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Abstract

Purpose – The purpose of this paper is to understand why some Senators choose to use Twitter more frequently than others. Building on past research, which explored causal factors leading to early congressional adoption, theories about why some Senators use Twitter more frequently in their daily communications strategies are developed.

Design/methodology/approach – A "power user" score was developed by evaluating each Senator's clout, interactivity, and originality on Twitter. These scores are then used as the dependent variable in a regression model to evaluate which factors influence Senators becoming Twitter "power users."

Findings – The study found that: constituent income is positively correlated with heavy use, but constituent education level is not; the more ideological a Senator is the more he or she will be a Twitter power user; the number of days on Twitter is a significant indicator of advanced Twitter usage; and having staff dedicated to social media is positively correlated with being a Twitter power user.

Research limitations/implications – All Senators in the second session of the 113th Congress (2014) were evaluated. As such, future research hope to expand the data set to additional Senators or the House of Representatives.

Practical implications – A better understanding of why some Senators use Twitter more than others allows insight into constituent communications strategies and the potential implications of real-time communication on representation, and the role of accountability between a Senator and his or her constituents.

Originality/value – The study examines constituent communication by Senators in a new, more interactive medium than previously considered. Additionally, the study places findings about Senator's constituent communication in the broader context of representation.

Keywords Social media, Congress, Communications, Representation, Constituent service, United States Senate

Paper type Research paper

Three days prior to Barack Obama's second inauguration, Twitter issued a press release declaring victory. As of January 18, 2013, all 100 US Senators had a Twitter account (Sharp, 2013)[1]. Twitter could reasonably claim that it had helped revolutionize how Members of Congress communicate with constituents, the general public, and even each other. But beyond the headline, important questions remained: adoption aside, how widespread is Twitter use in the Senate? Is there significant variation in Twitter use among Senators? Are there political or demographic characteristics of Senators or their states that explain such variation in social media engagement? This paper takes initial steps to answer these questions.

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Why would political scientists care about Twitter use among US Senators? One reasons scholars of Congress should be interested in social media usage is its potential for changing norms of representation. In previous decades, representation imposed real costs on both constituents and legislators. Citizens contacted representatives primarily by postal mail or telephone. Informing a representative about an opinion was not free. With the advent of social media and its widespread use among Members and Senators, the cost of such contact has diminished greatly. This transformation has the potential to change models of representation in significant ways.

In her landmark study, Jane Mansbridge outlined four categories of representation (2003). Her new models provided more robust descriptions of representation than the previous "mandate" and "trustee" dichotomy. Social media adds a new element to representation that could not have been foreseen by Mansbridge. Specifically, social media has introduced the concept of "iterative" representation and real time, constant accountability of Members to constituents.

Mansbridge does premise her model of "anticipatory representation" upon communications between representatives and the governed. However, there is still a time lag for sanctions if the principal (constituent) is not satisfied. Anticipatory representation focusses on the "prudential incentive to please the voter in the next election" (p. 520). Social media is more temporally demanding than this formulation. As Members use more sophisticated tools provided by social media, they can actually engage in real-time delivery of information and justifications for action. All Members must stand for reelection, but social media diminishes the importance of an election-based, fixed time lag. The expectation is Members will respond instantly and engage in back-and-forth iterative conversations about preferences, priorities, and policy decisions. Iterative representation is constant accountability.

One academically appealing aspect of social media use by Members is that it can be studied comprehensively. In earlier eras, it was difficult, if not impossible, to study how Members engaged in representation. Short of embedding oneself in lawmakers' inner circles (as Fenno (1978) famously did), gaining access to how Members answered constituent mail or communicated with voters was haphazard, at best. The transparent nature of social media allows scholars to easily observe how Members are using these new tools to communicate and engage in representation. For example, some Senators are already using Twitter and Facebook to conduct "town hall" meetings. These virtual events can be easily observed, measured, and analyzed.

The rise of social media magnifies the age-old question of how to gauge what all constituents, not just the vocal minority, want. Some studies have shown that while the number of people who are willing to use the internet to contact their Member of Congress has increased, the type of individuals using online resources is not uniform across demographics and socio-economic classes (Schlozman *et al.*, 2012). In other words, groups of constituents are not utilizing the relatively cost free internet to contact Members of Congress, and likely are not contacting their representatives or senators at all (Schlozman *et al.*, 2012, p. 500). Further, to what degree accurately representing constituent preferences impacts reelection chances remains an open question (Adler and Wilkerson, 2012, p. 21). Further, constituent preferences may be so varied that Members must reconstitute district or state desires on a policy-by-policy basis (Lapinski, 2014). Also, recent preliminary results released by the Congressional Management Foundation demonstrated that congressional staffers were more responsive to a small number of social media comments than a large volume of constituent e-mail (Nehls, 2014).

In short, social media provides the richest and most promising data in which to study how democratic representation and decision making is evolving. This paper is an attempt to make sense of why certain Senators exhibit higher levels of social media engagement than others. Is there a connection between the demographic characteristics of constituents that encourage Senators to elevate their use of Twitter? If "iterative representation" has conceptual potential, then the first step is examining empirical evidence that might show a relationship between a Senator's Twitter activity and the composition of his or her constituents.

Previous research on social media

There is a small but growing literature on Members of Congress and social media. Some studies have focussed on the early adopters of social media (Straus *et al.*, 2013). Political ideology was an important predictor of early adoption. The most liberal and conservative Members were more likely to have Twitter accounts in 2010, with conservative Republicans exhibiting the highest probability of early adoption. Member age was also a significant factor, as well as the proportion of the district or state population considered urban (Straus *et al.* 2013). Other studies (Gulati and Williams, 2010; Peterson, 2012) corroborated several findings concerning early congressional adopters of Twitter. Research analyzing UK Members of Parliament showed that third party MPs were more likely to adopt Twitter early (Jackson and Lilleker, 2011).

Other studies have focussed on the content of congressional tweets. Mergel (2012) found that Members tweet about appearances in their home district and policy issues they care deeply about, back-and-forth tweeting (using @ for replies) is rare among Members, even when one Member mentions another Member in a tweet. Additionally, early studies of tweet content showed that Members were largely linking to press releases or touting official actions, like committee hearings. In fact, 43 percent of in-session tweets in 2009 were press-related tweets with little original content (Glassman *et al.*, 2009). Another study categorized 53 percent of Member tweets as "informational" content (Golbeck *et al.*, 2010).

A subsequent and more comprehensive examination of social media usage in 2011 analyzed congressional tweets and Facebook posts and revealed changing content patterns (Glassman *et al.*, 2013). Members were tweeting and posting policy positions (41 percent), while media or press release tweets had dwindled to fewer than 10 percent of all tweets and posts. As more Members joined Twitter, gained followers, and began to understand the tool better, the content of congressional tweets changed. Members and their staffs determined that they could effectively state positions on proposed bills or policy issues in 140 characters. Over time, Members have exhibited more informal and Twitter-specific language in their tweets, adapting their communication strategies to the norms of the tool. Members now tweet more frequently and preliminary research suggests that partisan differences in frequency may be diminishing (Lassen and Bode, 2013). These studies suggest an evolution of social media use among Members, specifically trending toward a model of "iterative representation," in which feedback from constituents is constantly monitored, evaluated, and considered.

Additional research has focussed on other aspects of congressional Twitter use. An analysis of who Members follow on Twitter revealed few commonalities between the parties except for DC-based publications such as *The Hill*, *The Washington Post*, *Politico*, "CSPAN," and *Roll Call*. A higher proportion of Republicans followed Speaker John Boehner (88.7 percent) than the proportion of Democrats who followed President Barack Obama (71.0 percent). Among reporters, Members of both parties followed

Politico's Mike Allen and MSNBC's Chuck Todd, but bipartisan overlap was rare. Instead, not surprisingly, Members follow like-minded pundits (Amira, 2013).

A final line of emerging inquiry analyzes Members' social networks on Twitter. Social networks are measures of connectivity among Twitter users, generated by specific actions on the tool, such as "follow," "reply," or "mention." One study found that the average degree of separation between Members of Congress was six (Shapiro *et al.*, 2012). Given that Congress is a bounded institution, such a large separation between Members was surprising. This indicates that Members do not use Twitter to "explicitly position themselves in terms of others" (p. 15). However, the same study found that there are stronger social network connections between Republicans than Democrats, while Members of opposing parties have few overlapping social networks (Shapiro *et al.*, 2012). The polarized nature of political discussions on Twitter was reinforced by a recent Pew study examining Twitter conversations among all users. Dialogue on Twitter concerning controversial political issues resulted in completely distinct conversations, with little overlap between liberals and conservatives (Smith *et al.*, 2014).

The existing literature does not address which Members of Congress might be heavy users of social media. Previous research, however, does provide some conclusions about frequency of social media use in the general population. An early study (Emmanouilides and Hammond, 2000) examined frequency of internet usage and found that early adopters were more likely to become heavy users, even when the effects of other covariates are controlled. A subsequent study (Assael, 2005) examined internet usage and concluded that heavy users were young, wealthy, college-educated, and male. They also tended to be workaholics, logging more than 50 hours a week at work.

Focussing on a specific type of internet use, Cha (2010) found that age was inversely related to frequency of social media use and that women were more active users and spent more time on social media sites than men. It appears that gender differences in social networking sites is unsettled in the literature, with some studies claiming that men have more "friends" or "followers" than women, and others concluding the opposite (Kuss and Griffiths, 2011).

Existing research about the frequency of Twitter use and the demographics of heavy users is illuminating. In 2013, the Pew Research Internet Project concluded that Twitter users were more likely to be younger, urban dwellers, and non-white (Duggan and Smith, 2013). These findings were similar to a 2012 Pew study, which specified African-Americans as frequent Twitter users (Duggan and Brenner, 2013). Users who obtain information about the news on Twitter are disproportionately younger and highly educated, in comparison to both the general population and Facebook users (Mitchell and Guskin, 2013). In 2012, scientists used super computers to categorize 10 percent of all Twitter activity during a six-week period. Their findings demonstrate a wide range of frequency among Twitter users. Heavy users on Twitter (the top 1 percent) account for approximately 20 percent of all Twitter activity; the top 15 percent of Twitter users issue 85 percent of all tweets. During the time period, 25 percent of Twitter users tweeted just once (Leetaru *et al.*, 2013).

Data and methodology

In December 2014, data were compiled to analyze the frequency of Twitter use by Senators during the second session of the 113th Congress (2013-2014). The dates of collection were between January 3, 2014 and December 16, 2014 – the Senate's first and last day in session. First a comprehensive list of their Twitter handles were compiled. In total, 93 Senators were identified by visiting each senator's Senate.gov webpage.

The other seven Senators' Twitter handles were identified through the Twitter search engine and cross checking those results against a Google search to verify that an official, not campaign account, was captured. In three cases, Senators who had announced their retirement or were not reelected, deleted their Twitter accounts prior to data collection. These Senators were not included in our analysis.

Once Twitter handles were collected, the usernames were entered into the Twitonomy search engine, a Twitter analytics website[2]. Using the webpage, results were filtered to display information for each Senator's account in the study's timeframe. Included in this data were the total tweets for each Senator, how often a senator's tweets were retweeted, how often each senator retweeted others, and the number of replies made to other users. The data from Twitonomy were used to create a "Power User" score for each Senator, the study's dependent variable. A power user is defined as an individual who is very active and involved on Twitter, has numerous followers, posts original content, and often interacts with other users. These three components – clout, originality, and interactivity – make up a power user:

$$Power\ user = clout + originality + interactivity$$

Clout is the amount of influence a person has on the social media platform. As the amount of information available on the internet continues to increase, users who have a significant reach, or clout, have the ability to disseminate information further through their follower networks (Romero *et al.*, 2011). A user's reach tends to be represented in social media through the number of likes, views, or shares. Translated to Twitter, two measures are used to represent a Senator's clout: the number of followers and the percentage of the Senator's tweets that are retweeted.

The number of followers is important because it indicates how many people the Senator is able to reach or influence. Subsequently, a Senator with a large number of followers will have substantive clout. The percentage of the Senator's tweets that are retweeted by other users is the second measure. When other Twitter users retweet they are sharing the Senator's tweets to more users. As a result this will increase the influence and popularity of the Senator, increasing his or her clout on Twitter.

The second component, originality, is one of the most defining aspects of being on social media, as creating new content can encourage others to share posts with a wider audience. Studies have indicated that individual users share content created by others, often by providing links, because they derive satisfaction from "participating" in spreading news and ideas (Lee and Ma, 2012) and in helping to shape "brands" by offering commentary, instead of just sharing content written by a corporate marketing department or Member of Congress' communications staffer (Fournier and Avery, 2011). Power users will post more original content as compared to sharing what others have written. The posting of original content is measured by the total number of original tweets. This includes all tweets that are not replies or retweets. Senators often issue original tweets to take policy positions, highlight state specific issues, and inform users about legislation (Glassman *et al.*, 2013).

The third component of a power user is interactivity. Social media encourages users to interact with each other and to enable the spread of ideas beyond traditional social networks. For example, studies of both the Arab Spring and the response to the January 2010 earthquake in Haiti have demonstrated the power of social media to connect individuals and groups that might otherwise never come in contact with each other (Smith, 2010; Eltantawy and West, 2011).

Senators are power users if they have high levels of interactivity with others. Two measures are used to represent interactivity: the number of replies and the number of retweets. Replies show that the Senator is engaging in conversation with other users on Twitter. This is particularly important when considering how Senators interact with constituents. Retweeting shows that the Senator is actively involved by following and sharing other users' content. A strong power user is a Senator who posts many retweets and replies. In sum, a Senator with a large amount of clout, originality and interactivity on Twitter will receive a high power user score.

To create the power user scores, each Senator was "graded" using the methodology created by Mark Taylor (2012) to grade presidents. In his study, Taylor used eight economic indicators to create an economic grade point average of every president from 1789 to 2009. Using Taylor's method as a guide, five Twitonomy measures were analyzed. These were: Retweets, Followers, Replies, Original tweets, and the percentage of the Senator's tweets that were retweeted. Table I shows the descriptive statistics of the Twitonomy measures included in the dependent variable.

Each measure was then graded separately using two different algorithms. First, Senators were graded using quintiles. Senators in the top quintile received an "A" (four points). Those in the second received a "B" (three points), the third received a "C" (two points), the fourth received a "D" (one point), and the bottom received an "F" (zero points).

Second, Senators were graded on a bell curve. Senators with values within one standard deviation of the mean received a "C." Values within the next half standard deviation received a "B" or "D." Values above the "B" range received an "A" while those below the "D" range received an "F." The five quintile grades and the five bell curve grades were separately averaged to get a final quintile score and a final bell curve score for each Senator. The final power user score was created by averaging together the final quintile score and the final bell curve score for each Senator. Overall, the power user scores ranged from 0 to 3.5, with an average score of 1.67 ("C−"), a median of 1.7 ("C−"), and a mode of 1.8 ("C"). Table II presents a breakdown of power user scores of each senator and their final grades.

A number of independent variables were collected to control for state-level variation in the general population's use of the tool. It is expected that heavy users will have a higher percentage of urban populations in their states (Straus *et al.*, 2013). It is also expected that heavy users were early adopters of Twitter and are younger than their colleagues on average[3]. The literature is not settled concerning the role of gender and social media use, so there is no expectation of a significant relationship between gender and heavy Twitter usage. There is also evidence that Senators from small states employ different constituent communications strategies than Senators from large states (Lee and Oppenheimer, 1999), and any differences there will be detectable in the analysis.

Several political variables may also help predict a Senator's level of Twitter use. Based upon existing literature, it is anticipated that Senators running for reelection use

Table I.
Twitonomy measures used to develop the power user dependent variable

Variable	Mean	SD	Range
Retweets	132.1	184.88	0 to 1,136
Followers	75,734.14	248,997.5	471 to 1,931,021
Replies	46.73	198.89	0 to 1,915
Original tweets	805.24	677.96	0 to 2,802
Percentage of Senators tweets, retweeted	77.69%	0.18	0 to 98.8%

Power user range	Number of senators	Grade
3.26-3.50	1	A−/B+
2.76-3.00	5	B
2.51-2.75	6	B−
2.26-2.5	3	B−/C+
2.01-2.25	11	C+
1.76-2.00	19	C
1.51-1.75	13	C−
1.26-1.50	18	C−/D+
1.01-1.25	7	D+
0.76-1.00	5	D
0.51-0.75	2	D−
0.26-0.50	3	D−/F+
0.01-0.25	1	F+
0.00	3	F
Total	97	

Table II.
Powers user scores of Senators of 113th Congress

official communications avenues less and campaign sources more (Zupan, 1990; Franklin, 1993). Further, if a Senator is retiring, it is expected that his or her Twitter usage will be less than those who are returning next Congress (Herrick *et al.*, 1994; Rothenberg and Sanders, 2000; Carson *et al.*, 2004). Additionally, based on previous studies of ideology and social media (Straus *et al.*, 2013), it is expected that ideological Members will use Twitter more frequently than their politically moderate counterparts. Lastly, it is expected that Senators who hire staff dedicated to social media will be power users compared to those who do not have dedicated staff. Table III contains summary statistics of the independent variables used to estimate these models.

Based on the study's expectations, older Senators should be less active on Twitter, Twitter veterans should use the tool more frequently, Members who are more active are more likely to hire dedicated social media staff, and ideologically extreme Members should tweet more often than moderates. Similarly, Senators who are retiring at the end of the term (2014) should send fewer tweets than Senators running for reelection or are otherwise staying in the chamber. Lastly, Senators who represent states with large urban areas, high proportions of high school graduates, higher median household incomes, and smaller populations should be heavy Twitter users.

Results

The relationships between the independent variables and the "power user" dependent variable were tested using a linear regression model. Since the power user distribution approximates a normal distribution, an OLS model is appropriate. Table IV presents the results of four models: clout, originality, interactivity, and the combined power user score adapted from Taylor (2012).

As Table IV shows, the full power user model is driven almost exclusively by clout. In the full model, days in office, ideology-squared, and social media staff are both significant and in the expected direction. In examining the three models with the component parts of the full power user model, we can see that only clout produces significant variables. For two of the clout predictors – days on Twitter and ideology-squared – the independent variables are more significant than in the full

Independent variable	Coding	Mean	Median	SD
Age (years)[a]	Range from 40 to 80	61.88	62.5	9.97
Days on Twitter[b]	Range from 94 to 2,591	1,627.8	1,573	537.4
Seat up for election in 2014	0 = seat up for reelection 1 = seat not up for reelection	0.29	0	0.45
Ideology[c]	DW-NOMINATE common space score (range from −0.585 to 0.99)	0.037	−0.196	0.442
Ideology squared	Square of DW-NOMINATE common space score (range from 0.0077 to 0.9801)	0.195	0.151	0.191
Gender	0 = male 1 = female	–	–	–
Retiring from the senate	0 = non-retiring 1 = retiring	0.07	0	0.255
Population	Range from 582,658 to 38,332,531	6,309,648	4,510,383	6,990,326
Proportion of state population considered urban	Range from 38 to 95%	73.3%	73.7%	14.4%
Proportion of citizens with a college degree	Range from 18 to 39%	28.4%	27.9%	4.8%
Median household income	Range from $33,641 to $71,836	$51,742.44	$50,009	$8,128.12
Social media staff[d]	0 = no social media staffer 1 = social media staffer	0.16	0	0.367

Notes: [a]Age was calculated by determining the number of years that have passed between a member's birthday and December 16, 2014. This data were chosen because it allowed for uniform comparison of ages for all Senators. Birthdates were compiled from US Congress, Joint Committee on Printing (2014); [b]days on Twitter were calculated by determining the number of days between the senator adopting Twitter – as determined by his or her first Twitter post, using Twitonomy – and December 16, 2014; [c]DW-NOMINATE common space score range from −1(most liberal) to 1 (most conservative). See Carroll *et al.* (2015). Data for the 113th Congress were provided directly by Keith Poole to the authors by e-mail. Two Senators did not have common space scores. For one, a former Member of the House, his House common space score from the first session of the 113th Congress was used. For the other, who was appointed during the study period, the average common space scores for his predecessor and the other Senator from that state were used to approximate his likely senate ideology; [d]dedicated social media staff were determined by examining the staff listings for each Senator in the 2014 *US Senate Telephone Directory*. Staff who were dedicated to social media were identified by a number of different titles, including "Deputy Press Secretary for New Media," "New Media Director," "New Media Coordinator," "Director of Digital Media," "Social Media Coordinator and Press Assistant," and "Digital Coordinator" (US Congress, Senate Sergeant at Arms, 2014)

Table III.
Independent regression variables and summary statistics

power user model. Additionally, the population variable is significant in the clout model, but it is not in the expected direction.

Overall, the clout model appears to be the strongest of the three component pieces of the power user model. As shown in Table IV, when using clout alone as a dependent variable, two of the significant variables from the power user model become even more significant. None of the independent variables in the originality or interactivity model are significant. Why would clout be such a strong driver of a power user? One explanation might lie in the effort of Senators to create a brand name. Twitter – or any social media platform – allows a Senator to communicate directly to the general public without the filter of the mainstream news media, especially if the Senator is more ideological (Straus *et al.*, 2013). When looking at the clout model's results, this makes sense. As Senators develop a brand, they become more comfortable using social media

Independent variables	Power user score	Clout	Interactivity	Originality
Age	0.00421 (0.00741)	0.00668 (0.00991)	−0.00391 (0.0114)	0.00888 (0.0127)
Gender	0.144 (0.175)	0.0114 (0.235)	0.269 (0.270)	0.172 (0.301)
Days on Twitter	0.000288 (0.000124)**	0.000441 (0.000165)***	0.000271 (0.000190)	6.96e-06 (0.000212)
Election year	−0.155 (0.149)	−0.0612 (0.199)	−0.126 (0.229)	−0.355 (0.256)
Ideology	0.0939 (0.230)	−0.241 (0.308)	0.205 (0.354)	0.0898 (0.396)
Ideology squared (I^2)	0.778 (0.457)*	1.528 (0.612)***	0.190 (0.703)	0.435 (0.786)
Retirement	−0.348 (0.295)	0.00599 (0.394)	−0.146 (0.453)	−0.679 (0.507)
Population	1.17e-08 (1.06e-08)	3.30e-08 (1.41e-08)**	−9.03e-09 (1.62e-08)	9.00e-09 (1.82e-08)
Urban	−0.498 (0.568)	−0.912 (0.759)	−0.00135 (0.873)	−0.604 (0.976)
College graduate	2.619 (1.726)	0.142 (2.308)	3.410 (2.654)	3.0678 (2.967)
Social media staff	0.365 (0.195)*	0.318 (0.261)	0.318 (0.300)	0.276 (0.335)
Constant	0.312 (0.750)	0.648 (1.004)	0.241 (1.154)	1.017 (1.290)
R^2	0.2425	0.2480	0.0979	0.0843

Notes: $n = 97$. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Table IV. Regression model results of Senator usage

(days on Twitter) and this allows them to reach a broader audience than they could without social media (population). This brand, however, appears to be member-centric, not the party brand that studies have previously examined (Woon and Pope, 2008; Carson *et al.*, 2010).

Analysis and discussion

Four specific results from the regression models merit discussion: days on Twitter is an indicator of advanced Twitter usage; the more ideological a Senator is, the more he or she will be a Twitter power user; having staff dedicated to social media is positively correlated with being a Twitter power user; and the larger a state's population, the more likely that a Senator will be a power user.

Days on Twitter

As expected, the number of days a Senator has been on Twitter is positively associated with power users. Why early adopters are heavy users, however, is not clear; several possible mechanisms could be at play. First, some small proportion of the power user score is likely an artifact of the number of days a Member has been on Twitter. As with any Twitter user, "junk" or "spam" followers can be collected passively, simply by having an active account. To the degree that the number of such "junk" followers are correlated with days on Twitter, the clout score will be artificially inflated, and thus the power user score will skew higher. This effect is probably negligible, but it is undoubtedly real. A similar phenomenon is probable with retweets.

More substantively, several alternative mechanisms might explain the higher power user scores of early adopters. First, early adopters may systematically differ from later adopters across a variety of static personal variables. For instance, it is likely that Members who were early Twitter adopters may simply be personally more technologically savvy, both in their eagerness to use social media, as well as their

adeptness at it. Even in cases where all social media management is being delegated to a staff member, technologically savvy Members are probably more likely to encourage interactive use, or at least be less risk-averse about letting staffers experiment with different social media strategies for the office. This should, in turn, increase both the originality and interactivity components of the powers user score.

Alternatively, early adoption may be associated with power users because of learning effects. As with any constituent communications strategy, Members and their staff are constantly trying to maximize the effectiveness of their social media presence. Given the relative immaturity of the technology, much of this maximization is an iterative process. While some advice and best practices for the political use of Twitter are now available, innovation, and advancement in the quality of a Member's social media operations will largely still be achieved through trial and error at the individual office level. This will almost certainly have effects on the number of followers and retweets. Over time, Members may be able to optimize their social media output, which in turn will increase their power user score. Likewise, Members may simply become more sophisticated over time. Everyone learns how to walk before they run; it is quite likely that Members begin their Twitter careers by using the technology as a one-way push of information, and only later begin to explore the interactive capabilities of the platform.

Ideology

The model shows that ideological Senators are heavier users than their more moderate counterparts. Ideology has the biggest statistical effect of all the variables in the model. On average holding all else constant, for every one unit increase in the ideology score there is a 0.78 increase in the power user score, which is close to a full letter grade. The model also builds upon previous research findings that more ideologically extreme Members of Congress were more likely to adopt Twitter (Straus *et al.*, 2013). Importantly, these studies found that the effect was strongest in the House of Representatives. The results of the model, however, suggest that ideology also plays an important role determining level of Twitter use in the US Senate.

Research on social media usage by social movements has shown that members of these movements turn to social media to broadcast their message because it reduces costs and easily connects people (Thorson *et al.*, 2013, p. 423). Social media enables ideologically extreme Members of Congress to connect directly with like-minded followers in an inexpensive and unimpeded manner. They can more easily reach a sympathetic public without directly competing with traditional news outlets (Brewer and Cao, 2006; Harmon and Foley, 2007; Reese *et al.*, 1994). Furthermore, Members on the ideological extremes do not have to rely upon their own party's apparatus or caucus structure to communicate their ideas, which may fall outside the mainstream beliefs of congressional leadership.

Whether social media provides actual constituent engagement, or a wider platform to engage with out-of-state (or out of country) individuals remains an open question. Previous studies have found some evidence that more ideologically extreme Members who are active on social media receive more "out-of-state donations" than do their more moderate colleagues (Hong, 2013). Additionally, non-geographic constituents may seek out Senators with whom they agree ideologically. This may especially be true for more extreme ideologies where individuals seek out celebrities (in this case a Senator) and form one-sided bonds, which "over time […] resemble social interaction." The relationship, however, is controlled by the celebrity, regardless of what the follower might think (Frederick *et al.*, 2012, p. 483).

Since ideology appears to play a role in the choice of Senators to be heavy Twitter users, the positive and negative aspects of the relationships they build with followers could be an important element for future research. The wider platform and contact with non-geographic constituents may provide support for Mansbridge's (2003) anticipatory representation both for reelection and ideological connections with both geographic and non-geographic constituents. The broad scope of Twitter, however, also presents negative consequences when followers identify personally with a Senator, often based on ideology, and believe they are having genuine social interactions with Senators. While this could certainly be part of the iterative representation discussed earlier, it is also not likely a concept that Senators consider when they adopt and decide to become heavy users of social media.

Social media staff

As expected, Senators who hired staff to concentrate on social media and online interactions, on average holding all else constant, saw their power user score increase by 0.37. This is the second most statistically effective variable after a senator's ideology. From a practical perspective, it makes sense that a Senator who chooses to use his or her official resources to hire a dedicated social media professional would be a Twitter power user. Dedicating staff to a task outwardly demonstrates to constituents, the media, and other Senators that the office is serious about communicating in an online environment. Studies of social media usage by non-profit organizations have found that dedicating staff to social media outreach and interactivity decreases barriers to effective communication that can exist when staffer are tasked with multiple roles (Briones *et al.*, 2011). Assigning staff to these interactions can provide a Senator with additional opportunities to engage with followers in a way that would not be possible without dedicated resources.

State population

State population was not in the expected direction in any of the models, but was significant in the clout model. As the population of the state increased, Senators were more likely to have more influence on Twitter. Existing literature suggests that state size influences Senate behavior (Schiller 1995, p. 192; Lee and Oppenheimer, 1999). The popular media has even picked up on this trend. In 2013, *The New York Times* reported that smaller states have more clout in the Senate because each state has two Senators regardless of their population, so a "Vermonter has 30 times the voting power in the Senate of a New Yorker just over the state line […]" (Liptak 2013).

Social media is yet another tool in a Senators arsenal that allows them to communicate directly to their constituents (and others). Lee and Oppenheimer (1999) found that Senators "believe that constituents in less populous states expect to have closer and more frequent contact with their senators than do those in larger states" (p. 49). Subsequently, it is possible that social media reverses this trend. Large state Senators use social media as a way to make their states smaller and to have more personal connection with their constituents.

Conclusion

In his classic formulation of presidential power, Neustadt (1990) developed a model that understood political strategy as a function of structure and resources. The best strategies were ones that understood how the currently available resources matched with the existing political structure of American politics. If a legislator's representational strategy

is examined through this lens, technological innovations such as Twitter serve as disrupting influences on both structure and resources. New communication tools offer legislators additional resources in the most basic sense; Members now have more options than ever before for constituent contact. But more importantly, social media technologies alter the underlying structure of representation. Members have a choice about whether they want to use social media as a part of their constituent communication strategy. But they cannot control how their constituents use social media, or how social media is reshaping the nature of political communications.

Evidence suggests that social media and electronic communications are perpetuating far reaching effects on American politics. The increased speed and reduced cost of communicating with Congress is transforming the office operations of Members (Glassman, 2014). The amount of constituent communications being sent to Congress has increased almost tenfold over the past 20 years, and over 90 percent of it now is e-mail (Glassman, 2014, p. 99). Many offices have responded by dedicating more staff to answering constituent mail, typically by reducing the number of staff available for policy work (Glassman, 2014).

At the same time, electronic communications can now disseminate information and allow constituents to raise instantaneous issues – how do you plan on voting on the amendment just offered? – that in the past were not possible, requiring offices to be prepared to answer questions on a much wider set of policy and procedural issues. Social media is perceived as changing Member representational strategies on a much more fundamental level. This research is the first step in establishing a connection between congressional social media activity and changing norms of representation. The concept of iterative representation – in which Members engage in the type constituent explanations Fenno (1978) described – occur rapidly, in real time. These interactions produce scenarios that may increase, for better or worse, instantaneous accountability. In many cases, such accountability is desirable. Many traditional forms of legislative obfuscation – hiding substantive decisions in procedural votes or not offering amendments when such options are available – no longer escape constituent notice in the social media age. On the other hand, the public and immediate nature of social media could contribute to gridlock. For example, a legislator who is active on social media might be hesitant to take risks or participate in closed door negotiations because they feel that they need to explain their actions to their followers. Conversely, other legislators might be hesitant to negotiate with an active social media user for fear he or she might share sensitive details prematurely. In future research, an examination of the relationship between social media, the evolving concepts of representation, and legislative behavior and decision making, is planned.

Social media is also changing the definition of "constituent." Members have some ability to control whether their incoming e-mail is from their district, but virtually no ability to control whether their Twitter followers are their actual voting constituents. This has likely led to the aggregate incoming message to Member offices being more nationalized in character and less reflective of district opinion. Good or bad, the effects of this evolution are enormously consequential. Not only may it lead to the homogenization of the opinion signal received by Members, but Members may also now actively cultivate a national constituency in ways unthinkable two decades ago. With campaign funds and potential supporters across the country, costless electronic communication offers the possibility of Members creating issue-based national constituencies in addition to their geographic-based electoral ones. In Mansbridge's formulation, this was an outlier – surrogate representation – reserved for hot-button

issues such as gay rights or an anti-war movement. The rise of social media may result in more and more legislators seeking this sort of political base alongside their traditional district- or state-based electoral coalition.

The rise of such electronic communication has altered the traditional patterns of communication between Members and constituents by reducing costs, increasing the speed of communication, and allowing Members to reach citizens who are not their electoral constituents. These changes have substantial implications for the practice of legislative politics, altering how Members organize their personal offices, manage their legislative activities on and off the floor, and, perhaps most importantly, represent their constituents. Understanding the longitudinal development and effects of social media on representational norms is critical for those who study Congress, institutional change, and democratic governance.

Notes

1. The House of Representatives lagged slightly; only 90 percent of representatives (398) had started tweeting. But by the end of 2014, only eight House Members did not have a Twitter account (Ingraham, 2014).
2. Twitonomy is an independent website – unaffiliated with Twitter – that allows users to search for the Twitter history of accounts by entering a Twitter handle into a search box. Information on total number of tweets, followers, following, and other analytic statistics are then provided. Data are available for download with the payment of a monthly or yearly fee. For more information, see www.twitonomy.com
3. To determine early adopters of Twitter, the number of days between the Senator's adoption of Twitter and December 16, 2014 was calculated.

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