Changes in Referents and Emotions over Time in Election-Related Social Networking Dialog

Scott P. Robertson
Information and Computer Sciences Department
University of Hawai‘i at Mānoa
scott.robertson@hawaii.edu

Abstract
The U.S. Presidential election in 2008 saw the first serious use of social networking tools by candidates and voters. A week-by-week content analysis of Facebook wall postings by candidates’ fans shows that in the months leading up to the election comments became less personal and that positive and negative sentiment was expressed more evenly as the election approached. These trends are taken as support for a Reflection-to-Selection hypothesis and a Converging Sentiment hypothesis of online political discourse.

1. Introduction
In 2008, for the first time the number of U.S. adults who went online to get involved in the political process exceeded 50% [37]. Social networking sites (SNSs) and blogs played a prominent role, with 19% of Internet users posting their political thoughts and opinions in one of these online venues [37]. For 18-24 year olds, the percentage was 37%. It is clear that democratic deliberation, along with many other aspects of government, has moved online [28,29,33,38,39,40,43,49].

According to proponents of deliberative democracy, informed argument and rhetoric leads to rational decision making [4,5,6,11,12,15,44]. Alternatively, social choice theorists suggest that unconstrained discourse can result in disequilibrium and may, in the end, result in confused and chaotic decision making and irrational outcomes [2,32,44].

Several researchers have explored the role of non-technical social networks in shaping and influencing political processes [3,15,20,26]. Early research on networked groups has characterized the similarities of computer networks to traditional social networks [25,45,46]. Implications for politics online have also been discussed in detail by several authors [14,33,40,41,42,47].

White [48] maintains that true political deliberation is characterized by:

- Allowing each person an opportunity to participate
- Allowing anyone to question a proposal
- Allowing anyone to introduce a proposal
- Allowing anyone to express attitudes, wishes, and needs
- Universality on agreement concerning outcomes

Fishkin [11,12] adds that true deliberative democracy is advanced by:

- Equity in opportunities to be heard
- Presence of views expressing a diversity of interests
- Practice of mutual respect among all participants

In previous research [36], we examined the role of SNSs as versions of Habermas’ public sphere [6,7,8,11,12,16,17,18,44,48] and argued that SNSs and blogs meet many, even most, of the requirements above. In particular, we argued from Facebook data that SNSs reflect what Dahlberg calls “ideal role taking” and “a commitment to an ongoing dialog” [7], and what Fishkin [11,12] calls “mutual respect.” We also found evidence for Dahlberg’s [6,7] requirement that true public spheres should demonstrate “discursive inclusion and equality.” Despite these positive potentials for contribution in online public spheres, there continues to be concern about whether participants listen to the broad range of views available [9,27].

Most research on blogs and SNSs to date, including our own, has taken an overview of large corpuses of participation data [1,19,21,22,23,24,34,35,36]. In this study, the hypothesis is examined that political dialog in an SNS changes its nature over time. Voters are considering different matters and participating with different groups at the beginning of a political campaign as compared to the end. How is this reflected in SNS content?

SNSs and blogs are instances of Web 2.0 technologies that contain primarily user-generated content and that often organize and present this content uniquely to each user. For example, an SNS such as Facebook consists of multiple user-generated content
types (posts, links, videos, pictures, web-based news stories, etc.). Each user sees the set of posts from his or her friends as well as posts from other sites that he or she “likes.” Since each user’s friend list and interest profile is different, each user’s view is unique.

Users may engage in political dialog by posting information on their sites that will, in turn, be broadcast to friends. This activity is largely invisible since it is private activity among friends. However, Facebook also supports more public areas, accessible to all users (Facebook reports that it currently has over 400 million active users), which are associated with groups, causes, or public figures. Virtually all serious contenders for national office in 2008 had Facebook sites. Williams and Gulati [50,51] have suggested that Facebook activity predicts electoral success.

Sites of public figures on Facebook typically consist of areas utilized by the campaign and areas open to postings by anyone (“fan”) (more recent terminology refers to people who “Like” the candidate’s site, but at the time of this study users who were allowed to post on a public figure’s site were called “fans”). A fan becomes identified as such to their friends, and all posts that they make on a politician’s “wall” (again, at the time of this study) were broadcast to their friends and visible to anyone else who looks at the candidate’s site. Such posts are therefore not anonymous or private. Posting a comment on a political wall is a public act, and an act reflecting a serious willingness to engage in dialog not only with participants on the site but also with one’s friends.

The study of online participation in SNSs and blogs is currently very active [1,19,21,22,23,24,50,51] with many researchers concerned with characterizing user types and user comment categories. Researchers have found that emotional expression is common and easy to observe in online discourse [19,21].

2. Current study

In this study the content characteristics of political discourse within an SNS are examined over time. The broadest research question in this study is simply:

1. Does civic dialog regarding political candidates and electoral issues evolve in interesting content-related ways over time throughout an election season?

Two more specific content-related research questions are also addressed:

2. Do SNS participants in political dialog change their emotional sentiment as time progresses and an election approaches?

2.1. Reflection-to-selection hypothesis

Pronoun usage in discourse reflects who the participants are talking with or about. Considerable use of first-person pronouns (“I”, “we”) suggests that the conversation is self directed, about the individual who is speaking or about reference groups to which the speaker belongs. First-person pronoun usage is associated with reflection and self efficacy [30,31]. Considerable use of the second-person pronoun (“you”) and third-person pronouns (“he, she”, “they”) suggests that the dialog participants are more “other directed,” referring directly to other participants (especially “you”) or about others who may not be present. In this data, the second-person pronoun “you” was most often used to directly address the candidate.

A political campaign moves from building support for a candidate in initial stages to participation in a contest in later stages. For a voter, the decision process may move from establishing rapport with a candidate (inward directed to the self and outward directed to the candidate) to engaging the opposition (outward directed to others). This Reflection-to-Selection hypothesis would be evident in a change from first-person and second-person pronoun usage to third-person pronoun usage as an election approaches.

2.2. Converging sentiment hypothesis

Although it goes against rational choice models of decision making, political dialog is often highly emotional. The negative tenor of campaign advertising is widely bemoaned. Online political SNSs provide an opportunity for citizens to engage in their preferred mode of emotional valance: positive, neutral, or negative.

The Reflection-to-Selection process outlined above suggests that early discourse about candidates should be positive as voters become more involved with candidates that they like. As the election approaches, however, the need to engage the competition and turn outwards may reduce positive discourse and/or increase negative discourse.

An extreme version of this turn would be for negative discourse to completely displace positive discourse as an election approaches. We can refer to this as the Positive-to-Negative Sentiment hypothesis. An alternative is a Converging Sentiment hypothesis in which the amount of positive and negative discourse
begins to equalize as participants in political discourse begin to divide their time, and their comments, between their own candidate and group and their competitors’ candidates and groups.

3. Method and data set

Wall posts from the Facebook sites of U.S. Presidential candidates Barack Obama, Hillary Clinton, and John McCain from September 1, 2006-September 30, 2008 were examined for this study. The general characteristics of this data set have been discussed elsewhere [34,35,36], however some descriptive measures are repeated here for context.

In this time period, a total of 76,045 individuals created 687,626 posts on the three Facebook walls. Obama’s wall contained 324,780 posts (47.2%), Clinton’s wall contained 316,330 posts (46%), and McCain’s wall contained 46,516 posts (6.8%). The mean number of posts per poster was 9.04, although the distribution was highly skewed with 73.2% of posters contributing only a single post. In this study, the goal was to characterize features of the overall dialog, hence all data was used in subsequent analyses.

4. Results

4.1. Content analysis overview

For this study, the wall posts from Barack Obama’s, Hillary Clinton’s, and John McCain’s Facebook sites were segmented into bimonthly time slices. The time slices began in September 2006 for Obama and Clinton and February 2006 for McCain (McCain did not start his Facebook page until February 2006). All time slices ended in August 2008. Due to differences in starting times, there were 48 time slices for Obama, 49 time slices for Clinton, and 37 time slices for McCain. The slices are synchronized in subsequent analyses and presentations.

The posts from each time slice were analyzed using the LIWC (Linguistic Inquiry and Word Count) program [30,31]. LIWC extracts words from text and provides basic word counts and percentages of words in several part-of-speech and semantic categories. Semantic categories were derived empirically by the LIWC developers and word categories have been psychometrically tested [31] and used in a variety of analyses of discourse, including blogs [1,19,21,22,23,24]. In this study, we examined the appearance of pronoun categories and evidence of positive emotional sentiment and negative emotional sentiment.

For the content analyses below, the data set generated by LIWC consisted of 9,305,485 recognized words from Obama’s wall, 8,658,628 recognized words from Clinton’s wall, and 1,671,757 recognized words from McCain’s wall.

Figure 1. Average words per sentence on the Facebook walls of Barack Obama, John McCain, and Hillary Clinton from September 2006 - September 2008.

4.2. Words over time

Figure 1 shows the average number of words per sentence and Figure 2 shows the total word count in bimonthly time slices for the 24 months from September 2006 to September 2008. The number of words per sentence remained more or less equal, or increased by a very small amount, across the time period. In contrast, the total word count began increasing dramatically at the beginning of 2008 and wall-posting activity in subsequent time periods corresponded to significant events in the political process.

January 2008 corresponded to the opening of the official Democratic primary season. At the beginning of the month, the important Iowa and New Hampshire caucuses were held with the result that Barack Obama emerged as a strong candidate and all major candidates except for Barack Obama, Hillary Clinton, and John Edwards either withdrew from the race or suspended their campaigns. By the end of the month, after the Nevada caucuses, the South Carolina primary, and unsanctioned Michigan and Florida primaries, John Edwards withdrew leaving the race to Barack Obama and Hillary Clinton.
The beginning of the heated race between Obama and Clinton in January 2008 was clearly reflected in dramatically increased political dialog on these two candidates’ Facebook walls as shown at the “Jan08” time point of Figure 2. Dialog on McCain’s wall also increased markedly at this time point, although it is clear that the real contest involved the Democrats. The discussions reached their peak in February and March 2008 with biweekly word counts reaching one million for both candidates in this period. This increased dialogue corresponds to “Super Tuesday” which took place on February 5, 2008 and several other subsequent primaries and caucuses. A lengthy lull in primaries from March 11 to April 22 corresponds to a dip in the activity on Clinton’s and Obama’s walls. McCain’s wall remained flat despite his confirmation as the Republican nominee on March 5.

On June 3, 2008 the “superdelegate” votes made Barack Obama the clear leader for the Democratic Party’s nomination. One week later, on June 7, Hillary Clinton conceded the race. These events are evident at the “June08” time point of Figure 2 as a dramatic decrease in activity on the Democrats’ walls and a marked increase in the activity on John McCain’s wall. In the time period after June 2008, activity on Obama’s and McCain’s walls began a steady climb, and activity on Hillary Clinton’s wall remained low, as the race shifted to the two final candidates.

The announcement of Sarah Palin as McCain’s running mate at the beginning of August generated considerable activity on all walls, including Clinton’s. In fact, after the Palin announcement, the activity level on McCain’s wall became equal to the activity level on Obama’s wall for the first time. Obama’s activity had regained its level near one million by late August.

4.3. Us versus them

The use of the first-person pronouns (“I”, “we”), the second-person pronoun (“you”), and the third-
person pronouns ("he", "she", "they") was examined for all three candidates across the time periods. (Preliminary analysis showed that usage of singular and plural pronouns did not differ across candidates or time slices, so they were combined). Figure 3, shows usage trends as percentages of total words in the three pronoun categories for Obama, Clinton, and McCain respectively. In all cases, dialog before the beginning of 2008 was dominated by use of the first- and second-person pronouns in relation to the third-person pronouns. As 2008 approached, usage of the first-person and second-person pronouns declined as usage of the third-person pronouns increased (these percentages are independent of each other). By the end of the sample period, use of the three pronoun categories was essentially equal.

In order to assess the pronoun trends, each time slice was given an ordinal value starting at 1 and ending at the maximum number of slices for each candidate: 37 for McCain, 48 for Obama, and 49 for Clinton. Correlations were then performed for each pronoun measure with the following outcomes:

- Use of the first-person pronouns ("I" and "we") was negatively correlated with time for all three candidates: \( r(46) = -.87, p < .0001 \) for Obama; \( r(47) = -.52, p < .0001 \) for Clinton; and \( r(35) = -.78, p < .0001 \) for McCain.

- Use of the second-person pronoun ("you") was negatively correlated with time for all three candidates: \( r(46) = -.89, p < .0001 \) for Obama; \( r(47) = -.74, p < .0001 \) for Clinton; and \( r(35) = -.73, p < .0001 \) for McCain.

- Use of the third-person pronouns ("he", "she", and "they") was positively correlated with time for all three candidates: \( r(46) = .84, p < .0001 \) for Obama; \( r(47) = .80, p < .0001 \) for Clinton; and \( r(35) = .88, p < .0001 \) for McCain.

These results suggest that on all three candidates’ walls the participants initially expressed information about themselves (first-person) and made direct references to the candidates (second-person), but as the contest drew on and the actual decision phase approached, the participants began to speak more about the other candidates and to address each other (third-person). This supports the turning outward aspect of the Reflection-to-Selection hypothesis.

### 4.4. Positive and negative emotion

The LIWC dictionary assigns positive and negative sentiment to various words. The expression of positive sentiment versus negative sentiment was contrasted across the time slices. Figure 4 shows the percentages of words in each sentiment category across time for Obama, Clinton, and McCain respectively. In all cases, the wall discourse was dominated by positive emotional sentiment in contrast to negative emotional sentiment early in the sample period. As time went on, however, the tenor of the walls grew less positive and also grew more negative such that expression of the two sentiment categories was close to equal by the time the contest had narrowed to the two final candidates.

In order to assess the sentiment trends, a difference measure between the positive and negative values was obtained for each time slice (the percentages of positive and negative sentiment words are independent of each other). Figure 5 shows the difference measure...
for all three candidates across time. It is clear that the scores are converging and also that the variation in the difference is scores is lessening. A correlation was performed between the order of the time slice (as defined above) and the difference scores with the following outcome:

• In all cases, the differences between positive and negative sentiment word percentages decreased as time increased: $r(46) = -.90, p < .0001$ for Obama; $r(47) = -.64, p < .0001$ for Clinton; and $r(35) = -.82, p < .0001$ for McCain.

Examination of the three panels of Figure 4 suggests that the convergence was due both to a decrease in use of positive emotion terms and an increase in the use of negative emotion terms. However, to test this more empirically, correlation analyses with time were performed separately on the positive and negative emotion percentages. If the convergence was due to a decrease in positive emotion expression while negative emotion stayed flat, then there should be a strong negative correlation of positive emotion percentage with time and no correlation of negative emotion percentage with time. If the convergence was due to an increase in negative emotion expression while positive emotion stayed flat, then there should be a strong positive correlation of negative emotion percentage with time and no correlation of positive emotion percentage with time. True convergence would be evident in both a strong negative correlation of positive emotion with time and a strong positive correlation of negative emotion with time.

The following outcomes were obtained:

• In all cases, the percentage of positive emotion sentiment terms was highly negatively correlated with time: $r(46) = -.86, p < .0001$ for Obama; $r(47) = -.64, p < .0001$ for Clinton; and $r(35) = -.82, p < .0001$ for McCain.

• In all cases, the percentage of negative emotion sentiment terms was highly positively correlated with time: $r(46) = .90, p < .0001$ for Obama; $r(47) = .52, p < .0001$ for Clinton; and $r(35) = .75, p < .0001$ for McCain.

These results suggest that, for all three candidates, the participants were overwhelmingly positive and not terribly negative at the outset of the study period, but that they grew both less positive and more negative as
time progressed such that their sentiments were more equally balanced as the field narrowed and the election neared. This pattern supports the Converging Sentiment hypothesis.

5. Discussion

The results support the overall hypothesis that the nature of political discourse in SNSs changes dramatically during a campaign. Micro-level changes in participation activity that tracked with important political events were evident. Additionally, macro-level changes that trended over months were evident with regard to participants’ reference group orientation and participants’ balance of affect. Specifically, the results showed that participants were focused on themselves and their candidate at the beginning, but became more involved with others and discussed the competing candidate more as the election approached. This is taken as evidence for a Reflection-to-Selection process of political deliberation. Also, the results showed that participants expressed overwhelmingly positive emotions at the beginning of the campaign season but expressed less positive emotion as the election neared. This was true for all participants in all candidates’ discussion groups, suggesting a general phenomenon and not something tied to the fate of a particular candidate. This is taken as evidence for a Converging Sentiment process of political deliberation.

The results show that it is important not to analyze participation in SNSs, blogs, or other online forums as monolithic data sets. This is especially true for forums that are related to particular events like an election. The archival nature of online discourse makes it possible to examine how political decision making evolves through time, and such close examination should lead to more nuanced models of online democratic deliberation.

6. Future work

In other work we have shown that political dialog in SNSs varies in important ways along dimensions of user frequency and user involvement across multiple political groups. We have proposed a two-dimensional space along these dimensions in which different user personas might be placed [36]. In future work, these dimensions will be examined across time to see if different user personas [24] have different evolutionary paths.

While here the theoretical aspects of the results have been stressed, there are also practical aspects of the research to be explored. For example, could a politician examine the trajectory of pronouns or sentiment over time to estimate at what stage his or her supporters might be in the decision-making process? If so, then such information could be used to more effectively target campaign messages and activities to individuals at the time that they are most ready. It remains an empirical question, though, what activities are appealing, for example, to someone in the early, positive affect stage that would be unappealing later; or what messages might be more effective at a later outward-oriented stage in contrast to an earlier self-reflective stage.

7. Acknowledgements

This research was funded by NSF award Nos. IIS-0535036 and IIS-0827911. Any opinions, findings and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation.

This research was aided by valuable early theoretical and technical contributions from Dr. Ravi Vatrapu at the Copenhagen Business School and Richard Medina at the University of Hawaii. I am grateful for their participation.

8. References


