Textual Analysis of Leaders' Speeches[1]

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Abstract

Recent research has shown that natural disasters present political problems for societies, as these events make both citizens and leaders vulnerable. Leaders who respond successfully to natural disasters should be rewarded with longer tenure than those whose responses are deemed insufficient. Autocratic leaders use language strategically following natural disasters to maximize their time in office. We introduce a new data set derived from using computational linguistic programs (LIWC and Coh-Metrix) to explore language patterns in the discourse of three prominent political leaders to uncover their strategies for navigating the political and social problems created by natural disasters, which help to preserve their political leadership over several decades. Our analysis covers the speeches of Chairman Mao Tse-Tung (365 texts between 1926-1970), Commander Fidel Castro (1,172 texts between 1959-2008), and President Hosni Mubarak (307 texts between 1996-2011).[3] We show that leaders' language reveals their preferences and strategies for accommodating the social, political, and economic shocks created by natural disasters. Leaders opportunistically use more inclusive language, carefully assign blame, and utilize in-group/out-group frames to manage the consequences of these natural disasters.

Keywords: text analysis, autocracies, political linguistics, natural disasters

Introduction

Natural disasters are exogenous shocks to the political system that test the mettle of autocratic leaders. These destructive events, like droughts, floods, and earthquakes, represent disruptions in the status quo for the lives of civilians as well as for the quotidian functioning of government business. Democratic leaders face institutional constraints like election cycles that incentivize effective responses. Autocratic leaders, on the other hand, face fewer institutional constraints, but still they must Understanding how autocrats manage the disruptiveness of disasters by using text analysis is an evolving genre of research in political science. Much of what we know about autocratic leaders' behavior comes from aggregate, annual information. Furthermore, autocrats are idiosyncratic individuals who often shield their private information and decision-making strategies from public scrutiny. Social scientists know comparatively little about the biographies and daily activities of many contemporary autocratic leaders. Understanding the stability of autocrats' preferences and strategies for managing crises is a critical gap in the literature which we address by examining autocratic leaders' speeches and texts during times of crisis.

Large-scale natural disasters are national crises that threaten the political status quo, since people often make policy demands of their leaders to alleviate their suffering. To remain in power, autocrats can increase repression or make policy concessions. Natural disasters create and exacerbate both grievances and needs, and they can elevate the standing of opposition leaders who emerge to articulate citizens' political demands for concessions like increased access to adequate food, reprieve from high food prices, compensation for destroyed property like homes and farmland, and commitments to assist in post-disaster reconstruction. Autocratic leaders can privilege certain groups with these types of concessions and strategically distribute benefits to

engender allegiance from potential threats. If citizens blame government leaders for failing to respond to natural disasters, their grievances can accumulate. On the other hand, if citizens reward autocratic leaders for responding to natural disasters, then the leader's extended tenure in office is more secure.

This project offers meta-linguistic insight into leaders' continuous evaluations of threats and management of crises arising from natural disasters. While the speeches and texts of autocratic leaders have been readily available for individual analysis through human coding, social scientists have lacked the computational linguistic tools to systematically analyze the data embedded within these documents. Every country has political emergencies, but the tools and strategies for autocrats to weather these events are different from those of democratic leaders. To better understand how autocratic leaders meet these challenges; we evaluate the effects of natural disasters on leaders' use of language. Specifically, we investigate three theoretical claims pertaining to strategies political leaders might use during time of crisis.

When a natural disaster happens in an autocracy, the leader has several options. First, he[4] can ignore the event and those affected. This option may be particularly attractive if the disaster affects citizens with little political power to exert influence over the leader's choices or tenure in office, or if the disaster onset is gradual or incremental with no clear start date. Second, he can respond favorably by promising policy concessions and empathizing with the suffering of those affected. This scenario may be most likely under the conditions that the natural disaster happens to a set of constituents who have influence over the leader's tenure in office, or the disaster happens quickly and has a clearly identifiable onset date and afflicted group. This strategy is

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[4] The pronoun 'he' is used herein to refer to autocrats for two reasons: first, in our sample, all autocrats are male. Second, most world leaders to date, and especially those classified as autocrats, are male as well.

similar to the rally effect in conflict politics, where the leader's words unify the citizens of the country around a tragedy. Wen Jiabao's response to the 8.0 magnitude 2008 Szechuan province earthquake which killed more than 68,000 people exemplifies this strategy. His words of empathy for those affected served to endear him to the public who compared him to Zhou Enlai, alongside the Communist party's official disaster relief strategy entitled, "Resist the Quake, Redress the Disaster" (*kangzhen jiuzai*). Following the highly destructive Hurricane Michelle in 2001, Fidel Castro made policy concessions aimed at providing food relief for suffering Cubans by agreeing to import American-grown grains like rice, corn, and soybeans.

Third, the leader can respond negatively, assigning blame for the natural disaster to political opponents or to external actors like neighboring states or international enemies. An autocrat can avert personal responsibility for the effects of the natural disaster by scapegoating lower-ranking officials. An example of this scenario again comes from the 2008 earthquake in Sichuan province that measured 7.9 on the Richter scale and killed more than 10,000 people. Local officials were blamed for using shoddy building materials and construction that increased the death toll and damage. Analysts from the Institute for International Economics note that famines, droughts, and food shortages in North Korea are often blamed on acts of God, rather than state policies. Local and regional officials bore the brunt of political blame for the effects of flooding in July 2012 in Russia, insulating the national leadership from responsibility. Challengers can blame incumbents for disaster failures, national leaders can blame local and regional leaders, and citizens can allocate blame at any level (Malhotra and Kuo 2008; Healy and Malhotra 2009; Lay 2009).

Finally, the leader can react by positioning himself as a strong leader, prepared to guide the country and citizens through the disaster. Under this strategy, leaders facilitate the sense-making process for citizens by creating a coherent narrative of the events to help citizens make sense of the disaster. Whereas citizens affected by the disaster are distraught and panicked, the leader assumes a resolute and levelheaded demeanor. Each of these strategies serves the function of keeping the leader in power. Leaders select their words to insulate themselves from blame, to unify the country, and to help citizens create an integrated meaning of the events and resources, which reinforces their position as a strong authority figure with the ability to lead the country through difficult times.

Leaders' strategies for holding power through times of national crisis are also contingent on the type of regime in which they hold power. The leaders in this study preside over authoritarian regimes, which presents different incentives than exist for leaders of democracies. In the subsequent section I will discuss the features of autocracies that characterize the linguistic strategies leaders use in the aftermath of disasters.

The Political Structure of Autocracies

To date, most political science research has relied on macro-level indicators to identify trends in autocratic leaders' careers, like their aggregate economic performance, the structure of political institutions, bureaucracies, and legislatures, and incidences of civil unrest. While there are many types of autocracies (Geddes, Wright, and Frantz 2012; Lai and Slater 2006; Weeks 2011), they all share the common feature of accountability to a smaller audience than leaders of democracies. Whether party-based, military, or personalist, autocratic regimes must satisfy a smaller proportion of the population than do leaders of democracies. Whereas leaders of

democracies remain in power by providing public goods to all citizens, leaders of autocracies remain in power at least in part by providing private goods to a subset of the general domestic constituency. Autocrats' strategies for remaining in power have been revealed by examining changes in coalition sizes, trends in economic development, and responses to civil unrest (Mesquita, Smith, and Morrow 2003).

We also still have much to learn about the effect of exogenous natural disaster shocks on the tenure of autocratic leaders in office (Windsor, forthcoming). Davies posits a relationship between the needs that citizens have, and the ability of the government to meet those needs (Davies 1962). However, governments prepare for and respond to national crises, like those created by natural disasters, in very different ways. In democracies, leaders have an electoral incentive both to enact preventive measures as well as to respond efficiently to citizens' needs following natural disasters because their tenure in office depends on support from a large constituency (Mesquita, Smith, and Morrow 2003). Democratic leaders that fail to respond effectively can face certain removal from office (Lay 2009; Achen, Bartels, and (Madrid) 2004; Healy and Malhotra 2009). Autocratic leaders, on the other hand, are comparatively unconstrained by electoral institutions as their tenure in office depends on support from a privileged few, and as such have a lesser incentive to supply citizens with remedies for their suffering. However, autocrats cannot ignore the effects of natural disasters altogether either since they must be concerned with the accumulation of grievances and potential for revolt.

As Gandhi and Przeworski (2007) note, autocrats can face both domestic and external threats. Autocrats who effectively extend benefits to potential political rivals through nominally democratic institutions can neutralize threats to their tenure in office. These threats can come from within the leader's inner circle of trusted advisors and consultative councils, or the threats

can originate from "larger groups within society (Gandhi and Przeworski 2007: 1280)." Challenges to autocratic authority arise from both rural and urban unrest. Skocpol (1976; 1979) notes that in developing and pre-industrial countries, challenges to autocratic authority often originate in agrarian protests. Bureaucratic inefficiencies coupled with natural disaster disruptions can exacerbate grievances and incentivize rebellion and contention in both rural and urban areas. Using the bully pulpit of state media to amplify their speeches and policies, autocratic leaders seek to avert unrest, reiterate their authority, and deflect blame.

Leaders intend to reach multiple audiences through their speeches, including those who are essential and those who are non-essential to their retaining power. The distribution of power that keeps all leaders in office is conceptualized as a ratio of the selectorate to the winning coalition (Mesquita, Smith, and Morrow 2003). According to this theory, "In autocratic systems, the winning coalition is often a small group of powerful individuals, and the selectorate is those who have the positions (for example, military rank or party membership in a single-party system) to aspire to make and break leaders (Mesquita et al. 2002: 561)." Autocrats retain power by providing private goods to members of the winning coalition, and are minimally beholden to provide public goods to the selectorate, or general population. As a result, autocracies often under-invest in public programs and infrastructure and are comparatively less well prepared for the consequences of natural disasters than are democracies. In practice, this may mean that members of the willing coalition are insulated from the deleterious effects of natural disasters, whereas the general population suffers greatly when they happen.

Opening the Black Box of Autocracies

Democracies have more transparent institutions than do autocracies. They are able to credibly signal their resolve and reveal private information because of institutional openness, including publicly available political process, freedom of the press from government censorship, and leadership authority ratified by a large domestic constituency. Although autocratic regimes are less transparent, we can rely on the documents that autocratic leaders produce to reveal information about their strategies and preferences for maintaining power. Specifically, we seek to learn about the ways in which autocrats use language throughout the duration of their tenure, especially during times of crisis. How does their language reflect and reveal autocrats' power preservation strategies? How do leaders use language to navigate the problems created by exogenous events, like natural disasters?

We use text analysis to open the black box of autocratic leaders' strategies for successfully navigating political crises arising from natural disasters. Text analysis is increasing as an analytical method across disciplines (Monroe and Schrodt 2008; Atteveldt, Kleinnijenhuis, and Ruigrok 2008; Klebanov, Diermeier, and Beigman 2008). Computer automated data collection makes retrieval and coding feasible under time constraints and limited human capabilities (Quinn et al. 2010). Computer-coded textual analysis of political data is an emerging field of research with interdisciplinary applications (Monroe and Schrodt 2008; Benoit, Laver, and Mikhaylov 2009).[5]

Political science research assumes that all leaders, including autocrats, are rational actors, meaning that they have a set of ordered preferences and are self-interested in pursuing them.

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[5] Political Analysis, the journal of the Society for Political Methodology, published a special issue in Winter 2008 (Vol. 16, No. 4) specifically dedicated to the statistical analysis for political text. See for example (Lowe 2008; Monroe, Colaresi, and Quinn 2008; Klebanov, Diermeier, and Beigman 2008; Shellman 2008)

How autocrats arrive at these preferences is less well understood because of the lack of transparency in autocratic regimes as compared to democracies. Using text analysis allows researchers to probe the linguistic patterns of autocratic leaders for information about their crisis management strategies. Simon and Xenos provide a useful overview of the state of the political science discipline with regard to issues in textual analysis. In particular, they note that, "Using factor analysis in content analysis appears to have fallen out of favor amid a variety of criticisms…We contend that Landauer and Dumais's (1997) theoretical and empirical argument supporting the use of latent semantic analysis (LSA) provides a new and convincing rationale for using exploratory factor analysis as a tool for uncovering patterns of meaning within human communication (Simon and Xenos 2004: 65)." LSA allows scholars to reveal the mental constructs that leaders use to develop policy and maintain power over long periods of time, including during periods of national crisis when they are vulnerable.

Computer-coded textual analysis of political data is an emerging field of research with interdisciplinary applications (Monroe and Schrodt 2008; Benoit, Laver, and Mikhaylov 2009). Linguistic features of leaders' speeches, like the use of emotionally laden vocabulary, or pronouns like *I* or *they* to indicate psychological distance, are evidence of the strategies leaders use to relate to their audiences. Previous scholarship has investigated the way language reveals leaders' preferences and personal style. Using experimental research design to test the electability of candidates based on linguistic features describing their past negative or positive actions, Fausey and Matlock find that "the combination of imperfective and negative information appeared to shift attention away from beneficial policy outcomes and lead to more decisions that the candidate would not be elected (Fausey and Matlock 2011: 9)."

Natural Disaster Effects

The scope of natural disaster research in political science is multifaceted and spans a broad set of literatures that include civil wars, retrospective and economic voting, social psychology and blame attribution, environmental degradation and protection, international organizations and cooperation, and country-specific case study methodology. The effects of natural disasters on the lives of citizens are universally deleterious, but are also mitigated by the type of government and society in which they occur, and the capacity of the state to respond. However, democracies are more able both to prepare for and respond to the humanitarian needs of their citizens. As a result, most research focuses on voters' punishment of leaders' poor policy performance following natural disasters in democracies, or citizens' likelihood of conflict following natural disasters in non-democracies.

Natural disasters tend to shorten the tenure of democratic leaders in office, and lengthen the tenure of autocrats (Windsor 2012). Most scholarship on natural disasters focuses on social conflict is the most likely outcome (Nel and Righarts 2008; Burke et al. 2010; Buhaug 2010; Slettebak 2012). Other work focuses on the potential for domestic and international cooperation (Gartzke 2012). Evidence from humanitarian assistance contributions and from post-disaster relief efforts demonstrates that countries are willing to offer support to those suffering from the effects of natural disasters (Stromberg 2007). Political science research on the effects of natural disasters has focused broadly primarily on country-level and annual attributes. However more recently, scholars have begun to employ geo-referenced data to disaggregate countries into gridded spaces for more nuanced analysis (Hendrix and Salehyan 2010).

One theory posits that citizens blame leaders for poor policy performance. Several scholars have addressed the role of blame attribution related to natural disasters in democratic politics. Achen and Bartels (2004) find that voters punish elected officials for events such as droughts, epidemics, and even shark attacks. Lay (2009) finds that voters are sophisticated in blame attribution so long as the natural disaster happened just prior to an election and caused sufficient death and destruction, and that voters find that the government should be held accountable for the problems they incur as a result of the natural disaster. Healy and Malhotra (2009) find that voters reward elected officials for post-disaster compensation, but not for preventive spending. A further study by Bechtel and Hainmuller (2010) finds that voter gratitude for effective disaster responses persists over several elections. Leaders' policy responses are measurable outcomes, like funding allocation for preventive and compensatory measures, and their decision strategies that lead to these policies can be analyzed through their speeches and written communication. The breadth of these studies, covering areas of Europe, the United States, and Africa, have controlled for government type as an explanatory variable and a contributing factor that influences countries' resilience with regards to natural disasters. In this paper, we hold government type constant by investigating three autocratic leaders over time to reveal regime-type specific trends in autocratic leaders' management of natural disasters.

Case Selection

We evaluate the political speeches and texts produced under the tenure of Mao Tse-Tung in China, Fidel Castro in Cuba, and Hosni Mubarak in Egypt using two linguistic facilities, Coh-Metrix and Linguistic Inquiry and Word Count (LIWC). All three leaders presided over politically closed authoritarian regimes. However, they are not devoid of bureaucratic, partisan, or electoral institutions. Autocrats use political institutions strategically to manage both internal

and external threats, which can arise from the onset of natural disasters. Levitsky and Way note that Egypt can be considered a "façade electoral regime in which electoral institutions exist but yield no meaningful contestation for power," but in Cuba and China, "elections have been eliminated either de jure…or de facto (Levitsky and Way 2002: 54)."

For all years, all countries fall in the range of scores that categorize them as non-democracies. With the exception of Cuba, there is some variation in the Polity scores, with China moving toward autocracy, and Egypt more toward democracy, but all remaining non-democracies during the period of study in question. China, Cuba, and Egypt have a common form of government, but demonstrate important variations in geographic location, years of autocratic rule, territorial size, and experience with natural disasters. As comparative cases, we hold constant the type of government to assess the effects of natural disasters on the language that leaders use to retain power.

Theory of Language During Crisis: The Unity Effect

Autocrats are most well known for their callous brutality, not for their sympathy. However, leaders know that following a natural disaster, citizens can leverage their grievances against the regime. To thwart political discontent stemming from unplacated, disaffected citizens, leaders often use their speeches to unify citizens together, similar to the effect of war crisis rallying. Several studies show that immediately following a large-scale events, individuals drop in their use of the word "I" and increase in their use of "we" references (Pennebaker and Lay 2002; Pennebaker, Mehl, and Niederhoffer 2003). Discourse becomes affectively charged due to empathetic and hopeful communication, as well as acknowledgement of citizens' suffering (Bligh, Kohles, and Meindl 2004).

Hypothesis 1: Leaders will use more inclusive language ("we") as well as more emotionally-laden vocabulary ("affect") following natural disasters.

Blame Management

Leaders use blame strategically to insulate themselves, their policies, and their party from responsibility for natural disasters. Although considerable progress has been made in investigating the role of blame in democratic regimes, little is known about how autocratic leaders navigate the challenges generated natural disasters (Masters and 't Hart 2012). We investigate strategies for blame avoidance that have been popular in political discourse analysis (Bhatia 2008; Dijk 1998; Masters and 't Hart 2012), political science (Mor 2007) organizational psychology (Hood 2002), and social psychology (Stapleton and Hargie 2011). When disasters happen, citizens allocate blame to the leadership they deem responsible for their suffering. The national leader can help channel citizens' discontent toward local or regional officials, thus insulating themselves from culpability. Leaders use polarizing language to isolate the blame in lower-level officials or in the political opposition.

Hypothesis 2: Leaders will increase their use of negative language ("negative emotion") as well as pronoun-distancing language ("they") following natural disasters.

Sense-giving

Scholarship on leadership styles asserts that crises have different effects on leaders than they do on citizens. Leaders are immune to the traumatic effect of natural disasters as their primary role is to relieve the distress for their constituents, rather than being demonstrably affected by it themselves (Yukl 2002; Bligh, Kohles, and Meindl 2004; Heller 1992; Fodor 1978). Weick's sense-making and giving model (1988) states that leaders articulate a cohesive

story of the events and provide clarity for available options and next steps. Citizens affected by natural disasters face emotional upheavals in the aftermath of a crisis, including confusion, fear and anxiety, all of which are potentially devastating effect on individual self-concepts as well as collective national identity. Times of social disequilibrium thus increase the need for leaders to be strong, authoritative and clear because citizens look to them as a coping mechanism (Bligh, Kohles, and Meindl 2004). Linguistically, we operationalize this theory by evaluating the narrativity, and cohesiveness of leaders' speeches. Table 1 shows the three categories of potential leader responses and a description of the associated linguistic strategies they use.

Hypothesis 3: Leaders will become more cohesive and narrative in their speeches following natural disasters.

[Table 1 About here]

Description of Linguistic Analysis Tools

In recent years, researchers have made revolutionary advances in automated text analysis. Computer programs that examine patterns of words in a given text or speech sample are commonly used by social scientists to reveal, for example latent semantic meaning (Lowe 2008). More recently, researchers have incorporated cognitive approaches in the exploration of political phenomena, namely corpus linguistics and computational techniques (Baker et al. 2008; Hancock et al.; Masters and Hart 2012). Coh-Metrix and LIWC provide a new framework for identifying and analyzing linguistic and psychological strategies in political discourse. These tools can systematically analyze massive amounts of information that span many years (Brier and Hopp 2011; Hancock et al.; Masters and Hart 2012). Scholars of political leadership have identified the need for explaining the

leadership phenomena over time (Shimar, 2011). With such sophisticated computational and statistical capabilities we are now able to evaluate theoretical claims on how leaders build and retain power, as well as capture any adaptive dynamic qualities of political influence during times of contentious political behavior.

In addition to word counting programs, researchers have made significant strides in more complex linguistic analysis tools that facilitate investigations into the deeper more subtle patterns in language and discourse. The following sections describe the two linguistic tools we use to evaluate leaders' speeches.

Linguistic Inquiry Word Count (LIWC)

LIWC is an increasingly popular automated word analysis tool used in the social sciences(Tausczik and Pennebaker 2010). LIWC analyzes texts files on a word-by-word basis using an internal dictionary of more than 2,300 of the most common words and word stems within a given text, and then categorizes them into over 80 linguistic dimensions. These dimensions are organized into language categories including the following: standard language like articles, prepositions, pronouns; psychological processes like positive and negative emotion words, cognitive processes; and content categories like sex, death, home, occupation. The standardized values are expressed as a percentage of the total words in the text sample. For example, if the number for the category "pronouns" is 9.22, this means that 9.22% of the total words in the text were pronouns. The only categories that do not reflect percentages are word count, words per sentence and words found by dictionary.

Coh-Metrix

Coh-Metrix is an automated linguistics tool that analyzes higher-level features of language and discourse (Graesser et al. 2004). Unlike basic word counting systems, Coh-Metrix relies on more sophisticated methods of natural language processing, such as syntactic parsing and cohesion computation, to capture these higher-level language characteristics (Graesser, McNamara, and Kulikowich 2011). Previously, Coh-Metrix provided hundreds of measures at multiple levels including genre, cohesion, words as well as other characteristics of language and discourse (Graesser et al. 2004).[6] Additionally, the Coh-Metrix dimensions align with the proposed multilevel theoretical framework of language and discourse (Graesser and McNamara 2011; Kintsch 1998; Snow 2002). These frameworks distinguish representations of meaning, structures, strategies, and cognitive processes at different levels of language and discourse. Five levels have frequently been proposed in these frameworks: (1) words, (2) syntax, (3) the explicit textbase, (4) the situation model (sometimes called the mental model), and (5) the discourse genre and rhetorical structure.[7] The set of collected speeches analyzed by both LIWC and Coh-Metrix are called the corpus. In the subsequent section, we describe the corpus for the three authoritarian regimes analyzed in this paper: Cuba, China, and Egypt.

[Table 2 about here]

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[6] Recently, a principal component analysis revealed eight orthogonal dimensions accounting for 67% of the variance in a large corpus of 37,000 texts from the TASA corpus. We use five of the principal components, narrativity, referential cohesion, deep cohesion, simple syntax, and word concreteness, in our analysis.

[7] A comprehensive list of Coh-Metrix and LIWC variables can be found here:
http://cohmetrix.memphis.edu/cohmetrixpr/index.html
http://www.liwc.net/

Authoritarian Leader Corpus

Commander Fidel Castro's corpus consisted of 1,172 English-translated texts delivered between 1959 and 2008. The texts were obtained using the Castro Speech Database maintained by the Latin American Information Center at the University of Texas at Austin as well as Discursos e Intervenciones de Fidel Castro.[89] Chairman Mao Zedong's corpus consisted of 365 English translated texts delivered between 1926 and 1970. The speeches from 1926-1957 were collected from the "Selected Works of Mao Zedong" published by Foreign Languages Press (2005), while the speeches ranging from 1958-1970 were collected from the "Selected Works of Mao Zedong" published by Kranti Publications (1991). President Hosni Mubarak's corpus consisted of 307 English translated texts delivered between the years of 1996 and 2011. The texts were obtained using the Egypt State Information Service site.[10]

The genres of texts included speeches, statements on major issues, and addresses in which the leader was the sole speaker. Information that was not a part of the actual discourse (e.g., audience reactions, editor comments) was removed in a rigorous cleaning process. Each speech was then labeled by date and put into a text file format and analyzed with Coh-Metrix and LIWC. We developed a time scale that provided a unique increasing number for each of the speeches. [11]

[Figures 1, 2, and 3 about here]

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[8] http://lanic.utexas.edu/la/cb/cuba/castro.html

[9] http://www.cuba.cu/gobierno/discursos/index.html

[10] http://www.sis.gov.eg

[11] The formula used was [(year-initial year)*12) + months]. We standardized this measure yielding using a 0-1 scale, calculated as [(V - min V)/(max V - min V)], where V represents the timescale value of the variable in the original data set, as well as minimum and maximum values.

Natural Disaster Variables

The variables for natural disasters were assembled from The International Disaster Database and the Centre for Research on the Epidemiology of Disasters – CRED (Em-dat 2010). Per the ontology proposed by Nel and Righarts, we use different types of disaster variables representing both slow and rapid onsets (Nel and Righarts 2008). Several scholars have suggested that disaster effects differ by onset type, where rapid-onset disasters being more likely to elicit policy responses from leaders due to the specificity of their onset as well as a clearly defined affected target population (Windsor, forthcoming). On the other hand, slow-onset natural disasters are more likely to elicit a "wait and see" approach from leaders. To account for this, we record the disaster data as a count of the number of rapid-onset events and the number of slow-onset events. Given the sporadic nature of leaders' speeches and unbalanced structure of the data, and given the differing time frames for responding to natural disasters, we count the number of rapid-onset natural disasters happening within a 14-day window of leaders' speeches, and the number of slow-onset natural disasters happening within a 60-day window of leaders' speeches. Rapid-onset disasters include cold episodes, earthquakes, floods, mass movements (dry), and storms. Slow-onset natural disasters include epidemics and droughts. We will discuss in further detail the structure of the data in the subsequent Methodology section.

VII. Methodology

The dependent variables in this data set are continuous measures of linguistic scores assigned to individual leader speeches. However, leaders do not make speeches at regular intervals, and thus our data are unbalanced. Leaders may make two speeches on one day, and then make another speech two weeks later. Given the repeated measure nature of the data, we assume that leaders' speeches, especially those grouped closely together, have serial

autocorrelation. For this reason, we choose the Generalized Estimating Equations (GEE) model because it performs well under these conditions, yielding consistent and unbiased estimators and does not assume any distribution of the data (Zorn 2001; Liang and Zeger 1993; Zeger and Liang 1986). The generalized estimating equations allow the researcher to specify the family and the link function as well as the correlation structure. This model is also theoretically appropriate since we are making claims about the broad category of autocracies, rather than specific autocratic leaders. While we acknowledge that there are many types of autocracies, they all face similar constraints in their accountability to a limited constituency, and thus we assume that given these constraints they will behave similarly under crisis conditions.[12]

For this data, we specify a Gaussian family, an identity link function, and an unstructured correlation. The independent variables are counts of natural disaster events (Em-dat 2010). Additionally, for all GEE regressions we use robust standard errors (Huber 1967; White 1980). We also include a variable for the amount of time between speeches. We estimate separate regressions by leader.

[Tables 3, 4, and 5 about here - GEE Regression results for individual leaders]

The expected direction of each of the variables is positive. We hypothesize that leaders will use blaming strategies, using increased distancing and negative language, that leaders will use unifying language, and that leaders will provide a clear, cohesive narrative for citizens affected by natural disasters.

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[12] Were we interested in the behavior of individual leaders within the set of autocracies, a mixed effects model accounting for leader-specific or regime-type specific characteristics would be more appropriate.

VIII. Results and Discussion

One of the substantive questions we are interested in answering is if all autocratic leaders respond similarly to exogenous natural disaster shocks. We can say with some confidence that this is the case. For all leaders, we find a statistically significant decrease in the use of unity, blaming, and sense-making language. These findings, while contrary to our expectations, are meaningful in their consistency across leaders. For both Fidel Castro and Mao Zedong, there is no statistically significant effect on their language in the presence of only one disaster, but under the circumstances of multiple disasters, each modifies his language. In the presence of multiple disasters, Fidel Castro uses less negative emotion, less inclusive language, and less narrative language. A similar story is true for Mao Zedong who, in the presence of multiple disasters, uses less negative language, less affective language, less inclusive language, and less coherent language. The results for Hosni Mubarak mirror those of Mao Zedong's, at the threshold of one disaster.[13]

While we anticipated that leaders would increase their use of blaming, unifying, and coherent language when natural disasters happen, we find that this is not the case. Leaders decrease their use of negative language after natural disasters happen, but this does not necessarily imply that they use increasingly positive language either. It is possible that in the immediate aftermath of natural disasters, leaders are less inclined to resort to blaming tactics, but reserve this type of language for other circumstances, like responding to challengers or other types of exogenous threats. We find also the decreased use of inclusive language to be puzzling,

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[13] In Appendix 1 we investigate an alternate conceptualization of the blaming and unity hypotheses whereby the variables are combined and scaled to reflect a continuum of blame and unity. We subtracted "we" from "they" and "positive" from "negative" and then added the two new variables together to create this continuum. Results for each leader using this blame-unity variable are similar to the ones we find using the disaggregated variables in the models in the paper. The direction of the statistically significant variables continues to be negative.

especially given anecdotal evidence about individual leaders' personalized responses following particular disasters.

Most interestingly, it appears that leaders' ability to create a coherent narrative is affected by natural disasters. We had hypothesized that leaders were impervious to the sense of panic and chaos that citizens often experience following natural disasters. It appears that when natural disasters happen, leaders become less cohesive in their language, and demonstrate less narrativity in their remarks. Leaders are not insulated from the destabilizing effects of natural disasters, and perhaps mirror their constituents' sense of disequilibrium in their words. Whether this is strategic, or whether leaders truly are affected in similar ways to the people affected directly by natural disasters, is debatable.

IX. Conclusions

This study provides a first look into the language that autocratic leaders use in the context of natural disasters. Given that autocratic leaders are not behaving and speaking as we would expect, we anticipate that there are other strategies they are using to weather the effects of natural disasters which can be investigated in future studies. Both Coh-Metrix and LIWC have many other variables which might better capture how autocratic leaders strategically use language.[14] We also understand the value of increasing the number of autocrats in our data set to investigate other leaders and other countries.

We also anticipate that leaders use language strategically to navigate other types of national crises, like internal and external conflicts, and to signal their resolve to domestic and foreign challengers who pose threats to the stability of their regime. We feel this linguistic metric

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[14] Appendix 1 shows a possible reconfiguration of the blaming-unity hypothesis which we feel could yield better information about the continuum of possible responses leaders can make.

will be useful in identifying leaders' speech patterns with regards to credible threats and promises, like deciding to uphold or abrogate treaties or initiate conflicts. This technique could provide useful information about current threats facing the international community, like those stemming from the uncertainty in the actions of Kim Jong Un in North Korea. Furthermore, text analysis can help reveal actors' preferences, capabilities, and resolve in uprisings and civil wars by revealing meta-linguistic patterns in social media. Using textual analysis to uncover the trends in autocratic leaders' language can be a valuable contribution to the field of political science by revealing patterns and processes that are not visible at the aggregate, annual level of data, or at the level of event analysis.

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Tables and Figures

Table 1.

Theory	Description	Linguistic features	Variables
Unity Effect	Unifies citizens, encouraging, empathetic	Use of "we" and emotionally charged words	We, Affect
Blame, Deflection, and Insulation	Assign blame to other individuals, groups, or God	Use of "they" and negatively charged words	They, Negative Emotion
Sense-Making	Reasserts authority and power to see citizens through the crisis	Use of language with strong narrativity and high cohesion	Narrativity, Referential Cohesion

Table 2. Summary of Linguistic Measures

Variable	Obs	Mean	Min	Max
They	1844	1.19	0	4.75
Negative Emotion	1844	1.97	0	6.44
We	1844	2.42	0	6.85
Affect	1844	5.32	0.21	11.45
Narrativity	1844	-0.21	-1.68	1.54
Referential Cohesion	1844	-0.20	-2.52	2.32

Figure 1. Scatterplot of Unity Effect
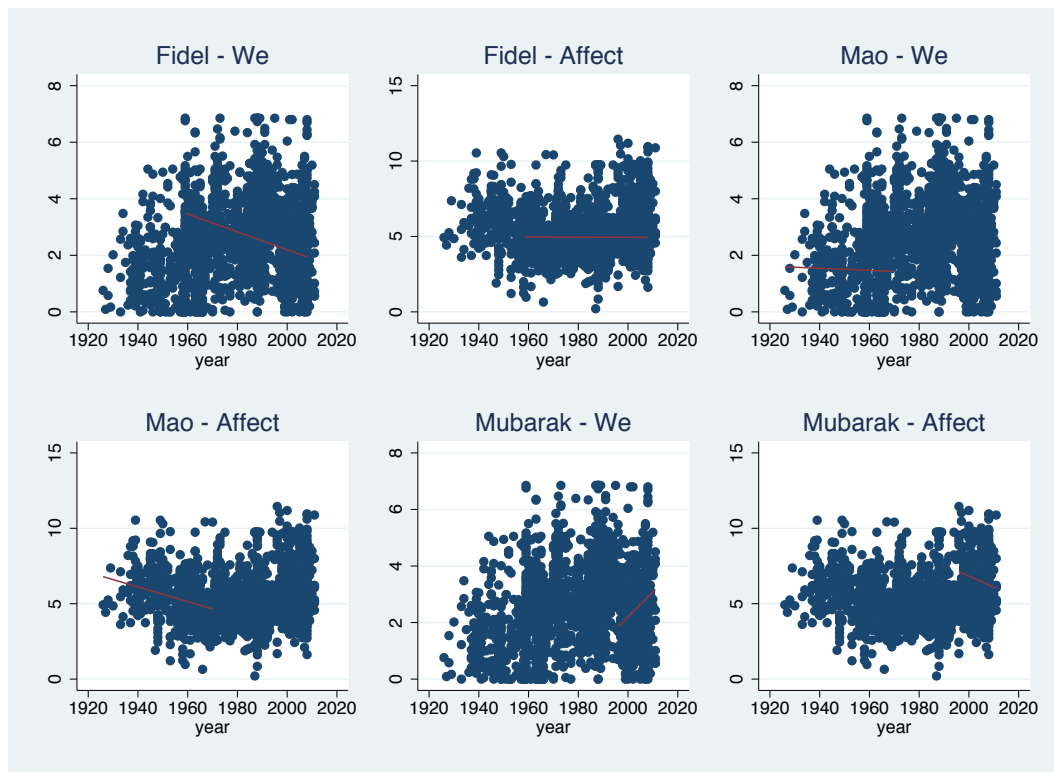
Figure 2. Scatterplot of Blame
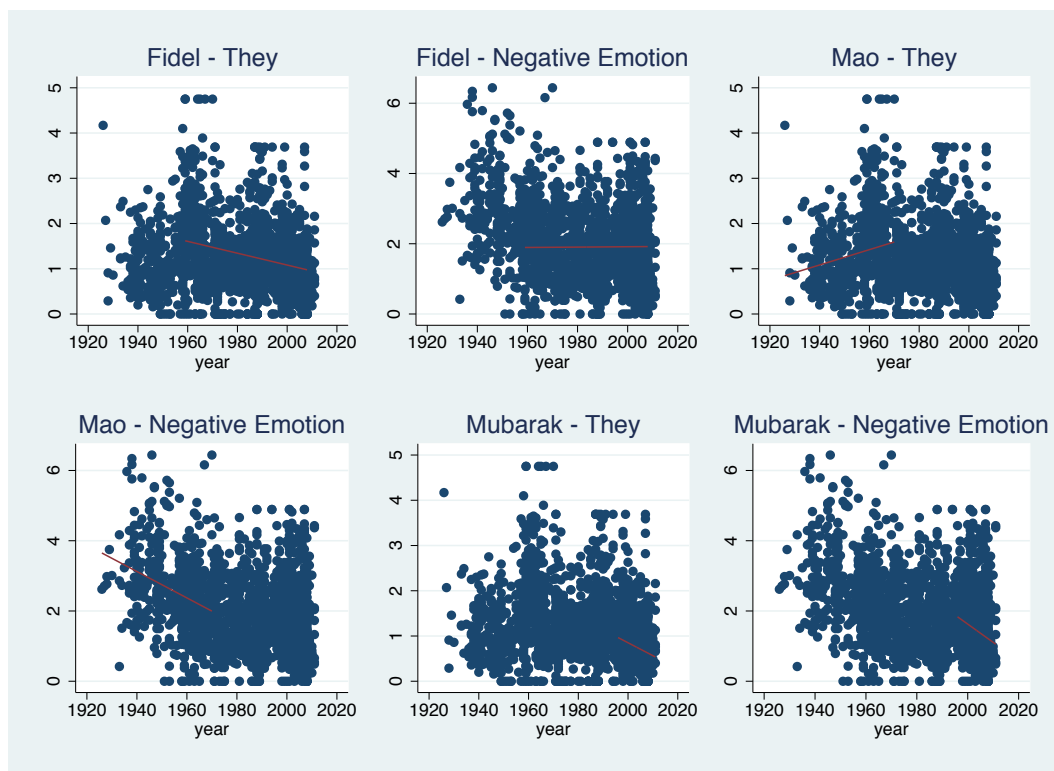
Figure 3. Scatterplot of Sense-Making
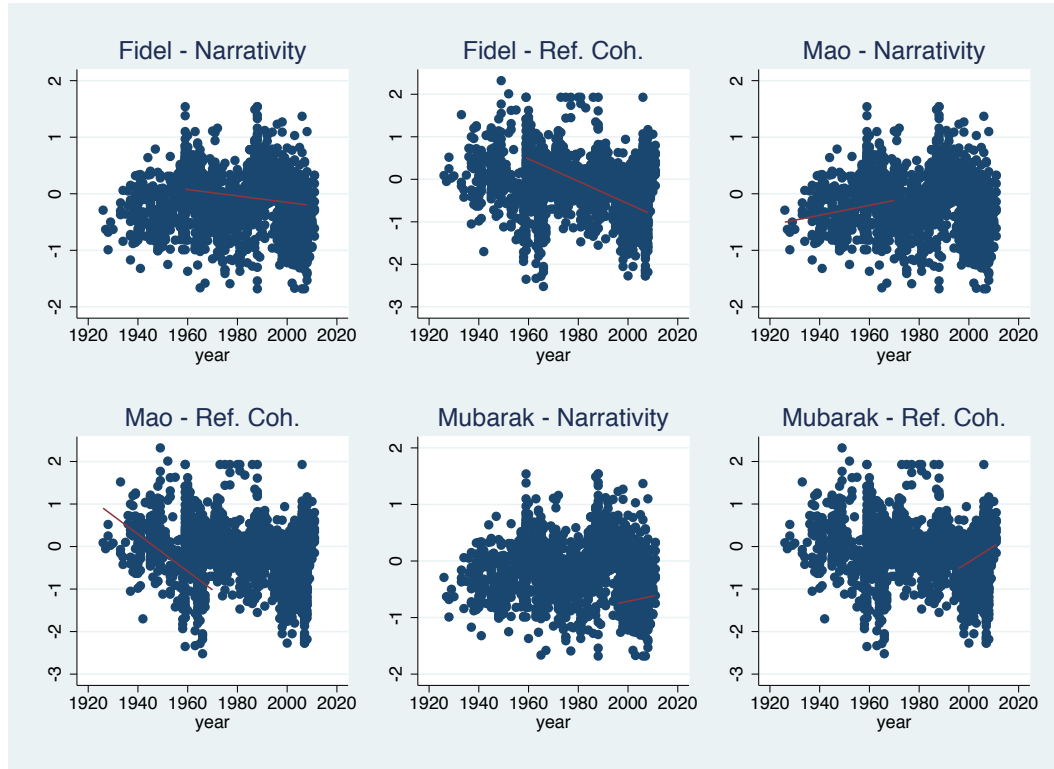
Table 3. GEE Regression Results – Mao Zedong

	(1)	(2)	(3)	(4)	(5)	(6)
	Negative Emotion	They	Affect	We	Narrativity	Referential Cohesion
1 Disaster	-0.539	0.272	-0.266	-0.281	0.0631	-0.0864
	(-1.90)	(0.87)	(-0.73)	(-0.99)	(0.48)	(-0.43)
2 Disasters	-0.687*	0.617	0.00771	-0.684**	0.0995	-0.704***
	(-2.01)	(1.40)	(0.02)	(-2.65)	(0.68)	(-3.86)
Time	-0.159**	0.00967	-0.362***	0.122*	0.0745***	-0.105**
	(-2.80)	(0.22)	(-4.78)	(2.30)	(3.75)	(-2.86)
Constant	3.326***	1.224***	6.934***	1.055***	-0.567***	0.189
	(14.84)	(7.07)	(23.10)	(5.13)	(-7.20)	(1.34)
N	365	365	365	365	365	365

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4. GEE Regression Results – Hosni Mubarak

	(1)	(2)	(3)	(4)	(5)	(6)
	Negative Emotion	They	Affect	We	Narrativity	Referential Cohesion
1 Disaster	0.228	-0.0705	0.0136	0.208	0.0352	0.0651
	(1.62)	(-1.07)	(0.06)	(1.02)	(0.81)	(0.96)
2 Disasters	-0.601***	0.650	-1.774***	-1.533***	-0.155	-0.208***
	(-4.02)	(1.86)	(-13.37)	(-16.29)	(-0.67)	(-4.23)
Time	-0.0903	-0.0299	-0.101	0.355***	0.0852***	0.00469
	(-1.82)	(-1.17)	(-1.18)	(5.13)	(4.82)	(0.19)
Constant	1.721***	0.854***	6.926***	1.156***	-1.013***	-0.233*
	(8.29)	(8.29)	(19.46)	(4.25)	(-14.23)	(-2.32)
N	307	307	307	307	307	307

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5. GEE Regression Results – Fidel Castro

	(1)	(2)	(3)	(4)	(5)	(6)
	Negative Emotion	They	Affect	We	Narrativity	Referential Cohesion
1 Disaster	0.109	0.0187	0.0610	-0.579***	-0.118	-0.441***
	(1.04)	(0.21)	(0.36)	(-4.36)	(-1.86)	(-5.82)
Time	-0.0454	-0.0662**	-0.0771	-0.116**	0.00469	-0.134***
	(-1.63)	(-3.01)	(-1.58)	(-3.01)	(0.30)	(-7.11)
Constant	2.094***	1.559***	5.275***	3.206***	-0.0779	0.424***
	(16.85)	(15.36)	(24.55)	(18.64)	(-1.14)	(5.11)
N	1172	1172	1172	1172	1172	1172

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix 1

In this regression, the dependent variable is a continuum of blame and unity responses. We subtracted we from they, and positive from negative emotions, creating two new variables that are correlated at the .30 level. We then added these two new variables together to create a spectrum of potential responses that leaders could make in the aftermath of a natural disaster.

We find results similar to those in the original models, where the direction of the sign is not in the expected direction.

	(1)	(2)	(3)
	Fidel Castro	Mao Zedong	Hosni Mubarak
1 Disaster	-0.786**	0.285	-0.207
	(-3.08)	(0.48)	(-0.61)
2 Disasters		0.0784	-2.756***
		(0.12)	(-16.03)
Time	-0.0348	0.0770	0.483***
	(-0.44)	(0.75)	(3.82)
Constant	2.704***	0.0405	3.731***
	(7.68)	(0.10)	(7.47)
N	1172	365	307

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$