Updates to Congressional Speech Acts on Twitter

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Abstract

Over the last several years, research on our elected officials' use of social media as a political communication platform has greatly increased. While the bulk of social media-related research focuses on elections, social media-traditional media connections, or the effect of politicians' social media communications on people's attitudes and opinions, the present study shows how members of the U.S. Congress use Twitter to engage in a range of speech-based actions. Examples of these speech-based actions include narration about one's day or recent events, providing information in the form of online or offline information, and positioning for/against policies and other politicians. In terms of outcomes, this paper provides updates regarding gender, chamber, and party-based differences. Second, based on the assumption that speech acts now occur in hybrid form, this paper examines how polarizing political communications are couched in more subdued formats. Third, a set of recommendations is provided to help journalists and citizens identify these hybrid speech-based actions before making a potentially misinformed retweet or comment. In this way, the function of Twitter use by elected officials is further explained and our understanding of Twitter's role in U.S. political communication is further deepened.

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Introduction

The present study approaches politicians' social media use by revisiting earlier findings that show how members of the U.S. Congress use Twitter. In this way, we provide both an updated and deeper understanding of Twitter's role in U.S. political communication. Based on a dataset of 1.2 million tweets posted by 529 Twitter accounts, we discover here that much has changed over the past several years: gender, chamber, and party-based differences have all reversed in terms of predicting Twitter post frequency. Based on the results of an automated classification process for what we call "speech actions," we relax our earlier assumption that communications on Twitter can be broken into specific, single speech actions rather than multiple speech actions simultaneously. Our analysis of these "hybrid" speech acts shows that members of Congress are now simultaneously providing information and positioning via Twitter, and there are significant party-based differences. Gender-based differences are nonexistent with regard to predicting hybrid speech acts, and congressional chamber-based differences are significant in only one instance.

The inclusion of hybrid speech acts is crucial for the corpus of research on online political communications. They are expected to be much more effective at obscuring politicizing content and couching it in non-politicizing rhetoric. In other words, members of Congress are using Twitter by embedding positioning statements within other speech acts such as providing information, requesting action, and thanking. This nuanced method of providing information invokes theories of the politicization of information and undoubtedly increases the information asymmetries between members of Congress and the general public. It also has implications for the traditional media, which relies extensively on Twitter as a primary source of information, if journalists lack critical literacy skills.

In the following pages, we establish the literature central to this project, particularly the linguistics of Twitter and how Twitter content can be politicized. We then outline the classification process, largely building off of Hemphill et al. (2013), and attempt to answer a number of research questions with our panel dataset of congressional tweets. Following a discussion section, we conclude with suggestions for journalists as well as general citizens when encountering varying degrees of positioning in congressional speech acts on Twitter.

Related Work

We recognize that social media is but a part of politicians' broader information-sharing strategies, and we build on the literature focusing on how elected officials communicate using the traditional media (Cook et al., 1983; Edwards & Wood, 1999; Entman, 2007; Kedrowski, 2000; Lee, 2009) as well as online (Gentzkow & Shapiro, 2011). Our focus is not simply to determine whether and when Twitter rates for members of Congress rise and fall (see, for example, Chi and Yang (2011) and Straus et al. (2013)). Rather, we are more interested in the composition and intent of political communications from our elected officials.

The Linguistics of Twitter

There is not a large literature suggesting that language behaviors in general have evolved over time on Twitter or other social media. Rather, the bulk of Twitter-oriented research has focused on changes in linguistic patterns that are then attributed to social relations (i.e., language style being modified and/or influenced as a function of one's relations with others). This is consistent with a foundational literature on linguistic variation holding that 1) people's linguistic style is largely predicted by their demographic attributes (e.g., gender, age, where they grew up, etc.), 2) people may change their style as a function of the addressee -- who they are addressing (i.e., their audience) and what relationship they have with the addressee (Labov, 1966). Others employ a social identity approach to explain why people adapt their language patterns, with the underlying drive being social acceptance from others (H. Giles, Coupland, & Coupland, 1991). For instance, people of lower social status will adapt to those of a high status, stylistically. Allan Bell (1984) provided a theory of language change even in the absence of direct interaction between people (which is an assumption for Labov [1966]), claiming that each medium has a "house style; e.g., the linguistic styles of newscasters (Bell 1982). This explanation is structured around audience design in that communicators (in this case people who write for the media) may not have direct, frequent communication with others, but they do have an idea of who their audience is based on infrequent contact and/or mass media contact (1984).

Among those studies focusing exclusively on Twitter, Marwick and Boyd's (2010) research on the "imagined audience" resonates with Bell's notion of a house style resulting from audience design. Their qualitative study of Twitter users revealed that people do largely imagine their audience on Twitter and design their behaviors as a result of that imagined audience, even though the audience actually consists of a diverse range of people, known and unknown to them. Employing a computational approach, Hu et al. (2013) then confirmed that the stylistic features of tweets differ significantly from the style typically use on other media (e.g., SMS, chat, email, blog corpora). Twitter's house style is strikingly more formal than what might be expected in that sentiment is more positive than negative, less dynamic over time, and exhibits relatively less usage of slang (Hu et al., 2013).[1] Further, members' language change can predict their stage in the lifecycle in the online community; when one becomes less accommodating to the linguistic style of the group, it is a typical indicator of losing interest and abandonment of the community (Danescu-Niculescu-Mizil, West, Jurafsky, Leskovec, & Potts, 2013).

Early descriptions of Congress suggested politicians use Twitter mostly to provide information (Golbeck, Grimes, & Rogers, 2010; Hemphill, Otterbacher, et al., 2013). In a parallel vein, research has examined the specific content or action of tweets, identifying the following characteristics: attacking, campaigning, mobilization, issues, media, and user interaction (Evans, Cordova, & Sipole, 2014; Haber, 2011); providing information, requesting action, positioning, thanking, narrating (Hemphill, Otterbacher, et al., 2013); direct communications, personal message, activities, information, requesting action, fundraising (Golbeck et al., 2010); informational, organizational, policy, and attack/negative campaigning (Gainous & Wagner,

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[1] Some of this stylistic variation has been attributed to power differences between interlocutors (Danescu-Niculescu-Mizil, Gamon, & Dumais, 2011).

2014; Granberg-Rademacker & Parsneau, 2018); campaign events and locations, information, personal, attacks, presidential candidates, replies, calls to action, incumbent business, fundraising (Frechette & Ancu, 2017); position taking, press or web links, district or state activities, official congressional action, personal, and replies (Glassman, Straus, & Shogan, 2009). This compilation of tweet qualities clarifies a consist focus on campaigning, sharing information, and, most importantly, politicking.

Within this class of communications, campaigning impacts politicians' communications in a unique way, but there was not a marked change in strategy among congressional candidates in the 2016 election (Druckman, Kifer, & Parkin, 2017). Consistent with the extant literature on campaign strategy (see, for example, (Druckman, Hennessy, Kifer, & Parkin, 2009; Graham, Jackson, & Broersma, 2014), newcomers challenged incumbents, and incumbents focused on policies (Frechette & Ancu, 2017). As well, most of the effort in 2016 was to convey information rather than mobilize supporters or fundraise (Frechette & Ancu, 2017), although challengers may have tweeted more frequently to blunt the institutional advantage of incumbents (Evans et al., 2014). We acknowledge that campaigning plays a significant role in how language is used on Twitter, but our focus accounts for the entire history of congressional Twitter use rather than singular events such as elections.

Together, the extant research on the house style on Twitter and the common uses of Twitter by politicians suggest the following research question:

> RQ1: In what ways has Congress changed its speech acts distribution over time? Has the "house style" changed?

Twitter's Political Communication Potential

We assume that political communications are rooted in the notion of a frame in a communication, which refers in the case of Twitter to words (i.e. hashtags), phrases, or images (i.e. forwarded photos) that highlight certain considerations toward a politician, policy, or issue (Druckman, 2001). How these frames are both constructed and received are both relevant. On Twitter, for example, there has been considerable research about how members of Congress clarify their interest in specific policy issues through the use of hashtags (Cunha et al., 2011; Hemphill, Culotta, & Heston, 2016; Huang, Thornton, & Efthimiadis, 2010; Shapiro & Hemphill, 2017). For the present study, we invoke Hemphill et al.'s (2013) model of Twitter-based speech acts. Presented in Table 1, these five speech acts and their definitions were derived from an iterative hand-coding and automated-coding process.

TABLE 1 HERE

Among the five speech acts identified by Hemphill et al.'s (2013) model, we highlight the fact that positioning is a politicizing frame and that providing information as a news-update frame. However, we offer an update to the existing research on Twitter-based political communication by recognizing the potential for combinations of frames to occur. We focus particularly on hybridized speech acts involving the conflation of positioning and providing information with each other as well as with the remaining speech acts. The presence of hybrid speech acts would indicate a subtle but shrewd framing strategy by members of Congress. For example, conflation between positioning and providing information speech acts could provide legitimation for political content by providing URLs and directing people to outside sources of information. Similarly, conflation between positioning and thanking could emphasize the compassionate qualities of politicians over attempts to portray themselves as political leaders. To our knowledge, these nuanced approaches to political communication on Twitter have not been addressed in the existing literature.

We also assume that politicians frame their Twitter posts while continuing to recognize the significance of their online audiences (Karlsen, 2015; Norris & Curtice, 2008; Williams & Gulati, 2010). Some research suggests that politicians are engaging in one-sided or parasocial interactions rather than reciprocating, human-to-human interactions (D. C. Giles, 2002) and that such parasocial interactions are nothing more than a facade of interactivity (Stromer-Galley, 2000). However, and in line with McMillan (2002), we believe that citizens appreciate and feel more proximate to their elected officials via Twitter given evidence that members of Congress directly respond to their constituents (Barberá et al., 2014; Barberá, Bonneau, Jost, Nagler, & Tucker, 2013).[2] At the same time, the size of one's audience is a positive function of media contact as journalists increasingly draft their articles on the basis of social media-based information (Hamby, 2013; Parmelee, 2013; Verweij, 2011). Politicians acknowledge that the media will be the ultimate conveyor of information to the general public (Lieber & Golan, 2011) and thus use Twitter to communicate political statements and policy preferences to the mainstream press (Shapiro & Hemphill, 2017). If journalists continue to engage in significantly less fact-checking of politicians when information originates in tweets (Coddington, Molyneux, & Lawrence, 2014), and if hybrid speech acts are employed as a framing strategy by members of Congress, the prospects dim for transparent and accurate journalism.

Thus, the potential for hybrid speech acts to arise suggests a second research question:

> RQ2: How is the positioning speech act conflated with other speech acts, and what are the implications of couching positioning with, for example, thanking or providing information?

Variance among Members of Congress

We acknowledge the frequent emphasis in the existing research with regard to how Twitter can be used in different ways by different types of politicians. These differences often focus on gender, congressional chamber, and party. We know that the behavior of women in Congress can differ from that of men, namely that women are active in their online engagement (Hemphill, Otterbacher, et al., 2013; Niven & Zilber, 2001). As well, recent research confirms that female politicians use the Internet for communication -- including Twitter -- more frequently than their male counterparts (Evans, Cordova, & Sipole, 2014; Evans, Ovalle, & Green, 2016), which counters existing research on Twitter use (Hemphill, Otterbacher, et al., 2013). In terms of congressional chamber, in a study of Twitter use from October 2015 to May 2016 among

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[2] Twitter-based connections from politician-to-citizen are typically limited to constituents that are co-partisans.

individuals on the U.S. House and Senate Armed Service Committees, it was found that representatives tweet more about legislative functions while senators tweet more about oversight functions (Buckles, 2017). Regarding party-based differences, which are likely to have the greatest implications if polarizing rhetoric differs between Democrats and Republicans, in an analysis of Twitter use by U.S. senators, it was found that partisan rhetoric is more likely to be employed by Republicans (Russell, 2017).

These conflicting findings about differences across gender, chamber, and party suggest a third research question:

> RQ3: How do members of Congress differ in terms of how they use Twitter? Specifically, what differences can we observe between men and women, between chambers, and between parties?

Methods

The principal updates to Hemphill et al. (2013) offered in this paper are reflected in both the nature of the data and in our analytical approach. The entire dataset was recollected, and the existing model in (Hemphill, Otterbacher, et al., 2013) was used to label speech acts. Our full dataset includes 765,626 tweets from 414 accounts, representing 77 percent of the members of Congress in 2016. To collect Twitter handles, we used a crowd-sourced list of official Twitter accounts for members of Congress from the unitedstates project.[3] We collected tweets using Purpletag's collect functions (Hemphill et al., 2016). Twitter's search API returns up to 3,200 tweets for each user, and we therefore have complete histories for accounts with fewer than 3,200 tweets but the most recent 3,200 tweets for accounts with more than 3,200 tweets. The earliest posting of a Twitter post in our dataset is February 14, 2008, and the latest posting was made on February 15, 2016.

Automated Classification

The classifiers developed in Hemphill et al. (2013) used to label tweets in our data set employ MALLET (Machine Learning for LanguagE Toolkit) to train and evaluate our classifiers (McCallum, 2002) (http://mallet.cs.umass.edu/). Using the maximum entropy classifier, the words appearing in a tweet are its features, and the classifier is a function that maps the features onto the output classes. "Maximum entropy models begin with the assumption that uniform distributions are preferred (i.e., assume a 50/50 chance that a tweet is 'narrative' or not). They use training data to learn constraints to be applied to this distribution. Nigam and colleagues (Nigam, Lafferty, & Mccallum, 1999) report that in many cases, maximum entropy outperforms Naïve Bayes, however, it does have a tendency toward overfitting in cases where data is sparse (i.e., when there are only few positive examples of a tweet of a given class)" (Hemphill, Otterbacher, et al., 2013: 4). The accuracy statistics for our classifier's performance are reported in Table 2.

TABLE 2 HERE

[3] https://github.com/unitedstates/congress-legislators

Statistical Analysis

In line with the research questions presented above, our primary focus is the use of Twitter by members of Congress. We provide direct updates for previous research on this topic and also consider specific features of the identified speech acts that had been hitherto ignored, namely the presence of hybrid speech acts. The dataset itself is unique in its panel structure, and the time parameter is based at the minute level. When structuring the dataset, approximately nine percent of the tweets were made by individual members of Congress at the same minute, creating duplicates in terms of the panel structure. We opted to delete these duplicates to maintain a dataset free of non-uniquely identified observations. We could have alternatively transformed the time parameter from the minute to the second level and modified duplicate tweets' timestamp by one second. We confirmed, though, that there were no significant differences between the original and truncated datasets in terms of their descriptive statistics, correlations, and a preliminary pooled data analysis where the time parameter was included as a control. The statistical output remained virtually unchanged between the original and truncated datasets. Random effects linear regression was conducted to identify characteristics driving overall frequency of tweets. Random effects logistic regression was conducted to identify characteristics driving each speech act.

Results and Discussion

We first establish which types of politicians are in fact using Twitter for communication. To this end, we present in Table 3 the results of regressing frequency of Twitter posts on gender, congressional chamber, and party attributes. We observe that the average member of Congress posts on Twitter more than 837 times. We also observe that females, senators, and Democrats are much more likely to tweet; in the case of chamber, the difference between senators and representatives is on the level of 355 tweets. These findings confirm Evans et al. (2016) in terms of gender but contrast with (Russell 2017) in terms of party (for senators only). They also differ completely from the parallel analysis in Hemphill et al. (2013), leading us to claim that Twitter use by members of Congress has evolved and that the "house style" has in fact changed over the last several years.

We note that the gap between senators and representatives is a function of temporal variation between chambers, namely the difference in term lengths between senators and representatives. This and other potential sources of individual and temporal variance will be subsequently addressed with qualifying tests for random effects modeling.

TABLE 3 HERE

Based on our sample of 765,626 tweets, Table 4 reports two estimates for the predicted probability that a speech act applies to any given tweet; the left-hand column reports the raw MALLET scores (i.e., mean probability that a speech act applies) while the right side conveys the descriptive statistics for these speech acts after applying a 0.50 threshold to the classifier (i.e., applying a stricter condition for a label to be assigned). In this way, we are able to create a binary classifier for each speech act under the condition that MALLET predicts at least a 50 percent probability of a speech act occurring. Under this 0.50 threshold, the results are similar in terms of these five speech acts' overall frequency ranking, but the proportion of tweets represented by narrating, positioning, requesting action, and thanking is more conservative under the 0.50 threshold relative to the MALLET scores.

TABLE 4 HERE

We note that positioning and providing information are the most prevalent speech acts. The mean raw MALLET-generated score for positioning is 0.349, indicating that the probability of this speech act occurring is 34.9 percent. For providing information, that probability is 41.1 percent. Narrating is the third most frequently identified speech act, with a 15.6 percent probability of being identified by the MALLET classifier. Requesting action and thanking are the least common speech acts of members of Congress, representing 5.6 and 5.9 percent probabilities of being identified by the classifier (and even less under the more conservative estimates). All of these findings are consistent with those presented in Hemphill et al. (2013).

We highlight again that these speech acts are not mutually exclusive but may represent combinations of speech acts. Presented in Table 5, the pairwise correlation analysis of both the raw MALLET scores and the 0.50-threshold-based speech acts shows that narrating and providing information and, separately, thanking and providing information are most strongly correlated with each other. Given our interest in politicized framing on Twitter via conflated speech acts, we also observe that the correlation coefficient for the positioning and providing information speech acts is quite low, reflecting a very low association between them in terms of both their raw MALLET scores and the 0.50 threshold measure.

TABLE 5 HERE

We examine the nature of hybrid speech acts and calculate them according to whether the speech acts of interest met or did not meet the 0.50 threshold. That is, a speech act is considered a "hybrid" if both of its constituent parts have raw MALLET scores of at least 0.50. Presented in Table 6, 5.3 percent of the total sample of tweets (40,755 tweets) are a hybrid of the narrating and providing information speech acts. Speech acts classified as a hybrid of thanking and providing information represent 2.5 percent of the total sample (18,833 tweets). Further, and contrasting with the relatively low correlation between them in Table 5, the percentage of our sample represented by the positioning and providing information hybrid speech act is 10.9 (83,396 tweets). The implication is that positioning and providing information are not associated because the relationship between them is bifurcated: high levels of positioning and low levels of providing information are negatively related, while low levels of positioning and high levels of providing information are positively related. Whether these patterns are connected to gender, chamber, and party-based differences is as of yet unknown but can be determined with further analysis of all hybrid speech acts involving positioning and providing information.

TABLE 6 HERE

Table 7 conveys the statistical output representing the first part of our analysis, focusing on how non-hybrid speech acts are predicted by gender, chamber, and party. Given the cross-sectional and longitudinal nature of the data and given the potential for individual-specific or time-specific error variance components to be significant, we conducted the Breusch-Pagan Lagrange multiplier test and confirmed that a random effects model was appropriate. The results of these analyses shows that gender is largely insignificant, that senators are more likely to position while representatives are more likely to request action, and that Republicans request action while Democrats provide information and thank. Narrating was not significantly different for any of the independent variables. The lack of gender and party-based differences, particularly with regard to positioning, contrasts strongly with existing research such as Russell (2017) and Evans et al. (2014, 2016).

TABLE 7 HERE

The second part of our analysis focuses on hybrid speech acts, and we observe in the odds ratios presented in Table 8 that gender-based differences are not at all significant, which again contrasts with Evans et al. (2014, 2016). Chamber-based differences are also largely insignificant except for the observation in model (7) that representatives are more likely to engage in a providing information-thanking hybrid speech act. However, there are significant differences between Democrats and Republicans across five of the seven hybrid forms identified. There is also variance between parties in terms of preferences for specific hybrid speech acts: Republicans are more likely to combine requests for action and positioning as well as combine requests for action and providing information. Democrats are more likely to engage in speech acts that combine positioning and providing information, positioning and thanking, and providing information and thanking.

TABLE 8 HERE

These separate analyses of non-hybrid and hybrid speech acts have implications for how framing occurs on Twitter. We observe in Table 3 that senators are more likely to engage in positioning speech acts while representatives are more likely to engage in requests for action and thanking speech acts. These patterns hold up in later findings on the hybrid forms (Table 8) in that senators are more likely to simultaneously position and provide information while representatives are more likely to provide information and thank. As a result, senators conflate positioning and providing information much more than representatives.

Notable among our findings are the differences between Democrats and Republicans in terms of how they frame their communications with hybrid speech acts. Statistically significant differences based on random effects logistic regressions indicate that Democrats *position-provide information*, *position-thank*, and *provide information-thank* more than Republicans. Republicans, however, differ from Democrats in that they are more likely to *position-request action* and *provide information-request action*. We also observe that Republicans are no different from Democrats with regard to positioning or providing information until they are conflated with requests for action. As such, requests for action are a distinctly Republican framing strategy. At the same time, we observe that Democrats are significantly more likely to engage in, separately, providing information and thanking. They are also more likely to engage in these speech acts in their hybrid forms, implying that providing information and thanking are crucial features for the Twitter-based Democratic framing strategy.

Future Work

There are a number of ways that this line of research can be further expanded. One can expand the nature of the hybrid speech act to include more than two speech acts at a time or, alternatively, attend to the gradient of the raw MALLET score for positioning (and all other speech acts) by comparing how these hybrid versions are predicted at more conservative measurements. For example, a comparison could be made between 0.50 scores and 0.60 or 0.75 scores, the assumption being that more restrictive (higher) measures indicate stronger positioning and thus potentially more polarizing rhetoric. One can also bridge speech acts with other communication tools used by members of Congress on Twitter, the hashtag in particular. Given connections identified between congressional framing of political issues via hashtags (Hemphill, Culotta, & Heston, 2013), positioning and providing information speech acts can be examined in the context of specific issues.

Future research can also attempt to build alternative automated classifiers using the scikit-learn (Pedregosa et al., 2011) Python packages. Given the increased accessibility to powerful yet easy-to-implement machine learning tools since 2013, we could, for example, compare our maximum entropy classifier with a broad range of other techniques (e.g., logistic regression or random forest models that provide transparent decisions on class assignments). The implication is that there may be more computationally efficient and transparent classifiers. For instance, logistic regression as a classifier is arguably a technique that is relatively better known and understood by a broad audience; using logistic regression might thus make our results more explainable and accessible. Given the increased concerns surrounding transparency and accountability in data science, the use of more common techniques arguably offers benefits over more computationally complex approaches in terms of explainability. Finally, we can mitigate suspicions we have about the classifier with a more thorough comparison across additional classifiers, whether they run in MALLET, Python, or another program or language.

Most importantly, the hybrid-focused analysis of speech acts among congressional Twitter users has shown that, while both chambers and both parties are not significantly different from each other in terms of how they engage in positioning speech acts, positioning-based hybrids are distinctive framing tools for each party. Future research can help understand this in further detail by examining, for example, whether a URL-based reference is included. More than 83K tweets represent both positioning and providing information, but nearly 124K positioning tweets include URLs according to our data. How these URL-included tweets are distinct from the hybrid tweet is worth exploring.

Conclusion

We have determined that (a) information provision remains the most common speech act among members of Congress on Twitter, (b) information provision and political positioning are frequently conflated within hybrid tweets, and (c) females, senators, and Democrats are much more likely to tweet. Together, these findings suggest that members of Congress have developed routines of Twitter use that prioritize one-way communication and that attempt to subtly serve their framing efforts as they relate to positioning speech acts. How a particular group of MCs uses Twitter at any given time seems to change -- e.g., whether women or senators are more active -- but does not indicate dramatic advantages or disadvantages among these groups in terms of access or impact.

A tension remains in U.S. political culture regarding the extent to which new technologies hinder or facilitate political discussion online. Some are more optimistic (Delli Carpini, 2000), but we are more cautious in light of the analysis above. We believe that positioning is an analogue to more polarizing language than simply sharing information or making simple requests of constituents. At stake is the potential for Twitter to limit democratic dialogue (Theocharis, Barberá, Fazekas, Popa, & Parnet, 2016). This is possibly a premature concern given updates to how Twitter can be used according to its guidelines[4] as well as how politicians and the more politically active public has modified and will continue to modify their online communications. Nevertheless, we can offer suggestions for journalists and general citizens when encountering varying degrees of information provision and positioning in congressional speech acts on Twitter.

First, recognizing the implications of Internet-based communications supplementing traditional news outlets (Brainard, 2015), we point out that Twitter is not a passive activity. Increased use by the general public with regarding to congressional tweets could in fact foster democratic dialogue if constituents are providing clear and direct responses and commentary to their elected officials. Journalists and citizens must actively engage members of Congress with questions, feedback, and suggestions, and Twitter cannot be the only site of interaction. With specific regard to Twitter, we know that this works as members of Congress are connected to their constituents; i.e. the flow of information does in fact go both directions. However, we also know that politicians are more influenced by those within their party as well as those that are more politically engaged than by other users (Barberá et al., 2014). Which of these effects are stronger -- co-partisanship or political engagement -- is in flux, and increases in Twitter-based activity between members of Congress and their constituents will lead to a critical mass of non-co-partisan-oriented dialogue. At that point, members of Congress would be forced to address on Twitter the concerns of all constituents.

Second, savvy consumers of Congress's tweets must be better informed regarding politicians' attempts to blur the line between information provision and position-taking. For journalists, they must revert back to more conservative methods and confirm the accuracy of every statement posted by a politician on Twitter. This is particularly important for those tweets classified as positioning and providing information speech acts, which we believe convey the most newsworthy information. Staunching the flow of inaccurate information from politician to journalist will have a significant impact on the news received by the general public, but it will not affect citizens that receive and retweet information directly from their elected officials. For this group, they must be made more literate regarding the potential for hybrid speech acts. One simple but imperfect method is to verify any external links (i.e. URLs) provided in a politician's tweet. This will be a small but significant step toward establishing the credibility of the politicians'

[4] https://help.twitter.com/en/rules-and-policies/twitter-rules

statements and, in turn, potentially parsing out the constituents of a hybrid framing strategy on Twitter.

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Table 1. Definitions and examples of Twitter-based speech acts

Code	Definition	Example
Narrating	Telling a story about their day, describing activities	“headed up to the Fox News camera for an interview” (Rep. Ron Paul, R-TX)
Positioning	Situating one's self in relation to another politician or political issue, may be implied rather than explicit	“A9: Theoretically, not realistically. HC spending is growing 4x inflation and driving our debt. Let’s tackle the real threat. #ryanttv” (Rep. Paul Ryan, R-WI)
Providing information	Pointing to a resource URL, telling you where you can get more info	“Harkin Announces More Than $300,000 for Housing in Tama County http://1.usa.gov/lf6Aem” (Sen. Tom Harkin, D-IA)
Requesting action	Explicitly telling followers to go do something online or in person (not just visiting a link but asking them to do something like sign a petition, apply, vote) - look for action verbs	“RSVP to my Immigration Forum with Rep. Luis Gutierrez this Saturday in Brooklyn http://t.co/qTcWugs” (Rep. Yvette Clark, D-NY)
Thanking	Says nice things about or thanks someone else, e.g. congratulations, compliments	“@rmartindc Thanks. MoC's handwriting is probably on par with M.D.'s. Glad I could make your job easier.” (Rep. John Shimkus, R-IL)

Note: Based on Hemphill et al. (2013), Table 1.

Table 2. Mean classification accuracy on test data: 10-fold cross-validation procedure

Classifier	Narrating	Positioning	Providing info	Req. action	Thanking
Maximum Entropy	0.83 (-0.05)	0.71 (-0.06)	0.91 (-0.03)	0.91 (-0.03)	0.95 (-0.03)

Table 3. Predicting frequency of Twitter posts, OLS

	Frequency of tweet
Male	-170.713** (66.660)
Senate	354.935*** (66.681)
Republican	-159.685*** (54.839)
Constant	837.300*** (59.602)
F	16.32***
R2	0.107
N	414

Table 4. Descriptive statistics for speech acts, two measures

	Raw MALLET scores		Applying 0.50 threshold	
	Mean	Standard Dev.	Mean	Standard Dev.
Narrating	0.156	0.201	0.083	0.276
Positioning	0.349	0.267	0.274	0.446
Providing info	0.411	0.395	0.410	0.492
Requesting action	0.056	0.101	0.014	0.116
Thanking, etc.	0.059	0.126	0.026	0.158

Note: “Raw MALLET scores” refer to the probability that an individual tweet belongs in a given class; “Applying 0.50 threshold” refers to the proportion of tweets that are assigned probabilities above 0.50 for a given class.

Table 5. Pairwise correlation coefficients of speech acts, raw MALLET scores / 0.50 threshold

	Narrating	Positioning	Providing info	Req. action	Thanking
Narrating	1 / 1				
Positioning	-0.162 /-0.063	1 / 1			
Providing info	0.259 / 0.141	-0.048 /-0.017	1 / 1		
Req. action	0.083 / 0.067	-0.216 /-0.061	0.018 / 0.090	1 / 1	
Thanking	-0.021 /-0.030	-0.165 /-0.080	0.398 / 0.180	-0.076 /-0.017	1 / 1

Table 6. Descriptive statistics for hybrid speech acts

	Mean	Standard Dev.
Positioning & Narrating	0.015	0.122
Positioning & Providing info	0.109	0.312
Positioning & Requesting action	0.001	0.024
Positioning & Thanking	0.001	0.038
Providing info & Narrating	0.053	0.224
Providing info & Requesting action	0.006	0.078
Providing info & Thanking	0.025	0.155

Note: “Mean” refers to the proportion of tweets that are assigned probabilities above 0.50 for each of the two classes listed.

Table 7. Predicting speech acts, generalized least squares

	(1) Narrating	(2) Positioning	(3) Providing info	(4) Req. action	(5) Thanking
Male	0.002	-0.004	0.002	0.003*	0.000
	(0.004)	(0.006)	(0.009)	(0.001)	(0.002)
Senate	-0.001	0.020***	-0.006	-0.004**	-0.006**
	(0.005)	(0.006)	(0.012)	(0.002)	(0.002)
Republican	0.001	-0.006	-0.041***	0.010***	-0.009***
	(0.003)	(0.005)	(0.009)	(0.001)	(0.002)
Constant	0.158***	0.347***	0.439***	0.049***	0.065***
	(0.003)	(0.005)	(0.010)	(0.001)	(0.002)
Model type	Random effects	Random effects	Random effects	Random effects	Random effects
X^2	0.56	14.19***	21.66***	82.13***	29.72***
Groups	415	415	415	415	415
N	765,826	765,826	765,826	765,826	765,826

Note: Robust standard errors in parentheses; *, **, *** represent *p*<0.10, *p*<0.05, *p*<0.01, respectively.

Table 8. Predicting hybrid speech acts, logistic

	(1) Positioning & Narrating	(2) Positioning & Providing info	(3) Positioning & Req. action	(4) Positioning & Thanking	(5) Providing info & Narrating	(6) Providing info & Req. action	(7) Providing info & Thanking
Male	0.994	0.943	0.992	1.035	1.045	1.175	1.021
	(0.065)	(0.052)	(0.142)	(0.105)	(0.061)	(0.120)	(0.078)
Senate	1.070	1.093*	0.843	1.052	0.937	0.906	0.740***
	(0.069)	(0.060)	(0.116)	(0.104)	(0.054)	(0.090)	(0.056)
Repub.	0.984	0.789***	1.840***	0.673***	0.980	1.615***	0.852**
	(0.053)	(0.036)	(0.223)	(0.058)	(0.047)	(0.136)	(0.054)
Constant	0.014***	0.132***	0.000***	0.001***	0.053***	0.003***	0.025***
	(0.001)	(0.007)	(0.000)	(0.000)	(0.003)	(0.000)	(0.002)
Model type	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects	Random effects
X^2	1.22	36.78***	29.24***	22.33***	1.82	45.24***	22.42***
Groups	415	415	415	415	415	415	415
N	765,826	765,826	765,826	765,826	765,826	765,826	765,826

Note: Odds ratios are presented; standard errors in parentheses; *, **, *** represent *p*<0.10, *p*<0.05, *p*<0.01, respectively.