

Mature and Internet Enabled Communication Technologies: Insights into the Impact of Gender on Legislator Communications

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Abstract

This United States wide survey sent to all 7,383¹ state legislators examines how state legislator gender impacts the frequency of use and importance of communication technologies (CTs) commonly used by state legislators. The study compares the frequency of use and importance of evolutionarily mature CTs such as face-to-face meetings, handwritten letters, and phone conversations and Internet enabled CTs (IECTs) such as E-Mail, Facebook, Twitter, YouTube, web pages, Blogs, and text messaging. The study uncovers evidence that: 1) Female legislators both use and more highly value Internet enabled communication technologies more than male legislators, 2) Female legislators communicate more frequently with **other legislators** via E-Mail, Twitter, Facebook, webpages, blogs, and text messaging than male legislators, 3) Female legislators communicate more frequently with **their constituents** via hardcopy letters, E-Mail, Twitter, Facebook, blogs, YouTube, text messaging, and press releases than male legislators. With respect to CT importance, we find that: 1) Male legislators find face-to-face communications more important when communicating with peers and the telephone more important when communicating **with constituents** than do female legislators while 2) Female legislators find E-Mail, Twitter, Facebook, YouTube, and text messaging more important when communicating **with peers** than male legislators and hardcopy letters E-Mail, Twitter, and Facebook more important when communicating **with constituents** than male legislators. Our

¹ **Important Note: This paper is being written during the final stages of a mixed-mode study of state legislators. Thus far, 1,839 state legislators have responded to this study: 984 via an Internet survey and 659 via USPS survey. The overall response rate of this study, including only legislators who were successfully contacted via E-mail (Internet mode) or by mail (mail mode) is currently = $1839/6977 = 26.4\%$. This number will increase as we follow up with legislators who did not respond to this study. Much earlier preliminary results of this study presented at the APSA Preconference in San Francisco California in September of 2015, prior to the mail mode phase of this study.**

research shows support that the concept of tokenism is reflected in how female legislators communicate.

Introduction

The core element of any legislator's job is to represent the people of their district and to legislate in order to address problems facing their communities. While the core responsibilities of the legislator are shared across institutions and individuals, there is a robust set of literature that has identified differences in how individual legislators go about their work of representing and legislating. Previous scholarly work has focused on elements such as professionalization of the legislative institution, how urban or rural a district is, and how long a member has held office, among other explanatory factors. (Ellickson & Whistler, 2001) Consistently, over the last several decades, women in legislative positions, whether at the state or the national level have been shown to function differently from men in several regards. These studies have focused on the different elements in how men and women in legislatures communicate with each other (Kathlene, 1994; Thomas & Welch, 1991), lead within their institutions (Michele Swers, 2002, 2013), as well as utilize their time (Ellickson & Whistler, 2001; Michele Swers, 2001; Michele Swers, 2002, 2005, 2013). One element of such studies have focused on efforts of women in legislatures to break out of being seen as tokens and excluded from the "good old boys network" and have full accessibility to both formal and informal arenas of legislative deal making (Blair & Stanley, 1991). Each of these elements of legislating could have a potential effect on not only the amount of communication women legislators use, but each element could help better understand the choices that female and male legislators make regarding the types of communication they find important.

This paper focuses on understanding gender-based differences in the frequency of use of, and the importance² assigned to, common communication technologies (CTs) in use by state legislators today. In addition, the relationships between frequency of use and importance of mature³ CTs, Internet enabled⁴ CTs (IECTs), and mass media⁵ are examined. The results of this study suggest that men and women in state legislatures utilize different forms of communication. Because of women's traditional status as outsiders or minority members in state legislatures, token status, and differences in leadership style, we expect to find that female legislators utilize a more diverse set of communication formats as well as find non-traditional communication tools to be more important when communicating with peers.

This paper focuses on four primary research questions:

Research Question **RQ1**: How does legislator CT frequency of use vary as a function of legislator gender?

Research Question **RQ2**: How does legislator assigned importance of CT vary as a function of legislator gender?

Research Question **RQ3**: How is the use of face-to-face CT and IECT impacted by legislator gender?

Research Question **RQ4**: How is the concept of tokenism reflected by CT frequency of use and assigned importance?

The work of scholars like Beth Reingold and others (Cammisa & Reingold, 2004; Fraga, Martinez-Ebers, Ramirez, & Lopez, 2003; Hawkesworth, 2003; Volden, Wiseman, & Wittmer, 2013) have included a call to make research into gender and state legislators more complex by including variables that capture the diverse environments of state legislatures today, such as

² Importance was defined in all survey questions as follows: "Importance is related to the likelihood that you will respond favorably to a request received from another legislator (or a constituent), all else equal, via one of the communication technologies shown below".

³ Face-to-face meetings, phone conversations, and written/printed communications.

⁴ E-Mail, Twitter, Facebook, YouTube, web pages, blogs, and text messaging.

⁵ Television, radio, press releases, and town hall meetings.

intersectional analysis, professionalism, and political culture. But as with all areas of study of gender and politics, observing the descriptive picture around differences between men and women has always been a first step in researching different areas of women in politics. While some moderate work on women's use of modern, information based communication technologies exists in analyzing campaign efforts, little work has yet sought to analyze how differences in such technologies in the actual work of a legislator.

Sex based differences in legislative communication

While no study has looked broadly at how women differ from men in the types of communication that they utilize in the course of doing their work legislating (communicating with peers) or doing their work representing (communicating with constituents), current research has mixed findings about differences between male and female legislators' legislative advocacy activities. A key point of research has been evaluating the differences between men and women in addressing their institution. Studies of communication differences between male and female legislators have varied findings.

Some studies have found that little differences exist between how men and women in U.S. legislatures communicate. An early study of activity differences between male and female legislators across twelve states by Thomas and Welch (1991) found that women were only very slightly less likely to engage in communication based activities such as speaking on the floor, speaking in committee, speaking with lobbyists, and engaging in or having difficulty with bargaining. Statistical significance of these differences disappeared once other controlling variables, such as years of service and age, were introduced into the analysis. Others (Ellickson

& Whistler, 2001) have found little difference in other communication intensive areas of legislative work such as constituency case work and advocating for district pork barrel.

Yet more recent studies have found that when it comes to the question of differences in communication, women and men are not similarly situated in legislative work. For instance, Kathlene (1994) argues that there are strong indications, “that women and men will not be ‘equal’ participants in group discussions. Therefore, electing more women to legislatures will not automatically change the power balance or the influence in policymaking” (p. 561). In areas where there is open discussion amongst members, such as committee meetings, women are less likely to engage in communication. In her study of the Colorado legislature, Kathlene found that women committee members as well as female chairs of committees engaged in less interruptions, tended to enter into the discussion later, and did not have as many contributions to the discussion in terms of length of comments or turns talking as compared to their male colleagues in similar positions (Kathlene, 1994). These findings, showing that women participate in discussions less than male colleagues, may be an indicator that women in legislatures may not be as comfortable with mature communication technology, since these methods often require personal interaction with male colleagues who may be more aggressive and more likely to interrupt during the development of an idea or argument.

But when women have a good guarantee that they will not be interrupted, such as when they are allocated a specified floor time, women have been found to be more likely to use mature communications. Differences between floor activity between men and women are most salient when various party effects are included in the analysis (Pearson & Dancey, 2011; Volden et al., 2013). One approach has been to consider patterns in debate participation at either the floor or committee level. In a comparison of the 103rd (1993-94) and 109th (2005-6) Congresses, Pearson

and Dancey (2011) find that women in the U.S. House of Representatives are more active in floor speech activity including not only floor debate but also one-minute speeches, despite composing a smaller segment of both Congress as a whole as well as each party. They argue that this pattern is due to female members efforts to establish their credibility in a gendered institution that positively biases male participation. They find that Democratic women are more likely than their male Democratic colleagues to give one minute speeches, while there is not statistically significant difference between male and female Republicans in their usage of one minute speeches during the 103rd Congress. The situation was different in the 109th Congress in which women of both parties were more likely to give one minutes speeches than their male colleagues. (Pearson & Dancey, 2011) When analyzing speeches given on key legislative debates, Pearson and Dancey find that women were significantly more likely to give speeches during debate than male colleagues, even when controlling for party. The debates on which women spoke more often than men did not always comprise “women’s issues,” but included typically male issues such as The North American Free Trade Agreement debate and the Iraq War Resolution debate.

Volden et al. (2013) argue that success of women depends on the institutional context. They distinguish between majority and minority party status as well as early legislative activities (i.e., proposing bills and committee work) from later legislative activities (successful floor action). In particular, they argue that women’s tendency toward collaborative communication and strategy are more successful when they are in the minority party since such a legislative approach is a necessary requirement for legislative success by minority party members. Those seeking legislative success with a majority party status do not have to use collaborative approaches to the same extent. Volden, *et. al.* find this to be the case. Women in the majority

party do not seem to have the same boost in legislative success, which is attributable to the fact that a collaborative communication strategy are not as necessary for bill passage. Support for the importance of other institutional variables in understanding the different patterns of communication between men and women was found in a recent study of the usage of Twitter by members of Congress. In a 2012 study of the usage of Twitter by members of the U.S. Congress, Hemphill, Otterbacher, and Shapiro (2013) found that male members tweeted much more often than female members, but the gender effect nearly halved when controlling for partisanship, with Republican members using Twitter to a much greater extent than Democrats.

All of these efforts to assess differences in how male and female legislators communicate and to assess the impact on legislative effectiveness focus on one type of communication technology—traditional, mature communication methods found in face-to-face, formal legislative discussions. Communication in the course of representation and legislating is done through more activities than formal speeches and debate. Many elements of meaningful lawmaking happen in the less formal discussions and communication that happens before a bill gets to the floor. While there has not been a formal study of differences in communication technologies women and men utilize in peer to peer communications, there are two sets of literature that may help us better hypothesize what kinds of differences to expect in how men and women utilize various communications methods in the course of doing their work. After consideration of women’s access to institutional networks, we turn to consideration of women’s leadership, since the act of leadership is often a communication intensive endeavor. Finally, we end with a consideration of tokenism.

Extra- institutional pressures and communication

Many elements of effectiveness as a legislature require communication and relationship development outside of the halls of the legislature. Blair and Stanley (1991) in their discussion of the difficulties women have in their work as legislators in Texas and Arkansas, find that one barrier is the manner in which critical work friendships develop. They observe, “much of the friendship-forging process has taken place in less formal surroundings, as members gathered after the day’s work for dinner and drinks and a night on the town or on trail rides and hunting trips when members became acquainted in the mutual pursuit of pleasure” (Blair & Stanley, 1991). Women in Blair and Stanley’s study observed that even though less legislative work was done outside the halls of the legislature than in the past, increasing their access to leadership and power was difficult because men had an easier time creating bonds of trust because of their shared experiences and outside interests. Additionally, many in their interviews (both men and women) saw an edge to being part of extra-legislative recreational activities for the process of lawmaking in both forging friendship and trust as well as exchanging information informally, and it was generally recognized these pathways were relatively closed off for women.

When women are leaders

A final documented difference between men and women that support the expectation that men and women would utilize different methods of communication is the finding that men and women display different leadership styles. For instance, Reingold (1996) argues that typically masculine leadership styles tend to be zero-sum in nature, where those who support the leadership are rewarded and those who disagree are punished. Such a command and control style is contrasted with how she defines feminine leadership styles that are more collaborative in nature. This collaborative style of leadership tries to facilitate a win-win situation through cooperation.

These findings regarding differences in how men and women communicate in open or closed communication spaces, development of trust outside of the institution, and leadership lead us to our first series of hypothesis associated with research question **RQ3**:

- 1) **H_{1a}**: Female legislators will communicate more frequently via Internet enabled communication technologies than their male counterparts.
- 2) **H_{1b}**: Female legislators will place more importance on Internet enabled communication technologies than their male counterparts.
- 3) **H_{1c}**: Female legislators will communicate with their peers via face-to-face meetings less than their male counterparts.
- 4) **H_{1d}**: There will be no difference between the frequency of face-to-face communications with constituents and legislator gender

It is important to note that this fourth hypothesis, while not specifically addressed in previous research stems from the concept that if indeed female legislators are intimidated by the “good old boys network” when communicating with their peers, no such dynamic can be expected to exist when female legislators communicate with their constituents.

Thresholds to move from tokens to active members

Critical mass theory would lead us to expect that women members of Congress would value and utilize more internet enabled technologies as a way of communicating. Critical mass theory posits that women members of legislatures have different pressures depending on the strength of their group presence in the institution. Rosabeth Moss Kanter’s (1977) seminal work on women in corporations found that there are critical thresholds found in institutions before

women become active, engaged members of a group or community. She argued that below a critical threshold, women were merely tokens. In her study of group dynamics and gender, she found four distinct types of groups: uniform, skewed, tilted, and balanced (Kanter, 1977). Uniform groups have a ratio of 100:0, skewed groups have a ratio of 85:15, tilted groups have a ratio of 65:35, and balanced groups have a ratio of 60:40. She labels the minority group in skewed groups as tokens, “because they are often treated as representatives of their category, as symbols rather than individuals” (Kanter, 1977, p. 966) Often tokens must struggle with efforts of the dominant group to subvert them, which undermines their ability to do their job and be effective and successful. They often had to work harder to be recognized. As a result Kanter finds that some women who are tokens will seek to differentiate themselves and highlight their contribution based on such difference, but that most will feel pressure to minimize difference and try to conform.

Michelle Saint-Germaine (1989) applies Kanter’s findings to understand the impact women have on public policies in state legislatures. In her study of the Arizona legislature, she found that Kanter’s fifteen percent threshold for skewed groups helped to understand the likelihood of women legislators’ to propose both feminist legislation as well as legislation that is traditionally considered a male’s domain. While across the board no matter what percentage of the legislature women composed, women introduced and were more successful in passing women’s interest legislation. Over time and as women’s representation in the Arizona legislature moved into the tilted category, they were able to be more successful in both bill introduction and passage of women’s issues than when they were in a skewed legislature. Essentially, women in a skewed legislature were boxed into low profile positions that were seen as supportive of the efforts of male colleagues. Thomas (1994) finds wider support for Saint-

Germain (1989) in a study of twelve state legislatures. She find that when women hold more than 15% of the legislature, they are more likely to introduce bills than women who hold less than 15% of the legislature, but she also finds that women who are tokens in a legislature are more likely to propose bills that are related to traditional concerns of women such as bills dealing with children and family (Thomas, 1994). Thomas does note that this phenomenon may change as U.S. society becomes more accustomed to women's presence in public life, including institutions of higher education as well as in business.

In contrast to these expectations, more modern work has shown that tokenism may work in new ways in the political realm. For instance, Michele Swers (2002) finds that women in the U.S. Congress (tokens during 2002 at 14% of the House of Representatives) are often expected to be experts on women's issues and have women's issues as their legislative priority. Swers finds that this expectation is most frustrating for Republican women in the House, who are often interested in pushing policy priorities that have been traditionally been considered more masculine issues. Bratton (2005) finds in her study of four legislatures from 1969 to 1999 that being in a token or a titled legislative setting did not predict women's advocacy for women's issues in each of the state legislatures. She found that no matter the percentage of seats occupied by women legislators, women in the legislature were more likely to sponsor women's issue legislation (Bratton, 2005; Bratton & Haynie, 1999). Bratton also found that women in the legislature did not consistently predict the passage of women's issue legislation.

An essential feature of successful bill passage is communication across the chamber to promote sponsored legislation. All studies of the impact of tokenism on legislative behavior of women have focused upon sponsorship and passage of women's issue legislation. Having more or less women in a chamber may also affect women's comfort levels, making them more or less

likely to use traditional methods of communication or seek to use new technologies for communication. A better test for the relevance of critical mass theory is to look at effects in how women go about their job. If critical mass theory is relevant, we would expect that women in skewed legislatures would be less likely to engage in mature communication methods, such as speeches and other face to face methods, since there is a higher risk for undermining credibility or being penalized and are more likely to utilize internet-enabled communication technologies, since such technologies allow women to communicate their message without interruption and can be indirectly directed toward their peers through general statements about their positions on an issue or a bill (See Hemphill et al. (2013) who find that the dominant usage of Twitter by members of Congress is providing information and position taking).

The tokenism literature reviewed in this section leads us to our second and final series of hypotheses associated with research question **RQ4**:

- 1) **H_{2a}**: The frequency of face-to-face meetings by female legislators is positively correlated with the percentage of female legislators in their legislature.
- 2) **H_{2b}**: The importance of face-to-face meetings by female legislators is positively correlated with the percentage of female legislators in their legislature.
- 3) **H_{2c}**: Female legislators in legislatures with a high percentage of female legislators will communicate less frequently via Internet enabled communication technologies than their peers in legislatures with a low percentage of female legislators.
- 4) **H_{2d}**: Female legislators in legislatures with a high percentage of female legislators will find Internet enabled communication technologies *less important* than their peers in legislatures with a low percentage of female legislators.

Data Collection and Methodology

Research Population

This study focuses on legislators in the upper (Senate) and lower (House of Representatives)⁶ legislative chambers in all 50 states in the United States. At the time of the drafting of this document, there were 7,383 state legislators in the United States.

Survey Modes

The survey data collection for this study consisted of Internet and mail survey delivery modes, modeled after the Tailored Design Method approach developed by Dillman and colleagues (Dillman, Smyth, & Christian, 2009). A survey pre-notice email was sent to legislators on July 6th and the Internet mode survey data collection began on July 13th 2015, when the official invitation to participate in the online survey was emailed to legislators. The email invitation contained a link to the Qualtrics online survey. Email addresses were obtained from state government websites for all states except Kentucky, New Jersey, and South Carolina. Because these three states do not publish their legislator email addresses, researchers had to contact state officials to determine email addresses. Survey links were emailed to all 7,383 legislators. Of the 7,383 emails sent, 1,421 emails were returned as undelivered due to email address errors⁷ and 988 were blocked as spam by state legislature information technology

⁶ Lower chambers in certain states are known under different names. For example, in California, the lower chamber is referred to as the California State Assembly. For simplicity, in this study I will refer to all lower chambers as the House of Representatives.

⁷ Including closed email accounts, errors in email address coding, and errors in legislator contact information webpages.

departments. To the best of our knowledge, a total of 4,974 emails were delivered to state legislator email inboxes⁸.

As part of the Internet survey, legislators were invited to use an identifying alphanumeric code that enabled researchers to identify legislators who responded to the Internet survey so that mail surveys would not be mailed to legislators who had already responded to the survey. 642 out of 984 (65.2%) of legislators responding to the Internet survey included their unique alphanumeric code. Follow-up (reminder) emails were sent to all 4,974 legislators every 7 days from the initial email. Follow-up emails ceased on August 17th when legislator responses dwindled to fewer than 10 per week, although the Internet survey was left open so that legislators could respond if they wished.

The second mode, the mail survey, began on September 10th 2015 and mail mode surveys are still being received as of April 2016⁹. Mail surveys were identical in format to the online survey, with the following exceptions: 1) they were printed instead of being displayed on a monitor and 2) they were not displayed one question at a time.

Instrument

The survey instrument¹⁰ consisted of an introductory cover letter briefly outlining the study and obtaining participant consent followed by sixteen questions. These questions consisted of nine demographic questions focused on the following variables: legislator age, gender, race (two questions), education, state, chamber, political party, and years in office. In addition, there

⁸ State information technology departments can block emails “silently” with no errors sent back to the sender. It would be difficult to detect when this occurs.

⁹ Previous research by West (2014) suggests that legislators will sometimes defer “public service” tasks such as responding to surveys until after their legislative session ends. It was important to leave the Internet survey open to allow legislators this option.

¹⁰ See Appendix A for the actual instrument.

were seven questions that were used to develop the dependent variables for the study. Specifically, there were two questions focused on the frequency of use and importance of CTs used to communicate with other legislators, two questions focused on the frequency of use and importance of CTs used to communicate with constituents. These questions about CT frequency of use and importance were asked multiple times across specific CT or hardware technologies. In particular, respondents were asked these questions about ten forms of CTs: 1) face-to-face meetings, 2) telephone calls, 3) letters (hardcopy), 4) E-mail, 5) Twitter™, 6) Facebook™, 7) webpages, 8) blogs, 9) YouTube, and 10) text messaging. For constituent communications only, three additional forms of mass-media communications were surveyed: 1) press releases, 2) television, and 3) radio. Legislator use of town hall style meetings were also examined.

In addition to the four questions related to communication frequency of use and importance, there were three other dependent variable questions: One question examined the legislator's behavior as a delegate (or trustee or politico), one question examined how frequently a legislator's policy preferences conflicted with the preferences of the majority of their constituents, and the final question examined how much time a legislator spent meeting with various individuals during a typical day. The list of choices included constituents, legislative staff, lobbyists and special interest groups, legislators from their own political party, legislators from other political parties, constituents from their own party, constituents from other political parties, legal counsel, government agency representatives, and constitutional officers (governor, attorney general, secretary of state, etc.)

In the questionnaire, the communication frequency of use variables were ordinal in nature, with the following response categories: do not use (coded as 0), use annually (coded as 1), use monthly (coded as 2), use weekly (coded as 3), use daily (coded as 4), and use hourly

(coded as 5). The CT importance of use variables were also ordinal in nature with the following response categories: do not use (coded as 0), not important (coded as 1), slightly important (coded as 2), moderately important (coded as 3), important (coded as 4), and very important (coded as 5).

While the previous paragraphs discuss all of the variables in the instrument, this paper focuses primarily on the frequency of use and importance variables and the relationships between mature CTs and Internet enabled CTs. Demographic variables will be discussed in the context of their relationships to and impact on frequency of use and importance variables.

Results

Overall Legislator Survey Response Demographics

Table 1 provides the descriptive statistics for the legislators who responded to the online survey.

Demographic Variable	Number of Responses	Summary Statistics
House of Representatives	1170	72.99%
Senate	433	27.01%
Strongly Progressive Democrat	175	11.20%
Moderately Progressive Democrat	326	20.87%
Slightly Progressive Democrat	71	4.55%
Independent Leaning Democrat	96	6.15%
Independent	13	0.83%
Independent Leaning Republican	60	3.84%
Slightly Conservative Republican	41	2.62%
Moderately Conservative Republican	412	26.4%
Strongly Conservative Republican	368	23.56%
Other	0	0%
Male	1083	73.64%
Female	380	26.36%
Years In Office	1559	Min = 1 Max = 66 Mean = 7.91 Std. Dev. 8.04

Age	1401	Min = 21 Max = 88 Mean = 58.04 Std. Dev. 12.01
Education	1445	Min = 10 Max = 23 Mean = 17.30 Std. Dev. 2.87
White	1256	76.45%
Hispanic	25	1.74%
Puerto Rican	7	0.47%
Cuban	3	0.23%
Spanish or Latino	10	0.68%
Negro, African American, Black	64	3.90%
American Indian	13	0.88%
Asian Indian	3	0.23%
Filipino	7	0.45%
Japanese	9	0.53%
Korean	3	0.23%
Vietnamese	2	0.15%
Native Hawaiian	4	0.30%
Samoan	2	0.15%
Other Asian	3	0.23%

Table 1 Overall Legislator Demographics

Male vs. Female Legislator State Legislator Demographic Comparisons

Table 2 provides a comparison of the descriptive statistics for male legislators responding to the survey as compared to female legislators responding to the survey.

Demographic Variable	Males	Females
House of Representatives	778	279
Senate	292	99
Strongly Progressive Democrat	81	81
Moderately Progressive Democrat	184	118
Slightly Progressive Democrat	52	14
Independent Leaning Democrat	63	23
Independent	10	2
Independent Leaning Republican	48	6
Slightly Conservative Republican	30	9
Moderately Conservative Republican	318	65
Strongly Conservative Republican	270	54

Other	0	0
Years In Office	7.86	8.04
Age	58.02	58.49
Education	17.30	17.37
White	926	313
Black	35	29
Other	122	38

Table 2 Male vs. Female Legislator Demographics

Figures 1 and 2 show the number of responses by state for females (Figure 1) and males (Figure 2).

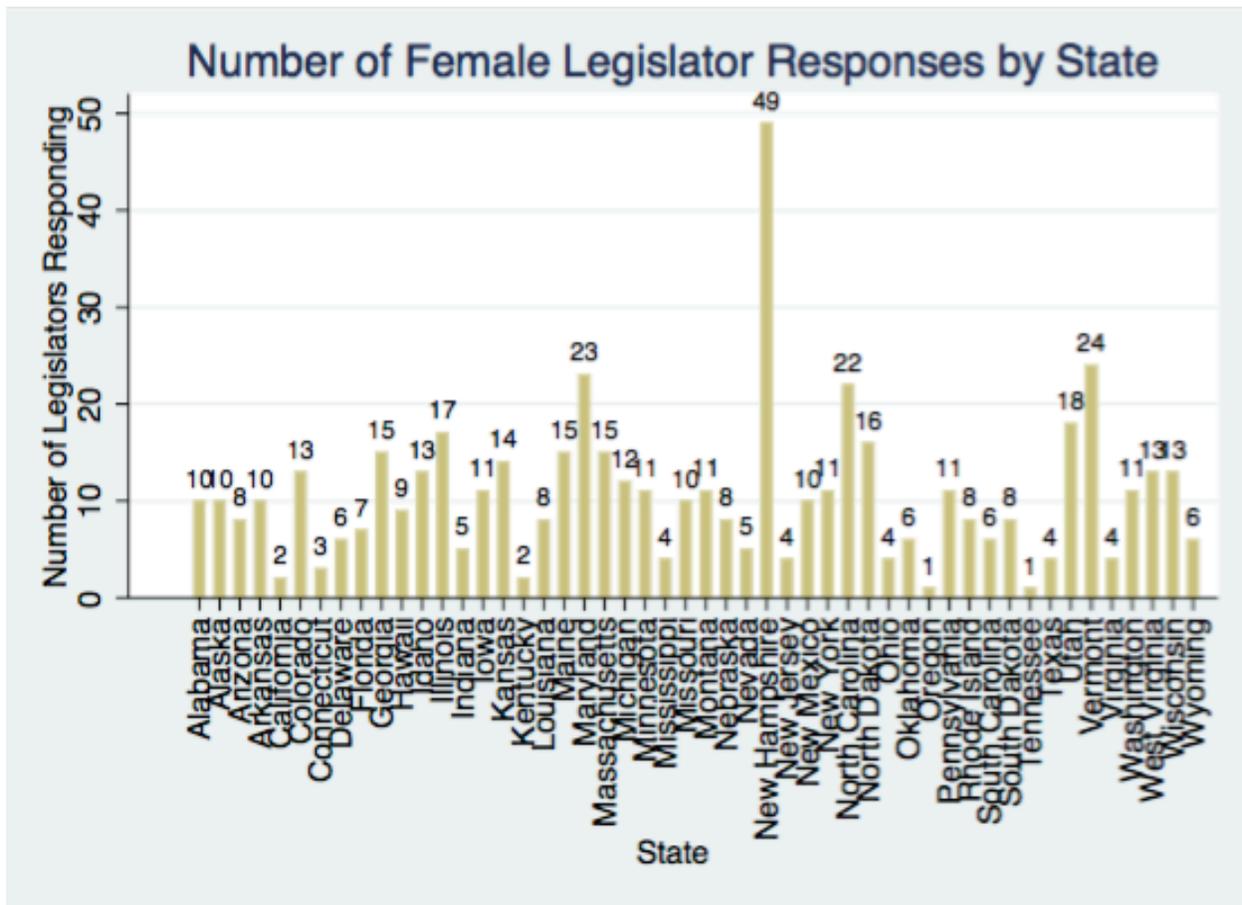


Figure 1 Number of Female Legislator Responses by State

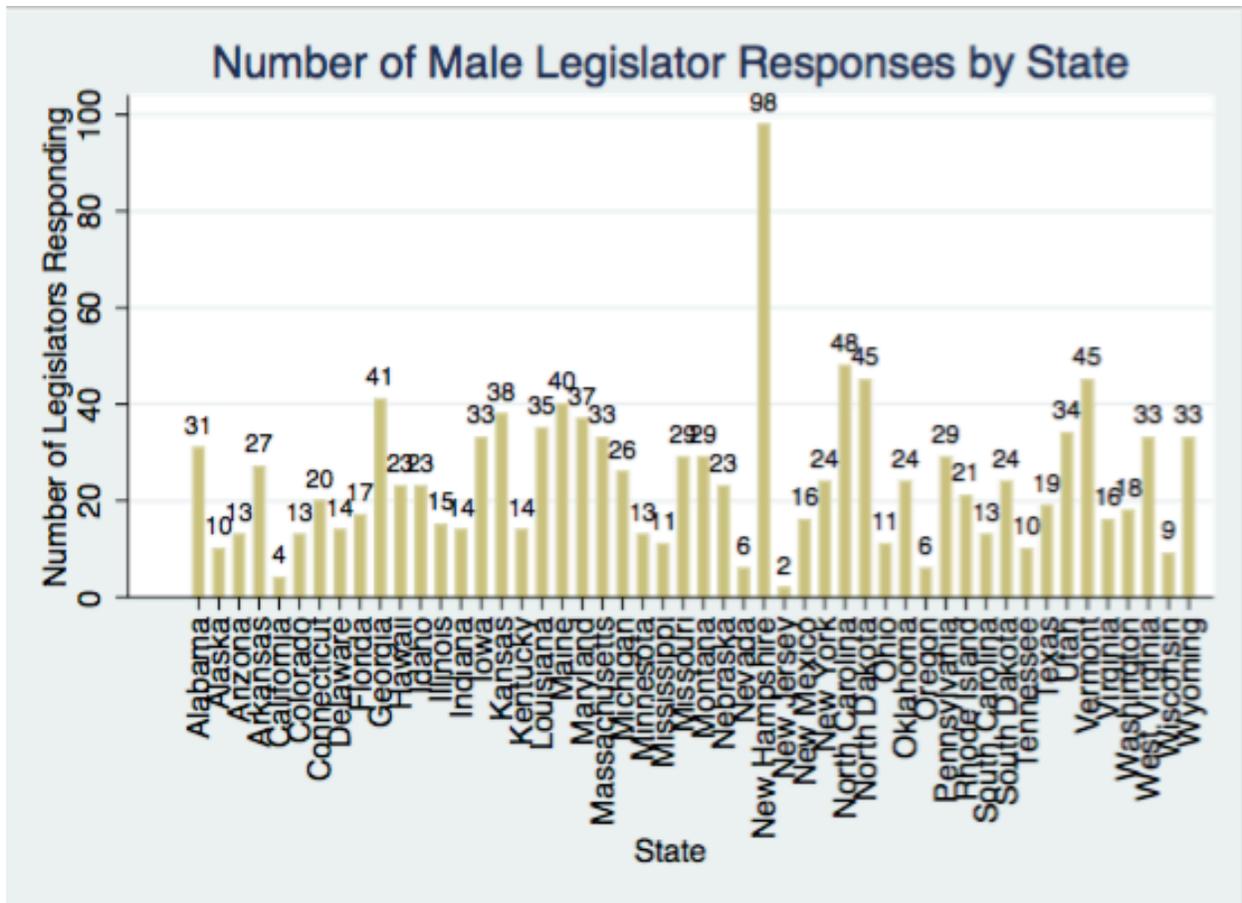


Figure 2 Number of Male Legislator Responses by State

Series One Hypotheses Results

The findings in this section address research question **RQ3**. Before examining inferential statistics for the first set of four hypotheses, kernel density estimations (KDE) of the data associated with each hypothesis were graphed. These graphs are shown in Figures 3 through 6.

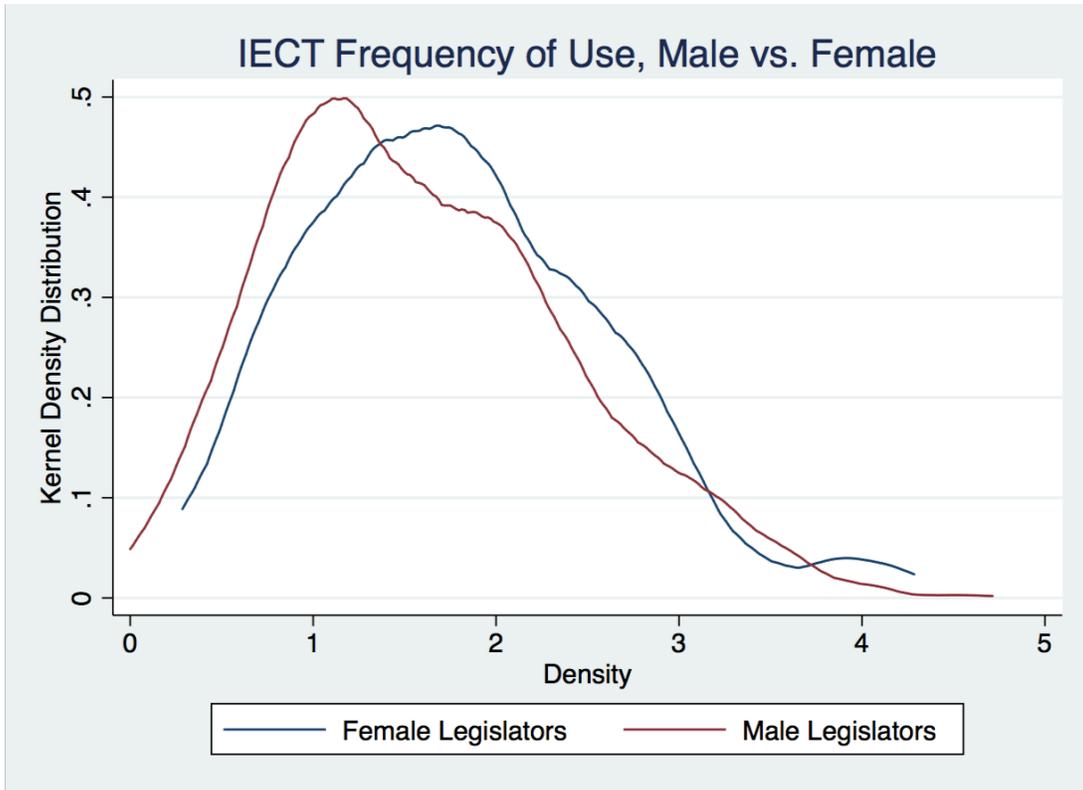


Figure 3 IECT Frequency of Use, Male Legislators vs. Female Legislators

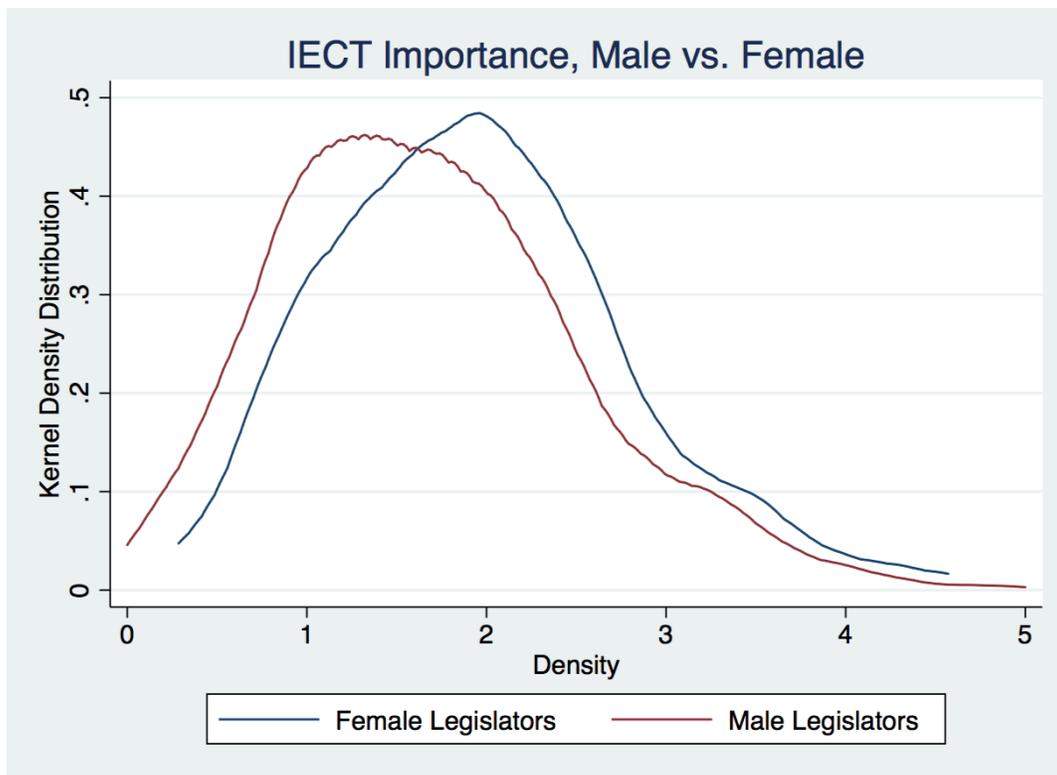


Figure 4 IECT Importance, Male Legislators vs. Female Legislators

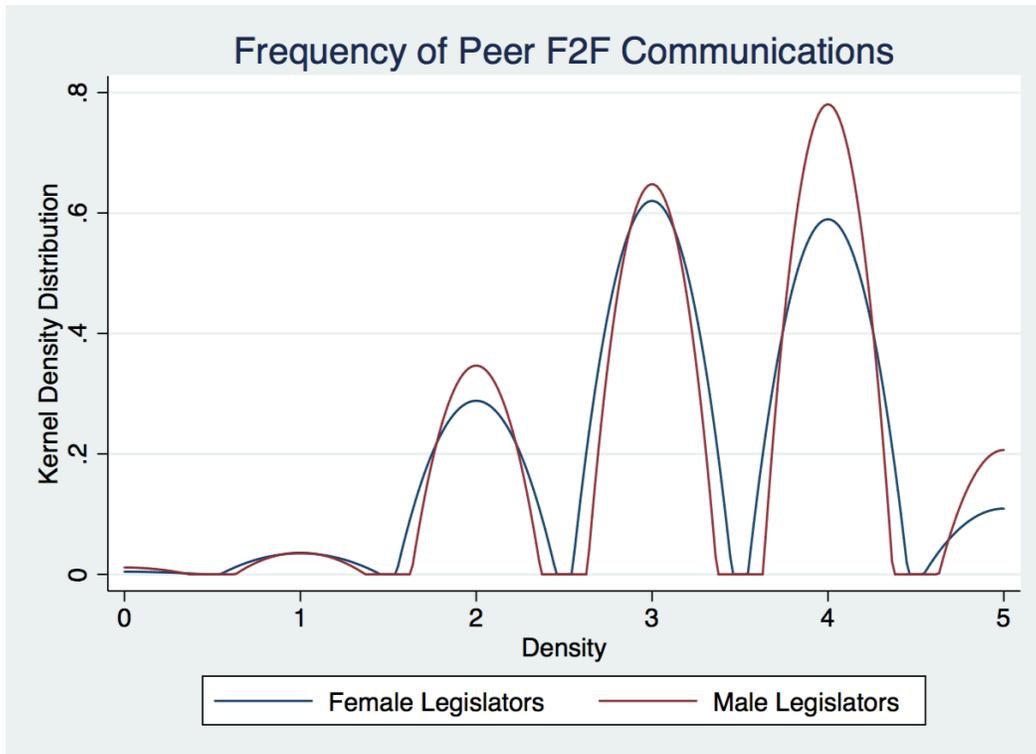


Figure 5 Frequency of Face-to-face Communications, Male Legislators vs. Female Legislators

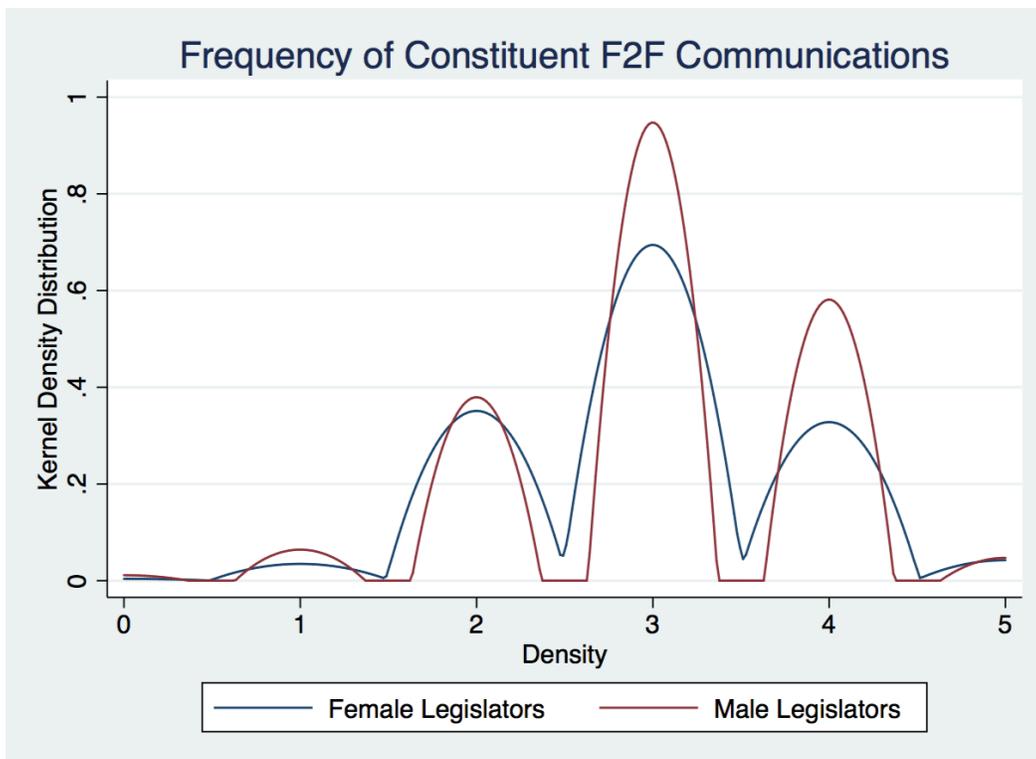


Figure 6 Importance of Female Legislator IECT Communications vs. % Female in Legislature

Examination of Figures 3 and 4 suggest that female legislators both use and value (find important) IECT communications more than male legislators. A similar examination of Figures 5 and 6 suggest that male legislators communicate with peers and constituents via face-to-face meetings more than female legislators. Although these graphs do not tell us if the relationships are statistically significant, the signs of the relationships fit the expected signs of hypotheses H_{1a} through H_{1d} corresponding to Figures 3 through 6 respectively. With graphical evidence that hypotheses H_{1a} through H_{1d} are supported, the continued examination of these hypotheses via inferential statistics is justified.

Because all of the variables in the first series of hypotheses are ordinal in nature, Wilcoxon ranksum testing was used to evaluate the difference of means between male and female legislators for each hypothesis. The results are shown below and are summarized in Table N along with the second series hypotheses.

- 1) **H_{1a}** : Female legislators will communicate more frequently via Internet enabled communication technologies than their male counterparts. Based on a p-value of .001, we reject the null hypothesis and conclude that female legislators find IECT more important than their male counterparts.
- 2) **H_{1b}** : Female legislators will place more importance on Internet enabled communication technologies than their male counterparts. Based on a p-value of .001, we reject the null hypothesis and conclude that female legislators communicate more frequently via IECT than their male counterparts.
- 3) **H_{1c}** : Female legislators will communicate with their peers via face-to-face meetings less than their male counterparts. Based on a p-value of .041, we reject the null hypothesis

and conclude that female legislators communicate less frequently via face-to-face communications with their peers than their male counterparts.

- 4) **H_{1d}**: There will be no difference between the frequency of face-to-face communications with constituents and legislator gender. Based on a p-value of .061, we accept the null hypothesis and conclude that there are no differences in the frequency of face-to-face communications with constituents as a function of gender.

In addition to analyzing difference of means for each hypothesis, ordinal logistic regressions were performed using the following models for each hypothesis:

- 1) **H_{1a}**: $f_{reqict} = \beta_0 + \beta_1 (male) + \beta_2 (yearsoffice) + \beta_3 (age) + \beta_4 (race) + \beta_5 (educ) + \varepsilon$
- 2) **H_{1b}**: $imp_{ict} = \beta_0 + \beta_1 (male) + \beta_2 (yearsoffice) + \beta_3 (age) + \beta_4 (race) + \beta_5 (educ) + \varepsilon$
- 3) **H_{1c}**: $pfreq_f2f = \beta_0 + \beta_1 (male) + \beta_2 (yearsoffice) + \beta_3 (age) + \beta_4 (race) + \beta_5 (educ) + \varepsilon$
- 4) **H_{1d}**: $cfreq_f2f = \beta_0 + \beta_1 (male) + \beta_2 (yearsoffice) + \beta_3 (age) + \beta_4 (race) + \beta_5 (educ) + \varepsilon$

The results of these ordinal logistic regressions are shown in Table 3 below. Odds ratios are reported.

	H_{1a} IECT Frequency	H_{1b} IECT Importance	H_{1c} Peer Face-to- Face Frequency	H_{1d} Constituent Face-to-Face Frequency
<i>male</i>	0.682***	0.591***	1.151	1.330*
<i>yearsoffice</i>	0.985*	0.981**	1.011	1.036***
<i>age</i>	0.958***	0.957***	1.011*	0.993
<i>black race compared to white</i>	1.737*	2.189*	0.539*	1.111
<i>other race compared to white</i>	0.665*	0.841	0.796	0.845
<i>education</i>	1.020	0.999	1.036*	0.991

Table 3 Ordinal Logistic Regression Models, Odds Ratios.

* p<=0.05, ** p<= 0.01, *** p<= 0.001

The results of the ordinal logistic regressions shown in Table 3 suggest that hypotheses H_{1a} and H_{1b} hold true even after controlling for the demographic variables shown. We would fail to reject the null hypothesis on hypothesis H_{1c} and would reject the null on hypothesis H_{1d}. In addition to the statistically significant coefficients on the variable *male*, other interesting relationships can be gleaned from Table 3. For example, the *yearsoffice* variable for hypothesis H_{1a} can be interpreted as: one additional year in office decreases the odds that a legislator will select “Use Hourly” for IECT frequency of use by 1.5%, while controlling for gender, age, race, and education, on average, all else equal.

Although no hypotheses were developed for the frequency of use and importance of all communication technologies examined, all CTs were subjected to Wilcoxon ranksum difference of means testing. The results of these tests are shown in Table 4 (importance, **RQ2**) and Table 5 (frequency of use, **RQ1**) below.

Communication Technology	Male Mean	Female Mean	Statistical Significance
Peers			
Face-to-Face	4.59	4.59	
Telephone	4.08	4.06	
Letters	2.73	2.72	
Email	4.18	4.39	***
Twitter	0.87	1.29	***
Facebook	1.50	1.79	***
Webpage	.614	.816	***
Blogs	3.53	3.92	***
YouTube	1.16	1.25	
Text Messaging	0.48	0.68	***
Constituents			
Face-to-Face	4.60	4.61	
Telephone	4.35	4.40	
Letters	4.21	4.44	***
Email	1.10	1.50	***
Twitter	2.11	2.60	***
Facebook	1.54	1.85	***
Webpage	2.77	2.77	
Blogs	0.55	0.66	*

YouTube	0.59	0.80	***
Text Messaging	2.56	2.70	*
Press	2.80	3.21	***
Town Hall	1.01	1.11	
Television	1.48	1.54	
Radio	0.73	0.83	

Table 4 Importance of CT, Male Legislator vs. Female Legislator

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Communication Technology	Male Mean	Female Mean	Statistical Significance
Peers			
Face-to-Face	3.37	3.27	*
Telephone	3.39	3.31	
Letters	2.03	1.98	
Email	3.87	3.96	*
Twitter	1.10	1.50	***
Facebook	2.02	2.37	***
Webpage	0.56	0.65	
Blogs	3.30	3.43	
YouTube	1.41	1.61	*
Text Messaging	0.48	0.57	*
Constituents			
Face-to-Face	3.07	2.99	
Telephone	3.32	3.18	**
Letters	3.63	3.76	*
Email	1.16	1.52	***
Twitter	2.13	2.60	***
Facebook	1.39	1.55	*
Webpage	2.39	2.26	
Blogs	0.42	0.54	
YouTube	0.49	0.55	
Text Messaging	1.81	1.89	
Press	1.25	1.34	
Town Hall	0.47	0.52	
Television	0.83	0.81	
Radio	0.40	0.60	

Table 5 Frequency of Use of CT, Male Legislator vs. Female Legislator

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Series Two Hypotheses Results

The findings in this section address research question **RQ4**. Unlike the series one hypotheses, the series two hypotheses lend themselves to graphical analyses via scatter plots. Before examining inferential statistics for the second set of four hypotheses, scatter plots of the data associated with each hypothesis were graphed and are shown in Figures 7 through 10.

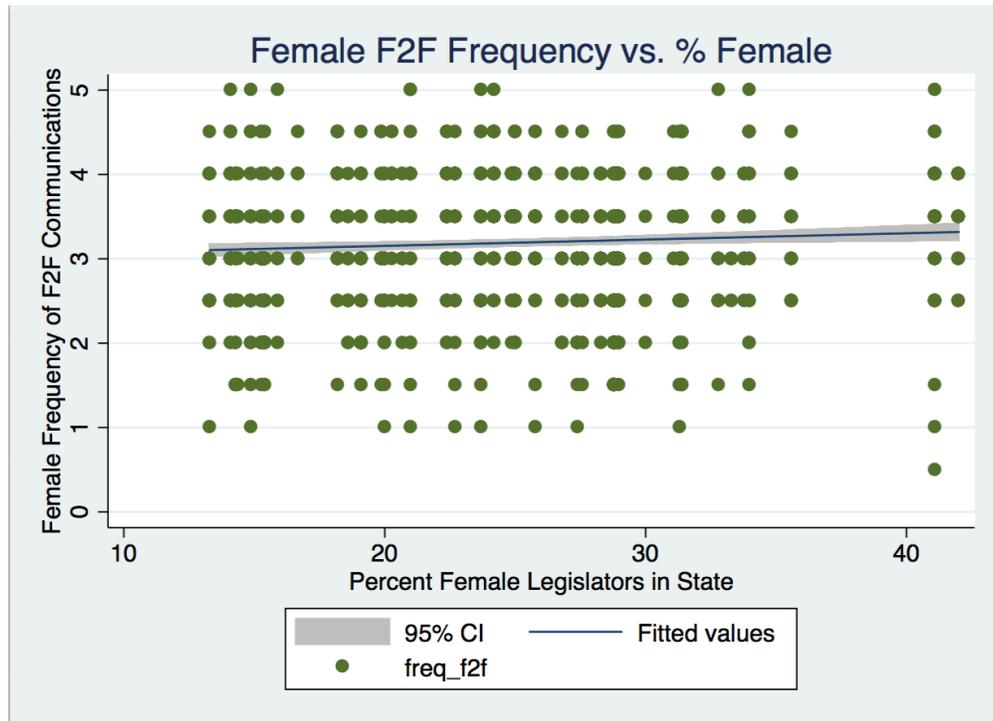


Figure 7 Frequency of Female Legislator F2F Communications vs. % Female in Legislature

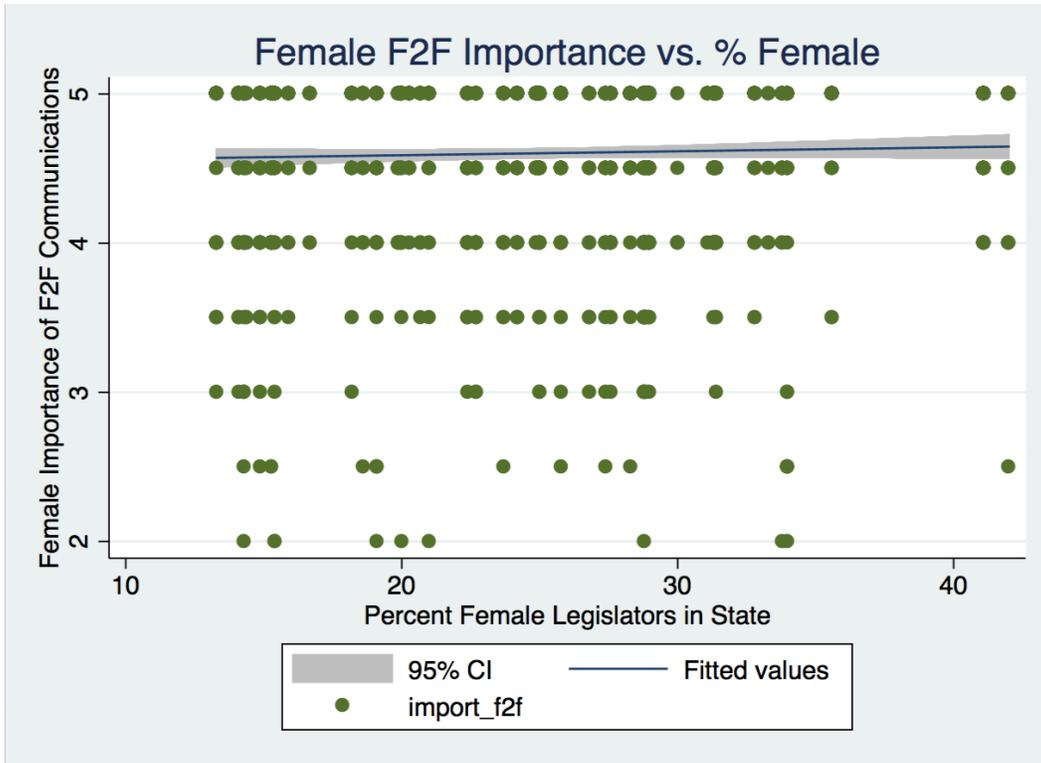


Figure 8 Importance of Female Legislator F2F Communications vs. % Female in Legislature

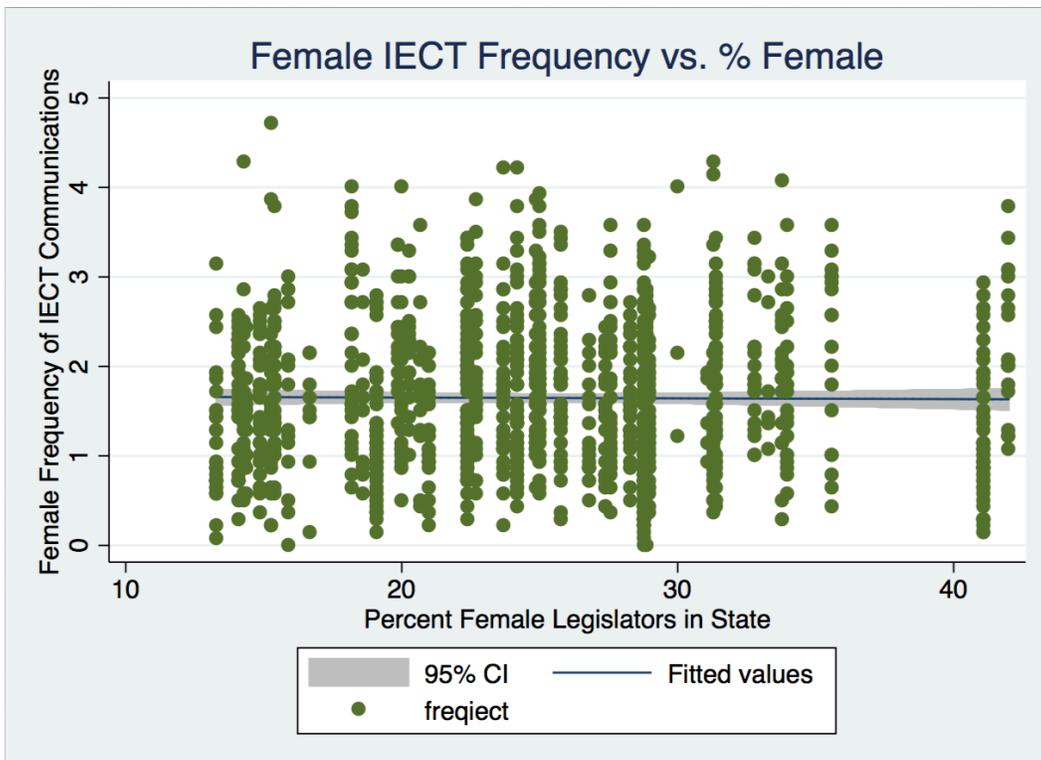


Figure 9 Frequency of Female Legislator IECT Communications vs. % Female in Legislature

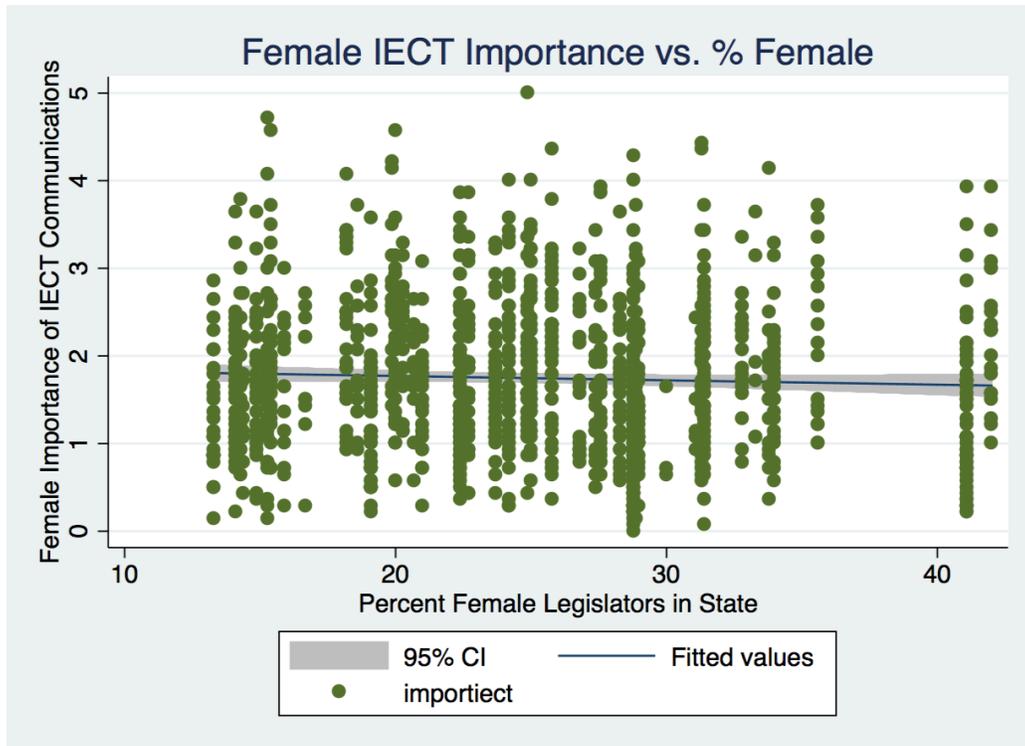


Figure 10 Importance of Female Legislator IECT Communications vs. % Female in Legislature

Examination of Figures 7 and 8 suggest that there is a *positive* relationship between the frequency that female legislators use face-to-face communications (and the importance they assign to face-to-face communications) and the percentage of female legislators in the legislature. A similar examination of Figures 9 and 10 suggest that there is a *negative* relationship between the frequency of use of IECT (and the importance of IECT) and the percentage of female legislators in the legislature. The signs of the relationships fit the expected signs of hypotheses H_{2a} through H_{2d} corresponding to Figures 7 through 10 respectively. With graphical evidence that hypotheses H_{2a} through H_{2d} are supported, the continued examination of these hypotheses via inferential statistics is justified.

Because all of the variables in the second series of hypotheses are ordinal in nature, Wilcoxon ranksum testing was used to evaluate the difference of means between male and

female legislators for each hypothesis. The results are shown below and are summarized in Table 7 along with the first series hypotheses.

- 1) **H_{2a}**: The frequency of face-to-face meetings by female legislators is positively correlated with the percentage of female legislators in their legislature. Based on a p-value of .002, we reject the null hypothesis and conclude that the larger the percentage of female legislators in a legislature, the more frequently female legislators will use face-to-face communications.
- 2) **H_{2b}**: The importance of face-to-face meetings by female legislators is positively correlated with the percentage of female legislators in their legislature. Based on a p-value of .469, we fail to reject the null hypothesis and conclude that there is no relationship between the importance female legislators assign to face-to-face communications and the percentage of female legislators in their legislature.
- 3) **H_{2c}**: Female legislators in legislatures with a high percentage of female legislators will communicate less frequently via Internet enabled communication technologies than their peers in legislatures with a low percentage of female legislators. Based on a p-value of .001, we reject the null hypothesis and conclude that female legislators in legislatures with high percentages of female legislators will use IECT less frequently than their peers in legislatures with low percentages of female legislators.
- 4) **H_{2d}**: Female legislators in legislatures with a high percentage of female legislators will find Internet enabled communication technologies *less important* than their peers in legislatures with a low percentage of female legislators. Based on a p-value of .001, we reject the null hypothesis and conclude that female legislators in legislatures with high

percentages of female legislators find IECT less important than their peers in legislatures with low percentages of female legislators.

In addition to analyzing difference of means for each hypothesis, ordinal logistic regressions were performed using the following models for each hypothesis:

- 1) **H_{2a}**: $freq_f2f = \beta_0 + \beta_1 (pct_female^{11}) + \beta_2 (yearsoffice) + \beta_3 (age) + \beta_4 (race) + \beta_5 (educ) + \varepsilon$
- 2) **H_{2b}**: $import_f2f = \beta_0 + \beta_1 (pct_female) + \beta_2 (yearsoffice) + \beta_3 (age) + \beta_4 (race) + \beta_5 (educ) + \varepsilon$
- 3) **H_{2c}**: $freqiect = \beta_0 + \beta_1 (highpctfemale^{12}) + \beta_2 (yearsoffice) + \beta_3 (age) + \beta_4 (race) + \beta_5 (educ) + \varepsilon$
- 4) **H_{2d}**: $importiect = \beta_0 + \beta_1 (highpctfemale) + \beta_2 (yearsoffice) + \beta_3 (age) + \beta_4 (race) + \beta_5 (educ) + \varepsilon$

The results of these ordinal logistic regressions are shown in Table 6 below. Odds ratios are reported.

	H_{2a} F2F Frequency	H_{2b} F2F Importance	H_{2c} IECT Frequency	H_{2d} IECT Importance
<i>pct_female</i> (H_{2a} & H_{2b}) <i>highpctfemale</i> (H_{2c} & H_{2d})	1.025***	1.011	0.723**	0.657***
<i>yearsoffice</i>	1.029***	0.997	0.982*	0.976***
<i>age</i>	0.999	0.986**	0.961***	0.959***
<i>black race</i>	0.590*	0.893	1.826*	2.526***

¹¹ A ratio level variable that represents the percentage of female legislators in each state legislature.

¹² A dummy variable representing a 1 for the 10 state legislatures with the highest percentage of female legislators and a 0 for the 10 state legislatures with the lowest percentage of female legislatures.

compared to <i>white</i>				
<i>other race</i> compared to <i>white</i>	0.723*	1.041	0.676*	0.860
<i>education</i>	1.023	1.019	1.016	0.995

Table 6 Ordinal Logistic Regression Models, Odds Ratios.

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

The results of the ordinal logistic regressions shown in Table 6 suggest that hypotheses H_{2a} holds true even after controlling for the demographic variables shown. We would fail to reject the null hypothesis on hypothesis H_{2b} and would reject the null on hypothesis H_{2c} and H_{2d} . In addition to the statistically significant coefficients on the variables *pct_female* and *highpctfemale*, other interesting relationships can be gleaned from Table 3. For example, the *yearsoffice* variable for hypothesis H_{2a} can be interpreted as: one additional year in office decreases the odds that a legislator will select “Use Hourly” for face-to-face meeting frequency of use by 2.9%, while controlling for gender, age, race, and education, on average, all else equal.

Table 7 shown below provides a convenient summary of the hypotheses tested in this paper.

Hypothesis Number	Summary of Alternative Hypothesis	Expected Sign for Correlation	Actual Sign for Correlation	Null Hypothesis Result
H_{1a}	Female legislators communicate more frequently via IECT than male legislators	Positive	Mean Male = 1.59 Mean Female = 1.78 Wilcoxon Ranksum (p = 0.001)	Rejected
H_{1b}	Female legislators will place more importance on IECT than male legislators	Positive	Mean Male = 1.68 Mean Female = 1.94 Wilcoxon Ranksum (p = 0.001)	Rejected
H_{1c}	Female legislators will communicate with their	Positive	Mean Male = 3.37 Mean Female =	Rejected using difference of means

	peers via face-to-face meetings less than their male counterparts		3.27 Wilcoxon Ranksum (p = 0.041)	testing, fail to reject using ordinal logistic regression with demographic control variables
<i>H_{1d}</i>	The frequency of face-to-face communication with constituents is not a function of legislator gender	No correlation expected	No correlation found Wilcoxon Ranksum (p = .061)	Rejected
<i>H_{2a}</i>	The frequency of face-to-face meetings by female legislators is positively correlated with the percentage of female legislators in their legislature	Positive Correlation Expected	Positive correlation found, (p = 0.002)	Rejected
<i>H_{2b}</i>	The importance of face-to-face meetings by female legislators is positively correlated with the percentage of female legislators in their legislature	Positive Correlation Expected	No correlation found, (p = 0.469)	Fail to Reject
<i>H_{2c}</i>	Female legislators in high percentage female legislatures will communicate less using IECT than female legislators in low percentage female legislatures	Negative Correlation Expected	Negative correlation found (p = 0.001)	Rejected
<i>H_{2d}</i>	Female legislators in high percentage female legislatures will find IECT less important than female legislators in low percentage female legislatures	Negative Correlation Expected	Negative correlation found (p = 0.001)	Rejected

Table 7 Summary of Hypotheses

Conclusion

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