All (Mayoral) Politics is Local?

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Abstract

One of the defining characteristics of modern American politics is the degree to which democratic representation has become increasingly "nationalized," or focused on national issues at the expense of local issues. In this paper, we examine the degree to which this nationalization phenomenon has affected U.S. mayors. We do so by evaluating the similarity in political speech on Twitter between mayors in the National Council of Mayors and Members of Congress. We find substantial differences in the topic and partisan content of mayoral speech, suggesting that the office of the mayor has not been subject to the trends of nationalized politics. However, we further show that the degree to which mayors engage in nationalized rhetoric is a function of the population size of the city over which they govern.

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1 Introduction

At the heart of the republican ideal in the United States is the notion that elected officials properly represent those to whom they are electorally accountable. That is, elected officials in a well functioning democratic setting are expected to articulate the preferences and desires of the governed. Indeed, numerous studies of democratic representation compare some measure of aggregate constituency preferences with some measure of elite behavior or outcomes (see, e.g., Esaiasson and Wlezien, 2016). Given the nature of American federalism, this implies that local officials should be concerned with representing and articulating the preferences of citizens at the local level while federal officials should be comparatively more concerned with national-level policies.

However, recent scholarship suggests that American politics has become increasingly nationalized. Thus, rather than being contested over local issues that are of importance to each respective constituency, political campaigns are largely focused on national issues (Hopkins, 2018). As this focus on national politics often comes at the expense of local issues that are typically of greater importance to citizens, the nationalization of American elections has the potential to weaken the degree to which citizens are effectively represented by their governing officials. Evidence for such a nationalization effect has been found in U.S. House, Senate, and gubernatorial elections (Carson and Sievert, 2018; Sievert and McKee, 2018; Aleman and Kellam, 2008).

In this study, we examine whether the nationalization of American elections has reached the mayoral level. Presiding over the most local form of government within the federal system and managing the government services with which citizens interact most frequently, mayors have tremendous influence over the daily lives of their citizens. Accordingly, understanding whether mayors have shifted their focus toward national issues and away from the needs of their local constituencies is of tremendous importance. To address this question, we analyze patterns of elite speech via the Twitter social media platform. We leverage a unique dataset of nearly 40,000 tweets from U.S. mayors and approximately 50,000 tweets from federal officials. We present results suggesting that mayors – regardless of party – talk about qualitatively different subjects than their co-partisans

in Congress. This implies that, unlike other offices in the United States, the nationalization of American elections has yet to affect mayors. However, we also present results that indicate that the degree to which mayors discuss national issues rather than local issues is dependent upon the size of the city over which they govern. As the population size of a city increases, mayors are more likely to engage in nationalized political rhetoric. This results are robust to the inclusion of individual mayoral traits and political preferences.

This paper proceeds as follows. First, we outline recent work on democratic accountability, elections, and the nationalization of American elections. We then develop a theory that links electoral contexts and city-level institutional constraints to nationalized mayoral behavior manifested through elite speech. We then present a series of results derived from LDA topic models suggesting that American mayors are less partisan and less nationalized than their Congressional counterparts. We then show how this result varies as a function of individual mayor and city-level covariates. Finally, we conclude with a discussion about the implications of our results for democratic governance.

2 Elections, Accountability, and Nationalization

Perhaps no topic within political science has been studied more than elections. From a normative standpoint of democratic health, elections serve an indispensable purpose. Among other things, elections allow citizens to hold elected officials accountable for their actions in office (Ferejohn, 1986; Fearon, 1999; Fiorina, 1981), ensure proper representation (Verba, Schlozmann and Brady, 1995), and provide an avenue for expressive political participation (Hamlin and Jennings, 2011). Given the importance of accountability, representation, and participation in a democratic setting, understanding how voters choose between candidates within an election is of the utmost importance.

While canonical models suggest that voters make rational decisions about candidates within each electoral context (see, e.g., Downs, 1957), recent evidence suggests that American political behavior has become increasingly nationalized (Hopkins, 2018; Abramowitz and Webster, 2016). Such nationalization is problematic for the proper functioning of elections as mechanisms of accountability – particularly at local levels. Indeed, rather than voting for a candidate at the state

and local level based upon that candidate's ability to deliver public goods, Americans today are increasingly relying on their evaluations of the national parties to inform their voting decisions in elections at subpresidential levels. At the same time, local elections are being increasingly fought over national issues. To the extent that this nationalization phenomenon causes state and local officials to prioritize national interests and the concerns of ideologically-motivated donor bases to the exclusion of the local citizenry's needs, as Hopkins (2018) suggests, then the nationalization of American politics has the potential to drastically alter the relationship between citizens and their elected officials at the local level.

The existing literature on the growing nationalization of American politics has largely focused on U.S. House and Senate elections (see, e.g., Carson and Sievert, 2018; Aleman and Kellam, 2008). Jacobson (2015), for instance, notes that the incumbency advantage in American politics, long seen as the source of high re-election rates across the country, has been declining over time. At the same time, he notes that the explanatory power of partisanship in predicting election outcomes for House elections has increased tremendously. Such a shift indicates that Americans today care less about the specific person who represents them and more about the partisan balance of power in Congress. This implies that, unlike in earlier eras, it is increasingly difficult for politicians to court the "personal vote" in their districts (Mayhew, 1974; Fenno, 1978).

Outside of federal elections, scholars have focused almost entirely on how the nationalization of American politics has affected gubernatorial elections.[1] Hopkins (2018) shows that the state-level correlation between voting for the Democratic presidential candidate and the Democratic gubernatorial candidate has increased considerably over time. Nearly thirty years ago, the correlation between voting patterns at these two electoral levels was a moderately strong .61. By 2010, the correlation had strengthened to just under .9. A similar relationship exists between the percentage of the two-party vote accruing to the Democratic presidential candidate and the percentage of the votes received by the Democratic gubernatorial candidate (see also, Sievert and McKee, 2018).[2]

[1] One notable exception is Fouirnaies and Hall (2018), who study the electoral incentives of state legislators. They find that state legislators are responsive to their constituencies – a finding which runs counter to the phenomenon of the nationalization of American elections.

[2] This relationship holds whether one examines gubernatorial elections that occur during midterm elections or concurrently with presidential elections.

Mayors may be somewhat immune from these national trends: voters cast ballots in mayoral elections based upon retrospective local economic conditions, such as local unemployment, and this effect dwarves the effect of national economic conditions (Hopkins and Pettingill, 2017). That voters are casting ballots for mayors in a way that does not necessarily channel national political trends suggests that mayoral representation may be based on local, not national, politics. Relevant for this project, moreover, they find that "[i]n cities with their own TV stations and newspapers, there is a robust relationship between city-level unemployment and the [electoral] performance of the incumbent mayor" (Hopkins and Pettingill, 2017). That information about local economic conditions changes political behavior, particularly relative to national economic conditions, is especially relevant when considering the impact of of a mayoral social media communication strategy.

Despite a growing concern among scholars that the nationalization of politics and political competition in the United States has served to weaken political accountability, no existing study has examined the degree to which the nationalization phenomenon has altered mayoral behavior. Understanding the extent to which mayors are affected by the nationalization of elections is important for numerous reasons. First, mayors preside over the most local form of government in the American federal system. As such, the decisions they make and the policies they pursue are likely to have the greatest impact on the day-to-day lives of citizens. Additionally, understanding whether – and how much – the nationalization of American elections has affected mayoral behavior is important because democratic theory argues that citizens should be most aware of their most local government. This awareness should translate into a high degree of governmental responsiveness. However, if mayors are also experiencing the forces of nationalization that are present in House, Senate, and gubernatorial elections, then the link between citizens and their most local form of government will be weakened.

2.1 Mayors and Nationalization

Nationalization, as typically conceptualized by the literature, conventionally refers to one of two things. In one case, nationalization refers to the process whereby voters judge politicians – regardless of the electoral level – by their evaluations of the national parties. In the second case,

nationalization occurs when state and local elections are largely fought over national (largely symbolic) issues. Among other causes, these two different forms of nationalization are thought to occur when parties offer similar candidates across electoral levels or the media market changes in a way that prioritizes national over local news (Hopkins, 2018; Martin and McCrain, 2018). Yet mayors may be qualitatively different than national politicians. Mayoral partisanship may be associated with different issues than partisanship at a national level, and mayoral offices may be sufficiently local such that national partisanship does not affect voting nor decision-making (Adrian, 1952). Mayoral governments are focused on evaluating what can be built where, on public goods such as streets and sanitation, and on public safety (Oliver, 2012). Further, according to Gerber and Hopkins (2011), "the presence of Republican mayors in overwhelmingly Democratic cities – consider Rudolph Giuliani in New York or Richard Riordan in Los Angeles – provides a hint that partisanship may function differently at the local level." Additionally, mayoral elections do not necessarily occur at the same time as national campaigns, and thus may not benefit from the media market trends that align gubernatorial campaigns with national issues.

Nevertheless, there are compelling pieces of evidence to indicate that mayoral representation can and does align with national political agendas. Indeed, mayoral fiscal preferences are known to align with their partisan labels (Einstein and Glick, 2018), and partisan control of local government is predictive of local government spending at both the county level (Percival, Johnson and Neiman, 2009; Choi et al., 2010; de Benedictis-Kessner and Warshaw, 2018; Ybarra and Krebs, 2010) and the mayoral level (Tausanovitch and Warshaw, 2014; Einstein and Kogan, 2015; de Benedictis-Kessner and Warshaw, 2018).[3]

Accordingly, understanding whether mayors engage in nationalized rhetoric and the situations under which they do so are important – and unanswered – questions. We theorize that mayors' representational style is distinct from congressional representation, and moreover that we will be able to evaluate these differences in representational style via elite speech on Twitter.[4] However,

[3]Earlier work did not necessarily support this finding (Ferreira and Gyourko, 2009; Gerber and Hopkins, 2011).

[4]It is now well-established that text analytics can contribute to quantifying and measuring some important characteristics of political speech, for example partisanship (Lin, Xing and Hauptmann, 2008; Grimmer and Stewart, 2013; Gentzkow and Shapiro, 2010; Ahmed and Xing, 2010; Iyyer et al., 2014). These methods are often used to generate substantive conclusions. For example, Gentzkow, Shapiro and Taddy (2018) report that partisanship in Congress, measured as the ease of telling which party a speaker is from based on a fragment of text they generated, has been

we also expect that a mayor's likelihood of engaging in nationalized rhetoric will vary based off of certain mayoral and city-level covariates.

To begin, we expect to observe more nationalized and partisan speech from mayors who represent cities with a strong partisan tilt. Such an expectation is grounded in the fact that cities that are largely Democratic or Republican will be easier and better represented by mayors that engage in a nationally-consistent message. In this scenario, mayors who engage in nationalized rhetoric will *not* be at odds with their constituency. On the contrary, nationalized mayoral rhetoric in cities that are heavily Democratic or Republican will result fewer discrepancies between constituents and their city's chief executive.

Building on the findings of de Benedictis-Kessner and Warshaw (2018), we further expect the degree to which we observe nationalized mayoral rhetoric will be a function of various city-level and governmental features. First, we expect to observe more nationalized mayoral rhetoric when mayors are less involved in the day-to-day operations of the municipality. More specifically, we expect mayors to be more nationalized in their rhetoric when their city employs a city manager. Used by all cities operating under a city-manager form of government, as well as some cities employing a council-mayor system, city managers are individuals who are hired by the mayor or city council to oversee the daily operations of the city's government. When city managers are present, mayoral power is attenuated and mayors tend to focus on more ceremonial duties. Freed from the responsibilities of managing the city's bureaucracy, mayors whose city employs a city manager will have more time to engage in national political debate. Such a focus on nationalized rhetoric could even be strategic on the part of a mayor in this case, as it might allow her to connect with her partisan-oriented constituents.

Second, we expect the degree to which mayors engage in nationalized rhetoric to be increasing in the size of their city's population. As a city's population increases each individual becomes less likely to have any form of personal engagement with the mayor's office. As a result, mayors will have less of an incentive to discuss local issues and will have a greater opportunity to focus on national issues.

increasing in recent years.

Finally, we expect mayors to engage in more nationalized rhetoric when they have won their election with large margins of victory or have served long terms in office. Both expectations are rooted in the idea that electoral security affords mayors the opportunity to discuss partisan and national issues at the expense of more non-partisan, local issues. Moreover, such an expectation has empirical grounding at the national level. Indeed, Grimmer's (2013) study of congressional representation found that the most liberal and the most conservative Senators were the most likely to use partisan rhetoric and that this use was facilitated largely because these Senators were the most electorally secure.

3 Data & Empirical Strategy

In order to examine the extent to which the nationalization of American politics has affected mayors, we collect the official Twitter handle for each mayor who is a member in the United States Conference of Mayors as of May 2018.[5] Though mayors are not uniformly on Twitter, we obtain Twitter handles for 587 mayors.[6] This amounts to 42% of the mayors eligible for inclusion in our study. Yet, because some mayors are relatively inactive on Twitter, we exclude all mayors who have fewer than 100 tweets from our data. This leaves us with a mayoral sample of 375 mayors.

Using social media for mayors is costly in terms of time, effort and risk. Yet, using social media may provide policy benefits to constituents (through sharing of information) as well as personal benefits to mayors (through self-promotion). We anticipate that mayors will use social media when the benefits outweigh the costs – that social media usage is associated with a mayor's electoral incentives and that mayors will be strategic with their social media usage. Mayoral social media content is a component of their strategic communication plan to engage with constituents as well as a broader audience. Importantly for our purposes, social media provides us with an opportunity to capture and record a component of this strategic communication plan.

We also collect mayoral attributes of these mayors. This includes mayors' gender, racial identi-

[5]The United States Conference of Mayors is the official non-partisan organization of cities with populations of at least 30,000. We choose this sample because we anticipate that mayors of medium to large-sized cities have access to Facebook and Twitter and possibly even staff to help monitor these accounts.

[6]We first collect official accounts, and if an official account is not available, we then use a campaign account.

fication, length of term in office, the percentage of the vote share they received in their most recent election, and each mayor's partisan affiliation.[7] In instances where mayoral elections are conducted without party labels, mayors are classified as non-partisan.

In addition to these individual-level characteristics of mayors, we also collected information on the institutional features of each city in our dataset. This includes indicators for whether the city government operates with a mayor-council system or a council-manager system, as well as whether the city employs a city manager. In mayor-council systems, a city's mayor is elected separately from the city council and oftentimes acts as the city's chief executive officer. Council-manager systems, by contrast, select the city's mayor from within the city council. Under the council-manager system of local government, the mayor is comparatively weak and the day-to-day operations of the city are overseen by an appointed or elected city manager.[8] We also collected data on each mayor's length of term in office and how long each mayor has held their current position.

To these individual- and institutional-level variables we add information on the demographic composition of each city. Using data from the most recent American Community Survey (ACS) estimates, we collected the mean age of residents each city, as well as the percentage of male and female residents. We also collected information on the percentage of Black and Hispanic residents, as well as the percentage of individuals who own or rent their homes. We add to this data proxy measures of each city's election results for the 2016 presidential election.[9]

In late November 2018 we scraped the previous 3,200 tweets for each of these Twitter handles. Then, we exclude all re-tweets and only retain the tweets that were posted by mayors. Of the 375 mayors in our dataset, this leaves us with 450,197 tweets. In the end, due to the fact that some mayors are more active and post more tweets than other mayors, which could lead to imbalances in

[7]This data was obtained from a combination of mayors' campaign websites, newspaper biographies of the mayors or of the mayoral election, or it was inferred from the mayor's collection of endorsements or source of campaign funds. For example, mayors who received endorsements from prominent national Democrats were classified as a Democrat. On the other hand, mayors who received funding from conservative political action groups were classified as a Republican.

[8]Though all city-manager forms of government contain a city manager, city managers are also occasionally used in mayor-council systems.

[9]These estimates are constructed by using county-level presidential election returns that are weighted by the percentage of the city that is in each county. For example, because 93.3% of Atlanta, GA, is in Fulton County and 6.7% is in DeKalb County, the presidential vote share for Atlanta is a weighted average where the Fulton County vote shares receive a weight of .933 and the DeKalb County vote shares receive a weight of .067. For cities that are contained within only one county, the city's estimated presidential election results are the county-level results.

our dataset, we sub-sampled 100 tweets from each mayor. Full summary statistics of our mayoral data are shown in Table 1.

Statistic	N	Mean	St. Dev.	Min	Max
White	375	0.800	0.401	0	1
Black	375	0.117	0.322	0	1
Hispanic	375	0.056	0.230	0	1
Male	375	0.768	0.423	0	1
Female	375	0.232	0.423	0	1
Republican	375	0.392	0.489	0	1
Democrat	375	0.605	0.489	0	1
Nonpartisan	375	0.003	0.052	0	1
Council-Manager	375	0.472	0.500	0	1
Mayor-Council	375	0.544	0.499	0	1
City Manager	375	0.549	0.498	0	1
Avg. Trump Vote Share	375	43.009	14.518	8.706	82.514

Table 1: *Summary Statistics of Mayoral Data.* This table shows summary data for our mayoral data, conditional upon having an active Twitter handle.

4 Quantifying text data

There are two main degrees of freedom in modern text analytics. The first is how to represent the text, and the second (of course intertwined) is what methods to apply to that representation. We consider two main representations in this paper.

Word/phrase vector representation Research over the last two decades in machine learning has established that simple representations of documents in terms of either presence or absence, or adjusted frequency, of terms in a given vocabulary can be coupled with regularized linear models to produce powerful out-of-sample predictions in both classification and regression settings. For our models, we first establish the vocabulary by splitting text into bigrams after stopword removal, stemming and tokenization, and then using all bigrams that appear at least in 3 different documents in the data. Once this is done, each document is represented by the TFIDF (*term frequency inverse document frequency*) reweighting of how many times each bigram appears (the number of times that bigram appears in the document divided by the number of documents in which that bigram

appears at least once). We use the generic term *document* to refer to a single instance depending on the unit of analysis (typically an individual's entire set of tweets).

Topic representation Topic models are typically generative models, where the text generating process is assumed to be that each document has a particular distribution over topics, and each topic has a distribution over words (note that the language of documents and words is again generic; in our case, documents are typically aggregated Twitter feeds and words are single words as opposed to bigrams, as in the word vector representation above). A document is generated by repeatedly first sampling a topic from its topic distribution, and then sampling a word from that topic's word distribution (note that this loses sequence information, but is consistent with the "bag of words" style of document modeling). We use latent Dirichlet allocation (LDA) to learn topic models. The LDA algorithm itself specifies and uses sparse Dirichlet priors over the topic and word distributions, and then learns the distributions, typically using either variational methods or Markov chain Monte Carlo sampling techniques. The number of topics to use is a key input to the method.

We use regularized logistic regression as our learning algorithm; while simple, this method (sometimes called "maximum entropy") has had tremendous success in text analytics. We can view our machine learning problem as follows. Given a set of n instances of the form $(\mathbf{x}_i, y_i)$, where $\mathbf{x}_i$ is the word vector or topic vector representation of the document, and y_i is either the partisan label (-1 for Democrat and +1 for Republican) or a real-valued variable (the first dimension of the DW-Nominate score), return a function $h(\mathbf{x})$. For the classification problem, we require h to return a real number between 0 and 1 that can be interpreted as the probability of being a Republican. We use L2 regularized logistic regression in this case (thus h is the maximizer of the sum of the log likelihood and an L2 penalty on the weights). Letting $\mathbf{w}$ be the weight vector representation of h, the objective function that is maximized is then $\ln \Pi_i \Pr(y_i|\mathbf{x}_i, \mathbf{w}) - \lambda \|\mathbf{w}\|_2^2$.

In all of the following, "individual" refers to a mayor or a member of Congress, and "document" refers to the entire collected sample of an individual's tweets. We quantify the text data in two main ways. First we compute partisanship scores (which can itself be done in two different ways), and second, we measure the similarity of mayors to members of Congress.

1. Partisanship scores We compute partisanship scores on top of the word vector representations of each document, one representing each individual.

- **Mayor-internal partisanship (MIP) score**. We use leave-one-out-cross validation on the dataset of partisan mayors and their tweets in order to predict the partisanship of an individual mayor. That is, to compute the MIP score of mayor i, we train a logistic regression on the tweet documents of each mayor other than i, labeled by their partisanship. We then predict the partisanship (probability of being a Republican) of mayor i using the logistic regression model thus trained.
- **Congress-to-Mayor partisanship (CMP) score**. In this case we train a single regression model of partisanship solely on the tweet documents of each member of Congress, labeled by the first dimension of their DW-Nominate score. We directly apply this model to each mayor i to derive their CMP score.

2. Congressional similarity (CS) score The CS score is built on top of the topic vector representation. An LDA model is trained on the union of Congressional and mayoral tweet documents, and each document is then represented by its distribution over topics. Each document is labeled as either "Member of Congress" or "Mayor" (rather than by partisanship). Then, for each mayor i, we train a logistic regression classifier based on the documents corresponding to all other mayors (labeled as 0) and members of Congress (labeled as 1). We then predict the probability that mayor i is a member of Congress using this model, and consider that prediction the CS score.

5 Results

5.1 Topic differences: Mayors vs Congress

We evaluate the similarity of mayors and members of the U.S. Congress through four distinct analyses. First, we represent each mayor and representative in a common topic space by using LDA to train a topic model using the set of all mayors and representatives. We then look at the differences in these topic vectors to establish whether mayoral tweets are similar in terms of their

topics to congressional tweets. Our second analysis is a robustness check on the methods and interpretability of our results. We establish the topic distributions of mayors and of representatives separately by training two separate LDA models using the set of all mayors and of all representatives, respectively. We then manually analyze the topics in terms of the distributions of words within each topic in order to establish whether mayoral tweets are similar in terms of their topics to congressional tweets. Third, we turn to the question of whether mayors are easily distinguished from representatives in topic space. We run cross-validation experiments to estimate the out-of-sample accuracy in our ability to distinguish mayors from representatives based simply on the distribution of topics in their tweets. Finally, we evaluate the extent to which an individual mayor is more similar to other mayors or to members of Congress via a "leave one out" test (the CS score discussed in Section 4). Across all of these analyses, we consistently find that mayoral speech is distinct from congressional speech and, moreover, that mayoral speech tends to be more focused on local issues.

To begin, we train an LDA (Blei, Ng and Jordan, 2003) topic model based on the tweets from all individual representatives and mayors.[10] We then calculate a topic distribution vector for each mayor and representative. We then calculate the *Jensen-Shannon divergence* (Fuglede and Topsoe, 2004) between every pair of topic distribution vectors in our sample, representing the differences in topics that show up in the content generated by two individuals in our sample. From the pairwise results, we then split the distances into three groups: representatives vs. representatives, mayors vs. mayors, and representatives vs. mayors. Figure 1 shows a histogram of these differences, with the three groups color-coded. We observe smaller differences between mayors (in green) and between representatives (in blue) than we do across mayors and representatives (in pink).[11] That the average distance is greatest between representatives and mayors suggests that these groups are systematically focused on different topics.

In our second analysis, we separately run LDA on representatives' tweets and mayors' tweets and visually inspect the words associated with all topics. We list some of them for illustration

[10] We limit the number of topics to 15 in this analysis as the time range of our data is narrow and topics are highly concentrated.

[11] Paired t-tests across each of these three pairs indicates these mean values are statistically distinguishable from each other using 95% confidence intervals.

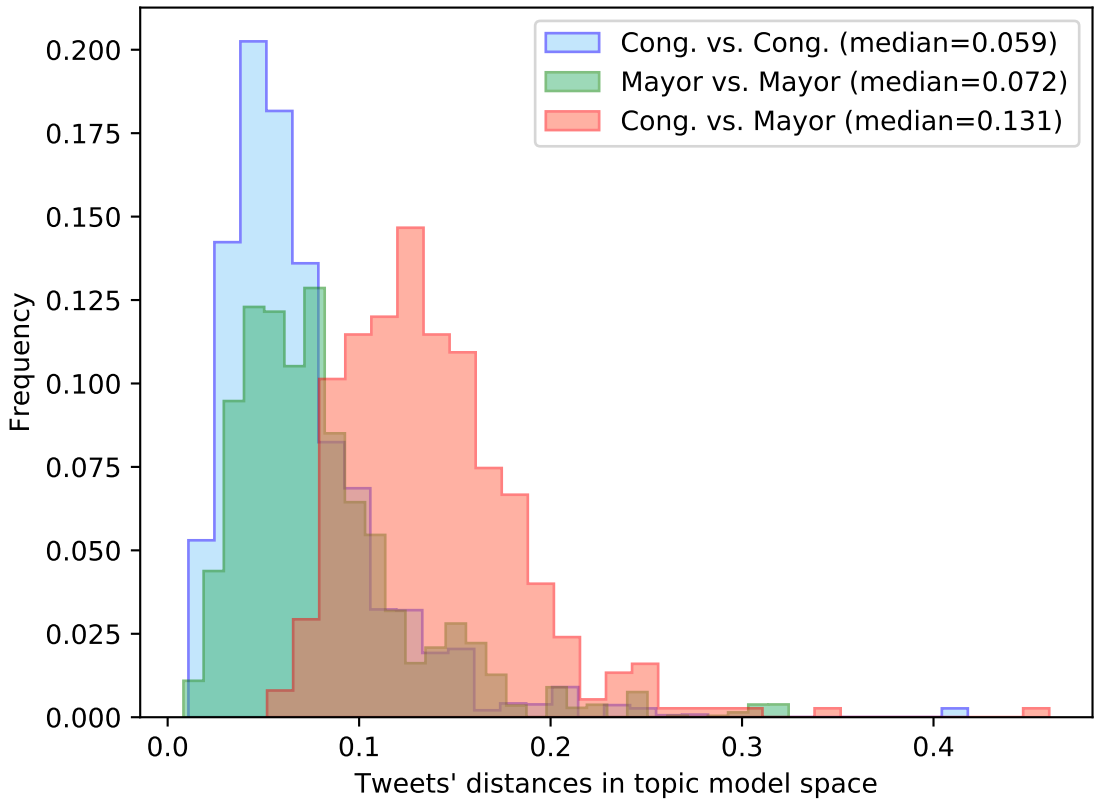

Figure 1: Histogram of topic distances.

in Table 2.[12] We can see that the congressional twitter topics are more "national" than mayors', which is consistent with the topic vector distance distribution in Figure 1. Mayoral topics include terms such as "community, downtown, parking, fire" and congressional topics include terms such as "trump, american, gun, family."[13]

Our third test asks whether we can reliably distinguish mayors from Members of Congress based on their choices of topics to tweet about. We run a 5-fold cross-validation test using logistic regression trained on the (joint) topic distribution vectors, with the classification task being to distinguish between mayors and Members of Congress (labeled 0 and 1 respectively). Cross-validation operates by randomly permuting the data, separating it into k (in our case $k = 5$) "folds" and

[12] Once again using 15 topics.
[13] Full word lists by topic are available in Table 4 and Table 5.

Table 2: Congress vs. Mayor tweet topics

Congress	Mayor
law, letter, court, justice, judge, enforcement, supreme, victim	street, tonight, weather, downtown, open, market, development, begin, new, club.
bill, house, support, vote, act, senate, bipartisan, passed	mayor, love, congratulation, great, mike, christmas, chief, award, police, campaign
tax, job, cut, new, reform, american, economic, economy	city, police, state, board, mayor, news, meeting, candidate, watch, lake
statement, president, read, security, trump, full, budget, american, hearing, obama	go, right , one, fire, tax, city, housing, home, plan, now
health, american, need, care, child, family, trump, can, people	city, park, road, new, first, please, live, today, god, learn

then repeatedly training a classifier on $k-1$ of the folds and testing on the remaining one. Thus, each individual is tested on exactly once. We find that the area under the ROC curve (AUC) is 0.9873, meaning that, given a mayor and a member of Congress chosen uniformly at random, the classifier would correctly rate the mayor as more likely to be a mayor 96.13% of the time.[14] Thus, this analysis concludes that mayors and Members of Congress are very easily distinguishable from each other based only on the distribution of topics they choose to tweet about.

Finally, we conduct a leave-one-out analysis to see which mayors express similar content to Members of Congress. In each round of our analysis, we exclude one mayor's topic distribution vector as a test vector, and we train a classifier based on all the remaining mayors and all Members of Congress. The test gives us a probability that this particular mayor is a Member of Congress based on their tweets, the *Congressional Similarity (CS) score*. We repeat this for each mayor in our data.[15] We explore uses of the CS scores more fully in association with mayoral covariates in

[14] AUC is generally considered a more reliable way to evaluate classifiers than accuracy because of potential calibration issues.

[15] The following mayoral twitter ids have topic distributions most similar to representatives in Congress: patownhall, joshfryday, mayorcorymason, mike_spence, andrewgillum. Andrew Gillum is the mayor of Tallahassee, Florida, and was the Democratic candidate for Governor of Florida in 2018. As a candidate in a race that received significant national attention, Gillum's Twitter account frequently mentioned national issues and politicians including President Trump. Those who are most different include: clvhtsgov, mayorhoye, mayornoak, bethlehemmayor, votemike4mayor. This includes Smith Joseph, mayor of North Miami, Florida, and Manuel Lozano, mayor of Baldwin Park, California.

Section 5.3.

5.2 Partisanship: Mayors vs Congress

In this section, we investigate partisanship expression in mayoral tweets. First, we investigate whether it is possible to correctly predict (out-of-sample), the party of a mayor based on their tweets. Restricting ourselves to mayors, we run a 5-fold cross-validation experiment on the word vector representation with party identification as the target. The AUC is 0.7032, which is generally considered quite low. To calibrate that number, we replicate this process using congressional tweets and find an AUC of 0.9925. Thus, it appears that mayors express substantially less partisanship in their tweets relative to Members of Congress. This is not to suggest that the expression of partisanship is completely absent from mayors. However, our results suggest that mayoral partisanship is significantly harder to distinguish based on language used on social media than congressional partisanship.

It is possible it is harder to distinguish language that is informative of partisanship from mayoral tweets in part because the identification and use of language is less disciplined and hence noisier. There is evidence that partisan language moves from Members of Congress to the media (Yan et al., 2018) and can be used to assess the bias of media sources (Gentzkow and Shapiro, 2010) as well as to quantify changes in polarization over time (Gentzkow, Shapiro and Taddy, 2018). Similar phenomena might occur in social media, so we investigate the possibility of classifying mayoral partisanship using *congressional* language. We first train a linear regression model on the Twitter records of members of congress, with the target being (the first dimension of) their DW-Nominate score. We then use this model to estimate mayors' partisanship using AUC (which relies only on relative ranking, another advantage over accuracy). The AUC on the mayoral data is 0.7741, which is better than the above 5-fold cross-validation experiment with mayors' tweets. We call these scores the Congress-to-Mayor partisanship (CMP) scores. This is suggestive that nationalization of parties may be driving the increase in partisan speech.

We regress mayors' partisanship scores based on the above cross domain experiments and leave-

These accounts largely focus on local issues and events, such as community back to school fairs and announcements about the retirement of city fire officials.

one-out cross-validation scores, and the regression is shown in Figure 2. While the scores are clearly associated with each other, we will rely upon the CMP scores in our next analysis.

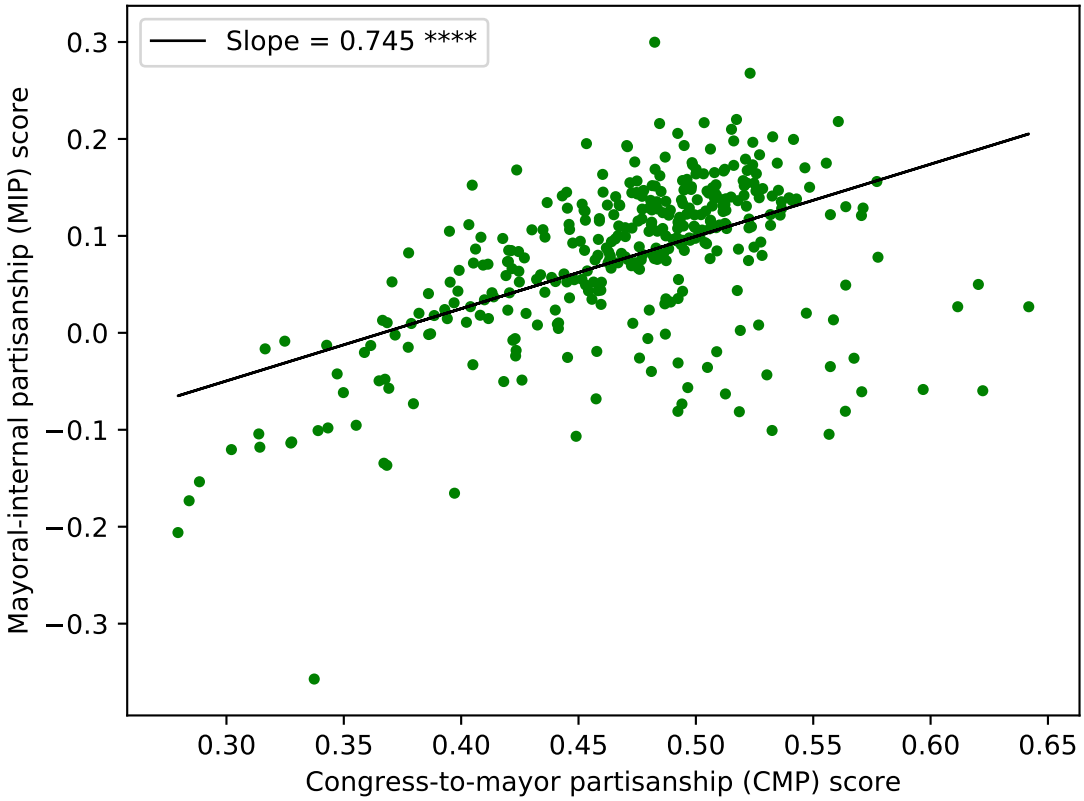

Figure 2: Congress-to-mayor partisanship (CMP) score vs Mayoral-internal partisanship (MIP) score.

We theorize that the mayors who express more similar topics to members of Congress are more likely to be classified as partisan via the CMP score (that is, when using the congressional partisan language). To test this expectation, we create a measure of each mayor's partisanship level. Suppose mayor i's CMP partisanship score is m_i. Their partisanship level pm_i based upon the k co-partisan mayors is defined as:

$$pm_i = |m_i - median(m_k)|$$

After creating this partisanship level measure for each mayor in our dataset, we regress pm_i against our congressional similarity (CS) scores. The plot of this relationship is shown in Figure 3. For mayoral tweets, there is a significant correlation between the topic similarities with congressional tweets and partisanship level.

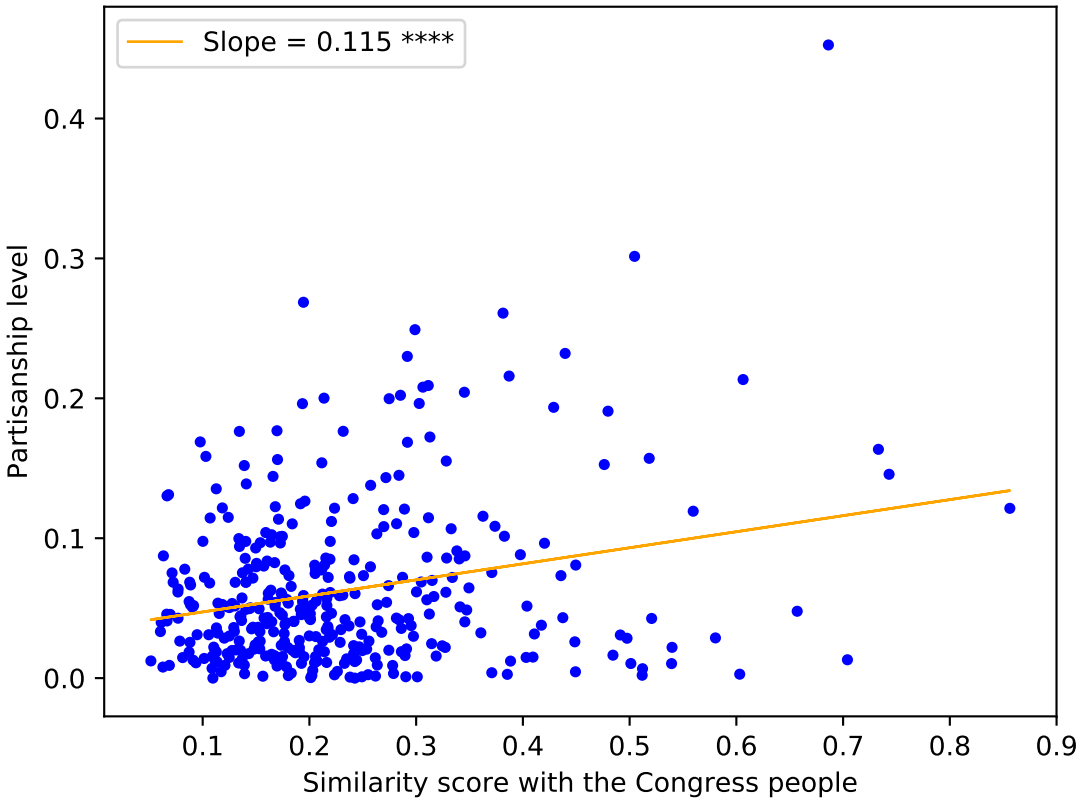

Figure 3: Mayoral congressional similarity scores vs. partisanship level.

5.3 Association between congressional similarity and covariates

The preceding analyses suggest that the nationalization of American politics has yet to reach the mayoral level. However, the absence of nationalized rhetoric at the mayoral level is unlikely to be uniform. Indeed, it is possible that some mayors are engaged in nationalized rhetoric at the expense of a more locally-focused representational style. To begin to understand the sources of variation

in mayoral rhetoric, we look for associations between covariates collected about mayors, their institutions, and the constituents they represent and the classification of mayors vs representatives using topic vectors (the congressional similarity score) or mayoral partisanship level (the difference from the mean congress-to-mayor partisanship score for co-partisans). Though these relationships are unlikely to be causal in nature, they nevertheless will help us to better understand the sources of variation in national mayoral rhetoric.

To reiterate our theory from Section 2.1, we expect more nationalized rhetoric from mayors who have had larger margins of victory or served longer terms in office. We also expect more nationalized rhetoric from mayors who represent larger cities. Finally, we expect more nationalized rhetoric from mayors who are less-involved in the day-to-day operations of their municipality – those who serve under a council mayor system or have city managers.

We use our similarity to Congress as a metric of nationalized rhetoric. The greater the similarity to congress, the greater the likelihood that the mayor has adopted national political speech. We regress this similarity measure on indicator variables for institutions (city manager, council-mayor system, etc.), the total number of years the mayor has served in office, the city population (re-scaled in units of 100,000), and the vote share won by the mayor in the previous election.[16] We present models with and without additional covariates – we can also control for mayoral race, gender, party, and Democratic vote share in the 2016 election – in Table 3.

Surprisingly, and contrary to our theoretical expectations, we find no statistically significant relationships between our measures of electoral safety – the mayor's previous vote share and the number of years in office – and nationalized rhetoric. Moreover, we find that employing a city manager is not associated with higher levels of mayoral nationalization. The sole coefficient for which we observe a meaningful association is that of city population, which indicates that as a city population increases the similarity of mayoral speech more closely mirrors that of a congressional representative. This lends support to our theoretical expectation that, as a city's population size increases, citizens are less likely to experience any form of personal contact with their mayor. This, in turn, allows mayors to adopt a more nationalized representational style.

[16] In cases where a city's mayor is appointed to the position by the city council, we treat the mayor's vote share in the previous election as the percentage of the vote they received in their most recent election to the city council.

While the results in this table should be interpreted with caution, as we are limited to a small set of mayors, we are encouraged that we observe similar results when including additional controls for race, gender, party and Democratic vote share in the 2016 election in the second column of Table 3. Within this set of variables, the sole meaningful association is between gender and congressional similarity.

Table 3: Coefficients for Congressional Similarity

Covariates	Coefficients	Coefficients
Years in office	-.002	-.003
	(.001)	(.001)
City population	.008*	.007*
	(.002)	(.003)
Previous vote share	-.00	-.00
	(.00)	(.00)
Council-Manager System	-.045	-.042
	(.024)	(.024)
City Manager	.04	.043
	(.024)	(.024)
Democratic Pres Share 2016		.00
		(.00)
White		-.015
		(.017)
Male		.047*
		(.016)
Republican		-.03
		(.015)
Constant	.232*	.20*
	(.024)	(.04)
N	364	363
R2	.05	.07

6 Conclusion & Discussion

The degree to which citizens' preferences and needs are represented by their elected officials is an important barometer of the health of a democratic society. In the case of the United States, which has experienced a considerable amount of political nationalization over the past few decades (Hopkins, 2018), this metric has trended in a negative direction at the federal and gubernatorial

levels. However, our analyses suggest that there is room for optimism about the vibrancy of representation provided by mayors. Unlike elected officials at other levels of government, the average American mayor appears to have been unaffected by the trend toward nationalization. On the contrary, mayoral rhetoric tends to remain focused on the needs and concerns of the local citizenry. This finding persists even when controlling for a multitude of mayoral- and city-level covariates.

However, our results also suggest that mayors do not uniformly focus on local issues. Nationalized mayoral rhetoric is more likely to occur among mayors who govern cities with a large population. Such a finding likely arises because a large municipal population diminishes the likelihood that any citizen has a personal experience or point of contact with her mayor. As a result, mayors are freer to engage in national rhetoric and abjure local issues. Though plausible, such an explanation is only one potential reason that we observe a relationship between city size and nationalized mayoral rhetoric. Future work should more thoroughly examine the mechanism linking a city's population to mayoral representational style.

One final concern pertains to the durability of these results. The nationalization of American elections did not suddenly develop and alter congressional and gubernatorial behavior. In reality, the nationalization of American elections has been a secular process that has resulted from the complex interplay of ideological realignment, partisan sorting, and a changing media environment. Whether these trends in nationalization will eventually affect mayors, or whether Americans' most immediate chief executives will remain focused on their local mandate, is a question that can only be answered in time.

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7 Appendix

Table 4: Full Word List: Congress

Congressional Word List
0.014*“right”, 0.012*“ha”, 0.009*“employee”, 0.007*“worker”, 0.007*“must”, 0.006*“sexual”, 0.006*“wage”, 0.006*“company”, 0.006*“congress”, 0.005*“make”, 0.005*“assault”, 0.005*“protect”, 0.005*“use”, 0.005*“way”, 0.004*“now”
0.052*“happy”, 0.034*“day”, 0.015*“thank”, 0.014*“birthday”, 0.011*“family”, 0.011*“year”, 0.010*“every”, 0.010*“wishing”, 0.010*“one”, 0.010*“may”, 0.010*“safe”, 0.010*“celebrating”, 0.010*“u”, 0.009*“new”, 0.008*“always”
0.022*“law”, 0.013*“letter”, 0.012*“court”, 0.011*“justice”, 0.009*“judge”, 0.009*“enforcement”, 0.008*“must”, 0.008*“supreme”, 0.007*“victim”, 0.007*“immigration”, 0.006*“illegal”, 0.006*“sent”, 0.006*“colleague”, 0.005*“immigrant”, 0.005*“stand”
0.036*“work”, 0.027*“business”, 0.019*“small”, 0.014*“can”, 0.013*“together”, 0.011*“u”, 0.010*“help”, 0.010*“know”, 0.009*“need”, 0.007*“making”, 0.007*“hard”, 0.007*“working”, 0.007*“support”, 0.006*“local”, 0.006*“done”
0.025*“wa”, 0.024*“honor”, 0.021*“woman”, 0.019*“veteran”, 0.019*“service”, 0.018*“honored”, 0.015*“today”, 0.014*“life”, 0.012*“thank”, 0.011*“proud”, 0.010*“men”, 0.009*“great”, 0.009*“congressional”, 0.007*“serve”, 0.007*“member”
0.026*“town”, 0.024*“hall”, 0.020*“question”, 0.015*“today”, 0.012*“hour”, 0.011*“office”, 0.009*“can”, 0.009*“answer”, 0.008*“call”, 0.008*“holding”, 0.008*“meeting”, 0.008*“find”, 0.007*“session”, 0.007*“early”, 0.006*“ag”
0.062*“great”, 0.029*“thanks”, 0.022*“student”, 0.015*“meeting”, 0.014*“good”, 0.014*“school”, 0.011*“congrats”, 0.011*“today”, 0.010*“meet”, 0.010*“enjoyed”, 0.010*“wa”, 0.009*“prayer”, 0.009*“thought”, 0.009*“see”, 0.009*“thank”
0.039*“bill”, 0.037*“house”, 0.016*“support”, 0.016*“vote”, 0.016*“act”, 0.016*“senate”, 0.015*“bipartisan”, 0.015*“passed”, 0.014*“legislation”, 0.012*“proud”, 0.011*“today”, 0.010*“help”, 0.010*“floor”, 0.010*“gun”, 0.009*“protect”
0.025*“make”, 0.021*“back”, 0.012*“people”, 0.011*“sure”, 0.011*“u”, 0.010*“ha”, 0.009*“get”, 0.008*“going”, 0.008*“last”, 0.008*“thanks”, 0.007*“voice”, 0.007*“take”, 0.007*“campaign”, 0.007*“vote”, 0.007*“state”
0.019*“statement”, 0.018*“president”, 0.017*“read”, 0.016*“security”, 0.013*“trump”, 0.013*“full”, 0.011*“budget”, 0.011*“american”, 0.009*“ha”, 0.008*“hearing”, 0.008*“obama”, 0.007*“national”, 0.006*“foreign”, 0.006*“social”, 0.006*“via”
0.054*“tax”, 0.042*“job”, 0.016*“cut”, 0.015*“new”, 0.011*“reform”, 0.010*“american”, 0.009*“economic”, 0.009*“economy”, 0.007*“create”, 0.007*“million”, 0.007*“family”, 0.006*“middle”, 0.006*“help”, 0.006*“plan”, 0.006*“growth”
0.035*“thank”, 0.017*“year”, 0.012*“public”, 0.011*“water”, 0.010*“today”, 0.008*“ago”, 0.008*“strong”, 0.007*“new”, 0.007*“fight”, 0.006*“u”, 0.006*“continue”, 0.006*“support”, 0.006*“state”, 0.006*“first”, 0.006*“land”
0.029*“forward”, 0.026*“tune”, 0.022*“discus”, 0.020*“look”, 0.020*“live”, 0.018*“looking”, 0.017*“watch”, 0.015*“joining”, 0.014*“morning”, 0.013*“talk”, 0.010*“talking”, 0.010*“listen”, 0.010*“check”, 0.009*“today”, 0.009*“week”
0.024*“health”, 0.021*“american”, 0.019*“need”, 0.017*“care”, 0.010*“child”, 0.010*“family”, 0.010*“trump”, 0.010*“can”, 0.010*“people”, 0.010*“million”, 0.009*“must”, 0.008*“ha”, 0.007*“plan”, 0.007*“cost”, 0.006*“right”
0.024*“office”, 0.017*“help”, 0.014*“can”, 0.013*“please”, 0.013*“visit”, 0.012*“sign”, 0.012*“join”, 0.011*“staff”, 0.010*“watch”, 0.008*“open”, 0.008*“learn”, 0.008*“dc”, 0.008*“u”, 0.008*“click”, 0.007*“get”

Table 5: Full Word List: Mayors

Mayoral Word List
0.012*“street”, 0.010*“ha”, 0.008*“tonight”, 0.007*“weather”, 0.007*“downtown”, 0.007*“open”, 0.007*“market”, 0.007*“development”, 0.006*“begin”, 0.006*“new”, 0.006*“club”, 0.006*“city”, 0.006*“parking”, 0.006*“state”, 0.005*“great”
0.057*“mayor”, 0.016*“love”, 0.012*“congratulation”, 0.010*“great”, 0.009*“mike”, 0.008*“christmas”, 0.007*“chief”, 0.007*“award”, 0.007*“police”, 0.006*“campaign”, 0.006*“tom”, 0.006*“story”, 0.006*“u”, 0.005*“former”, 0.005*“honored”
0.043*“day”, 0.038*“great”, 0.033*“happy”, 0.024*“see”, 0.015*“hope”, 0.014*“wa”, 0.013*“beautiful”, 0.012*“family”, 0.010*“thank”, 0.010*“friend”, 0.009*“everyone”, 0.008*“one”, 0.008*“fun”, 0.008*“veteran”, 0.008*“thanks”
0.051*“via”, 0.012*“city”, 0.009*“police”, 0.008*“state”, 0.008*“board”, 0.008*“mayor”, 0.007*“ha”, 0.007*“news”, 0.006*“meeting”, 0.006*“candidate”, 0.006*“watch”, 0.006*“lake”, 0.006*“officer”, 0.006*“committee”, 0.005*“say”
0.055*“city”, 0.034*“join”, 0.027*“council”, 0.019*“u”, 0.015*“hall”, 0.015*“please”, 0.011*“meeting”, 0.010*“vote”, 0.010*“tomorrow”, 0.010*“night”, 0.009*“early”, 0.009*“town”, 0.009*“last”, 0.009*“voting”, 0.007*“tonight”
0.082*“thank”, 0.027*“make”, 0.023*“good”, 0.018*“congrats”, 0.014*“work”, 0.009*“great”, 0.009*“sure”, 0.008*“support”, 0.008*“city”, 0.006*“many”, 0.006*“can”, 0.006*“proud”, 0.006*“much”, 0.005*“awesome”, 0.005*“help”
0.031*“forward”, 0.028*“looking”, 0.020*“look”, 0.011*“well”, 0.011*“new”, 0.010*“city”, 0.008*“part”, 0.008*“proud”, 0.007*“best”, 0.006*“moving”, 0.006*“step”, 0.006*“done”, 0.006*“always”, 0.006*“one”, 0.005*“mile”
0.035*“thanks”, 0.025*“community”, 0.021*“great”, 0.017*“wa”, 0.015*“city”, 0.012*“proud”, 0.011*“work”, 0.010*“thank”, 0.009*“working”, 0.007*“today”, 0.007*“honor”, 0.007*“project”, 0.006*“public”, 0.006*“service”, 0.006*“hard”
0.021*“great”, 0.015*“can”, 0.012*“business”, 0.010*“ready”, 0.008*“please”, 0.008*“getting”, 0.007*“hear”, 0.007*“state”, 0.007*“visit”, 0.006*“read”, 0.006*“talking”, 0.006*“thanks”, 0.006*“time”, 0.006*“small”, 0.005*“update”
0.020*“vote”, 0.019*“welcome”, 0.011*“day”, 0.011*“open”, 0.010*“election”, 0.009*“today”, 0.009*“way”, 0.009*“poll”, 0.008*“make”, 0.008*“get”, 0.007*“back”, 0.006*“start”, 0.006*“job”, 0.006*“go”, 0.006*“community”
0.064*“new”, 0.031*“facebook”, 0.027*“photo”, 0.027*“posted”, 0.015*“de”, 0.012*“la”, 0.011*“video”, 0.010*“center”, 0.009*“el”, 0.009*“ribbon”, 0.009*“opening”, 0.008*“follow”, 0.008*“grand”, 0.008*“great”, 0.008*“check”
0.025*“go”, 0.018*“right”, 0.011*“one”, 0.011*“fire”, 0.011*“tax”, 0.008*“city”, 0.008*“housing”, 0.008*“home”, 0.007*“plan”, 0.007*“now”, 0.006*“call”, 0.006*“action”, 0.005*“change”, 0.005*“need”, 0.005*“increase”
0.022*“time”, 0.018*“like”, 0.017*“get”, 0.017*“know”, 0.016*“great”, 0.016*“year”, 0.015*“let”, 0.013*“just”, 0.013*“need”, 0.012*“people”, 0.011*“ha”, 0.009*“sign”, 0.009*“u”, 0.007*“wa”, 0.007*“one”
0.012*“city”, 0.012*“park”, 0.011*“road”, 0.011*“new”, 0.009*“first”, 0.009*“please”, 0.009*“live”, 0.008*“wa”, 0.007*“ha”, 0.006*“may”, 0.006*“today”, 0.006*“god”, 0.006*“learn”, 0.005*“yes”, 0.005*“water”
0.040*“school”, 0.019*“great”, 0.017*“student”, 0.015*“high”, 0.010*“kid”, 0.008*“back”, 0.008*“program”, 0.007*“wonderful”, 0.007*“education”, 0.006*“class”, 0.006*“congratulation”, 0.006*“park”, 0.006*“teacher”, 0.006*“time”, 0.006*“festival”