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I Am Woman, Hear Me Tweet! Gender Differences in Twitter Use among Congressional Candidates

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ABSTRACT

This study synthesizes two theoretical literatures to explain gender differences in Twitter usage and effectiveness among US Congressional candidates. The first suggests that candidates in perceived disadvantaged positions, females in this case, innovate to improve their chances of success, and the second, that female politicians often adopt stereotypically masculine behaviors to be successful. On the basis of these theories, we hypothesize and confirm that female candidates are more likely than males to integrate Twitter into their campaigns, but our results are less conclusive regarding a difference in the likelihood that females use negative campaigning tactics via Twitter. Our results also indicate that those females who use Twitter more than their male counterparts tended to do better electorally, but this difference is conditional. Female Republican candidates who tweeted more increased their vote share, but the opposite is true for Democrats. We speculate that this differential effect may be a product of different audiences for social media in each party's electorate.

KEYWORDS

Twitter; gender; campaign communication; social media; campaigns and elections

Social networking Web sites are rapidly becoming a leading source of news and information for many Americans. These Web sites, which allow users to share photos, news, pictures, and more, account for three of the top five visited Web sites on the Internet (Quantcast 2013) and have become a regular activity for 72 percent of online adults (Pew Internet and American Life Project 2013). Twitter, in particular, has skyrocked in use: the site has an estimated 550 million users and growing by 135,000 each day (Pew Internet and American Life Project 2012; Quantcast 2013). Candidates and political campaigns increasingly use social media as a low-cost tool to convey information, persuade voters, and rally supporters; as a result, more than 95 percent of congressional campaigns had a Twitter account in the 2010 election. In the political sphere the importance of this growth in the use of social media is grounded in our understanding of American political thought. The foundational notion of American democracy is the idea that

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people exercise sovereignty through a republican form of governance (Wagner 2010). Information communication systems are vital to that process, because they structure what people know about politics and how they understand it (Bennett 2011). Social media alters the political calculus in the United States by shifting who controls information, who consumes information, and how that information is distributed.

Social media, as a shift in the production, dissemination, and consumption of political information, has the potential to both create parity and equality in politics or reinforce traditional power arrangements. New forms of media, such as Twitter, represent a low-cost method of getting targeted messages from campaigns to groups of supporters or potential supporters. Indeed, Twitter and other forms of social media have the potential to level the political campaign playing field by offering a low-cost alternative to targeted outreach (Gainous and Wagner 2014). The relatively newness of social media usage by campaigns means, however, that we are unsure about whether Twitter truly equalizes across advantaged and disadvantaged campaigns. The research we present here evaluates whether Twitter offers an opportunity for women to overcome a distanvantage in running for office.

We focus on the gender differences in Twitter usage and the effectiveness of Twitter usage among US congressional candidates in 2010. We begin with the premise that candidates who perceive a disadvantaged position are more apt to innovate and adapt to improve their chances of success. Because of a variety of factors, female candidates often perceive themselves as the disadvantaged candidate. As such, female candidates Tweet more often than male candidates do. We hypothesize and demonstrate that female candidates will be more aggressive in the use of Twitter as an efficient means to overcome gender stereotypes and their disadvantaged position in the campaign through the use of negative campaigning tactics. We also posit that female Republicans will be the most likely to innovate through Twitter and to use attack Tweets in an effort to overcome a perceived electorial disadvantages and belief-based stereotypes that lead voters to view women as more liberal. Our evidence suggests that Republican women are the most likely to use Twitter, but the evidence is more mixed concerning whether they are any more likely to go negative.

Finally, we also test the broader question of whether the use of Twitter actually does dissipate the electoral disadvantage female candidates have faced historically. While there is some evidence that it can and does, the results, based on the partisan divide, are mixed. Female Republican candidates who tweeted more often increased their vote share. It is interesting that male Republicans who used Twitter extensively actually decreased their vote share. The findings were not consistent across party lines. Democratic candidates had the opposite result, with women not being advantaged by the use

of Twitter. We speculate that this result is a product of differential audiences for social media in each party's electorate, as well as differing information effects across gender and party.

The modern Twitter campaign

An extensive body of literature documents the motivations of candidates to use media in efforts to gain election or reelection, beginning with David Mayhew's (1974) construct that candidates use media and other tools to win reelection. New forms of media, including social media, do not change that motivation. Candidates seeking to win office devote time and resources to online versions of advertising, credit claiming, and position taking (Gainous and Wagner 2014; 2011). As with other forms of advertising (Bergan et al. 2005; Funk 1999; Heberlig, Hetherington, and Larson 2006; Jacobs and Shapiro 1994; Rahn et al. 1990), candidates use tweets to advertise the candidate's events and appearances, promote personal characteristics, and emphasize their successes (Bode et al. 2011; Gainous and Wagner 2014; Peterson 2012). Extant research also documents the usefulness of negative advertising from candidates to assign credit and blame (Lau, Sigelman, and Rovner 2007); this behavior also extends to new forms of media such as Twitter.

While these strategies are well known, Twitter makes these activities more efficient, inexpensive, and immediate (Gainous and Wagner 2014). A campaign can send a tweet immediately to advertise a success, credit claim, or respond to criticism from an opposing candidate or interest group. Beyond the speed, a campaign can carefully target a tweet to supporters or receptive groups. While mail, telephone, or mass media could perform these tasks, all lack the immediacy, efficiency, and specificity of social media. Direct outreach in traditional ways also is not just time consuming but resource intensive and expensive. For campaigns with limited resources, Twitter can be a remarkable equalizer, by providing an opportunity for targeted outreach that almost any campaign can afford (Gainous and Wagner 2014). Furthermore, each tweet is limited to 140 characters. While that may be too short for exhaustive policy conversations, it is remarkably useful for campaigns, which are often intentionally, or because of limited resources, short on details. While people regularly assert that they want to see a candidate's policy plans, they are often more satisfied with simple policy statements or planned legislative direction as opposed to detailed plans (Kahn and Kenney 2002). As such, Twitter provides campaigns with a platform that limits them to sound bites of policy information.

Social media's true value as a campaign tool is in its ability to reach voters and fundraise in a way that allows nontraditional and disadvantaged candidates to compete for public office (Allison 2002; Gainous and Wagner 2007;

2014; Wagner and Gainous 2009). Some scholars go as far as to propose that the Internet will provide the means by which people and politicians can level an imbalanced political field that otherwise favors well-resourced candidates and interests (Barber 2003; Corrado and Firestone 1996; Hagen and Mayer 2000; Gainous, Marlowe and Wagner 2013). We expect social media adoption to be an innovation by out-of-power groups attempting to compete in a venue where they are less disadvantaged (Appleton and Ward 1997; Peterson 2012; Peterson and Surzhko-Harned 2011; Wagner and Gainous 2013). We argue that female candidates, particularly those running on a Republican ticket, represent a considerable group of out-of-power candidates (Crowder-Meyer and Lauderdale 2014), and, as such, will be more likely to use social media to overcome a potential disadvantage in running for office. The reach and penetration of a social media tool, such as Twitter, is not yet sufficient to remake a campaign by itself. However, Twitter can be a part of a larger information strategy that influences the importance of particular political issues and shapes how people place that information in their understanding of both campaigns and governance.

Furthermore, social media is an easy avenue for immediate negative campaigning. Campaigns in modern American politics often use negative or attack ads in appeals to voters, with well over one-third of campaign content focusing on attacks or negative materials (Fowler and Ridout 2013; Lau and Rovner 2009). Research on negative advertising often focuses on whether these appeals depress turnout, with most scholars finding that it does not (see Lau, Sigelman, and Rovner 2007 for a review). The effectiveness of negative ads for candidates is often contingent on the characteristics of the candidates in the election and the election itself, the attitudes of voters, and a variety of other factors.

The female Twitter advantage?

One key feature of political actors in the United States is the relative lack of female political candidates and public officials. Women currently hold 18 percent of US congressional seats, 22 percent of statewide executive offices, and 24 percent of state legislative seats (Center for American Women and Politics [CAWP] 2012a). Candidate numbers are also far from reaching parity: in 2012 female candidates set a record by running in just over half of the US Senate races and 46.67 percent of the seats in the House of Representatives (CAWP 2012b). Although this represents the highest rate of female candidacy to date, more than half of all congressional races still only involved male candidates.

The barriers that women face in seeking public office have declined over time. A significant body of research suggests that women can win at the same rate as their male counterparts when they run (Thomas 2005), receive similar

vote shares when on the ballot, and do about as well as men in polls (Fox 2010). However, candidates, elites, and voters continue to have concerns about the background and skills women need to run for and hold public office. This gap, which is partially the result of differing expectations for men and women from voters and political elites and partially the result of women's evaluations of themselves, means that "Women… have to be 'better' than men in order to fare equally well" (Lawless and Pearson 2008, 78).

Female candidates face higher levels of scrutiny on their ability to handle certain issues (Swers 2013), the level of personal quality required for support (Fulton 2012), and their ability to attract money from traditional sources (Fox 1997). Because female candidates rely on more and alternate forms of campaign contributions, they must also work to reach parity in fundraising and report being more concerned about campaign contributions than are men (Jenkins 2007; but see Burrell 2008). Female candidates also face what Fulton (2012) calls a "valence" gap. In essence, female candidates must exhibit higher levels of nonpolicy-related characteristics, such as integrity, competence, and leadership than their male counterparts to win the same vote share (Anzia and Berry 2011; Fulton et al. 2006; Lawless and Pearson 2008; Milyo and Schosberg 2000). While male and female candidates for Congress attract similar levels of support from voters without a control for valence, women face a 3 percent vote penalty once this control is introduced (Fulton 2012).

Women also face a personal perception barrier; that is, women believe they have to be better to run for political office than their male counterparts do (Fox and Lawless 2005; Fulton et al. 2006; Pearson and McGhee 2013). These perceptions influence women in the general population and those in office considering progressive ambition. Women are less likely than men are to believe in their own qualifications for office or that they will ever be qualified to run (Koch 1997; Verba, Burns, and Schlozman 1997); these perceptions may be particularly strong among Republican women (Pearson and McGhee 2013). Once in office, women are less likely to express progressive ambition (Bledsoe and Herring 1990; Fulton et al. 2006).

Women's depressed interest in serving in public office also influences the level of women's representation (Norris and Lovenduski 1995; Schneider et al. 2015). Lawless and Fox's (2005; 2010) evaluations of women's lower levels of political ambition focus on how family members, friends, and those in influential political positions are more likely to ask men than women to run for political office. Other research shows that political elites often discount women's electoral viability (Norris and Lovenduski 1995; Sanbonmatsu 2002). Taken together, the research on women's ambition suggests that women both *face* and *perceive* a gendered disadvantage when seeking office, which may translate into various strategic campaigning. Female candidates of both parties, aware of potential disadvantages and

voter perceptions, may view platforms like Twitter as an opportunity to shape and control the campaign dialogue. As such, *we expect that female candidates for Congress will use Twitter more frequently than their male counterparts do (Hypotheses 1).*

Research on women running for political office also often focuses on whether and how individuals apply gender stereotypes in evaluations of female candidates (Dolan 2015; Holman, Merolla, and Zechmeister 2011; 2015; Huddy and Terkildsen 1993; Schneider and Bos 2014). These gender stereotypes serve as informational mechanisms used by voters to supplement for additional information about the candidate, including traits and issue competancies. Generally, women are seen as more compassionate, emotional, and caring, whereas men are seen as stronger leaders and more aggressive (Fridkin and Kenney 2009; Huddy and Terkildsen 1993; Koch 2000). Belief-based stereotypes also lead voters to infer ideological information from candidate gender; female candidates are stereotyped as more liberal than male candidates (Koch 2000; Hogan 2010). Gender stereotypes are more effective and used most frequently in low-information environments (McDermott 1997).

How voters apply gender stereotypes remains a discussion of debate. On the one hand, a body of scholarship finds little evidence that stereotypes matter in vote decisions (Brooks 2013; Dolan and Lynch 2014; Hayes 2011). On the other hand, scholars find that certain campaign contexts cue gender stereotypes and shape candidate evaluations (Bauer 2014; Holman, Merolla, and Zechmeister 2011; 2015). For instance, electoral contexts with heightened salience of terrorist or national security threat can activate preferences for masculine traits and male candidates (Falk and Kenski 2006a; Holman, Merolla, and Zechmeister 2011), whereas campaigns that focus on factors, such as family values, can activate feminine stereotypes (Bauer 2014). Whether stereotypes matter or not, female candidates are often aware of the potential of these stereotypes and act to counter any negative perceptions that voters may have about them (Dittmar 2015; Fulton 2012).

Scholars have documented efforts by female candidates to engage in "strategic attempts" (McGraw 2003, 395) to guide voters to information favorable to the candidate and overcome perceptions of these stereotypes (Schaffner 2005; Schneider 2014). In doing so, the candidate (whether male or female) uses campaign information to focus attention on those issues or areas that provide the largest advantage at the polls. While a small body of scholarship finds that women who pursue strategies consistent with their gender are successful in attracting voters (Herrnson, Lay, and Stokes 2003: Holman, Schneider, and Pondel 2015; Windett 2014), many scholars find that expectations of voters and the media push female candidates to overcome gender stereotypes (Fox 1997; Herrnson and Lucas 2006; Kahn 1996; Kahn and Gordon 1997; Schneider and Bos 2014). As such, many female

candidates engage in actions that demonstrate masculine aspects of their character, including their competency in traditional masculine issue areas, such as military policy, and that they possess masculine traits, such as strong leadership (Fox 1997; Fridkin, Kenney, and Woodall 2009; Herrnson and Lucas 2006; Kahn 1996; Swers 2013).

One technique available to female candidates to persuade voters of their toughness includes negative or attack ads. Because gender stereotypes lead voters (particularly, low-information voters) to infer that female candidates are more kind and compassionate and less aggressive, attack ads may counteract the stereotypes about the female candidate. Not all candidates can engage in negative campaigning with equal effectiveness. Some research suggests that female candidates are punished (more so than their male counterparts) for using negative ads (Herrnson and Lucas 2006; but see Gordon, Shafie, and Crigler 2003 for no effect), although women do use the negative television ads at the same rate as their male counterparts (Goldstein, Franz, and Ridout 2002). The limited literature on gender, campaigning, and Twitter also finds that female candidates go negative more frequently (Evans and Clark 2015). We argue that engaging in negative appeals—even in an environment where such appeals are widespread—represents an effort by female candidates to appear more masculine and gain a comparative advantage. In doing so, female candidates are attempting to convince voters of their leadership ability and their strength. As such, *female candidates of either party may be more likely to engage in negative campaigning via Twitter (Hypothesis 2).*

We also expect to find partisan effects for those candidates engaged in negative campaigning through Twitter. The gender stereotypes previously discussed also apply to the political parties. In accordance with the theory of issue ownership, the public perceives the Republican Party as more competent at handling issues surrounding national security and war and Democrats as better at handling social issues (Petrocik 1996, 832). Party ownership also conveys trait associations; research links femininity to the Democratic Party and masculinity to the Republican Party (Schneider and Bos 2014; Winter 2010). Issue ownership may evoke gendered stereotypes about the parties, so that stronger leadership—a more stereotypically masculine trait—is associated with Republicans, whereas compassion is seen as a Democratic trait (Hayes 2005; Winter 2010). In addition, those outside power often use negative advertising to attack those in power. These factors lead us to expect Republicans to be more likely to engage in negative advertising overall because of the association of masculity with both the Republican party and with negative ads, as well as the Republican outsider status in the 2010 election.

Republican women represent a conundrum in political life, particularly when it comes to stereotypes. Partisan characterizations interact with

individual gender stereotypes in important ways. For example, a Republican female's partisanship may counter gender stereotypes in a context of masculine behavior. Some argue that Republican women are better able to combat trait and belief-based gender stereotypes because partisan cues can trump gender cues (Hayes 2005; Huddy and Capelos 2002; Matland and King 2002), whereas other research has found that gender and party stereotypes interact, particularly in Republican women (Holman, Merolla, and Zechmeister 2011; Koch 2000; Sanbonmatsu and Dolan 2009). Gender stereotypes may be particularly harmful to Republican women in low-information contexts, where (conservative) voters perceive them to be more liberal—because of their gender—and are thus reluctant to vote for them (but see Falk and Kenski 2006b, who find Republican voters are willing to support female Republicans over a Democratic alternative). In addition, Republican women remain the distinct minority in political office; for example, women are only 9 percent of Republicans in the Senate and 8 percent of House Republicans, with similar patterns at the state level (see, e.g., Prier and Wagner 2009; Wagner and Prier 2008). *We argue that Republican women's disadvantaged status in the party and in elected office overall will lead this group to use Twitter at the highest rate of any gendered party group (Hypothesis 3).*

Finally, the interaction of party and gender stereotypes can also have implications for how effective candidates are when they use Twitter. Candidates engage in these behaviors in an attempt to win election or retain their seats, thus addressing their primary concern of reelection (Mayhew 1974). Because Republican women represent the least familiar of partisan and gender groups to voters, we expect that they will get the biggest boost from voters for using Twitter. This is particularly true, given that gender stereotypes of Republican women as liberal (and thus unappealing to the party base) are most successful in low-information environments (Dolan and Lynch 2014). In addition, previous research has shown that voters seek out more information on women running for office, particularly for Republican women to establish the candidate's credibility (Ditonto, Hamilton, and Redlawsk 2013). This information seeking then translates into electoral support. As such, we hypothesize *that Twitter use will help candidates generally, but it will be particularly helpful for Republican women, so that their use of Twitter will be a larger factor in increasing vote gains for those candidates (Hypothesis 4).*

Data and measurement

We used data from multiple sources to test our hypotheses and explore the effectiveness of Twitter use across gender in the 2010 US Congressional elections. First, we gathered the universe of tweets in the six months leading

up to the November elections from members of Congress (MCs) and the leading challengers for their seats. We created a dummy Twitter account, signed up to follow official campaign Twitter accounts of all incumbent MCs, major party challengers, and both major party open seat contenders in the general election. We then downloaded each of their Twitter posting histories from June 2010 through the election in November,[i] comprising 64,557 total tweets.[ii] Of the 884 total candidates in the election, 483 had campaign Twitter accounts (55 percent). Despite a high number of women running in 2010, only 90 of the 483 Twitter accounts belonged to female candidates. In the six months leading up to the 2010 election, these MCs and challengers tweeted from as few as 0 times (candidates who created a Twitter account and then never used it) to as many as 1,340 times by Tim Griffin, a successful Republican House challenger from Arkansas. Anna Little, an unsuccessful Republican House challenger from New Jersey, was the most frequent female tweeter during the 2010 campaign (880 times).

To sort this extensive volume of tweets, we created a list of keywords that represented several concepts (campaign announcements, attack or negative campaigning tweets, tweets designed to highlight desirable personal characteristics about the candidates, policy tweets). For this research, we focus on both the total Twitter activity and the attack or negative campaigning tweets. Before assigning counts for the number of attack or negative campaigning tweets by candidate, we explored the qualitative data to inductively add keywords to our search. This exploration revealed a number of additional keywords that fit. We then performed a keyword search based on each of the identified words or phrases, verified that each time a keyword was identified the usage fit within the expected category, and then created counts of each keyword for each candidate, making the candidate the unit of analysis. The categories are not mutually exclusive, because one tweet could be counted more than once if it used multiple keywords.[iii] Finally, we constructed an additive index based on the summation of the keyword counts for attack or negative tweets. We used the following keywords, including all roots and derivatives: *Boehner/Palin/McConnell*—if used by a Democrat, *Pelosi/Obama/Reid*—if used by a Republican, *Tea Party/liberal, opponents' name, politicians*—when used derogatorily, and *establishment*—to refer to Washington insiders, or state insiders.

Included below is our rationale for using each keyword followed by an example:

Boehner/Mcconnell/Palin—if used by a Democrat

This list of names was chosen to represent an attack or negative tweet because, typically, a candidate uses the name of a popular leader from the other party to mudsling or attack in some way. We only counted instances of these names for

those candidates who were Democrats because John Boehner was the Republican House Minority Leader at the time, Mitch McConnell was the Republican Senate Minority Leader, and Sarah Palin was a popular, and divisive, former Republican vice presidential candidate very active in the 2010 election.

> **Tweet**: RT @whitehouse: Jared Bernstein: "John Boehner wants a lot of people to lose their jobs." More from Politifact http://bit.ly/aa2nbd 2:24 PM Aug 11th via web (Nancy Pelosi, Democrat, House incumbent).

Obama/Pelosi/Reid—if used by a Republican

The use of these names functioned the same way as the previous search terms but instead we used these to measure negative or attack tweets coming from Republicans. Clearly using President Barack Obama's name is going to be an attack in most instances for Republicans, and the same can be said for their use of the Speaker of the House, Nancy Pelosi, and Senate Majority Leader Harry Reid.

> **Tweet:** Teacher who watched Obama sign stimulus is laid off http://fb.me/Je7UT1uj (Jeff Miller, Republican, House challenger).

Tea Party/liberal

The idea behind using the words "Tea Party" and "liberal" was similar to those names described in the two previous sets of search terms. Democrats who use "Tea Party" are typically doing so in an adversarial way, and the same can be said for when Republicans use the word "liberal."

> **Tweet:** We need your help to counteract the liberal money that will be spent to keep this seat in Pelosi's column. Please donate today. http://ping. Tuesday, August 03, 2010 7:38:53 PM via Ping.fm (Martha Roby, Republican, House challenger).

Opponent's name

A candidate does not typically use their opponent's name in a positive light.

> **Tweet:** RT @kevingoody: For real RT @Kirk4senate: RT @bradleydj: I'm a Democrat. . .but Mark Kirk would make a better Senator than Alexi Giannoulias (Mark Kirk, Republican, Senate open seat challenger).

Politicians

Sometimes candidates use the word "politicians" in their tweets in an attempt to separate themselves from the negative connotations that people often associate with politics.

Tweet: "How do you know I won't become a career politician?" Listen to our radio ad "Career" to find out: http://bit.ly/cFX5JR #Linda2010 #CTSEN Friday, October 29, 2010 10:12:04 AM via TweetDeck (Linda McMahon, Republican, Senate open seat challenger).

Establishment

We included the word "establishment" to capture tweets that referred to Washington insiders, state insiders, or the existing power structure in general. This type of antiestablishment rhetoric is frequently used by challengers to distinguish themselves from the insiders whom people often identify as the problem and was particularly relevant in 2010, given the rise of the Tea Party and antiestablishment attitudes in the election.

Tweet: Noonan in the @WSJ: #TeaParty allowed GOP establishment to get out from under Bush. http://bit.ly/do2xX1 Agree? (Mike Coffman, Republican, House incumbent).

Our modeling strategy

The analysis that follows provides descriptive details on candidates' total Twitter activity, and differences in this activity are examined in the bivariate and multivariate settings. We then estimate two models of candidate vote share (one for Democrats and one for Republicans) as a function of gender, total Twitter activity, and the interaction between the two, *ceteris paribus*. The separation across party identification serves methodological and theoretical functions. First, ordinary least squares regression assumes that the error from one observation is independent of the error from another observation. We would violate this assumption if we included both parties in the model with vote share as our dependent variable. Inclusion of the values for both Republicans and Democrats are plainly not independent (each respective party share is directly proportional to the each other). Second, using vote count instead of vote share inhibits our ability to make inferences across districts or states because of differences in turnout. Third, separating the results by party allows us to test whether the gender effect varies across party; as we previously indicate, we expect that female Republicans, as a distinct minority, will be more likely to engage in Twitter to compensate for their perceived disadvantage. We also expect that female Republicans are more likely to engage in Twitter attacks, as they seek to fit the masculine behaviors associated with members of their party.

Our control variables include district competitiveness, spending differential, political experience, and the total number of candidates in the models across party identification.[iv] We rely on extant literature in including each of the control variables in the models. This increases our confidence that the

estimated effects of Twitter use across gender are not spurious. District or state competitiveness helps determine the electoral success of both incumbents and challengers (see Breaux and Gierzynski 1991; Koetzle 1998; Welch and Hibbing 1997). Campaign spending (Erikson and Palfrey 1998; Green and Krasno 1988) and political experience can influence electoral success (Abramowitz 1991; Bond, Covington, and Fleisher 1985; Jacobson 1992; Krebs 1998; Squire 1989). Finally, the number of candidates in each race can diminish a candidate's vote share simply as a mathematical by-product of having more candidates and greater campaign competition (Holbrook and Tidmarch 1993; Krebs 1998).[v]

In the models or measures that follow we provide indicators of statistical significance in probability values and confidence intervals. It could be argued that there is no need to provide such hypothesis tests here because we have the population of tweets as opposed to a sample. We think that it could also be argued that our data only represent a sample of Twitter activity at one point in time and our theory is not time dependent. Rather, we are using a sample of tweets at a given moment in time to make an estimate about future behavior. So we have a sample that is used to make a statement about the larger population, Twitter activity across time, which can be generalized to the future. This is debatable. As such, we discuss the results from both perspectives. Of course, this is unnecessary when we have statistical significance because the substantive interpretation of magnitude does not change, but when we fail to reach significance, we will also offer the interpretation assuming the measures have no sampling error.

Table 1 provides descriptive data on the use of Twitter by candidates. The results suggest that candidates, overall, tweet quite frequently, and oftentimes, these tweets contain attacks or negative campaigning tactics. Attack or negative tweets do not make up a majority of tweets; the mean number of total tweets was around 134, whereas the mean number of any of the negative or attack keywords used did not approach that level; for example, the use of an opponent's name, which is the most common method of attack, is only used an average of 17 times by candidates. The variation in total tweets is fairly substantial (standard deviation = 163.40), because of outlier candidates who tweeted very frequently in the six months leading up to the election. Few candidates had a Twitter account but never used it (3 percent). There was a fair amount of variation in use of the different attack or negative campaigning keywords. Republicans were much more likely (mean = 8.12, SD = 14.96, percent participating = 76 percent) to attack Obama/Pelosi/Reid than Democrats were to use the names of Boehner/McConnell/Palin (mean = 0.39, SD = 12, percent participating = 17 percent), an expected difference, given the presence of a Democratic sitting president in the election. While we believe that Democrat's attack count would certainly be higher if there had been a Republican sitting president, we decided to keep it in the index

Table 1. Distribution of total tweets and negative or attack tweets.

	Mean	S.D.	Maximum	% Candidates	Male Mean	Female Mean	% Male	% Female
Total No. of Tweets	134.49	163.40	1,340	97	125.1	171.01	96	96
Boehner/McConnell/ Palin	0.39	1.21	12	17	0.41	0.30	18	17
Obama/Pelosi/Reid	8.12	14.96	129	76	7.81	9.94	74	89
Tea Party/Liberal	0.43	1.33	11	18	0.44	0.41	17	17
Opponent's Name	17.43	42.31	377	54	15.58	25.52	53	60
Politicians	0.24	0.69	5	15	0.21	0.34	14	19
Establishment	0.06	0.37	6	4	0.04	0.16	3	9

Note. Data come from www.twitter.com. Minimum is 0 for all cases. % Candidates is the percentage of candidates with Twitter accounts who used the respective keyword at least once. The percentage for those who used names Boehner/McConnell/Palin only includes Democrats with a Twitter account, and Obama/Pelosi/Reid only includes Republicans with a Twitter account.

because ignoring the use of Obama's name would fail to capture a significant portion of the attacks. Candidates rarely used either Tea Party or liberal. The most commonly used attack or negative keyword in our search terms was use of the opponent's name (mean = 17.43, SD = 42.31, 54 percent participating).

Female candidates tend to tweet more often, generally, and they tend to go negative more frequently (which can be accounted for by the former as explained in the multivariate model results). While male candidates tweeted around 125 times across the six months leading up to the campaign, female candidates tweeted approximately 171 times on average (p = .02). In addition, while male candidates went negative approaching 21 times on average (the average of the flagged keyword counts in Table 1), female candidates did so nearly 31 times on average (p = .08).[vi] These results provide evidence in support of Hypothesis 1 where we theorize that because these disadvantaged (female) candidates use Twitter more frequently in an effort to innovate in their campaigns to diminish the disadvantages they face, and for Hypothesis 2, where we argue that female candidates use the masculine tactic of negative tweets more often than men do to counteract stereotypes suggesting they are weaker than men. We also provide results concerning Hypothesis 3 in Figure 1. Again, we expected that Republican women's disadvantaged status in the party and in elected office overall would lead this group to use Twitter at the highest rate of any gendered party group. The results confirm this expectation: Female Republicans tweeted 250 times on average. This is significantly more than all other groups (t-test p = .00). They also used attack tweets nearly twice as much as male Republicans and around four times as often as Democratic candidates, male or female (t-test p = .00 when female Republicans were compared to all other groups).

While the results in Table 1 provide initial support for Hypothesis 1 and 2, these results could still be spurious. Thus, we next evaluate whether women tweet more frequently than men do and whether they engage in negative tweets more often when including controls for the campaign environment.

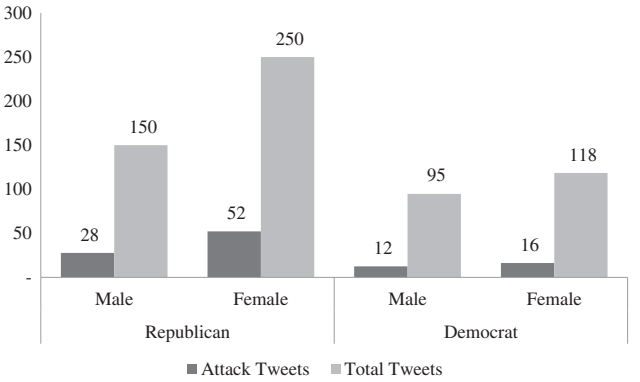

Figure 1. Gender, Party, and Twitter Behavior *Note*. Figure represents the average total tweets and attack tweets for Democrat and Republican men and women running for office. Data come from www.twitter.com.

The first model estimates the gender effect, *ceteris paribus*, on total Twitter activity (see Table 2). The model indicates that, on average, female candidates tweet about 49 times more than male candidates, while holding all other variables in the model at their respective means. Thus, we again find support for our first hypothesis of female candidates engaging in the campaign medium to overcome a disadvantage. We next evaluate whether female candidates engage in negative tweeting more often than male candidates do (also see Table 2). Our results do not provide full support for our hypothesis here. It depends on whether we think of our data as population data or sample data. Again, if it is the former, the test of statistical significance is unnecessary. Treating the data as sample data, although we find that female candidates use negative campaign tactics almost 11 more times in the campaign than their male counterparts did when excluding the total number of tweets as a control; when this control is added, the gender variable is no longer significant, suggesting that at least part of the reason that the count of negative tweets among women is higher than that among men is simply a product of the fact that women use Twitter with greater frequency. This null finding is interesting in itself. It provides a serious question to the "masculinity" argument. If we ignore the statistical significance here assuming that we have the population, the estimate is, in fact, still positive after controlling for the total number of tweets, suggesting that women are slightly more likely to go negative more than men at least modestly.

There was only minor variation for our control variables across both models. Senators tweeted approximately 103 more times than House members on average but were more likely to use attack or negative campaign keywords (they were 27 more times likely if we did not control for the total number of tweets). Incumbents tweeted overall approximately 65 times less than challengers and used negative tactics in their tweets about 13 fewer

Table 2. Modeling total tweets and negative or attack tweeting as a function of gender.

	Estimate	Standard Error	95% Confidence Intervals	
Total Tweets				
Female	49.25	17.67	14.53	83.97
Chamber	103.28	25.77	52.65	153.91
Incumbency	-65.20	12.29	-89.35	-41.04
District Competitiveness	-17.52	23.41	-63.54	28.50
Spending Differential	40.46	25.50	-9.65	90.58
Republican	61.34	13.20	35.40	87.29
R^2	0.16			
Negative or Attack Tweets				
Female	3.29	4.55	-5.65	12.22
Chamber	10.65	10.69	-10.35	31.66
Incumbency	-12.96	2.86	-18.59	-7.34
District Competitiveness	-7.56	5.91	-19.78	4.65
Spending Differential	0.99	6.01	-10.81	12.79
Republican	6.63	3.36	0.03	13.23
Total Tweets	0.15	0.03	0.10	0.21
R^2	0.37			
N	483			

Note. Data come from www.Twitter.com. Estimates are based on Ordinary Least Squares (OLS) regression. Standard errors are robust. The estimated effects are significant when 0 is not bounded.

times, a particularly interesting finding that provides additional support for our contention that those in disadvantaged electoral positions are more likely to use Twitter as a tool to remedy this disadvantage. Challengers are likely using Twitter to try to fight the incumbency advantage (Gordon and Landa 2009). Neither district competitiveness nor spending differential influences how often candidates tweet generally or negatively.

We next evaluate whether Twitter activity influences the vote share that each candidate receives. After all, candidates engage in these behaviors in an attempt to win elected office (Mayhew 1974). The next two models presented in Table 3 test whether heightened tweeting by female candidates was actually a fruitful effort to dissipate their electoral disadvantage. The results vary with partisanship. We find that Republican women's Twitter behavior correlates with a higher levels of vote share, whereas Democratic women's use of Twitter results in a decline in vote share (results detailed below when we interpret Figure 2). The estimates indicate that district competitiveness predicted higher vote share for Democrats but not for Republicans. As the gap between Democrat and Republican votes in the previous election increased, Democrats received a higher vote share (6 percentage points for every 500,000 votes). This is not the case for Republicans. Again, this is consistent with context; 2010 was a very strong year for Republicans. They gained 63 seats in the House and 6 seats in the Senate. While Republicans performed well in traditional strongholds, they also won many seats in districts that were not

Table 3. Modeling the interactive effects of tweeting and gender on vote share.

	Estimate	Standard Error	95% Confidence Intervals	
Republicans				
Female	-0.09	0.03	-0.15	-0.03
Total Tweets	-0.00	0.01	-0.01	0.01
District Competitiveness	-0.02	0.02	-0.07	0.03
Spending Differential	-0.01	0.02	-0.05	0.03
Incumbency	0.18	0.02	0.14	0.22
Political Experience	0.03	0.01	0.01	0.05
Total No. of Candidates	-0.03	0.07	-0.16	0.10
Female*Total Tweets	0.02	0.01	0.00	0.04
R^2	0.49			
N	251			
Democrats				
Female	0.08	0.03	0.00	0.12
Total Tweets	0.01	0.01	-0.03	0.04
District Competitiveness	0.06	0.03	0.10	0.19
Spending Differential	0.00	0.02	0.02	0.06
Incumbency	0.15	0.02	-0.23	0.01
Political Experience	0.04	0.01	0.02	0.14
Total # Candidates	-0.11	0.06	-0.00	0.02
Female*Total Tweets	-0.03	0.01	-0.06	-0.00
R^2	0.53			
N	231			

Note. Data come from www.Twitter.com and the Federal Elections Commission. Estimates are based on Ordinary Least Squares (OLS) regression. Standard errors are robust.

necessarily competitive in the previous election. The same can be said for spending differential. The more Democrats spent relative to their opponents, the more likely they were to increase their vote share, although the effect was small, with less than 1 percent increase in vote share for every $10 million spent.

As would also be expected based on the context, incumbency helped Republicans but was not a significant predictor of vote share for Democrats (again this is if we think of this as a sample; if not, there is a positive effect for Democrats as well). This is likely a product of the election of 2010, which had 52 Democrats in Congress lose their reelection bid. Alternatively, Republican incumbents increased their vote share by nearly 18 percentage points over their fellow Republican challengers. Political experience mattered for Republicans and Democrats. Each year of political experience increased their respective vote shares by 3 percentage points and 4 percentage points. Finally, the negative effect for the total number of candidates was not statistically significant.

The interactive results presented in Table 3 are best described by the graphical display contained in Figure 2. Again, our contention is that the gender stereotypes are more pervasive among the Republican electorate; thus,

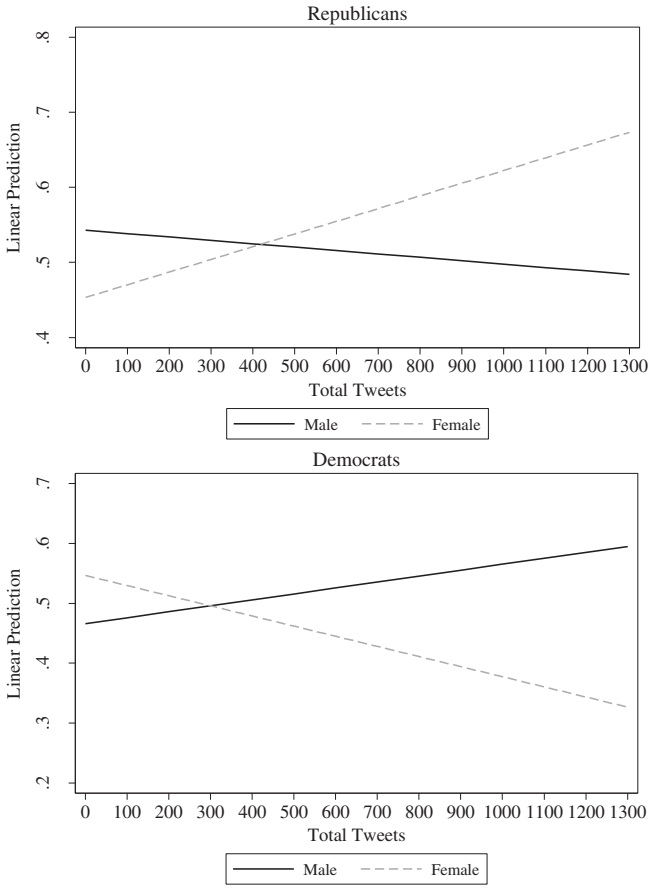

Figure 2. Interactive Effects of Gender, Party, and Twitter Behavior *Note*. Data come from www.twitter.com. Data come from www.twitter.com and the Federal Elections Commission. Estimates are based on Ordinary Least Squares (OLS) regression. Standard errors are robust. Full results are available in Table 3.

combatting them should provide more vote gains for Republican women (Hypothesis 4). The use of Twitter significantly helped Republican females, relative to Republican males (see the top graph), and the opposite is true for Democrats. In fact, about every 100 tweets raised the Republican female vote share by about 2 points, whereas decreasing the Democrat female vote share by about 3 points. This divergence may be simply a product of the Republican resurgence in Congress in 2010. However, the numbers suggest otherwise. A t-test shows that male Republicans actually averaged around 8 points higher than female Republicans, and female Democrats averaged around 6 points higher than male Democrats. Thus, it would appear that this observed Twitter effect may be combatting the gender disadvantage in the Republican Party. Because the Democratic Party has a far smaller gender disadvantage for women (and no measurable disadvantage in our data) to combat, at least within in public opinion or voting behavior, this partisan

differential in the effect of Twitter across party appears consistent. In fact, previous research focused on the gender gap in voting behavior shows a long-standing voting trend where females tend to favor the Democratic Party, as a result of ideological differences and issue position differences (Dolan 1998; Kaufman and Petrocik 1999; Whitaker 2008).

Conclusion

Starting with the premise that candidates in disadvantaged positions are more likely than the advantaged to innovate and adapt to improve their chances of success, we expected that females were more likely to integrate Twitter into their 2010 congressional election campaigns. Our results confirmed this expectation even when controlling for alternative explanations. We concede that we cannot exclude all alternative explanations for a greater volume of tweets from women, including gender differences in communication skills (Brizendine 2006). However, our premise is based on prominent theories in the literature, and our findings are consistent with some of those expectations. Beyond the volume of Twitter usage, we tested the notion that female politicians are compelled to adopt stereotypically masculine behaviors to be successful. We expected female candidates to be more likely to go negative via Twitter. Our results were not as conclusive for this expectation.

Finally, we explored the larger effect of this greater and more negative use of Twitter by female candidates. We expected partisan and gendered behavior to interact, with Republicans (and Republican women in particular) more likely use negative tweets. We find substantial evidence that Republicans, as the minority party, were more likely to use Twitter to attack their opponent. The results also supported the premise that women running for office seek alternative ways to overcome any perceived disadvantage. Female Republican candidates who tweeted more, often increased their vote share, whereas their male Republican counterparts actually decreased their vote share, and the opposite is true for Democratic candidates. This result is a product of the combination of party differences and gender stereotypes.

While the results do suggest an interesting differentiation along gender lines with both the adoption and effectiveness of social media in the campaign, we concede that these data represent the very beginning of this style of campaigning, and the trends may dissipate with time. The year 2010 was a particularly difficult year for Democrats, and the insurgent Tea Party movement might have had a short-term boost in usage for the GOP, which will not be sustained.

Furthermore, we recognize the limitations of a Twitter-only study. No one can plausibly argue that Twitter users alone reshaped the election in 2010. While the reach of Twitter has grown into the tens of millions, that number

is still not nearly equivalent to the number of active voters (Gainous and Wagner 2014). As a tool, its reach is large, but hardly comprehensive. However, the influence of social media platforms is more than the number of immediate users. Social media influence is part of a larger information strategy that affects the greater campaign and the importance and understanding of candidates and issues. Influential information now often originates and becomes relevant through social media, but it does not stay there. In some ways, social media incubates political strategy, with the flow of information continuing well beyond the online network into offline communication and campaigns. Twitter represents a larger social media strategy with implications beyond the online environment.

In addition, while the use of social media is innovative now, it may well become a standard campaign tactic, thus limiting the differences we measured and observed herein. However, because of the low cost and ease of use of these methods, we would still expect disadvantaged candidates to have a disproportionate use and likely benefit for some time. Nonetheless, more work will need to be done to see if these trends continue as they are or become less significant. For now, Twitter has become a venue for the voice of women candidates to be heard and perhaps even to roar.

Notes

1. Because some of the primaries fell after this June date, a portion of some of the tweeting was centered on the primary campaign. We opted to have an equal time period instead of limiting the data collection by campaign cycle.
2. Much of the initial work was done by Kevin Fahey, a graduate student at the University of Louisville at the time of the election and presently a doctoral student in political science at Florida State University. He created the account and gathered the data under our guidance. He also contributed significantly to the development of the keywords described below.
3. We decided that this is the optimal route because one tweet could simultaneously be used by a candidate to accomplish multiple strategic goals.
4. The results presented throughout are based on data where the missing values have been replaced by using multiple imputation. While the total number of missing values across each vector was not large in absolute terms, using listwise deletion in the multivariate models could bias the estimates because existing information would be lost. There were no missing values on the Twitter activity measures, but there were some in the contextual candidate control variables. The imputation model was simple. It included only those variables that had missing values (the winners' vote total in the previous election—9 percent missing, the losers' vote totals in the previous election—9 percent missing, the total vote for the candidate in 2010—less than 1 percent missing, and political experience —4 percent missing). We assumed that these data were missing at random (MAR). By using the multiple imputation procedure, five replicate data sets based on the data were generated, where the missing data in each replication were substituted with draws from the posterior distribution of the missing value conditional on observed values (Little and Rubin 1987; see also Horton and Lipsitz 2001). The analyses that follow are based on

pooled results of the five replicate imputed data sets correcting for underestimation of the standard error in the multivariate models. We also estimated the models here using the unimputed data, and this resulted in increasing the size of the *p*-value in several of the gender estimates. Again, assuming that missing values are MAR, our imputed gender estimates actually represent the unbiased estimates.

5. All district- or state-level elections data came from the Federal Elections Commission, and political experience data came from the personal Web sites of the candidates (and Wikipedia when the information was not available on their Web sites). District competitiveness was measured by taking the absolute value of the difference between the winner's vote total in the previous election and the loser's vote total in the previous elections, and then we divided this value by 500,000 to make the interpretation of estimate clearer. Campaign spending differential was measured by taking the absolute value of the difference between the loser's spending and the winner's spending in the previous election and then dividing that by 10,000,000, which produces a range from a 0.003 to above 4. Political experience was measured as the number of years the candidate has held elected office, and the total number of candidates was simply the count on the number of candidates in the general election as listed by the Federal Elections Commission for each candidate's respective race. Thus, there was no threshold for percent of vote when deciding which candidates to count.
6. Because conceptualization of negative campaigns often only think of them in terms of candidate attacks on their opponents or members of the opposing party, we decided to estimate this t-test using an index that excluded word counts for the words "politician" and "establishment." The substantive results did not change, so we decided to focus our analysis on the full index, because we believe it provides a more comprehensive indicator of the concept. We also use the full index for the multivariate models that follow.

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Kevin M. Wagner is an associate professor of political science at Florida Atlantic University. His research on American politics and information technology has appeared in various outlets, including a recent book with Oxford University Press entitled *Tweeting to Power*, and another book with Rowman & Littlefield entitled *Rebooting American Politics: The Internet Revolution* (both with Jason Gainous). His other work has appeared in various journals.

Jason Gainous is an associate professor of political science at the University of Louisville. His research focuses on political communication and information technology in particular. It has appeared in various outlets, including a recent book with Oxford University Press entitled *Tweeting to Power*, and another book with Rowman & Littlefield entitled *Rebooting American Politics: The Internet Revolution* (both with Kevin M. Wagner). His articles have appeared in *Political Communication; Journal of Information Technology and Politics; Political Research Quarterly; Social Science Quarterly*; and *American Politics Research*, among others.

Mirya R. Holman is an assistant professor at Tulane University. Her present research focuses on the politics of identity, gender, race, and ethnicity, as well as urban politics, environmental attitudes, and policy implementation. Her research has been published in the *Journal of Women, Politics, and Policy; Social Science Quarterly; The Yale Journal of Health Policy, Law, and Ethics; The Suffolk University Law Review;* and *The Roger Williams Law Review*, as well as in the *New York Times* and on Slate.com.

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