left-leaning voters are less likely to consider themselves "small-l" libertarians. It follows that strongly left-leaning voters are also unlikely to cast votes for a Libertarian, especially when there are Liberty Union, Progressive and Democratic candidates available. It is also not likely that libertarians would support candidates with overtly socialist platforms like the Liberty Union Party promotes. Some commentators speculated that voters disappointed with

Governor Shumlin may have cast "safe" protest votes for Feliciano (NanuqFC 2014), though it is difficult to tell how often that occurred.

Table 8 The number of votes for Libertarian gubernatorial candidate Dan Feliciano and how many ballots featured votes both for him and for at least one of the major parties' statewide candidates. Doug Hoffer, who ran unopposed for Auditor of Accounts, was not included. Values in parentheses indicate the percentage of *all* ballots in the town that featured votes for at least one of the statewide candidates from that party.

Town	**Feliciano**	**% w/LU**	**% w/D**	**% w/P**	**% w/R**
East Montpelier	50	24.0 (10.3)	86.0 (87.8)	28.0 (45.2)	76.0 (63.3)
Fayston	11	9.1 (8.5)	90.9 (86.3)	18.2 (45.9)	72.7 (65.2)
Manchester	23	26.1 (16.0)	95.7 (95.4)	43.5 (47.9)	65.2 (58.3)
St. Johnsbury	71	29.6 (16.4)	94.4 (97.3)	28.2 (43.4)	81.7 (71.5)
Westminster	20	15.0 (19.3)	50.0 (85.8)	30.0 (70.3)	80.0 (36.3)
Wolcott	27	25.9 (15.7)	81.5 (79.4)	29.6 (45.4)	92.6 (74.4)
Total	202	24.8 (15.0)	86.1 (91.3)	29.7 (48.9)	79.2 (61.8)

The data in Table 8 support the conclusion that Feliciano supporters may have mistook Liberty Union candidates for Libertarian candidates. For example, consider the percentage of all ballots cast that have a vote for at least one statewide Republican candidate: 61.8%. If only ballots containing votes for Feliciano are considered, the percentage increases (to 79.2%) as one would intuitively expect given the similarities of the Libertarian and Republican parties' platforms. As expected, the percentage of Feliciano ballots having votes for statewide Democrats is lower than when considering all ballots, and steeply lower for the Progressive Party, which is squarely left of the Democrats. Counterintuitively, but supporting the conclusion of this section, Liberty Union candidates (even further to the left of the Progressives) are represented almost twice as often on Feliciano ballots as in the overall sample.

The 21 ballots cast in Westminster with votes for both Liberty Union state Senate candidates are not representative of the 943 overall ballots cast there, as Table 10 shows.

Unsurprisingly, Liberty Union statewide candidates are overrepresented among these 21 ballots—these are voters who may not be partisans as previously defined, but certainly express their support for the Liberty Union Party through their ballots. However, Republican and Libertarian statewide candidates are overrepresented in these 21 ballots. The most striking example of this is in the race for the U.S. House, where voters casting votes for the Liberty Union state Senate candidates vote for the Republican candidate twice as often as all Westminster voters. When the percentages increase in this way, one might initially conclude that there is an ideological similarity between the two Liberty Union candidates and the Republican Party and ideological differences between the LUP and the Democratic Party. While the latter seems reasonable, the former does not, so an explanation other than similar ideology must be the case here.

Table 9 The percentage of votes cast in Westminster, Vermont for statewide candidates by voters who also cast ballots for both Liberty Union state Senate candidates, compared to the percentage of votes cast in Westminster for each statewide candidate by all voters.

Race	Candidate's Party	%, LUP voters	%, All voters
U.S. House	Liberty Union	14.3	0.8
U.S. House	Republican	38.1	19.3
U.S. House	Democratic	38.1	73.6
Governor	Liberty Union	9.5	0.8
Governor	Libertarian	4.8	2.1
Governor	Republican	38.1	22.3
Governor	Democratic	38.1	69.1
Lt. Governor	Liberty Union	14.3	2.9
Lt. Governor	Republican	52.4	34.0
Lt. Governor	Progressive/Democratic	28.6	61.6
Treasurer	Liberty Union	28.6	5.1
Treasurer	Democratic	28.6	69.1
Treasurer	Progressive	33.3	14.6
Secretary of State	Liberty Union	38.1	15.0
Secretary of State	Democratic	23.8	63.6
Secretary of State	Progressive	28.6	12.3

Attorney General	Liberty Union	23.8	4.7
Attorney General	Republican	38.1	22.1
Attorney General	Democratic	33.3	68.4

Table 10: The percentage of votes cast for the listed statewide candidates by Republican partisan voters, compared to the percentage of all ballots that featured votes for those statewide candidates. The Republican Party ran no candidates for Treasurer or Secretary of State in 2014.

Candidate Party	Race	%, R Partisans	%, All voters
Liberty Union	Treasurer	31.3	6.4
Liberty Union	Secretary of State	23.2	9.6
Progressive	Treasurer	18.3	13.5
Progressive	Secretary of State	19.8	12.4
Democratic	Treasurer	5.8	63.4
Democratic	Secretary of State	5.7	62.1

Since the Republican Party did not run candidates for Treasurer or Secretary of State, the behavior of partisan Republicans (as defined in the previous section discussing ticket splitting) with respect to these two races underscores the bias of conservative voters towards Liberty Union candidates. For example, Republican partisans made up nearly a third (31.3%) of all votes for the Liberty Union candidate for Treasurer, compared to 6.4% of all voters. Table 11 shows how these partisan voters compare to all voters casting ballots for Treasurer and Secretary of State candidates. Though Republican partisans were slightly more likely than the overall voting population to vote for the two Progressive candidates for Treasurer and Secretary of State, this might be explained by the extremely low proportion of partisans who voted for the Democratic candidates. These partisans may be showing that they are willing to vote for *any* candidate other than the Democrat, and chose the Progressive as the next best choice.[16]

The analysis here suggests some confusion about the Liberty Union Party but does not disprove alternative hypotheses. It is possible that many Feliciano voters are true independents, and not ideologically motivated. Another possible explanation for the patterns are that Liberty

Union votes are protest votes for candidates that the voters knew could not win. In any case, given the small sample size, the conclusions here are fairly weak and it is difficult to tell how likely the competing hypotheses are.

Table 11 East Montpelier's state Senate votes. There were six candidates for three seats, with three incumbents (in bold below): Cummings, Doyle, Gaffney, LeFavour, McDonald, and Pollina. Democrats are in blue text, Progressives in green, and Republicans are in red. Combinations of candidates not listed below were found on no ballots.

Votes	Number of ballots	% of total	Features
Cummings, Gaffney, **Pollina**	236	21.6	All Democratic
Doyle, LeFavour, McDonald	191	17.5	All Republican
Cummings, **Doyle**, **Pollina**	153	14.0	All incumbents
Cummings, **Doyle**, McDonald	62	5.7	
Pollina	48	4.4	
Cummings, **Pollina**	40	3.7	
Doyle	38	3.5	
Cummings	31	2.8	
Cummings, McDonald, **Pollina**	30	2.7	
McDonald	25	2.3	
Doyle, McDonald	23	2.1	
Doyle, McDonald, **Pollina**	20	1.8	
LeFavour, McDonald	18	1.6	
No votes	16	1.5	
Doyle, Gaffney, **Pollina**	16	1.5	
Cummings, LeFavour, McDonald	15	1.4	
Doyle, **Pollina**	13	1.2	
Doyle, LeFavour, **Pollina**	13	1.2	All men
Cummings, **Doyle**, Gaffney	13	1.2	
Gaffney, **Pollina**	10	0.9	All Progressives
Cummings, **Doyle**	10	0.9	
Cummings, **Doyle**, LeFavour	9	0.8	
LeFavour	8	0.7	
Cummings, LeFavour, **Pollina**	8	0.7	
Doyle, LeFavour	7	0.6	
Cummings, McDonald	6	0.5	
Gaffney, McDonald, **Pollina**	5	0.5	
LeFavour, McDonald, **Pollina**	4	0.4	
Gaffney, LeFavour, **Pollina**	4	0.4	
Gaffney, LeFavour, McDonald	4	0.4	All non-incumbents
Cummings, Gaffney	4	0.4	
Cummings, Gaffney, McDonald	4	0.4	All women
Gaffney	3	0.3	
Doyle, Gaffney, McDonald	2	0.2	
Doyle, Gaffney, LeFavour	2	0.2	
McDonald, **Pollina**	1	0.1	
LeFavour, **Pollina**	1	0.1	

Gaffney, McDonald	1	0.1	

Table 12 The percentage of undervotes (out of all ballots cast) in multi-member districts. The percentage of all legal strategic undervotes is listed in the SU column.

Town	Race	SU	0 votes	1 vote	2 votes	3 votes
E. Montpelier	Senate	26.2	1.5	14.0	12.3	72.3
Fayston	House	18.2	0.8	18.2	81.0	N/A
Fayston	Senate	29.3	3.9	16.9	12.4	66.7
Manchester	House	31.8	3.4	31.8	64.9	N/A
Manchester	Senate	46.4	6.8	46.4	46.8	N/A
St. Johnsbury	House	20.7	1.5	20.7	77.8	N/A
St. Johnsbury	Senate	33.4	1.7	33.4	64.9	N/A
Westminster	Senate	24.8	8.3	24.8	66.9	N/A
Wolcott	House	24.0	1.6	24.0	74.4	N/A
Wolcott	Senate	46.5	9.7	46.5	43.8	N/A
Subtotal	2-member, total	31.2	3.8	31.2	65.0	N/A
Subtotal	2-member, 3-cand.	40.2	4.8	40.2	55.0	N/A
Subtotal	2-member, 4-cand.	24.6	3.1	24.6	72.3	N/A
Subtotal	3-member, total	23.2	2.3	14.9	8.2	70.5

Observation 4: Strategic Undervoting in Multi-Member Districts is Common

In many legislative districts, Vermonters elect multiple at-large representatives. In Vermont, state Representative districts are either one-member or two-member, and state Senate districts range from one member to six members. Rather than electing only the candidate who receives the most votes, the top two (or three, or six) vote-getters are elected in these multi-member districts. In a two-member district, voters are instructed on the ballot to "Vote for no more than TWO," though voters certainly can and do opt to cast fewer votes than they are entitled. Voting for fewer than the maximum has been called *bullet voting* or *plunking* (Merrill 1988, 58), but a *strategic undervote* is here defined as any vote for fewer than the maximum permitted number of candidates, but for at least one candidate in a multi-member district.[17] With only aggregate results of elections (precinct-by-precinct, town-by-town, or state-by-state), it has been difficult to tell how often strategic undervoting actually occurs. Examining the individual

ballots makes this substantially easier, and can provide data points like those found in Table 11, which demonstrates how often undervoting and partisan voting occur even in a single race.

Williams and Adrian wrote that strategic undervoting "is a technique of minorities, or shows a voter's lack of knowledge about candidates" (1959). The findings of this work disagree with their assertion, as the ballot data show that this behavior is quite common, occurring in more than 30 percent of ballots in two-seat races and in more than 20 percent of ballots in three-seat races, as Table 12 shows. The similarity between Fayston and East Montpelier's Senate results (only a three percent difference here) are again apparent, given that the candidates were the same. While St. Johnsbury and Wolcott have superficially similar Senate and House races in their partisan make-up (refer back to Table 2), only the House races of the towns show similar results. Wolcott's Senate race had more single-vote ballots than "full" ballots containing two votes, while St. Johnsbury had about twice as many full ballots as single-vote ballots.

It is surprising to find that the frequency of undervoting *decreases* as the number of seats increased, since the opposite correlation is more intuitively satisfying and could be explained by voter exhaustion.[18] With additional data, this effect can hopefully be more clearly demonstrated than using the current, limited, sample. Unsurprisingly, the percentage of undervoting decreases as the number of candidates increases. When voters have more candidates from which to choose, they are more likely to find a full slate for which they are willing to cast their votes. Again, having additional data to corroborate this limited result will be necessary to make stronger claims.

Conclusion and Future Directions

The unfortunate lack of ballot-level data for most elections has forced researchers to draw conclusions based upon the available aggregate data or data derived from experiments conducted

outside the election itself. As demonstrated by the preceding sections, using individual ballot data can enable more substantial and novel insights into voter behavior than aggregate results, mock elections, or surveys can. Ballot data can also confirm or reject conclusions based upon other (non-ballot) sources. Hopefully, this work will persuade other researchers to seek out ballots where they are available to confirm or challenge prior results and draw new conclusions. Data about the votes cast in multi-member districts are also in demand as real-world data sources for a variety of fields, including social choice theory, where collections of such data have begun to appear (Mattei and Walsh 2013).

The most obvious next steps include repeating the analysis with additional Vermont ballot data. With more ballots, it becomes possible to compare ballots from towns with more competitive races and between towns with similar legislative races. These comparisons might lead to more robust conclusions than the comparatively shallow observations here. Other interesting questions answerable by ballot data that could have applications in other elections include:

1. Are partisan voters more likely to strategically undervote?
2. Can the ideological leanings of candidates (aside from their stated party) be measured by how often they receive votes alongside other candidates? For example, are certain Republican candidates well-represented on otherwise Democratic ballots?
3. What is the actual rate of voter roll-off (i.e. voters casting ballots without voting in down-ticket races) due to ballot exhaustion?
4. Can the clustering of voters be correlated with demographic data to associate the clusters with certain groups?
5. How much does clustering vary by election? What causes the clustering?

6. How do local or regional endorsements by media or other organizations correspond with shifts in the actual ballots?

Using the individual voters' choices, it also becomes possible to put together a picture of their collective preferences in multiple dimensions, such as in Figure 2, which illustrates the voters' choices for statewide candidates using a parallel coordinate system. The numbers on gray lines connecting candidates from different offices indicate the number of ballots that contained votes for the two candidates. Though examples do not appear here, more interesting alternative visualizations using heat maps or other multidimensional graphical representations may be useful in discovering interesting patterns in ballot data.

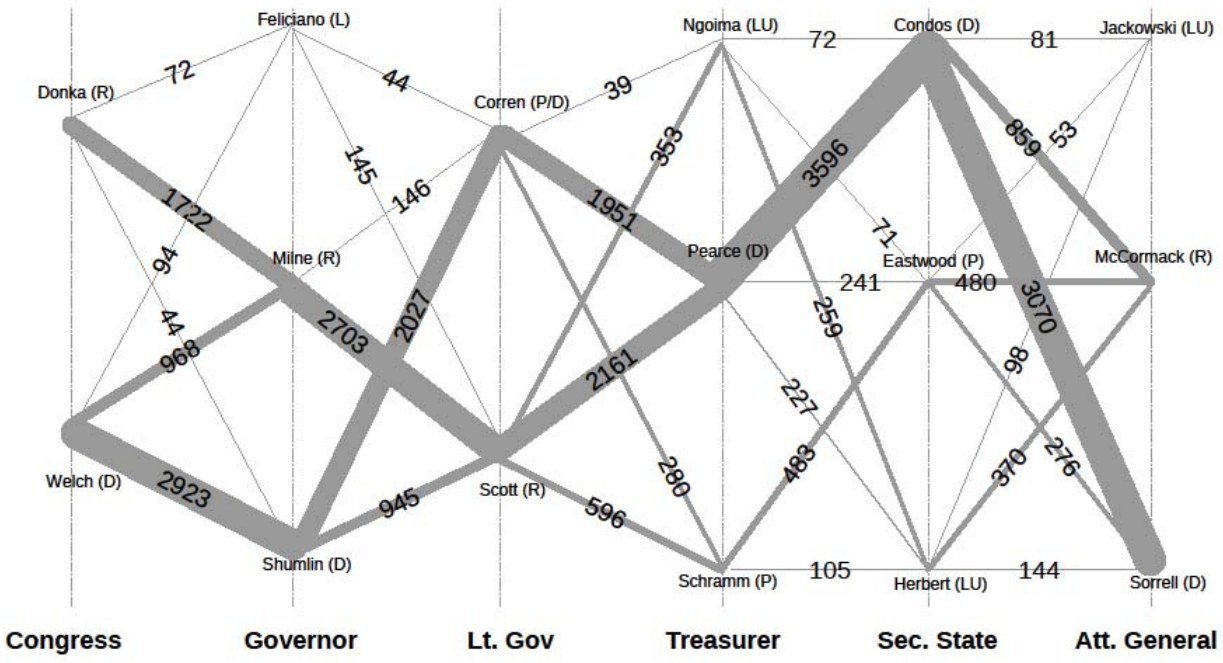

Figure 2 Vote patterns in 2014 statewide candidates displayed in a parallel coordinate system. Gray lines linking candidates indicate the number of ballots found in the entire 6,669-ballot data set that featured votes for both candidates on the ends of the line. The gray lines' widths are approximately proportional to the number of ballots shared between the two candidates. In the interest of clarity, several candidates for Congress, Governor, and Lieutenant Governor that received comparably few votes are not shown.

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[1] Aside from those running with a single party label, 2014 candidates included those running as Democratic/Republican, Republican/Democratic, Progressive/Democratic, or Democratic/Progressive. These combinations can become quite complex, as demonstrated in 2012 by Jim Condos, incumbent Democratic Secretary of State, who ran as a Democratic/Progressive/Working Families/Republican fusion candidate.

[2] The Liberty Union party is a socialist party founded in the early 1970s on an anti-war platform with no current officeholders. The Vermont Progressive Party is a social democratic party with roots in U.S. Senator Bernie Sanders' 1980s mayoral races. Progressives have two seats in the Vermont Senate, one cross-endorsed Democratic/Progressive in the Senate, six seats in the Vermont House, and the cross-endorsed Democratic/Progressive Auditor of Accounts.

[3] This observation is based on personal discussions between the author and Secretary of State Jim Condos and his staff.

[4] Votes for Democratic candidates were strongly correlated with other Democratic candidates, and similar correlation was found between Republican candidates. The p values for the tests for independence were so small that they were unable to be displayed as anything but zero. One possible visualization of these correlations may be found in Figure 2 in the concluding section.

[5] The distance between two clusters is measured by the maximum distance between every point in the first cluster and every point in the second cluster.

[6] This method minimizes the total intra-cluster distance (Murtagh and Legendre 2014).

[7] The distance between two clusters is measured by the squared Euclidean distance between the centroids (mean vectors) of the clusters.

[8] It is named so because it **p**artitions **a**round **m**edoids.

[9] The tool is so named because it does ***ag****glomerative* ***nes****ting*.

[10] There were a total of four across all six towns.

[11] Anti-Republican ballots overall are also likely higher than they would have been had the Republican Party fielded more statewide candidates.

[12] For the purposes of this analysis, Mary Hasson, the independent state Senate candidate in Westminster is considered to be the sole member of her own party.

[13] The largest legislative district in the current analysis (by voter registration) is the Washington County Senatorial district which encompasses East Montpelier and Fayston and has about 60,000 registered voters.

[14] Admittedly, Liberty Union activists argue that winning seats is not their ultimate goal.

[15] One feature of the election that casts some doubt on this observation is that both the Libertarian and Liberty Union parties fielded a candidate for governor. Libertarian voters would likely have noticed the candidates from two different (but similarly-named) parties.

[16] Thus, they would be one of a group of anti-Democratic Republican partisans.

[17] For example, a vote for four candidates in a six-member district would constitute a strategic undervote.

[18] Having to cast votes for many candidates might be more difficult for the voter than voting for comparatively fewer candidates.