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Article *in* Journal of Language and Politics · May 2014

DOI: 10.1075/jlp.13.1.04kan

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What can software tell us about political candidates?

A critical analysis of a computerized method for political discourse

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This study evaluates a computerized text analysis program, Linguistic Inquiry and Word Count (LIWC), by investigating the relationship between the discourse and personalities of presidential and vice presidential candidates in the 2008 presidential election in the United States. Analyses of speech samples ($N = 141$) from Barack Obama, Joe Biden, John McCain, and Sarah Palin were conducted using LIWC. The results show that in the context of political speech events, such as media interviews, political candidates make unique linguistic choices, which may be interpreted as displaying distinct personality traits. Yet, despite the statistical significance of the results, there are salient limitations of utilizing computerized methodologies to analyze political speech events, such as the limited interpretative capacity of the software to understand pragmatic and contextual language use.

Keywords: LIWC; political discourse; personality; and political election

1. Introduction

During a presidential election year one cannot listen to the radio, turn on a television, or read a newspaper without noticing that the words of presidential and vice presidential hopefuls are highly scrutinized and constantly evaluated. For instance, in politics gaffes are painfully identified, inconsistencies and inaccuracies are located, and questions are avoided, all of which may reasonably influence voters' perceptions of a given candidate. Further, as Americans listen to speeches and debates, a candidate's stance on any number of issues, such as government regulation, universal healthcare, education funding, and abortion, undoubtedly can result in constituents voting for or against the candidate. However, only in recent years have scholars considered whether specific linguistic forms, such as

Journal of Language and Politics 13:1 (2014), 77–97. DOI 10.1075/jlp.13.1.04kan
ISSN 1569–2159 / E-ISSN 1569–9862

articles and pronouns, can affect voters' perceptions of a candidate (Pennebaker, Slatcher & Chung 2005, Slatcher, Chung, Pennebaker & Stone 2007). More specifically, scholars have begun through computerized methods to analyze political candidates' discourse to determine whether the candidates' linguistic forms may be differentially linked to particular aspects of their personalities. This emerging body of research is significant in understanding to what extent the specific language of political candidates may affect the perceptions voters hold, which may in turn influence the choices of the voters on election day.

The purpose of this study is to contribute to the growing body of quantitative research on the discourse and personalities of politicians by investigating the capacities of a popular computerized text analysis method, known as Linguistic Inquiry and Word Count (LIWC).

2. Literature review

According to Chilton (2004), "Embedded in the tradition of western political thought there is in fact a view that language and politics are intimately linked at a fundamental level" (4). Although across academic disciplines the connection between politics and language is indisputable, scholars utilize a myriad of analytical tools grounded in either discourse studies or a particular computerized paradigm (i.e. LIWC), to examine political discourse, particularly in regards to the link between the words of political leaders and their personalities.

2.1 Discourse studies methods

Though there is one significant constraint in conducting research on political discourse – limited direct access to politicians, Winter (2005) argues that researchers can still study politicians "at a distance" (557) through the use of qualitative methods, such as content analysis. Moreover, Winter posits that specific discourse studies methods, like content analysis, can serve as windows into the personalities of politicians. For instance, Ekström (2009) found through content analysis of 19 press conferences that George W. Bush while in office used interruptions and jokes to maintain control over the press corps while simultaneously crafting an image as a confident and capable leader. More specifically, it was through interrupting the questions of reporters that he showed an air of self-assurance, as could be interpreted by those watching. Similarly, content analysis was used to examine the influence of media coverage of political candidates' language as an indication of personality. Specifically, Wasburn and Wasburn (2011) analyzed issues of *Newsweek* and *Time* with coverage pertaining to 2008 vice presidential candidates Joe Biden and Sarah Palin, finding that in the two months before the

presidential election, there was more text coverage of Sarah Palin; however, the text often focused on Palin's commentary of more superficial topics unrelated to politics. The findings suggest that the coverage featured Palin's discourse predominately on non-political topics, creating the perception that Palin is a common American with interests and thoughts similar to many constituents. However, a major constraining factor in this study that the researchers mention only briefly is that at that time Sarah Palin, unlike Joe Biden, was new to Washington and to many Americans outside of Alaska. The novelty of Palin's presence in national politics may have sparked both the quantity and scope of media coverage.

Other research exploring the intersection of discourse and personality have included studies (Charteris-Black 2011; Cienki 2004) analyzing the metaphorical discourse employed by American politicians to create a public personality. Specifically, Cienki (2004) used discourse analysis to investigate the metaphorical language of George W. Bush and Al Gore during the 2000 presidential campaign. Cienki found that although Bush used a variety of metaphors, his language was simple in contrast to Gore who constructed more detailed and complex argumentation. Cienki suggests that these general linguistic patterns can allude to the characterizations of Bush and Gore as personable and reticent, respectively. Similarly, through a discourse analysis of State of Union and inauguration speeches, Charteris-Black (2011) found that Bill Clinton used metaphorical language to (re)build his public personality, especially after the sexual scandal that surfaced during his second term as president. Through the use of metaphors Clinton attempted to persuade constituents of this goodness by positioning himself as an everyday hero. Likewise, Charteris-Black (2011) examined Obama's use of metaphorical discourse, finding that in 19 speeches Obama used metaphors to create a persona as the embodiment of the American Dream through situating himself as a common man who was able to achieve extraordinary accomplishments despite manifold personal difficulties. Ultimately, studies investigating the metaphorical discourse of politicians indicate that listening citizens could absorb the subtle connotations of these metaphors, thereby influencing their perception of the politicians' personalities.

Although these discourse studies provide fascinating insights into the language and personalities of contemporary American politicians, criticisms of discourse studies methods – the relatively small number of discourse samples that are analyzed and the potential interpretative biases that may emerge during data analysis – have led some scholars to consider alternative paradigms for exploring political discourse and personality.

2.2 Linguistic inquiry and word count methods

Predominately in the field of psychology, an alternative methodology in political discourse and personality has emerged and gained widespread use. Resting on

the assumption that political discourse can be an accurate measure of individual personality differences, Pennebaker, Chung, Ireland, Gonzales, and Booth (2007) developed and utilized a new theoretical and methodological approach in measuring personality through language. A number of studies (Pennebaker & King 1999; Pennebaker & Lay 2002; Pennebaker et al. 2005; Slatcher et al. 2007) have analyzed political discourse using this quantitative method, more specifically a computerized word count program called Linguistic Inquiry and Word Count (LIWC, Pennebaker et al., 2007). LIWC and other "Word count strategies are based on the assumption that the words people use convey psychological information over and above their literal meaning and independent of their semantic context" (Pennebaker, Mehl & Niederhoffer 2003: 550). The theoretical assumption of the LIWC methodology is the notion that parts of language can be categorized and quantified to make inferences about dimensions of individuals' personalities. In this method speech samples are processed through matching individual word stems within the samples to the word stems within the software's internal dictionary. Once each word has been properly identified, it is placed into its respective category. For instance, the word "arrive" would be identified by the software and categorized as a verb regardless of suffixation (e.g. third person -s, past tense marker -ed). One notable advantage to using a word count methodology is that a large number of speech samples can be collected and analyzed more quickly than in other methods, such as discourse analysis and content analysis.

A seminal study utilizing the LIWC method was conducted by Pennebaker and King (1999), who examined writing samples from a wide range of individuals, including college students, inpatients participating in substance abuse programs, and researchers. Through computerized text analysis of the written samples, the researchers claim that language was a reliable construct in measuring personality. That is, one's language may, in fact, reveal aspects of one's personality. Moreover, specific personality characteristics – henceforth referred to as *personality dimensions* – were created and tested through reliability and validity analyses. One example of a created personality dimension includes *cognitive complexity* or the ability to form distinctions in language through words expressing cause and effect (e.g. "affect" and "depending") and insight (e.g. "knowledge" and "ponder").

After initial research on personality traits manifested in the language of various populations, psychology scholars turned their attention to the political domain. For instance, Pennebaker and Lay (2002) collected 35 speech samples of the former New York City Mayor, Rudy Giuliani. In this study Pennebaker and Lay examined whether shifts in Giuliani's personality, as anecdotally reported, manifested in his language throughout his eight years as mayor. Using LIWC, Pennebaker and Lay (2002) found significant differences in Giuliani's speech throughout his battle with cancer and divorce from his long-term wife. Moreover, the analyses showed that Giuliani's speech shifted significantly following the September 11th

Attacks on New York City's World Trade Center. Similarly, a recent study employing LIWC (Abe 2011) revealed that the discourse of former Chairman of the Federal Reserve, Alan Greenspan, shifted with the rise and fall of the economy. His shifting language also was posited as a manifestation of Greenspan's changing personality during times of crisis. Although both Pennebaker and Lay (2002) and Abe (2011) suggest that personality changes anecdotally observed in political leaders are indicated quantitatively within their language, what is not considered is to what extent changes in a politician's discourse are deliberate political tactics, rather than a genuine shift in personality.

Research on discourse and personality has expanded to not only examine the relationship between language and personality of individual political leaders, but also to compare how several candidates' language may vary in connection with aspects of their personalities during election campaigns, with the underlying assumption that voters may be influenced by these linguistic patterns. For example, Pennebaker et al. (2005) conducted a linguistic analysis of the 2004 Democratic primary candidates, John Kerry and John Edwards, and then compared the results to the 2000 Democratic presidential candidate, Al Gore. Positing once again that personality can be reflected in political discourse, Pennebaker et al. used LIWC to identify the specific language patterns of the candidates. The results indicated that Gore and Kerry produced speech with considerable similarities, especially in their high levels of pronoun and article use as well as avoidance of first person singular. Edwards, however, produced language marked by high levels of cognitive complexity (i.e. distinct, specific language use) and insight words (i.e. words expressing awareness and thought). Despite the compelling findings, there was a surprising lack of discussion of the implications of the results. Might the results suggest that candidates, such as Kerry and Gore, were nominated in part because their language revealed dimensions of their personality that voters found particularly appealing, whereas Edwards was disadvantaged by cognitively complex language? Furthermore, perhaps Kerry's and Gore's shared language contributed to their eventual loss of the presidential elections to George W. Bush?

Attempting to answer the latter question, Slatcher et al. (2007) examined the discourse of Democrat and Republican presidential and vice presidential candidates in the 2004 election. The findings indicated that the language of the candidates might be perceived as an indicator of more or less desirable personality dimensions. For instance, more desirable personality dimensions were inferred from the language of the Republican candidates, Bush and Cheney. These dimensions include: honesty, cognitive complexity, age (associated with wisdom and experience), and presidentiality. Less desirable personality dimensions, such as depression, however were found in the Kerry–Edwards ticket, possibly contributing to their eventual loss to Bush–Cheney.

Here, it is imperative to discuss the foundation for the aforementioned personality dimensions in Pennebaker et al. (2005) and Slatcher et al. (2007), as they are commonly utilized in LIWC. Personality dimensions, such as honesty, cognitive complexity, presidentiality, etc. are essentially comprised of linguistic formulas, which are primarily derived from earlier LIWC studies. For instance, *honesty* is a dimension constructed as lower amounts of references to oneself (e.g. "I" and "myself") and exclusion words (e.g. "but" and "excluding"), yet higher amounts of motion words (e.g. "depart" and "fly") and negative emotion words (e.g. "frustrated" and "embarrassed"). This formula was based on the Newman, Pennebaker, Berry, and Richards (2003) study wherein participants recounted either honest or dishonest stories. From these stories linguistic patterns emerged; those who told dishonest stories referenced themselves and used negative emotion words at higher levels. Similarly, *femininity* was developed from Newman, Groom, Handelman, and Pennebaker (2008) who identified discrete differences in language across gender, such as differing levels of pronouns, prepositions, verbs, articles, taboo words, larger words, and words indicating number. Finally, studies by Stirman and Pennebaker (2001) and Rude, Gortner, and Pennebaker (2004) served as the foundation of the *depression dimension*. Specifically, Stirman and Pennebaker (2001) found that depression could be indicated by self-oriented language (i.e. references to self), while Rude et al. (2004) identified that expression of negative emotion manifests with depression.

Those who utilize algorithmic personality dimensions in their research, such as Slatcher et al. (2007), argue that these particular dimensions may be viewed more or less favorably by voters, and may ultimately indicate that personality does matter in a political race. Therefore, a method that can efficiently and systematically analyze discourse and then connect these quantified differences to aspects of political figures' personalities is a potentially powerful tool.

Those ascribing to this alternative paradigm to discourse analysis utilize language software to present ostensibly compelling results and implications about contemporary American politicians' personalities. Yet, despite the prevalent use of computerized software, this method has not been evaluated critically in research. Limitations have been acknowledged (Tauscizik & Pennebaker 2010) yet without evaluative exploration. Therefore, additional studies are needed to extend the body of research on quantitative discourse methodology. In an effort to address this gap in political discourse research, this study aims to investigate to what extent LIWC is able to correctly identify, analyze, and categorize political discourse, especially language with idiomatic and underlying pragmatic functions. For example, to what extent is this software able to analyze correctly the use of sarcasm, in which the opposite of what is spoken is actually meant? These potential pragmatic considerations will be examined and addressed through the data collected of political candidates in the 2008 U.S. presidential election.

The following research questions guided this study:

1. What quantitative and qualitative strengths and limitations arise with the use of the computerized text analysis method, LIWC, for examining political discourse?
2. According to LIWC, what are the linguistic characteristics of the 2008 presidential and vice presidential candidates in terms of cognitive complexity, depression, presidentiality, honesty, and femininity?
3. Which personality characteristics are associated with the linguistic choices of the 2008 presidential and vice presidential candidates?

3. Research design

To test the LIWC computerized method, a linguistic analysis of the 2008 presidential and vice presidential candidates, Obama and McCain, and Biden and Palin, respectively, was conducted to determine whether significant differences exist in their discourse. Furthermore, analyses were conducted to determine whether linguistic differences could be identified according to political party and candidate position as either President or Vice President.

3.1 Data collection

In collecting and analyzing speech samples for the 2008 presidential race, this study replicated the data collection methods of Slatcher et al. (2007). First, transcripts of political speech samples (N = 141) were obtained from the Lexis-Nexis database. The language samples were limited to spontaneous speech, as heard in interviews (n = 96), debates (n = 14), press conferences (n = 10), and town hall meetings (n = 21), in an effort to reduce threats to internal validity since spontaneous samples more closely reflect the actual personality of the candidates as opposed to the personalities of the candidates' speech writers and advisors. The samples were confined to the election year – January 1, 2008 to November 4, 2008 – the height of the presidential campaigning, during which candidates were constantly participating in interviews, debates, town hall meetings, etc. to vie for the attention and loyalty of American voters.

Finally, the length of the speech samples was controlled, resulting in samples with a mean length of 2,241 words (M = 2,241) and a range of 9,839 words. To reduce threats to internal validity, samples were obtained from a variety of networks, representing a range of political party preferences: MSNBC (n = 11), CNN (n = 40), ABC (n = 16), CBS (n = 15), Fox (n = 28), NBC (n = 17), and CNBC (n = 5), and miscellaneous networks, such as C-Span (n = 8).

3.2 Data analysis

Also replicating the design of Slatcher et al. (2007), speech samples were analyzed using the LIWC program to determine personality dimensions: cognitive complexity, depression, presidentiality, honesty, and femininity. These dimensions were defined and converted to z-scores as follows (Refer to literature review for the formulable bases of each personality dimension.):

1. *Cognitive Complexity* – the cognitive complexity dimension is comprised of higher amounts of tentative (e.g. "appears", "depending", "mainly"), discrepancy ("should", "would", "want"), exclusion (e.g. "except", "unless", "without"), and negation words (e.g. "neither", "never", "none"), yet lower amounts of inclusion words (e.g. "come", "including", "plus"). The formula is as follows: Cognitive Complexity = the z-scores of tentative words + discrepancy words + exclusion words + negation words – inclusion words.
2. *Depression* – the depression dimension is comprised of higher amounts of first person singular references (e.g. "I", "mine"), negative emotion words (e.g. "mad", "struggle", "tense"), and physical words (e.g. "nutrition", "physical", "sensation"), and yet lower amounts of words describing positive emotions (e.g. "cherish", "pleasurable", "thankful"). The formula for the depression dimension is as follows: Depression = the z-scores of first person singular + physical words + negative emotion words – positive emotion words.
3. *Presidentiality* – the presidentiality dimension is characterized by larger amounts of positive emotion words, large words (i.e. words with more than 6 letters), articles (e.g. "a", "an", "the"), and prepositions (e.g. "above", "on", "through"). The presidentiality formula is composed of the following: Presidentiality = z-scores of positive emotion words + large words + articles + prepositions.
4. *Honesty* – the honesty dimension is composed of higher amounts of references to oneself (e.g. "I" and "my") as well as references to others (e.g. "he", "oneself", "she") and higher amounts of exclusion words. However, honest people tend to use less motion words (e.g. "act", "drive", "enter") and negative emotion words. The honesty dimension formula is as follows: Honesty = z-scores of exclusive words + references to self + references to others – motion words – negative emotion words.
5. *Femininity* – the femininity dimension of an individual's personality consists of higher amounts of references to others as well as positive emotion words, yet lower amounts of prepositions, articles, large words, negations, profanity (e.g. "ass", "hell", "suck"), and limited mention of money (e.g. "bill", "cost", "money") and number-related words (e.g. "billion", "hundred", "seventy"). The femininity dimension formula is as follows: Femininity = z-scores of positive emotion words + references to others – prepositions – articles – large words – negations – profanity – numbers – money.

To compare the language of the four candidates, a series of one-way ANOVAs were conducted. From these analyses differences between the political parties (i.e. Democrats and Republicans) and positions (i.e. presidential candidates and vice presidential candidates) were identified and discussed. After conducting these results, the original political transcripts were examined to evaluate the interpretative accuracy of LIWC.

4. Results

A series of one-way ANOVAs were conducted to determine whether there were differences between the language of the candidates. The analyses revealed, as depicted in Table 2, that there were statistically significant differences between candidates on four dimensions: cognitive complexity, honesty, presidentiality, and depression. However, there were no statistically significant differences between candidates in the dimension of femininity. For the dimensions with a significant difference between candidates, a Bonferroni post hoc analysis was also conducted to identify which specific pairs of candidates had statistically significantly different language from one another (Refer to Table 3).

1. *Cognitive Complexity*

The analysis revealed that Obama's language was significantly more cognitively complex than Palin's ($F[3, 137] = 3.486$, $MSE = 7.476$, $p < .05$, $n^2 = .07$). The calculated eta squared indicated a moderate effect size. Yet, there was not a statistically significant difference between Obama and the other candidates, Biden ($M = 0.40$) and McCain ($M = -0.67$) (See Table 3).

2. *Honesty*

The post hoc analysis showed that Biden was significantly more honest than Obama and Palin in his language ($F[3, 137] = 5.896$, $MSE = 5.462$, $p < .05$). Eta squared was .11, which indicates a moderate effect size. However, there was not a statistically significant difference between Biden ($M = 1.09$) and McCain ($M = 0.44$) in the honesty of their language (Refer to Table 3).

3. *Presidentiality*

The Bonferroni post hoc analysis revealed that McCain was significantly more presidential in his language than Biden and Obama ($F[3, 137] = 6.338$, $MSE = 3.884$, $p < .05$, $n^2 = .12$). The calculated eta squared revealed a moderate effect size. As shown in Table 3, there were no statistically significant differences in presidentiality between McCain ($M = 1.06$) and Palin ($M = -0.13$).

4. *Depression*

Biden's language appeared significantly more depressed than Palin (F[3, 137] = 4.644, MSE = 4.236, $p < .05$) (Refer to Table 3). Eta squared was 0.09, revealing a moderate effect size. Additionally, Obama's language (M = 0.16) was second to Biden in terms of depression while McCain's speech (M = −0.28) was slightly less depressed than Obama's, as depicted in Table 1.

Table 1. Candidate mean standardized scores

	Obama	Biden	McCain	Palin
Cognitive Complexity	0.87	0.40	−0.67	−0.89
Honesty	−0.81	1.18	0.44	−0.72
Presidentiality	−0.19	−0.97	1.06	−0.13
Depression	0.16	0.92	−0.28	−0.94
Femininity	−0.34	−0.56	1.02	−0.06

Significant at the $p < .05$ level.

Table 2. ANOVA summary table of linguistic differences between candidates' mean scores

		Sum of squares	df	Mean square	F	Sig.
Cognitive Complexity	Between Groups	78.188	3	3	3.486*	.018
	Within Groups	1024.231	137	137		
	Total	1102.419	140	140		
Depression	Between Groups	59.653	3	3	4.694*	.004
	Within Groups	580.318	137	137		
	Total	639.971	140	140		
Presidentiality	Between Groups	73.847	3	3	6.338*	.001
	Within Groups	532.104	137	137		
	Total	605.951	140	140		
Honesty	Between Groups	98.081	3	3	5.986*	.001
	Within Groups	748.298	137	137		
	Total	846.379	140	140		
Femininity	Between Groups	52.953	3	3	1.569	.200
	Within Groups	1541.646	137	137		
	Total	1594.599	140	140		

Significant at the $p < .05$ level.

Table 3. Comparison of linguistic differences between candidates' mean scores

	Obama	Biden	McCain	Palin	*F*	n^2
Cognitive Complexity	0.87_{a}	0.40_{ab}	-0.67_{ab}	-0.89_{b}	3.486*	0.07
Depression	-0.81_{ab}	1.18_{a}	0.44_{ab}	-0.72_{b}	4.694*	0.09
Presidentiality	-0.19_{a}	-0.97_{a}	1.06_{b}	-0.13_{ab}	6.338*	0.12
Honesty	0.16_{a}	0.92_{b}	-0.28_{ab}	-0.94_{a}	5.986*	0.11
Femininity	-0.34_{a}	-0.56_{a}	1.02_{a}	-0.06_{a}	1.569	–

Note: Results of the Bonferroni post hoc analysis are shown through the use of subscripts (a, b). Means with the same subscript letter within each row are not significantly different, while means with different subscript letters within in row are significantly different at the $p < .05$ level.

5. Discussion of results

The analyses revealed that there were, in fact, linguistic differences between the candidates. These linguistic differences, as proponents of LIWC would argue, provide distinct personality impressions of the candidates to the voters who listen to their interviews, town hall meetings, and debates. For instance, Joe Biden appeared as the most dynamic politician in his language choices. Particularly, Biden embodied the linguistic extremes of a majority of the dimensions investigated in this study, demonstrating that his language was more honest and depressed, and yet the least feminine and presidential (Refer to Table 1). These extremes present to voters a candidate who is sincere, tough, and intelligent, yet uncensored, as he readily reveals negative emotions. This finding corroborates previous research by Pennebaker et al. (2005) and Slatcher et al. (2007), which also revealed that the language of another Democratic candidate, John Kerry, was marked by higher levels of negative emotion words, thus suggesting that Democrats may commonly produce language more similar of a depressed person. Also, it is important to consider that both Biden and Kerry were participating in campaigns during a time when Republican President George W. Bush was in office. Perhaps the high use of negative emotions connects to their political agenda – attacking the current administration.

Barack Obama on the other hand, appeared controlled, reserved, and cautious as a consequence of his complex language. This may give voters the impression that he is not entirely forthcoming when he discusses his latest plans and perspectives on various political issues. This inference is exemplified more recently in Obama's evolving stance on the topic of same-sex marriage rights. Furthermore, these perceptions of Obama as having measured and detached language are

echoed in popular press, such as *The New Yorker* ("The Choice" 2008). Similarly, Slatcher et al. (2007) also found that the Democratic presidential candidate in the 2004 election appeared the least honest of all the candidates. These findings suggest that Democratic presidential candidates in both the 2004 and 2008 elections may use language similarly – with caution and extreme care – when discussing contemporary problems during their respective campaigns (i.e. the War in Iraq, healthcare reform, terrorism, etc.).

Furthermore, the analyses indicate that Senator John McCain can be perceived as a compassionate person who also displays strong leadership abilities. Interestingly, McCain was the most feminine in his language, not his vice presidential candidate, Palin – the only female candidate in this study. Palin's language gave the impression that she is a simple, optimistic average American who happens to also be a politician because her language exudes simplicity and a sense of hope about the future. This sense of Sarah Palin was also conveyed in media coverage of her in major U.S. magazines, wherein her opinions about "everyday" and trivial topics were prominently highlighted in reporting (Wasburn & Wasburn 2011). This too, provides voters with a sense that Palin is a common, average person concerned with the daily topics that Americans discuss with friends and family.

In addition to individual personality differences between candidates, this methodology showed that the two political parties presented dissimilar personality characteristics. Unlike, Slatcher et al.'s (2005) study of the 2004 election, wherein in the Republican ticket possessed more positive personality characteristics, the data indicate that the parties possessed both more and less desirable traits. For instance, the Democratic candidate, Obama, appeared less open to voters, yet more intelligent. Contrastingly, Republicans in the 2008 election appear both more open and connected to voters and more capable in leadership positions, as seen in Palin's and McCain's language respectively (See Table 1). Yet, McCain and Palin may be perceived as emotionally and intellectually weaker when compared to their Democratic counterparts (Refer to Table 1).

Finally, the positions (i.e. whether the candidate are running as President or Vice President) of the candidates revealed one particular linguistic and personality difference. The data suggest that the vice presidential candidates, like Palin, are friendlier and more accessible, while Biden seemed more honest than the presidential candidates (See Table 1). These findings lend support to Slatcher et al.'s (2005) results, which indicated that the 2004 vice presidential candidates, Edwards and Cheney, appeared least cognitively complex and most honest, respectively, in their language, thus suggesting that vice presidential candidates may possess common personality traits. The 2008 presidential candidates, however, possessed the prominent characteristics of being stronger, more effective leaders as manifested in the presidentiality dimension (See Table 1).

When using LIWC it becomes difficult to identify which key personality factors played a role in the 2008 election. According to the analyses, both political parties possessed a range of personality characteristics that are favorable and unfavorable to the American public. When considering individual candidates themselves, there is no clear frontrunner. Obama, the least honest candidate, won the election against McCain, who was more presidential. Essentially, these findings suggest that although there may be personality differences between candidates and parties, there are other factors that played a more integral role in the 2008 election. Quite possibly the need for change, as discussed by Levine, Clark, Haygood, and Muenchen (2011), was a powerful message associated with the Obama–Biden ticket, more so than the Republicans. This campaign rhetoric, for example, may have possibly impacted voters' perceptions of the candidates in addition to the candidates' language heard by the American public throughout the election year.

6. Limitations

Although some of the statistical results corroborate with previous LIWC research in presidential campaigns featuring American politicians, there are limitations of this methodology both quantitative and qualitative in nature that must be considered. Ultimately, these limitations severely reduce the validity of using this method in the analysis of political discourse.

6.1 Quantitative limitations

The construction and empirical basis for the personality dimension formulas used in LIWC present notable quantitative limitations. For example, the presidentiality dimension constructed by Slatcher et al. (2007) is not based on empirical research, rather was constructed through an informal analysis of a range of U.S. inaugural speeches from Franklin Roosevelt to Bill Clinton. From these inaugural speeches *presidentiality* was defined by the linguistic patterns that emerged, such as a large amount of prepositions. Not only was this dimension created in absence of empirical research, but also there is no consideration as to what extent previous Presidents have written their own augural addresses. Certainly, there are speech writers who are integral in the creation of these addresses. This begs the question: Can "presidential" language be clearly defined when there are essentially multiple individuals contributing to formal speeches for inauguration and the State of the Union?

Additional limitations in the personality dimensions can be identified when evaluating the depression dimension, which was constructed from previous

studies (Rude et al. 2004, Stirman & Pennebaker 2001) that did not yield statistical significant differences in language use, but rather the dimension was derived from results that only indicated more or less of a particular linguistic form (e.g. depressed individuals use *more* self-references than non-depressed individuals). The absence of statistically significant differences calls into question the empirical foundation for the depression algorithm.

Moreover, when collecting data for statistical analysis, such as the ANOVA, there are several assumptions that researchers must not violate lest they threaten the internal validity of their studies. Significantly, the methodology used in LIWC studies violates a particular important statistical assumption – the independence assumption. According to the independence assumption each collected sample must be independent of the other samples, and therefore not influence one another (Huck 2012). In LIWC in order to analyze the discourse of each political leader a number of speech samples must be collected for each individual. However, for each politician the samples are not independent of the others because they are derived from the same individual, so that the discourse, for instance, in one of Palin's language samples is not independent from the discourse in Palin's other language samples. Certainly, samples collected from one politician cannot be independent; rather each embodies the same linguistic characteristics of the speaker. With the violation of the independence assumption the inferences made from the results can be rendered invalid (Huck 2012).

6.2 Qualitative limitations

In addition to the quantitative limitations of LIWC methods, there are qualitative constraints to using LIWC for making inferences about the connection between the discourse and personalities of political candidates. Through the analysis of the original samples a number of limitations were identified (See Appendix 1 for a list of the featured political speech events.). The first limitation involves the limited interpretative capacity of LIWC to examine the contextual subtleties of the language used by politicians, as a result of the imposition of uniform linguistic categories. For example, consider the following excerpt from one of the speech samples:

(1) *Biden: Thank you for listening. And now I want to take some questions from you all, if you have a chance. They tell me you're going to … I get a chance to answer some questions. And so we've got a guy with a mic here. And we've got them in all of the aisles. I'm going to let the staff pick out people, so you're* ***mad*** *at them, not me.*

Note the boldface word *mad,* which in LIWC would constitute a "negative emotion word". But, one cursory read of this excerpt reveals that Biden is not, in fact, using

mad to express his emotions. Rather his use of the word is merely to joke with those attending the town hall meeting – that he will let the staff select which individuals will ask him questions, so that no potential voters become *mad* at him. Surely, the crowd did not interpret this quip as an indication of an angry, negative person, but rather as a jovial politician. However, such words like *mad*, regardless of the contextual use would be interpreted as a negative emotion word and therefore contribute to the calculation of the depression personality dimension. An additional example of inaccurate interpretation of negative emotion words is illustrated during a presidential debate wherein Obama was addressing his response to the moderator, Lehrer, and not McCain. Consequently, Lehrer directs Obama on a number of occasions to address his response to Senator McCain. It is at this point that McCain interjects a self-deprecating joke about his own age, as depicted in the following segment of the debate:

(2) *Obama: And there are folks out there who've been struggling before this crisis took place. And that's why it's so important, as we solve this short-term problem, that we look at some of the underlying issues that have led to wages and incomes for ordinary Americans to go down, the … a health care system that is broken, energy policies that are not working, because, you know, 10 days ago, John said that the fundamentals of the economy are sound.*

Lehrer: Say it directly to him.

Obama: I do not think that they are.

Lehrer: Say it directly to him.

Obama: Well, the … John, 10 days ago, you said that the fundamentals of the economy are sound. And …

McCain: Are you ***afraid*** *I couldn't hear him?*

(Laughter)

Lehrer: I'm just determined to get you all to talk to each other. I'm going to try.

As Senator McCain jokes to the moderator, "Are you *afraid* I couldn't hear him?", he uses a negative emotion word – *afraid*. Although the audience at the debate had the capacity to understand that McCain was jesting, the LIWC software would immediately categorize this word as a display of negative emotion when, in reality, McCain is displaying a positive and even likeable characteristic – a sense of humor. This inaccurate interpretation calls into question the categorization process that LIWC relies heavily upon in order to identify patterns in political discourse. Moreover, according to Chilton (2004) words cannot be examined in absence of context without potentially misinterpreting nuanced meanings.

Similarly, context can affect the calculation of other personality dimensions as a consequence of narrowly defined linguistic categories. For example, Obama possessed the least honest language, which is characterized by higher amounts of

references to others. In the excerpt below during an interview Obama uses numerous references to other individuals:

(3) *Obama: And one of the things that I want to do, if I have the honor of being president, is to try to bring back the kind of foreign policy that characterized the* ***Truman*** *administration with* ***Marshall*** *and* ***Acheson*** *and* ***Kennan****. But also characterized to a large degree … the first* ***President Bush*** *… with people like* ***Scowcroft*** *and* ***Powell*** *and* ***Baker****, who I think had a fairly clear-eyed view of how the world works, and recognized that it is always in our interests to engage, to listen, to build alliances … to understand what our interests are, and to be fierce in protecting those interests, but to make sure that we understand it's very difficult for us to, as powerful as we are, to deal all these issues by ourselves.*

In LIWC the boldface words would not be interpreted as references to others because the program does not place proper nouns into their contextualized word category – "reference to others", but rather references to others through this computerized method are more limitedly identified as pronouns, such as "he", "she", and "them". Yet certainly during the campaign year candidates will use specific references to other individuals, for instance, to laud the efforts of their party members as well as to discuss the opposition's shortcomings. The latter is exemplified in the following heated debate between then Senators Hillary Clinton and Barack Obama during the Democratic primary:

(4) *Obama: There's a set of assertions made by* ***Senator Clinton,*** *as well as her* ***husband****, that are not factually accurate. When* ***Senator Clinton*** *said … or* ***President Clinton*** *says that I wasn't opposed to the war from the start, or says it's a fairy tale that I opposed the war, that is simply not true. When* ***Senator Clinton*** *or* ***President Clinton*** *asserts that I said that the* ***Republicans*** *had had better economic policies since 1980, that is not the case.*

Clinton: The facts are that he has said in the last week that he really liked the ideas of the Republicans over the last 10 to 15 years.

Obama: Let's talk about ***Ronald Reagan.*** *What you just repeated here today is patent … wait, no,* ***Hillary****, you just spoke …*

Again, Barack Obama uses numerous references to others, including individuals, such as Presidents Clinton and Ronald Reagan, in addition to groups of people (e.g. Republicans), yet in LIWC these references would not be considered. Although Myers (2008) delineates the purposes of referencing others through the use of names and titles while debating, these references would be unrecognizable in this computerized method. Ultimately, as demonstrated in these examples, contextualized language presents a threat to the internal validity of results derived from LIWC by directly influencing the calculations for the personality dimensions.

The second qualitative source of concern when using LIWC is that there is no consideration as to what extent an interviewer can affect the language of the politician he or she is interviewing. Since certain questions require particular linguistic forms when answering, it can be argued that the interviewer can shape the politician's language. Further, Chilton (2004) argues that questions and answers cannot be analyzed in isolation, but rather as connected discourse. Consider, for instance, the following example from an interview with Senator McCain:

(5) *Hannity: Tell us what do you envision for the governor, as* ***her*** *role?*

McCain: Well, first of all ***she*** *is probably one of the foremost experts in this nation on energy issues.* ***She*** *was responsible for – to make a long story short – a pipeline, the $40 billion pipeline bringing natural gas from Alaska down to the lower 48.* ***She*** *has been involved in these issues of energy in many unique ways, including being on the board that oversights the natural gas and oil resources, and other resources in the state of Alaska. And so I think that there's nobody more qualified to take on our mission of becoming energy independent. Second, obviously,* ***she*** *has been a great reformer. I still don't think a lot of Americans appreciate what it's like for a Republican to take on an incumbent sitting governor of your own party. It almost never happens. They wait until they retire or whatever it is … so it's clear that* ***she's*** *got a great record of reform.*

In this excerpt, McCain is specifically asked by the interviewer to describe what he imagines Sarah Palin doing in her vice presidential role. Such questions about another individual require a specific answer (i.e. an answer about another individual). Yet referencing others is a key factor in determining particular personality dimensions like femininity, for example. To what extent is it valid to quantify "language choices" when there does not seem to be a choice at all? In the aforementioned example, McCain has no choice, but to reference another person by extensively delineating her capabilities.

The language of the interviewer also affected Joe Biden's response in an interview when asked to discuss the sources of the funding for the Obama–Biden campaign. This topic in particular is loaded with financial language as seen below:

(6) *Williams: The words of Senator Hillary Clinton, Milwaukee Journal Sentinel, February 17th, 2008. "My understanding is that Senator Obama said he would take public* ***financing*** *and that now he's saying he won't. So I think it raises some serious questions about what it is he stands for." Her words, Senator Biden.*

Biden: I understand her words. She was competing against him. Were I, were I still in the race, I'd probably be raising it. But the essence, the honest to God truth is, he's kept his commitment of keeping big ***money****, individual influence, out of his campaign. If you notice, the end of the quote that, that Lindsey*

*read, he said that's why he supported public **financing**. That's the effect. And so the idea that anyone's going to be able to go say that **seventy**, almost **eighty** percent of his contributions are **hundred bucks** or less, how much influence do they have on him?*

Financial topics were commonly broached in interviews with other candidates most likely as a consequence of the onset of the economic recession in the United States during the 2008 campaign year. Consider the following question posed in an interview:

(7) *Blitzer: Let's go through a whole bunch of substantive **economic** issues, foreign policy issues. I'm going to give you quick questions, if you give me quick answers I think we'll get through a lot. We have limited time, as you know. You want universal health care or something approaching universal health care. That is a top priority. Where is the **money** going to come from?*

*Obama: Well, we're going to have to cut back on some things that don't make sense right now. We're **spending** $15 **billion** a year, for example, under the Medicare program to subsidize insurance companies. We're going to have to cut some programs that don't work in order to provide health care and as I said before, we're going to roll back the Bush **tax** cuts on the **wealthiest** Americans, people making over **250,000 dollars** a year, especially **millionaires** and **billionaires** who have been making much more than that.*

(Obama, 2008c)

Since both candidates were asked financial questions in the previous two examples, they must respond accordingly; however, references to money and numbers are essential in determining to what extent a candidate's language is feminine, as lower references to money are characteristic of feminine speech. The analyses in this study revealed that Biden's and Obama's discourse was least feminine of all the candidates, yet in the excerpts above it is apparent that Biden's and Obama's language was not masculine because of the natural production of language, but rather because they were asked questions that necessitated a "masculine" response, as defined by LIWC studies. Perhaps McCain's language, which was identified as "feminine", was a result of fewer questions focusing on economic topics.

It is significant to note that during an election year candidates participate in numerous interviews; however, only a limited number of debates, town hall meetings, etc. resulting in a large number of samples derived from interviews, which as explicated through the aforementioned excerpts creates a significant validity concern for LIWC proponents using this software for political discourse.

7. Conclusions and future directions

The significance of this study is that it provides both linguists and psychologists with important implications to consider about the methodologies used to measure personality in political discourse. It is apparent that findings derived from LIWC should be interpreted very cautiously, as numerous qualitative and quantitative limitations were revealed. Further, the underlying theoretical assumption of LIWC studies that personality can be quantified through lexical frequencies proves faulty as a consequence of the numerous limitations. Therefore, it behooves researchers employing this method to limit the reach of their inferences and conclusions about the personalities of influential political leaders since this method is problematic in the construction of personality dimensions, the data analysis of the politicians' language, and the rigid interpretative capacity of the software.

Additional studies are required to expand findings and to improve methodologies in understanding contextual language through quantitative approaches. Particularly, more research is needed to explore the connection between interviewer and interviewee discourse to determine the extent interviewers, as opposed to personality, actually affect the language of the interviewees. Finally, LIWC research to date has relied on inference to connect political discourse to personality. Future studies, however, should also incorporate voters' perceptions of personality based on language samples to investigate whether voters do, in fact, perceive the personality dimensions that are being examined in the samples.

The purpose of this study was to evaluate a commonly used text analysis program in political discourse. Despite the results of this study revealing meaningful differences in the language of the candidates as well as their political parties, this study demonstrated that LIWC, although efficient, analyzing language samples almost instantaneously, and less subjective than discourse studies, the validity of the results derived from this paradigm are questionable. It is unlikely that studies using this methodology are accurately measuring the interaction between discourse and personality since these methods are constrained by quantitative limitations as well as inability to consider the contextual use of language – a key factor which constituents would be able to interpret as they consider their voting choices.

Acknowledgements

I would like to thank Aneta Pavlenko, Yasuko Kanno, and the anonymous reviewers who provided invaluable and thoughtful insights on previous versions of this manuscript.

References

Abe, Jo Ann A. 2011. "Changes in Alan Greenspan's Language Use Across the Economic Cycle: A Text Analysis of his Testimonies and Speeches." *Journal of Language and Social Psychology* 30 (2): 212–223. doi:10.1177/0261927X10397152.

Charteris-Black, Jonathan. 2011. *Politicians and Rhetoric: The Persuasive Power of Metaphor.* Basingstoke: Palgrave MacMillan.

Chilton, Paul. 2004. *Analyzing Political Discourse: Theory and Practice.* London: Routledge.

Cienki, Alan. 2004. "Bush's and Gore's Language and Gestures in the 2000 US Presidential Debates: A Test Case for Two Models of Metaphors." *Journal of Language and Politics* 3 (3): 409–440. doi:10.1075/jlp.3.3.04cie

Ekström, Mats. 2009. "Power and Affiliation in Presidential Press Conferences." *Journal of Language and Politics* 8 (3): 386–415. doi:10.1075/jlp.8.3.03eks.

Huck, Schuyler W. 2012. *Reading Statistics and Research*. Boston: Pearson.

Levine, Kenneth J., Naeemah Clark, Daniel M. Haygood, and Robert A. Muenchen. 2011. "Change: How Young Voters Interpreted the Messages Sent During the 2008 Presidential Election Season." *American Behavioral Scientist* 55 (4): 479–501. doi:10.1177/0002764211398075.

Myers, Greg. 2008. "Analyzing Interactions in Broadcast Debates." In *Qualitative Discourse Analysis in the Social Sciences*, ed. by Ruth Wodak, and Michal Krzyzanowski, 121–144. Basingstoke: Palgrave MacMillan.

Newman, Matthew L., Carla J. Groom, Lori D. Handelman, and James W. Pennebaker. 2008. "Gender Differences in Language Use: An Analysis of 14,000 Text Samples." *Discourse Processes* 45: 211–236. doi:10.1080/01638530802073712.

Newman, Matthew L., James W. Pennebaker, Diane S. Berry, and Jane M. Richards. 2003. "Lying Words: Predicting Deception from Linguistic Styles." *Personality and Social Psychology Bulletin* 29: 665–675. doi:10.1177/0146167203029005010.

Pennebaker, James W., Cindy K. Chung, Molly Ireland, Amy Gonzales, and Roger J. Booth. 2007. *The Development and Psychometric Properties of LIWC2007.* Austin, TX: University of Texas. doi:10.1037//0022–3514.77.6.1296.

Pennebaker, James W., and Laura A. King. 1999. "Linguistic Styles: Language Use as an Individual Difference." *Journal of Personality and Social Psychology* 77: 1296–1312.

Pennebaker, James W., and Thomas C. Lay. 2002. "Language Use and Personality Crises: Analyses of Major Rudolph Giuliani Press Conferences." *Journal of Research in Personality* 36: 271–282.

Pennebaker, James W., Matthias R. Mehl, and Kate Niederhoffer. 2003. "Psychological Aspects of Natural Language Use: Our Words, Our Selves." *Annual Review of Psychology* 54: 547–577. doi:10.1146/annurev.psych.54.101601.145041.

Pennebaker, James W., Richard B. Slatcher, and Cindy K. Chung. 2005. "Linguistic Markers of Psychological State through Media Interviews: John Kerry and John Edwards in 2004, Al Gore in 2000." *Analyses of Social Issues and Public Policy* 5 (1): 197–204.

Rude, Stephanie S., Eva-Maria Gortner, and James W. Pennebaker. 2004. "Language Use of Depressed and Depressed-Vulnerable College Students." *Cognition and Emotion* 18 (8): 1121–1133. doi:10.1080/02699930441000030.

Slatcher, Richard B., Cindy K. Chung, James W. Pennebaker, and Lori D. Stone. 2007. "Winning Words: Individual Differences in Linguistic Style among U.S. Presidential and Vice Presidential Candidates." *Journal of Research in Personality* 41: 63–75. doi:10.1016/j.jrp.2006.01.006.

Stirman, Shannon Wiltsey, and James W. Pennebaker. 2001. "Word Use in the Poetry of Suicidal and Nonsuicidal Poets." *Psychosomatic Medicine* 63: 517–522.
Tausczik, Yla R., and James W. Pennebaker. 2010. "The Psychological Meaning of Words: LIWC and Computerized Text Analysis Methods." *Journal of Language and Social Psychology* 29 (1): 24–54. doi:10.1177/0261927X09351676.
"The Choice." [Editorial]. *The New Yorker*. Retrieved from http://www.newyorker.com/talk/comment/2008/10/13/081013taco_talk_editors
Wasburn, Philo C., and Mara H. Wasburn. 2011. "Media Coverage of Women in Politics: The Curious Case of Sarah Palin." *Media, Culture and Society* 33 (7): 1027–1041. doi:10.1177/0163443711415744.
Winter, David G. 2005. "Things I've Learned about Personality from Studying Political Leaders at a Distance." *Journal of Personality* 73 (3): 557–584.

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Appendix 1. List of political speech events

1. Town Hall Meeting in Green Bay, Michigan, 9/8/08
2. Presidential debate in Oxford, Mississippi, 9/26/08
3. Interview, 7/13/08
4. Democratic primary debate in Myrtle Beach, South Carolina, 1/21/08
5. Interview, 10/8/08
6. Interview, 6/22/08
7. Interview, 10/31/08