



A Multi-Appeal Model of Persuasion for Online Petition Success: A Linguistic Cue-Based Approach

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Abstract

Online petitions have become a powerful tool used by the public to affect change in society. Despite the increasing popularity of these petitions, it remains unclear how the public consumes and interprets their content and how this helps the creators of online petitions achieve their goals. This study investigates how linguistic factors present in online petition texts influence petition success. Specifically, drawing upon the dual-process theory of persuasion and the moral persuasion literature, this study examines cognitive, emotional, and moral linguistic factors in petition texts and identifies how they contribute to the success or failure of online petitions. The results, which are based on an analysis of 45,377 petitions from Change.org, show that petitions containing positive emotions and enlightening information are more likely to succeed. Contrary to popular belief, petitions containing heavy cognitive reasoning and those emphasizing moral judgment are less likely to succeed. This study also exemplifies the use of an analytical approach for examining crowd-sourced content involving online political phenomena related to policy-making, governance, political campaigns, and large social causes.

Keywords: Online Petition, Petition Success, Content Analysis, Political Persuasion, Cognitive Appeal, Emotional Appeal, Moral Appeal, Change.org, Analytics

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1 Introduction

The right of the people to petition their government, as guaranteed by the First Amendment to the Constitution of the United States, is currently undergoing an Internet revolution powered by Internet-based information and communication technologies (ICTs). ICTs have changed, probably fundamentally, the way that people interact with their governments and with society. They have also created novel social and political phenomena, opportunities, and challenges relevant to both society at large and academic researchers. One noticeable political change due to

ICTs is the migration of politics from physical spaces to cyberspace in the form of e-politics (Wattal, Schuff, Mandviwalla, & Williams, 2010). As a part of this migration, websites devoted to online petitioning have emerged and have become powerful tools that the public can use to motivate social or political changes. These websites serve as platforms that allow millions of people to easily express their views and opinions on issues of their choosing, participate in democratic initiatives and political dialogue, and eventually create societal impacts and influence policy- and/or decision-making (Hagen, Harrison, Uzuner, May, Fake, & Katragadda, 2016; Huang, Suh, Hill, & Hsieh, 2015).

In the United States, online petition websites, such as Change.org and We the People, have become popular means of empowering citizens to influence decision-makers in both government and business entities. In countries such as Australia, Germany, and the United Kingdom, online petition systems have arguably become a feature of e-government. In these countries, the right to petition the government, the parliament, or public authorities is also a fundamental right codified in national laws or constitutions (e.g., the German Basic Law).

However, despite the increasing popularity of online petitioning, its success rate remains generally very low (Huang et al., 2015; Panagiotopoulos, Sams, Elliman, & Fitzgerald, 2011). Moreover, online petitions have occasionally been associated with jokes or hoaxes that undermine their reputation as a serious form of expression (Garber, 2013; Panagiotopoulos et al., 2011). Despite such drawbacks, successful petitions have managed to gain public support, stimulated concrete changes in public policy, and imposed significant societal consequences. Nevertheless, information systems (IS) research on online petitions is scarce. Moreover, little is known about how the textual information making up online petitions communicates political agendas, boosts political attention, or how it ultimately achieves success.

Prior IS research on ICT-based communication has drawn considerable attention to media, media use, and media theories (Carte & Chidambaram, 2004; Daft & Lengel, 1986; Dennis, Fuller, & Valacich, 2008; Dennis & Kinney, 1998; Te'eni, 2001). IS researchers have also investigated the effect of message elaborations and message forms on conveying information in ICTs (Angst & Agarwal, 2009; Te'eni, 2001). Recently, IS scholars have investigated the role of ICT enabled-media in social change and development and in social movements in general (Gil de Zúñiga, Jung, & Valenzuela, 2012; Njihia & Merali, 2014; Oh, Agrawal, & Rao, 2013).

Nevertheless, the content of messages in ICT-based communication is no less important than the media that transmit it (Orlikowski & Scott, 2008). Orlikowski and Scott (2008, p. 463) argue that “we lose the possibility of seeing the technical and social as inextricably fused. Part of the problem...is linguistic”. They further emphasize the “inseparability between the technical and the social” (p. 434) and the importance of studying the huge amount of content created by social media to “generate deep insights into the contemporary world” and into ICTs’ societal influences (p. 465). Additionally, Internet-based media carry rich content generated through millions of participants’ actions (e.g., posting and reposting, liking and disliking). This data-rich environment offers researchers an unprecedented opportunity to study various aspects of social and political phenomena along with their large societal impacts.

Seizing this opportunity, IS researchers have recently demonstrated a growing interest in the content of ICT-based communications by conducting microlevel analyses of content such as online reviews, blogs, and microblogs (Aggarwal, Gopal, Gupta, & Singh, 2012; Kuan, Hui, Prasarnphanich, & Lai, 2015; Stieglitz & Dang-Xuan, 2013). Furthermore, user-generated political content, such as online petitions, disseminated via Internet media, shows an ever-increasing influence on political activism, social movements, and national and societal progress (Majchrzak, Markus, & Wareham, 2016). Consequently, IS researchers have also recently demonstrated a growing interest in the societal impacts and consequences of ICTs, which had been largely ignored by prior research (Majchrzak et al., 2016; Wattal et al., 2010). This new interest also capitalizes on the availability of a massive amount of real-world data associated with this topic (Abbasi, Sarker, & Chiang, 2016; Miranda, Young, & Yetgin, 2016; Stieglitz & Dang-Xuan, 2013).

This study further explores these research interests by focusing on the micromechanisms of persuasiveness in the language of online petitions. Our goal is to investigate persuasive factors in the form of linguistic cues in online petition texts. We focus on such micromechanisms because successful online petitions rely not only on persuading targets to make a change but also on gaining public support for a petition by collecting signatures. Furthermore, compared to traditional petitioning, online petitioning may lack social presence and convey fewer visual and verbal face-to-face cues. As a result, the information presented as the textual form of linguistic cues becomes a major channel through which persuasion takes place. As such, guided by the proposed multi-appeal model of persuasion, this study performs text analytics on the textual data of online petitions collected from Change.org. Specifically, this study is grounded in the dual-process theory of persuasion from Petty & Briñol (2015). This theory focuses on cognitive and emotional appeals in persuasion. We integrated the theory with the literature on morality and developed the multi-appeal model of persuasion. Such integration is novel, salient, and well-suited for the current research context. This is because many political issues involve social fairness and justice, often stirring up debates and discussions on morality and ethics. Moreover, guided by a theoretical model, we can effectively focus our analysis on critical issues and avoid analysis of the less important elements in content; such a consideration recognizes that online texts are often incoherent and intertwined. We used General Inquirer (GI), a well-established linguistic and content analysis tool, to analyze the collected textual data (Stone, Dunphy, & Smith, 1966).

Our study responds to the call for IS research to move beyond the business field to address ICTs’ impacts on

larger societal issues and challenges (Miranda et al., 2016; Watal et al., 2010). This study also fills a gap in IS research on e-politics, especially in terms of how the Internet has arguably become an instrument of e-politics (Newton, 2002). By examining the uniqueness of political persuasion in the content of online petitions, this study contributes to the understanding of the dissemination and consumption of crowd-sourced content in e-politics. More importantly, our research contributes to the persuasion-related IS literature by extending the dual-process theory of persuasion to include morality factors in the context of online petitioning. It also transcends traditional sentiment analysis, which has mainly focused on the valence in opinion or emotion, to include other persuasive factors, such as cognitive and moral factors. It demonstrates that a theory-guided analytics approach to dealing with the great volume of available real-world textual data can be essential and fruitful. Our findings can help the public use online petition platforms and other e-political platforms to more effectively voice opinions, better advocate for causes, and make positive societal changes.

The rest of the paper is organized as follows. In Section 2, we discuss the background of this study and review prior research on online petitioning. Persuasion theories and development of the research model and hypotheses are covered in Section 3. In Section 4, we describe our research methods and report the results of our data analysis. Section 5 contains the findings and contributions of this research. The limitations of our study and future research directions are discussed in Section 6.

2 Literature Review

2.1 Online Petitioning

A petition is a formal request to an authority, usually cosigned by a group of supporters (Lindner & Riehm, 2011; Panagiotopoulos et al., 2011). The authority may respond to the petition or ignore it (Newton, 2002). If the relevant authority responds positively or if the petition yields a high number of signatures, it is considered a success (Hale, Margetts, & Yasseri, 2013; Lindner & Riehm, 2011). In many democratic countries, petitioning is considered to be a means of democratic governance in which citizens have the opportunity to significantly impact governmental decisions and policy-making, by, for example, raising awareness and participating in setting agendas for policy change (Hale et al., 2013; Lindner & Riehm, 2011). Today, the targets of petitions include not only governmental agencies but also various nongovernmental organizations. Traditionally, offline petitions have generally been organized by leaders and/or well-coordinated groups. These leaders must often contribute significant resources such as time, money, and/or social capital in order to launch a petition campaign and collect the necessary signatures (Hale et al., 2013).

With the advent of Web 2.0, an increasing number of petitions are initiated, signed, and submitted online. Online petitioning reduces the cost of participation, dissemination, and organization (Margetts et al., 2015; Briassoulis, 2010). For instance, instead of physically participating in a protest rally or demonstration, supporters can spend five minutes to register at an online petition website (Alathur, Ilavarasan, & Gupta, 2012). Moreover, online petitions are scalable, especially geographically. There is no technical restriction regarding how many people can sign a petition online, or where and when they sign it. As a result, online petitioning has become an effective tool for stimulating governmental and societal change. Dumas et al. (2015) argue that online petitioning can rapidly elicit public attention concerning new, controversial, or previously ignored issues, mobilize citizens, and eventually bring about policy changes. Online petitioning can also serve to document a relatively new type of democracy footprint that traces ideas and actions, citizen profiles and characteristics, political campaigns, political communications, and political persuasions in cyberspace (Dumas et al., 2015). For instance, online petition platforms can document policy agenda-setting processes and dynamics (e.g., information flows and patterns) through online petitions surrounding a specific trigger event related to the issue and potential policy changes (Dumas et al., 2015). Online petitioning as a public collective action can thus be viewed as a phase of policy agenda-setting. For example, Lindner and Riehm (2011) found that the introduction of official online petition systems in some democratic countries facilitated citizens' integration into the political system and affected the transparency, openness, and responsiveness of the respective governmental institutions. In sum, online petitioning has significantly changed the construction, dissemination, and persuasive features of petitions.

Despite its usefulness, online petitioning has been criticized according to several viewpoints (Garber, 2013; Panagiotopoulos et al., 2011). For example, its ease of use, characterized as point-and-click, may result in a lack of quality or seriousness (e.g., posting of hoaxes or jokes on online petition websites), and its absence of deliberative mechanisms to verify signers' identities compromises the credibility of signers. Some scholars have questioned whether online petitioning is really a means of online activism or just "slacktivism" (Reardon, 2013). Although anyone can create an online petition for any reason, online petitioning often favors popular topics or those with organized backing. In some situations, the popularity of a topic on an online petition can be substantially bolstered by interest groups with power and resources. Such factors may contribute to underrepresentation among underprivileged or minority groups in this venue (Panagiotopoulos et al., 2011). Since there is no

control over what kinds of petitions can be published, views expressed in online petitions can be highly biased, and the changes such petitions seek can be highly subjective and even unreasonable. Nevertheless, online petitioning has attracted many activists, including individual citizens, social groups, and governments, and has become a practical and low-cost mechanism to stimulate massive e-participation and foster a culture of e-democracy.

In the United States, several online petition websites have emerged during the past decade and have quickly become popular. Two prominent websites are We the People and Change.org. We the People (WtP) was launched in 2011 as a section of the official U.S. government whitehouse.gov website. As of November 2016, WtP had over 28 million registered users and had launched 473,000 petitions. Change.org claims that it is the largest online petition website with more than 200 million users worldwide and over 1,000 petitions launched daily in the United States. It is also one of the most comprehensive petition websites, posting hundreds of thousands of petitions in any number of categories, including human rights, animal rights, economic justice, criminal justice, environment, education, and health. As of November 2017, it had achieved 24,030 victories.

At Change.org, users can easily initiate or sign a petition. Each petition is accompanied by a letter addressed to the target of the petition. A petition's creator (petitioner) can post updates of the petition chronologically. The number of signatures is also displayed on the petition page. A petition is considered victorious if the target entity responds satisfactorily to the petitioner. For example, in an effort to protect animals, a petition to ban the transport of hunting trophies was addressed to Delta Air Lines at Change.org. Within a few months, the petition had 394,788 signatures. Delta Air Lines responded to the petition and announced that the company would "officially ban shipment of all lion, leopard, elephant, rhinoceros, and buffalo trophies worldwide as freight" (Delta Air Lines, 2015). During the period of the petition, nine other airlines took similar action (Green, 2015).

Although online petitioning empowers individuals and groups who see issues and want to make an impact (Alathur et al., 2012), it suffers from a low success rate. As of 2015, less than 1% of on Change.org's petitions had been designated as "victories" (Huang et al., 2015). In their 2011 study, Panagiotopoulos et al. downloaded 3,688 petitions from the WtP site and found that the government had reviewed only 252 (6.8%). Therefore, we believe that factors influencing the success of online petitioning warrant research attention.

2.2 Related Literature on Online Petitions

Many prior studies on online petitioning are qualitative and exploratory. For example, Lindner and Riehm (2011) examined the demographic features of online petitioners on the e-petition system introduced by the German parliament. Earl and Schussman (2008) used the data collected from petitiononline.com to investigate the descriptive features of entertainment-related online petitions centered on youth culture. Prior research based on qualitative studies has also attempted to identify effective leaders (power users) and followers in online petitioning (Huang et al., 2015; Margetts et al., 2015). Hagen et al. (2016) examined the popularity of online petitions based on the semantic characteristics of online petition content. Dumas et al. (2015) investigated online communities based on a case study analyzing online petitions on WtP associated with the Sandy Hook shooting.

Qualitative insights from prior research highlight several divergent views of online petitioning. Some question the subjectivity of users' comments (Briassoulis, 2010) and the seriousness and quality of content (Garber, 2013; Panagiotopoulos et al., 2011), while others argue that online petitions play an increasingly prominent role in political systems and collective actions and that petitions directed at governmental bodies are receiving unprecedented public attention (Dumas et al., 2015; Lindner & Riehm, 2011). In fact, there are many examples of e-government adopting online petitioning as a means of facilitating government-citizen interaction in order to increase trust and improve transparency (Alathur et al., 2012; Lindner & Riehm, 2011).

Nevertheless, as pointed out by Majchrzak et al. (2016), the research gap on ICTs' societal issues is more theoretical than methodological. The qualitative and exploratory nature of prior research on online petitions reveals a similar gap in that many prior studies, especially petition content analysis studies, focus much more on data than on theory (e.g., Dumas et al., 2015; Hagen et al., 2016). Therefore, it is critical that IS researchers use both theory and data and adopt a theory-guided approach to investigating the large body of crowd-sourced content assembled by online petitioning. Indeed, IS researchers using content analysis have increasingly adopted this approach in other research contexts (Kuan et al., 2015; Miranda et al., 2016; Stieglitz & Dang-Xuan, 2013). In this study, our theory-guided approach provides a theoretical angle that we use to identify essential factors, in the form of linguistic cues associated with political persuasion in online petitioning. Identifying these factors is important because online petitioners are unable to use the range of persuasion strategies available in face-to-face communication contexts, especially those involving nonverbal cues (Wilson, 2003). Consequently, they must

rely more on the message itself as the medium to communicate with and persuade people.

3 Theoretical Foundation and Research Model

3.1 The Multi-Appeal Model of Persuasion

Based on the literature on psychology, political science, and IS, this study proposes a research model to explain the effect of three persuasive appeals (via textual content) on online petition success. Our research model was developed by adopting the dual-process theory of persuasion (Petty & Briñol, 2015), which is based on a meta-analysis of persuasion research guided by the elaboration likelihood model (ELM). This theory focuses on cognitive and emotional appeals in persuasion. We further extend the theory by including moral appeal based on the morality literature (Kaplow & Shavell, 2007; Wilson, 1993).

Persuasion refers to “an attempt to bring about a change in attitudes as a result of providing information on a topic (e.g., delivering a message)” (Petty & Briñol, 2015, p. 2). Political persuasion attempts to convince people to change their attitudes or behaviors concerning a political issue (Perloff, 2010). According to the dual-process theory, persuasion is anchored in the dual processes of cognitive and emotional appeals (Petty & Briñol, 2015). Cognitive appeal depends on thoughts and elaboration and is based on an individual’s cognitive, reflective, rational, or explicit thought processes. Specifically, by providing factual information and arguments, cognitive appeal tries to motivate an elaborative process that individuals use to carefully inspect and scrutinize all relevant information (e.g., message and content) so that they can accurately judge the issue at hand. Such judgment ultimately leads to a change in a person’s attitude or behavior. Cognitive appeal also explores the basic human need for cognition, which motivates individuals to seek, acquire, think about, and reflect on information in their environments (Cacioppo & Petty, 1982). Individuals often maintain positive attitudes toward tasks and stimuli that require cognitive skills, such as reasoning and problem solving (Cacioppo, Petty, & Morris, 1983). In general, individuals with higher needs for cognition tend to seek out and enjoy cognitive activities (Petty, Briñol, Loersch, & McCaslin, 2009).

IS literature has also demonstrated that cognitive appeal has a persuasive effect on attitude and behavioral change. Grounded in the ELM, prior IS research has found that arguments relying on the cognitive process (e.g., fact-based arguments on system functionality and performance) are persuasive and have the capacity to change attitudes and behaviors (Angst & Agarwal, 2009). In persuasive system

design, design principles and models (Fogg, 2009; Oinas-Kukkonen & Harjumaa, 2009) suggest the essential role of cognitive design elements in determining the persuasive power of the system.

Emotional appeal, the second type of appeal addressed in our research model, is also anchored in the dual-process theory of persuasion (Petty & Briñol, 2015). As the theory posits, emotions work on both affect and thinking to influence persuasion. When appealing to affect, emotional appeal is based on feeling, mood, impulsion, and intuition, reflecting the amount of affection expressed in content through positive or negative valences. Prior studies have found that a person’s emotions can be induced by a persuasive message, as well as by content, attitudinal figures, or other mechanisms of emotional manipulation. Such emotions can affect a person’s evaluations and judgments (Cacioppo & Petty, 1982; Petty & Briñol, 2015). Thus, emotional appeal attempts to induce emotions by injecting feelings and moods into persuasive material as a means of influencing appeal recipients’ feelings and moods and ultimately their attitudes and behaviors. However, emotional appeals applied to thinking can interfere with cognition to some extent and thus also influence attitudes and behaviors (Schwarz, Bless, & Bohner, 1991).

Prior IS research has investigated users’ emotions and their effects on human-computer interaction, IS artifact design, and digital and social media communication (Deng & Poole, 2010; Wang, Qiu, Kim, & Benbasat, 2016; Zhang, 2013). For example, IS research on ICTs in conjunction with the psychological literature on affections and emotions has led to the development of information infusion theories, which identify emotion as a salient factor in attitude change. These studies show that affective cues and characteristics are focal factors that address the effects of emotion in ICTs (Zhang, 2013).

The effects of cognition and emotion on persuasion are often discussed in parallel in the literature because they fall along a bipolar continuum from irrational to rational (Petty & Briñol, 2015). However, moral appeal appears to be missing from the discussion of persuasion appeals, although prior research has investigated the effect of morality on persuasion (Bartels, 2008; Ben - Nun Bloom & Levitan, 2011). To account for its persuasion effect, this study includes moral appeal in the research model. This inclusion is salient and well-suited to the current research context because political issues often involve moral debates and judgments.

The literature conveys two views of moral appeal, one rational and the other intuitive (Haidt, 2001). In the rational view, moral appeal and judgment rely mainly on a process of reasoning and reflection and function under the umbrella of cognition appeal. In contrast, the intuitive view argues that moral judgment is based on perceptions and intuitions and driven by unconscious

motives and feelings (Haidt, 2001). Nevertheless, empirical research has found that although moral judgment has both emotional and cognitive components, moral appeal is an independent dimension of persuasion appeal and derived from both thinking and feeling (Haidt, 2001). In addition, past research has demonstrated inconsistency in the persuasive effects of moral appeal (Ben-Nun Bloom & Levitan, 2011; Kaplow & Shavell, 2007). When appealing to reasoning and thinking, persuasion messages inculcating a moral sense may limit cognitive capacity in individuals because moral constructs may restrict how they think and act. In other words, guilt or virtue instilled by individuals' morality can become the primary power of persuasion (Kaplow & Shavell, 2007). In contrast, when moral appeal is directed at feelings, elements of morality in persuasive messages may trigger emotions on the issue, such as anger or disgust, which may undermine the persuasive power of such messages (Ben-Nun Bloom & Levitan, 2011). Therefore, persuasive efforts invoked by moral appeal may sometimes seem to have the opposite effect. Nevertheless, many studies (e.g., Clifford & Jerit, 2013) show that morality-related factors are influential in debates and persuasion.

Findings in IS research also demonstrate that factors related to morality (e.g., subject norm) influence users' behaviors and intentions (Chatterjee, Sarker, & Valacich, 2015; Venkatesh, Morris, Davis, & Davis, 2003). For example, moral beliefs and moral intensity were found to increase security policy compliance and deter deviant behaviors, such as unethical IT use (Chatterjee et al., 2015). Research has demonstrated that morality and ethics are influential factors in the context of information use (Mingers & Walsham, 2010).

Summarizing the above discussion, we develop the multi-appeal model of persuasion and identify linguistic cues in each appeal. Specifically, this study identifies four cognitive-appeal factors in the form of linguistic cues—cognitive orientation, enlightenment, overstatement, and understatement. The selection of these factors is based on the literature on the framing theory in communication (Borah, 2011). This literature shows that in addition to cognitive reasoning and causal interpretation, political campaigning often uses cognitive framing mechanisms like (de)emphasis framing and uniqueness framing. More specifically, *cognitive orientation* is a category of linguistic cues that reflects a persuader's general cognitive

commitment to cognitive reasoning and causal interpretation about an issue of interest. *Cognitive enlightenment* is a set of linguistic cues that a persuader uses in uniqueness framing to reveal insight and truth or to disclose misunderstood and misguided information. *Cognitive overstatement* refers to a set of linguistic cues that overly emphasize validity, exceptionality, intensity, certainty, and extremity of information and reasoning; cognitive understatement refers to linguistic cues that use uncertainty and ambiguity to overly deemphasize information and reasoning.

Similar to the previous literature (Kuan et al., 2015; Petty & Briñol, 2015; Stieglitz & Dang-Xuan, 2013), our study examines both positive and negative emotional appeals in online petitioning. Our choice is based on prior research in various fields that has shown the relevance of both positive and negative emotions for ICT communication (e.g., Stieglitz & Dang-Xuan, 2013). Moreover, positive and negative emotions have been shown to exert different influences, depending on the research context (Kuan et al., 2015; Lau, Sigelman, & Rovner, 2007). Thus, we believe that *how* linguistic cues of positive and negative emotions affect the success of online petitions merits special attention.

This study also identifies two moral factors associated with moral appeal based on the moral psychology literature: rectitude and linguistic modality (Clifford & Jerit, 2013; Shtulman & Tong, 2013). According to the literature, moral cognition involves cognitive parallels of moral judgment built on moral foundations, such as purity and fairness, and modal judgment referring to moral permissibility (Clifford & Jerit, 2013; Shtulman & Tong, 2013). Rectitude links to moral judgment and refers to linguistic cues related to morality in a text. Rectitude cues convey the persuader's moral beliefs about virtue, righteousness, goodness, and ethics. Modality based on modal judgment demonstrates how strongly a persuader stands by his or her moral values by employing words such as *should*, *ought*, *must*, etc. (Clifford & Jerit, 2013; Siering, Koch, & Deokar, 2016). This study focuses on strong modal cues representing a persuader's strong propositions on desirability, permission, and obligation concerning moral judgment and conduct (Lillian, 2008).

Figure 1 depicts the multi-appeal model of persuasion that serves as a theoretical foundation for hypothesis development.

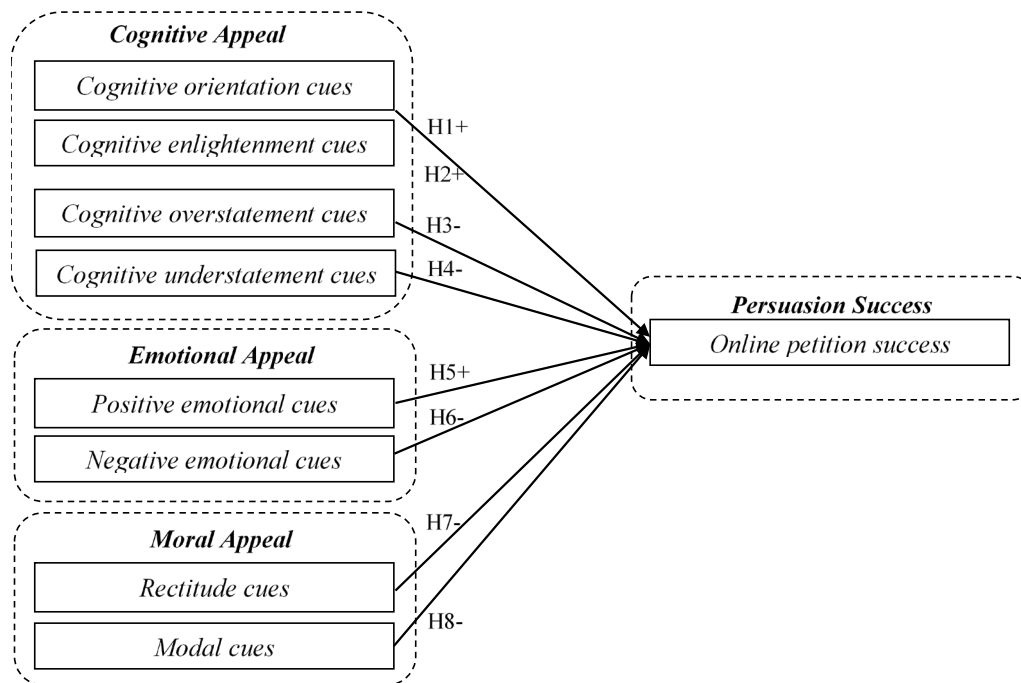


Figure 1. Multi-appeal Model of Political Persuasion

3.2 Hypothesis Development

3.2.1 Cognitive Appeal

A common tactic of cognitive appeal in persuasion is the use of cognitive cues to provoke recipients' mental processes of thinking, reasoning, reflecting, and inferring (Cacioppo & Petty, 1982). The purpose of cognitive appeal is to alter or reinforce recipients' knowledge about the issue of interest in a message so that recipients eventually accept the message. Prior research has found that cognitive efforts in message content enhance an audience's perceptions of an argument's quality and credibility and thereby encourage the audience to devote the mental effort to understand the argument (Angst & Agarwal, 2009; Cacioppo & Petty, 1982), which can thereby also encourage the audience to act in line with the persuader's intentions.

Cognitive-oriented words in an online message may trigger recipients to share the message. For example, prior research has found that a Tweet's quality in terms of argument precision and accuracy increases recipients' intentions to share it on social media (Ha & Ahn, 2011). Their findings suggest that cognitive-oriented words influence information virality and facilitate actions among recipients.

In online petitioning, shared causes and views form subnetworks around contentious issues. Cognitive-oriented words in the texts of online petitions enable individuals to better grasp the link between cognitive context and the individuals' cognitive map of the issue

(Passy & Monsch, 2014). For example, interacting with cognitive words in texts involving causal words (e.g., *source*, *condition*, *likelihood*, *reason*, and *consequence*) and quantity references (e.g., *percent*, *amount*, and *expense*) may enrich and modify individuals' cognitive maps by invoking logic- and fact-based arguments (Passy & Monsch, 2014). Such cognitive modification can transform an individuals into committed participants and supporters who not only sign a petition but also spread its message. Moreover, the use of quality-related cognitive words (e.g., *credibility* and *quality*) and cardinal numbers (e.g., *hundred*, *thousand*, and *million*) in a petition may appeal to an audience as evidence of argument quality and credibility. Such arguments have the capacity to exert a persuasive influence. As a result, members of these audiences may sign the petition or share it in their social networks, which may contribute to attracting a large number of signatures and may pressure the petition target into taking action.

Furthermore, research on reality monitoring points out that statements based on lies, imagination, speculation, or exaggeration generally contain fewer contextual details such as where (space), when (time), and how (sensory and environment details). Thus, such statements are considered less credible and less plausible (Johnson & Raye, 1981; Ndez-Fernaud & Alonso-Quecuty, 1997). In other words, a statement with more contextual information (space and time) and more sensory details (colors and sounds) is more likely to be considered truthful and plausible. Therefore, a cognitively appealing petition will often use cognitive

words related to time (e.g., *morning* and *century*), space (e.g., *block* and *wide*), and color (e.g., *red* and *blue*). Using such contextual and sensory details to describe an issue may persuade an audience of the petition's plausibility; persuaded audiences will, of course, be far more likely to act in line with a petitioner's intentions. Following the above logic, we hypothesize:

H1: Cognitive orientation cues in the texts of online petitions positively influence their success.

Cognitive enlightenment assumes that "individuals have the capacity to recognize truth and a disposition to assent to it" and that societal discourse propels spreading the truth (Braman, Kahan, & Grimmelmann, 2005, p. 286). In other words, people normally embrace truth and eagerly transmit it. Revealing concealed truth or misguided information often attracts attention and speeds up its dissemination. Thus, the use of words related to cognitive enlightenment (e.g., *clue*, *deliberation*, *disclose*, and *evidence*) in a petition may feed an audience eager for truth and may propel its members to sign the petition or act on it. Moreover, people generally embrace original opinions (Braman et al., 2005). Words related to the originality of opinions (e.g., *diagnosis*, *experiment*, *research*, and *discovery*) in a petition indicate a petitioner's effort to educate an audience of his or her principles and original opinions. When members of an audience appreciate the originality of opinions and accept them, they will be more likely to spread them and act on them. Therefore, we argue that:

H2: Cognitive enlightenment cues in the texts of online petitions positively influence their success.

Cognitive understatement and overstatement demonstrate how a persuader attempts to deemphasize or exaggerate the validity, exceptionality, intensity, certainty, and extremity of the truth or the reliability of quantitative information such as statistics and data in arguments intended to persuade. According to the ELM, quantitative information indicates strong arguments, implies argument quality, and can be strongly persuasive via the central route of persuasion (Petty & Briñol, 2015). However, overly emphasizing or deemphasizing quantitative information in a message may reduce an audience's motivation and ability to process the information because the complexity of the information as it appears may overwhelm the audience (Oinas-Kukkonen & Harjuma, 2009). Assertions for emphasis (e.g., *absolute*, *always*, *crucial*, *enormous*, and *extraordinary*) or deemphasis (e.g., *appear* and *seem*) may distract an audience from the central theme of the argument (Yalch & Elmore-Yalch, 1984). For example, petition audiences may be distracted by overstatement/understatement words in a sentence (e.g., *seem* and *extraordinary* in a sentence such as "it seems extraordinary that in the 21st century we still

have kids starving"). They may not only have to exert extra cognitive effort in interpreting these words but may also be distracted from the quantitative information (*the 21st century* in this case) and the issue of interest (*we still have kids starving*). A high frequency of such distractions and cognitive demands may reduce the number of responses and desired actions associated with a petition message.

Research on the design of persuasive systems also indicates that users often turn to cognitive shortcuts to avoid cognitive burdens when the persuasive functions of the system demand high cognitive efforts (Oinas-Kukkonen & Harjuma, 2009). Overstatement words added to the key message hinder such cognitive shortcuts and can result in fewer responses or can even lead to rejection of the persuasive effort.

Furthermore, overstatement words, in general, convey strong opinions and perceptions that require an audience to make a judgment (e.g., reasoning whether *extraordinary* in the above example sentence is plausible) (Johnson & Raye, 1981; Ndez-Fernaud & Alonso-Quecuty, 1997). Such language may also provoke resistance because the audience may associate the strong tone of the words with being forced into accepting the argument. As a result, the audience may become reluctant to support and act on the message.

On the other hand, cognitive understatement conveys a lack of argument quality. An audience may perceive understatement words (e.g., *appear*, *anyway*, and *insignificant*) as signals of uncertainty and may conclude that the argument is weak and the information possibly inaccurate. Weak arguments and misguided impressions lead to weak persuasion. Following the above logic, we hypothesize:

H3: Cognitive overstatement cues in the texts of online petitions negatively influence their success.

H4: Cognitive understatement cues in the texts of online petitions negatively influence their success.

3.2.2 Emotional Appeal

Emotional appeal relies on provoking feelings and moods that can be either positive or negative. Invoking positive feelings and moods relies on a hedonic frame that improves how an individual feels in a specific situation—for example, feeling pleasure or excitement (Lindenberg & Steg, 2007). In other words, a positive emotional appeal tries to put people in a hedonic frame that increases their responsiveness to information that makes them feel good. Feeling good then becomes a motive for behavior (Lindenberg & Steg, 2007). Positive content, in general, helps generate positive thoughts and leads to a higher likelihood of desirable outcomes among members of an audience (Petty & Briñol, 2015). Prior research has found that positive emotion in newsgroup messages reinforces a sense of

community and affirmation and increases the likelihood of reposting (Joyce & Kraut, 2006). Empirical evidence has demonstrated that positive content has a higher chance of being read on the Internet (Berger & Milkman, 2012). Past research has also shown that the experience of positive emotions broadens people's thought-action repertoires (Zhang, 2013). When using positive linguistic cues (e.g., *great*, *achieve*, *happiness*, *harmony*, and *improve*) in online petitions, petitioners pursue their cause by infusing their language with positive emotions of enjoyment, pleasure, certainty, and affirmation. Accordingly, they likely increase the audience's attention and participation. Following the above logic, we hypothesize:

H5: Positive emotional cues in the texts of online petitions positively influence their success.

When emotional appeal operates on negative feelings and moods, it focuses on negative sanctions and this may invoke strong, negative emotions in individuals. Such emotions often indicate strong opinions on an issue, inducing debate, opposition, and even hostile feedback instead of facilitating the desired actions and changes (Joyce & Kraut, 2006; Stieglitz & Dang-Xuan, 2013). Based on meta-analyses on the effects of negative political campaigning, Lau et al. (1999, 2007) found that despite the pervasiveness of negative campaigning, the literature in social science does not support that such campaigning wins voters, although it may attract their attention. Past research has also found that negative emotions can lead to hostile and insulting interactions (Joyce & Kraut, 2006). These findings indicate that negative words elicit negative emotions which in turn induce debate and opposition: the ensuing controversy deters message recipients from supporting or acting on the cause the persuader advocates.

An online petition often pertains to a contentious issue. People often channel their anger and frustration about the issue by appealing to negative emotions—which increases involvement in debate instead of action. For example, many petitions at Change.org and WtP associated with the Sandy Hook shooting contained negative emotions such as anger and sadness. However, while such emotions incited controversy (many petitions with different views were created immediately after the shooting), they seemed to deter action (a majority of these petitions failed to collect a large number of signatures or to achieve victory). In other words, online content with high negative emotional appeal may attract attention but may also result in superficial information processing (e.g., stereotyping) of persuasive material and accomplish little in terms of persuasion (Baron, Logan, Lilly,

Inman, & Brennan, 1994). Thus, we expect that the frequent appearance of negative emotional elements (e.g., *alienation*, *banishment*, *hassle*, *embarrassment*, and *shame*) in the content of an online petition will have a deterrent effect on persuasion and on persuasive outcomes in terms of actions by potential supporters and petition targets. We, therefore, hypothesize:

H6: Negative emotional cues in the texts of online petitions negatively influence their success.

3.2.3 Moral Appeal

As discussed earlier, morality burdens people by infusing them with either a strong sense of guilt or virtue (Kaplow & Shavell, 2007). Ben-Nun Bloom and Levitan (2011, p. 659) argue that “thinking about an issue as moral not only heightens resistance to persuasion, but also lessens people's receptiveness to the views of those close to them”. Rectitude words show strong propositions on moral values. Prior research has found that in social networks made up of groups with heterogeneous viewpoints, heavy use of moral cues in a message weakens persuasion and sometimes even nullifies previously held views (Ben-Nun Bloom & Levitan, 2011). Online petition websites attract groups that hold diverse views and advocate different, sometimes opposite, causes. Because these websites represent a community with heterogeneous values (Ben-Nun Bloom & Levitan, 2011), we expect that frequent use of rectitude words (e.g., *justification*, *right*, *God*, and *heaven*) in the content of a petition will convey to audiences a strong viewpoint and strict attitude on righteousness of conduct and moral virtue. This stance can stir resentment in audiences and thus negatively affect their responses and support for the petition.

In addition, many users of these websites have hedonic goals such as pursuing enjoyment, relaxation, and self-confirmation (Earl & Schussman, 2008; Lindenberg & Steg, 2007).¹ Under such circumstances, using language ensuring correctness or morality in online petitions can easily invoke feelings of guilt or virtue among users, which may consequently diminish their feelings of enjoyment. Therefore, petitions emphasizing morality and rectitude are less likely to succeed. Moreover, a high degree of morality shifts the evaluative focus from the overall sentiment of the content to rules about morality (Bartels, 2008). For example, a high degree of morality may shift audiences' attention from the direct consequences (benefits and costs) of an action described in the petition message to a debate about the morality of the action. In essence, such a shift creates distractions and debates. It ultimately weakens persuasion and

¹ Hedonic motivation is a type of intrinsic motivation. Regardless of a person's age, it is a critical determinant of behavior and intention in various contexts (e.g., social network participation) (Salehan, Kim, & Kim, 2017),

although it may be stronger in a specific age group (e.g., younger men) in certain contexts (Venkatesh, Thong, & Xu, 2012).

undermines the likelihood of any subsequent support and action. Thus, we hypothesize:

H7: Rectitude cues in the texts of online petitions negatively influence their success.

Strong modal words (e.g., *should*, *ought*, and *must*) reflect a persuader’s strong propositions toward the issue of interest. Such modal words are linguistic assertions and expressions of morality (Shtulman & Tong, 2013). For example, directly or indirectly, strong modal words often result in moral inferences such as moral obligations, moral judgments, moral imperatives, duty, and goodwill based on social or moral norms (Shtulman & Tong, 2013). Moral inferences can shift an audience’s focus from the issue at hand toward a debate on morality and thus increase resistance to the argument and undermine the power of persuasion (Bartels, 2008). In addition, strong modal words imply restrictions on possible choices, means, or courses of action based on a persuader’s moral stance (Allen, 1972). In other words, modal words demand decisions and judgments (cognitive operations) from

audiences. Furthermore, a high demand on cognitive operations may suggest that an argument has low credibility and plausibility (Johnson & Raye, 1981; Ndez-Fernaud & Alonso-Quecuty, 1997). Based on the above findings that restrictions and demands breed resistance among recipients of a petition message, we hypothesize:

H8: Modal cues in the texts of online petitions negatively influence their success.

4 Research Method and Result

4.1 Data Collection

We collected online petitions from Change.org using a web crawler combined with its application programming interface (API). Specifically, the web crawler searched petitions at Change.org based on commonly used English words with little meaning, such as *of*, *and*, and *have*, in order to retrieve as many petitions as possible.

Table 1. Number of Petitions by Category and Target Type

Category	Number of petitions
Animals	2,430
Human Rights	2,347
Education	1,625
Criminal Justice	1,362
Economic Justice	983
Environment	971
Health	880
Gay Rights	582
Unspecified	34,197
Target type	Number of petitions
Custom	35,578
Government	9,213
Unspecified	586

The API collected the status, signatures, category, text, and goal of each petition retrieved. To minimize the confounding effects of culture and political atmosphere, we only retained those petitions initiated by users from the United States. To mitigate the influence of outliers and ensure the generalizability of the findings, we excluded categories containing petitions that were less than 1% of our sample. This procedure removed only 3% of the petitions, which suggests that no serious bias in sample selection exists. Our final sample contained 45,377 petitions; of these, 3,514 were labeled victorious and 41,863 were closed.

We did not use open petitions because their outcomes (i.e., closed or victorious) were not yet determined.

Table 1 shows the distribution of petitions by *category*. When starting a petition at Change.org, a petitioner has an option to specify a category for it. Many petitioners choose not to do so. Consequently, many petitions lack a specified category. We designated these as “unspecified”. Table 1 also shows the distribution of petitions by type of target. As with categories, a petitioner can start a petition with or without specifying a *target type*. Targets are of two types, custom—an individual or a nongovernment organization—and

government. We also used “unspecified” to flag petitions not assigned a target type. If a petition was specified with multiple categories or target types, we used the first one.

4.2 Variable Definitions

This study used two variables to measure petition success. One was *petition status*, a binary variable indicating the status of petition victory: victorious versus closed. At Change.org, a petition can be labeled as victorious only after the target has responded satisfactorily; otherwise, it is labeled as closed after a certain amount of time. The other variable was *number of signatures* collected during a petition. At Change.org, a petitioner sets a target number of signatures (*goal*) for his or her petition. This goal is based on the number of signatures the target requires to act; more often the goal is based on intuition. Petition status and number of signatures are two aspects of petition success. A petition labeled a victory means the petition persuaded the target to make concrete changes. Number of signatures is a measure of popularity (Hale et al., 2013). A petition with a large number of signatures indicates that it has gained public support.

As noted earlier, many petitions pertain to contentious issues, such as gun control, for example. Some petition requests can be overdemanding—for instance, asking a chief executive to resign or insisting on a new law in a limited amount of time. It is unrealistic for the targets of these petitions to respond exactly as requested, even if these petitions have accumulated a large number of signatures. However, a large number of signatures serves to generate headlines and to support the agenda-setting efforts of petitioners (Dumas et al., 2015). Although a petition with a large number of signatures may not immediately lead to concerted action, it may increase pressure on the target of the petition, raise public awareness and knowledge about an issue, and eventually lead the issue to be considered in a policy setting agenda.

While some closed petitions attract a large number of signatures, victorious petitions typically enjoy broad support, indicated by a large number of signatures. In our sample, victorious petitions had, on average, 12,510 signatures, whereas the average number of signatures among closed petitions was only 2,171. In any case, petition status and number of signatures measure different aspects of petition success and present different perspectives for interpreting the findings in this study.

We used General Inquirer (GI) to analyze the data, and used the corresponding categories in GI (Stone, Dunphy, & Smith, 1966) to measure the four cognitive appeal factors (cognitive orientation, enlightenment, overstatement, and understatement), the two emotional appeal factors (positive and negative emotion), and the

two moral appeal factors (rectitude and modality). The selection of the GI categories was based on their relevance to the three appeals. For example, we selected the cognitive enlightenment category from GI categories for our model because linguistic cues in the category are related to knowledge and insight in political inquiry (Lasswell & Kaplan, 1950). GI categories for general linguistic cues and those irrelevant to the three appeals were not selected. For example, we did not use categories for names, pronouns, and yes/no. Table A1 in Appendix A shows the selected GI categories and sample GI word usages in petitions at Change.org.

We used GI because it supports a “systematic and easily replicable analysis” (Tetlock, 2007, p. 1144). Researchers have used GI widely for content analysis, emotion detection, and fraud detection; examples include extracting sentiment from Tweets, online forum discussions, financial statements, and online crowdfunding platforms (Das & Chen, 2007; Siering et al., 2016; Steinberger et al., 2012). Although GI was created decades ago, recent IS studies have demonstrated its effectiveness in analyzing online texts (Ghiassi, Zimbra, & Lee, 2016; Kuan et al., 2015; Siering et al., 2016). Unlike other typical sentiment analysis tools, GI provides linguistic dimensions far beyond sentiment polarity (positive and negative valance) and thus enables effective examination of the linguistic factors this study focuses on. In addition, some GI categories (e.g., Lasswell dictionary categories) were created specifically for political inquiry (Lasswell & Kaplan, 1950). Specifically, the enlightenment and rectitude categories used in this study are from the Lasswell dictionary. Therefore, GI is well-suited for the purposes of our research.

We wrote a Python script to count the number of words for each of the selected GI categories. For example, if the text of an online petition contained 10 words from the cognitive orientation category of GI, it had a score of 10 for the cognitive orientation factor. This score was further normalized by the total number of words in the petition. We performed similar operations to calculate the scores for the other seven factors.

Petition *category* and *target type* were controlled because certain categories or target types tend to be more successful than others (Albrecht et al., 2008). We also controlled the number of targets for each petition (*targets*) and the targeted number of signatures (*goal*), because some petitions, by nature, require more support to succeed. Furthermore, online petitions at Change.org restricts any online petition to collect more signatures than the target number of signatures set by the petitioner. We also controlled some general linguistic factors including *word count*, *expressiveness* (ratio of the number of adjectives and adverbs to the number of nouns and verbs) (Zhou, Burgoon, Nunamaker, & Twitchell, 2004), *average sentence*

length, and average word length. Only significant linguistic factors, *word count*, and *expressiveness* were included in the final analysis. Following Hair et al. (2009), we took a logarithm on *goal* and *word count* to

reduce skewness. The distributions of both variables were much less skewed after the transformation. We present the summary statistics of the above variables in Table 2.

Table 2. Summary Statistics of Variables

Variables		Mean	SD	Min	Max
Cognition	Cognitive orientation	0.167	0.055	0	0.556
	Enlightenment	0.033	0.023	0	0.500
	Overstatement	0.043	0.025	0	0.400
	Understatement	0.021	0.017	0	0.500
Emotion	Positive emotion	0.048	0.028	0	0.667
	Negative emotion	0.032	0.023	0	0.500
Morality	Rectitude	0.017	0.013	0	0.250
	Modality	0.004	0.008	0	0.222
Controls	Targets	2.175	3.871	0	151.000
	Word count (log)	5.297	1.162	0	10.420
	Goal (log)	6.029	1.989	2.303	21.490
	Expressiveness	0.248	0.111	0	4.000

4.3 Explaining Online Petition Success

To empirically validate the research model and the proposed hypotheses, we ran two statistical models to examine the effects of cognitive, emotional, and moral factors on two petition success variables: petition status (victorious vs. closed) and number of signatures. We ran the logistic regression model first to test the effect of these factors on the dependent variable (DV): petition status (victorious vs. closed). Logistic regression models the relationship between a discrete DV and a set of continuous and discrete independent variables. The logistic regression model was specified as follows:

$$\begin{aligned}
 & \text{Logit}(\text{status}) \\
 & = \beta_1 \text{cognitive orientation} + \beta_2 \text{enlightenment} \\
 & + \beta_3 \text{overstatement} + \beta_4 \text{understatement} \\
 & + \beta_5 \text{positive emotion} + \beta_6 \text{negative emotion} \\
 & + \beta_7 \text{rectitude} + \beta_8 \text{modality} + \eta_1 \log(\text{goal}) \\
 & + \eta_2 \log(\text{word count}) + \eta_3 \text{expressiveness} \\
 & + \eta_4 \text{targets} + \sum_{i=1}^j \gamma_i + \sum_{i=1}^k \delta_i
 \end{aligned}$$

We then ran a linear regression model that used number of signatures as the DV. A logarithm on the DV was performed to increase the linearity and normality of the model (Hair, Black, Babin, & Anderson, 2009). The model specification was as follows:

$$\begin{aligned}
 & \text{Log}(\text{signatures}) \\
 & = \beta_1 \text{cognitive orientation} + \beta_2 \text{enlightenment} \\
 & + \beta_3 \text{overstatement} + \beta_4 \text{understatement} \\
 & + \beta_5 \text{positive emotion} + \beta_6 \text{negative emotion} \\
 & + \beta_7 \text{rectitude} + \beta_8 \text{modality} + \eta_1 \log(\text{goal}) \\
 & + \eta_2 \log(\text{word count}) + \eta_3 \text{expressiveness} \\
 & + \eta_4 \text{targets} + \sum_{i=1}^j \gamma_i + \sum_{i=1}^k \delta_i
 \end{aligned}$$

In both models, β_i denotes the effects of cognitive, emotional, and moral factors, η_i denotes the effects of controls, γ_i denotes the effect of being in a specific category, and δ_i denotes the effect of petitioning a specific type of target.

4.4 Results

The R software was used for the statistical analysis. The variance inflating factors (VIF) of all applicable variables in both models were less than 2, indicating the absence of multicollinearity. Table 3 shows the coefficient estimates, odds ratios, and *p* values of the logistic regression model with petition status (victorious vs. closed) as the DV. The odds ratios are based on a 0.01-unit change (1%) of each variable rather than a one-unit change (100%) because the independent variables (IVs) in our model are word frequencies ranging from 0%-100%. The results show that three cognitive appeal factors significantly

influence online petition status at a 5% significance level. Specifically, the coefficient for cognitive orientation is -1.977 ($p < 0.001$). The odds ratio of cognitive orientation is 0.980, indicating that an increase of 1% in the ratio of cognitive-oriented words in the text of a petition decreases the odds that the petition will be victorious by about 2%. Although the

effect of cognitive orientation on online petition status is significant, the sign of the coefficient is the opposite of what was hypothesized. Thus, H1 is not supported. The coefficient of enlightenment is 2.522 ($p = 0.004$). Its odds ratio of 1.026 indicates that a 1% increase in the enlightenment word ratio increases the odds that a petition will achieve a victory by 2.6%. Thus, H2 is supported.

Table 3. Results from the Logistic Regression Model for DV: Petition Status

Variable	Coefficient	Odds ratio*	p Value
Intercept	-3.036	0.970	<0.001
Cognitive appeal			
Cognitive orientation	-1.977	0.980	<0.001
Enlightenment	2.522	1.026	0.004
Overstatement	-0.122	0.999	0.899
Understatement	-4.638	0.955	0.001
Emotional appeal			
Positive emotion	0.086	1.001	0.909
Negative emotion	-4.121	0.960	<0.001
Moral appeal			
Rectitude	-1.458	0.986	0.307
Modality	-7.859	0.924	0.021
Control			
Log (goal)	0.153	1.002	<0.001
Log (word count)	0.114	1.001	<0.001
Expressiveness	-0.688	0.993	0.001
Targets	0.020	1.000	<0.001
Target type			
Custom	-0.388	0.996	0.003
Government	-0.919	0.991	<0.001
Category			
Animal	0.114	1.001	0.120
Criminal justice	0.252	1.003	0.008
Economic justice	0.127	1.001	0.256
Education	0.676	1.007	<0.001
Environment	-0.034	1.000	0.776
Gay rights	0.715	1.007	<0.001
Health	0.499	1.005	<0.001
Human rights	0.200	1.002	0.007

Notes: * Based on 1% absolute change in the IVs; odds ratio = $e^{\beta/100}$, where β is the coefficient (Hair, Black, Babin, & Anderson, 2009).

Table 4. Results from the Linear Regression Model for DV: Number of Signatures

Variable	Coefficient	Coefficient (on original scale)*	p Value
Intercept	-0.908	-0.904	<0.001
Cognitive appeal			
Cognitive orientation	-0.992	-0.987	<0.001
Enlightenment	1.080	1.086	<0.001
Overstatement	-1.038	-1.033	0.001
Understatement	-1.797	-1.781	<0.001
Emotional appeal			
Positive emotion	0.910	0.914	<0.001
Negative emotion	-0.318	-0.317	0.275
Moral appeal			
Rectitude	-1.296	-1.290	0.003
Modality	-6.019	-5.840	<0.001
Control			
Log (Goal)	0.729	0.369	<0.001
Log (word count)	0.255	0.368	<0.001
Expressiveness	-0.467	-0.466	<0.001
Targets	0.015	0.015	<0.001
Target Type			
Custom	0.320	0.321	<0.001
Government	0.173	0.173	0.004
Category			
Animal	0.733	0.736	<0.001
Criminal justice	-0.120	-0.120	0.002
Economic justice	-0.653	-0.651	<0.001
Education	0.070	0.070	0.051
Environment	0.104	0.104	0.023
Gay rights	0.091	0.091	0.118
Health	-0.129	-0.129	0.007
Human rights	-0.544	-0.543	<0.001
Notes:* based on 1% absolute change in the IVs; the coefficients as percent change in the DV's original scale are calculated using $100(e^{\beta/100}-1)$ (Vittinghoff, Glidden, Shiboski, & McCulloch, 2011; Vittinghoff et al. 2011).			

H3 is not supported in this model because the effect of overstatement is not significant ($p = 0.899$). The coefficient of understatement is -4.638 ($p = 0.001$). Its odds ratio is 0.955 , indicating that a 1% change in the understatement word ratio is associated with a 4.5% decrease in the odds that a petition will achieve a victory. Thus, H4 is supported.

As for the emotional appeal factors, H5, which posits the effect of positive emotion on petition status, is not supported because of an insignificant coefficient ($p = 0.909$). The coefficient of negative emotion is -4.121 ($p < 0.001$), with an odds ratio of 0.960 , which suggests a 1% increase in the negative word ratio decreases the odds of victory by 4%. Thus, H6 is supported.

As for the moral appeal factors, the effect of rectitude is not significant ($p = 0.307$), suggesting that H7 is not supported. The coefficient of modality is -7.859 ($p = 0.021$), with an odds ratio of 0.924 , suggesting that a 1% increase in the modal word ratio decreases the odds of achieving a victory by 7.6%. The results support H8.

Among the control variables, *word count*, *goal*, and *number of targets* positively and significantly explain petition status, but *expressiveness* negatively influences petition status. Changing the target type of a petition from unspecified to custom or government significantly reduces its chance of victory. Changing the category of a petition from unspecified to criminal justice, education, gay rights, health, or human rights significantly increases its chance of victory. However, changing the category to animal, economic justice, or environment makes no difference.

Table 4 reports the coefficients, retransformed coefficients, and p values of the linear regression

model on the DV of number of signatures. The adjusted R-squared of the model is 0.57 ($p < 0.001$). The coefficients of enlightenment, overstatement, and understatement are 1.080 , -1.038 , and -1.797 , respectively. All their p values are less than 0.001 . This suggests that H2, H3, and H4 are further supported. H1 is not supported in this model because the effect of cognitive orientation is significant, but negative. Positive emotion significantly and positively influences the number of signatures, with a coefficient estimate of 0.910 ($p = 0.001$). H5 is supported in this model. The effect of negative emotion is not significant; thus, H6 is not supported. Rectitude has a coefficient estimate of -1.296 ($p = 0.003$) and modality has a coefficient estimate of -6.019 ($p < 0.001$), confirming H7 and H8 in this model.

Among the control variables, *word count*, *goal*, and *number of targets* positively and significantly explain the number of signatures, but *expressiveness* negatively and significantly influences the number of signatures. Changing the target type from unspecified to custom or government significantly increases the number of signatures. Changing the petition category from unspecified to criminal justice, economic justice, health, or human rights significantly reduces the number of signatures. However, changing the category to animal or environment significantly increases them.

Table 5 summarizes the results of data analysis by hypothesis. Overall, all the hypotheses except H1 are supported or partially supported (supported in either the logistic regression model on the DV of petition status or the linear regression model on the DV of number of signatures). The relevant GI categories and their sample word usages in petitions at Change.org for all hypotheses are illustrated in Table A1 in Appendix A.

Table 5. Results of Hypothesis Testing

Hypothesis (sign)	DV: Petition status	DV: Number of signatures
H1: Cognitive orientation (+)	Not supported	Not supported
H2: Enlightenment (+)	Supported	Supported
H3: Overstatement (-)	Not supported	Supported
H4: Understatement (-)	Supported	Supported
H5: Positive emotion (+)	Not supported	Supported
H6: Negative emotion (-)	Supported	Not supported
H7: Rectitude (-)	Not supported	Supported
H8: Modality (-)	Supported	Supported

5 Discussion

In this study, we used two statistical models to test the proposed hypotheses regarding the effect of linguistic cues on online petition success. The logistic regression model examined the status of petitions. The linear regression model explained the number of signatures accumulated. All the hypotheses, except H1, were supported in at least one model.

The first major takeaway from our findings is that in online petitions neither projecting strong moral beliefs nor imposing moral obligation, judgment, and imperatives is a good strategy to gain support. Similarly, introducing assertive arguments related to social norms, rules, culture, and religion may backfire because of the heterogeneity of Internet users. Arguments full of moral judgments may irritate users with different moral values. This is further supported by an observation from our dataset: online petitions with low numbers of signatures (bottom 25 percentile) contain many more moral cues such as *right* and *God* than those with high numbers of signatures (top 25 percentile). Our findings, instead, imply that successful petition texts should appear neutral, objective, and unbiased when discussing morality in political and societal issues in order to be successful. This aligns with political communication theories that argue that unbiased and objective language cues are effective in shaping and changing opinions in political communication (Weber, Dunaway, & Johnson, 2012). A recent IS study based on the theory of social information processing also found that recipients of messages judge their originators as highly competent politically and functionally when they use neutral, unbiased writing in computer-mediated communication (Brown, Fuller, & Thatcher, 2016). Consistent with their study, our findings imply the importance of being objective and unbiased in petition texts that seek to make a moral appeal.

Another important takeaway is the importance of being positive in petition texts. Our findings show that infusing positive emotions into online petition texts is essential for persuading people to support a cause and sign a petition. Conversely, negative language in online petitions demonstrates a significant negative effect on petition success. Although these findings parallel some previous findings in other research contexts (e.g., Berger & Milkman, 2012; Lindenberg & Steg, 2007), we provide additional insights into what is necessary in order to increase support in online petitioning. It appears that having a positive emotional appeal in a petition message is a necessary prerequisite for making a message go viral and winning public support. Although previous studies (Chevalier & Mayzlin, 2006; Park & Lee, 2009) on electronic word-of-mouth (eWOM) show that negative reviews are more influential than positive ones, our findings are

more consistent with those uncovered in a political context. Lau et al. (2007, p. 1176) found that “the research literature does not bear out the idea that negative campaigning is an effective means of winning votes, even though it tends to be more memorable and stimulate knowledge about the campaign”. Based on our findings, online petitioners should understand that although language expressing anger and frustration may attract attention to the severity of the underlying issues, a petition cannot be simply a complaint. Rather, petitions should focus more on the positive outcomes that could be accomplished by the proposed changes. However, given our finding that positive emotion cues were not significantly associated with petition victory, petition practitioners may prudently use such cues in petition texts.

Understatement reduces the effect of cognitive appeal among petition audiences and targets. The uncertainty and lack of confidence exhibited by understatement cues may cause petitioners to appear untrustworthy and thus deter the petition audience from further action. From the perspective of critical realism (Allen, Brown, Karanasios, & Norman, 2013), understatement cues may signal to a petition target that an issue is not particularly critical or that it is disruptive to social and cultural relations.

Overstatement cues also have significant, negative effects on petition success. Cues used to support validity, exceptionality, intensity, certainty, and extremity without substantial evidence may add to an audience’s cognitive burden; consequently, overstatement may bolster resistance to the argument, leading to rejection of the petition (Kazoleas, 1993). In fact, our data show that petitions with high numbers of signatures (top 25 percentile) used significantly fewer overstatement words, such as *large* and *enormous*, for example, than did petitions with low numbers of signatures (bottom 25 percentile).

Enlightenment cues have also been shown to work positively on both petition targets and petition supporters. This finding indicates that to successfully attract and persuade audiences and targets, petitions may need to offer insights and new facts about an issue. For example, we found that in the enlightenment category, the frequency of words such as *fact* and *aware* is higher in victorious petitions than in closed ones. Consistent with prior research on web credibility (e.g., Wathen & Burkell, 2002) and eWOM (e.g., Cheung, Luo, Sia, & Chen, 2009), our findings suggest that providing novel, up-to-date information and knowledge may be a key mechanism for preventing “easy-to-discard” behaviors by audiences (Wathen & Burkell, 2002).

Although we hypothesized that linguistic cues of cognitive orientation would positively influence petition success (H1), our results show that this effect

is in fact negative. A plausible explanation is that more cognitive-oriented cues may require more cognitive reasoning, and thus more effort from readers. When the content of a petition is difficult to digest, the audience may leave the page. In other words, petitioners should present cognitive-oriented cues in petition texts in a highly readable manner due to the rich factual information and cognitive reasoning reflected in such cues. Otherwise, such cues may affect persuasion marginally or even negatively. A major takeaway from this finding is that petition texts should be easy to read and easy to understand. Research on the readability index (Kincaid, Fishburne, Rogers, & Chissom, 1975) could be useful in this regard. Another possible explanation is that linguistic cues in cognitive orientation carry a serious tone. Such a tone may trigger uncomfortable feelings that lessen the power of persuasion.

The consistency between the two statistical models suggests that certain linguistic cues (e.g., enlightenment, understatement, and modality) are important to online petition success in general. Nonetheless, the discrepancy between the two models suggests that some linguistic cues (e.g., negative emotion) may have a stronger impact on petition targets, while other linguistic cues (e.g., overstatement, positive emotion, rectitude) may be more relevant to supporters. Such discrepancies are unsurprising because the success of a petition requires action from both supporters and target(s). Online petitioners should keep this discrepancy in mind and craft petition texts using linguistic cues that attract both supporters and targets.

5.1 Theoretical Contributions

A major contribution of this research to IS literature is the theoretical development and empirical test of the multi-appeal model of persuasion in the context of online petitioning. As a significant extension to existing IS theories, our model integrates moral factors with cognitive and emotional factors. Past IS research on persuasion and IS success has typically drawn on dual-process theories (e.g., the ELM) with a heavy focus on cognitive factors (Angst & Agarwal, 2009) and a light focus on emotional factors (Deng & Poole, 2010; Zhang 2013). However, these factors are limited in their capacity to explain online political behavior because political and societal issues largely involve morality, ethics, social fairness, and justice. Our research model sheds new light on the dissemination and consumption of crowd-sourced content in e-politics and on online behaviors involving moral issues, such as crowdfunding and online donations. Our study also indicates that when studying ICTs' larger societal issues, IS researchers should consider moral and ideological factors, given the contentious moral debates often involved in such issues.

Second, this research contributes to IS literature through microlevel analysis of online content

concerning digital activism and e-politics in the form of petitioning. Such content often voices important societal issues but has been largely ignored in IS research. Our study reveals opportunities for IS research to address larger societal issues, thereby improving research relevance. Moreover, e-government and e-politics have become increasingly integrated with social technologies (e.g., Twitter and Facebook) and have generated unprecedentedly rich content regarding citizens' interactions and reactions toward governmental and political initiatives. Our research offers new avenues for investigating the effectiveness of such initiatives by examining the micromechanisms of persuasiveness in content. For example, future research could use the proposed research model to examine the political persuasion of political campaigns on Twitter and Facebook, or to investigate social phenomena related to digital activism, such as hashtag activism. By extending our research model, IS researchers could also investigate the persuasiveness of social media texts in personalized political and celebrity campaigns and examine how these texts interplay with ICT-enabled features like emojis and videos to create effective political persuasion.

Third, this study shows that when moving toward studying larger societal issues and challenges, IS researchers need to reexamine classical IS theories (e.g., ICT-based communication theories) and enrich them with new, salient, and contextually relevant factors. Such reexamination could lead to greater in-depth theoretical understanding of the transformational challenges of societal issues in cyberspace. It could also provide a unique angle for IS researchers to understand and address issues related to political choices and persuasions in cyberspace (Wattal et al., 2010). Furthermore, recent headlines on Russian meddling in the 2016 U.S. presidential election indicate that social media platforms such as Twitter and Facebook have also been used for black propaganda (i.e., propaganda using covert sources and false information) and political deception and distraction (Kang, Fandos, & Isaac, 2017). Thus, this study calls for more research on ICT theories to investigate such disruptive phenomena in e-politics. For example, by extending our research model, IS researchers could develop theories examining the micromechanisms of political deception and distraction in ICT communication content.

Fourth, this study contributes to IS literature by exploring cognitive appeal through multiple linguistic dimensions. Prior IS research on persuasion has generally focused on a single cognitive dimension such as argument quality (Cheung, Sia, & Kuan, 2012) or argument framing (Angst & Agarwal, 2009). In contrast, our study demonstrates the benefits of using multiple dimensions of cognitive appeals in language (e.g., cognitive orientation, enlightenment,

overstatement, and understatement) for purposes of gaining more insight into the different aspects of human cognition used to process online user-generated content.

Finally, our paper contributes to the e-politics literature by demonstrating a theory-guided analytics approach. We first developed a research model based on rich theories in IS and other fields. Guided by the model, we effectively analyzed large volumes of unstructured online texts and extended our knowledge of the subject. Such a theory-guided analytics approach could be especially useful for examining the behavior and opinions of Internet users by following their digital tracks. Through this approach, Big Data and analytics could be better used to enrich IS theories and make a greater impact (Abbasi et al., 2016).

5.2 Practical Implications

This study can help online petitioners as well as practitioners in political campaigns avoid pitfalls in crafting their messages. Keeping messages inspirational, objective, and enlightening is the major takeaway from this study on Internet activism. Our study suggests that it is essential that online petitioners present novel findings and truth in their messages in order to create the effect of breaking news on petition audiences. A recent study showed that younger people pay more attention to breaking news than to regular news (American Press Institute, 2013). Thus, conveying enlightening information and revealing hidden insights could be effective ways for online petitioners to win younger supporters. Wathen and Burkell (2002) found that users often quickly judge the informational factors of the Web (e.g., message) to decide if they will leave a site. Our findings emphasize that the informational factors in messages need to be novel, original, and enlightening. Online petitioners should include enough original and enlightening cues in their messages to get both the targets and audiences of petitions to pay attention to their content and further evaluate it. More importantly, petitioners should avoid the pitfalls of sensational journalism and avoid using eye-catching headlines unless they are backed up by well-researched evidence.

Online petitioners should also avoid overburdening potential supporters with propositions that are heavy in moral obligations or arguments that require considerable cognitive processing, and should avoid any language with a strong negative tone. Applying our findings, political practitioners should consider prudently using a positive campaign strategy despite the prevalence of negative political campaigning in cyberspace and traditional media.

This study could help policy and/or decision makers in government or business use online petitioning and e-politics more effectively as new channels for understanding the impact of public opinion and for collecting meaningful opinions, considerations, and suggestions for legislative and policy changes. System developers could incorporate our findings associated with salient linguistics cues to the design of tools (e.g., opinion/issue crawlers) that could enable petition success. Online petition platforms, managed by either companies or governments, could also use our findings to help petitioners boost traffic, increase the number of signatures, and enlarge their audience base. For example, online petition platforms could provide features like digital nudging² to help petitioners craft messages that effectively promote their agendas (Weinmann et al., 2016). This study could also help practitioners understand citizens' influence in policy-making through cyberspace petitioning (Hagen et al., 2016). Finally, this study offers a worthy example of how to use an analytical approach to examine crowd-sourced content about online political phenomena related to policy-making, governance, political campaigns, and large social causes.

6 Limitations, Future Directions, and Conclusion

This study is not without limitations. First, we adopted quantitative analysis instead of qualitative analysis to explain the effect of cognitive, emotional, and moral factors on online petition success. To provide a more in-depth understanding of the factors influencing petition success, future research could employ a combination of qualitative and quantitative analysis. Additionally, future research could develop new theories for capturing linguistic and other patterns in the rich, abundant content generated by ICT communication. Doing so could perhaps yield additional theoretical and practical implications derived from such content (Abbasi et al., 2016). Second, the use of words in GI, which was created decades ago, to capture the cognitive, emotional, and moral factors in online petition texts may be a limitation. Although GI is still widely used by researchers, issues surrounding the completeness and relevance of its word entries may limit its effectiveness. More advanced natural language processing techniques may soon be available that would more precisely extract linguistic cues from online user-generated content. Third, other covariates, such as governmental structure and the degree of political freedom, may also affect online petition success. However, because all petitions analyzed in

² Digital nudging is the use of interface design elements (e.g., a pop-up message reminding the viewer to sign the petition)

to guide user behavior (Weinmann, Schneider, & Brocke, 2016).

this study were initiated by users from the United States, it is unlikely that there would be a large variation in these covariates. Future research could test the robustness of our findings in different political settings. Fourth, this study only focuses on the text content of online petitions from a single source, Change.org. Users at Change.org may only present a specific population of online petitioners. Researchers should exercise caution in attempting to generalize our findings to other populations. We also believe that examining the visual content of online petitions (e.g., images and videos), using multiple sources (e.g., use Change.org along with Facebook and Twitter), and investigating social network relationships among petition participants could yield more valuable insights into online petition success, as suggested by some studies in other research contexts (e.g., Deng & Poole, 2010). Finally, most online petitions in our data analysis were not associated with a category. Although the “unspecified” category represents a fixed effect for these petitions, the uncontrolled heterogeneity among them may interfere with the results. Future studies should conduct more robust analysis by including more control variables. Understanding how petition

category moderates the effects of linguistic cues on online petition success would be another interesting direction for future research.

In conclusion, this study provides an initial step toward understanding online petition success via analyzing petition texts. Online petitions, in general, aim at persuading petition targets and potential supporters primarily through textual information. Linguistic nuances play an important role in this process. Using the multi-appeal model of persuasion and GI, this study empirically investigates online petition success by using cognitive, emotional, and moral elements in petition language. Our findings suggest that to gain support, online petitioners should convey positive and objective information instead of focusing on complaining and moralizing.

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Appendix: Sample GI Word Usages in Petitions at Change.org

Table A1. Sample GI Word Usages

Linguistic cue category	Sample words from GI	Usage in online petitions (with petition ID)
Cognition	Reason	The reason the Polling should be restarted is because there are computer bots casting votes for the same exact five bands/musicians. (4456536)
	Percent	In recent years, approximately ninety percent of eligible public primary schools across the State have participated in the program. (4981114)
	Hundred	This has resulted in hundreds of deaths. (3932388)
	Morning	The next morning , both articles were still online. (4981070)
	Red	Imagine your child has a painful ear infection or pneumonia, or they need surgery, and the only antibiotics and pain relief available contain red or yellow dyes. (2886721)
Enlightenment	Clue	The clue is in the title and for our members it simply means they will be working for someone else not the Council. (3419789)
	Deliberation	After two years of deliberation , it's time to pass the Housing Element. (1970430)
	Disclose	We want to tax companies that bottle their water in California and get these companies to disclose whether or not their water was bottled in a drought and if it is spring or simply tap. (3681199)
	Evidence	The findings are very compelling just as the D.A.'s findings were, but until this day the FD refuses to look at the FBI investigative reports as well as all my other evidence . (4719094)
Overstatement	Absolute	Not only is this blatant act of sexism conveyed in the video also is the absolute ridiculous decision that compassion is punishable by 10 years in prison. (4983618)
	Always	The plan has always been to provide a balance of housing types and to maintain a commercial tax base to offset the costs of providing services to the community. (3408309)
	Enormous	The children of the rich have enormous advantages while the poorest Americans face unprecedented challenges. (4500558)
	Extraordinary	It seems extraordinary that in the 21st century, in a wealthy country, we still have people sleeping on the streets. (2891541)
Understatement	Appear	So in addition to all of the other reasons we do not want this airport expanded, it appears that their planes are transporting explosives and dangerous goods in a densely populated area. (1053051)
	Anyway	I'm not really into MTV any more since they don't play music videos that much anyway and are shows-dominant. (3805584)
	Insignificant	Kennel cough or any other insignificant reason that was mentioned above can no longer be a legitimate reason to take an animal's life. (1051050)
Positive	Great	Education of the people is a great way to get our voices heard. (4194412)
	Achieve	Help these students keep hope that they will achieve and will continue to be pushed to achieve , by keeping this wonderful teacher there. (3408425)

Table A1. Sample GI Word Usages

	Harmony	A united Israel is a stronger Israel where Muslims, Christians, and Jewish people can live together in peace and harmony without war and poverty. (3941640)
	Improve	Communities which invest in infrastructure to improve bicycle safety and convenience provide residents with more choice of transportation options. (2361921)
Negative	Alienation	Conservative ignorance regarding drug use has lead our youth to hospital beds, overdoses at festivals, deaths and ostracization and alienation from peers. (4759978)
	Banishment	If you have received more than two trespass warnings the punishment is banishment for a period of ninety to 365 days. (2843436)
	Hassle	Too far and too much hassle to collect heaps of recycling and take it to Dunedin. (2643001)
	Embarrassment	The health insurance industry is a national embarrassment that is costing patients their income and sometimes their lives. (4211636)
Rectitude	Justification	Hunters have hundreds of excuses for hunting but not one justification . (3935628)
	Right	I am the primary custodial parent, and as such I have the right to make educational decisions for my daughter. (2883711)
	God	Yet, here I am, trying to understand why I can not see my daughter, my god given right, my right as a father to have a meaning full relationship with her as described in the laws of our land. (4473948)
	Heaven	I hope you will sign this petition not only for the staff suffering these conditions but also the residents because heaven forbid one day your a resident in a facility that provides one caregiver for you as well as forty other people. (5386058)
Modal	Should	He should lose his position immediately since he clearly does not represent the well being of his constituents. (1312591)
	Must	Please think clearly and react appropriately. We are heading towards doom. Must realize this before a major episode of Divine Punishment becomes our fate. (1312685)
	Ought	Fireworks should only be used for Professional displays and a licence ought to be necessary to purchase them. (4719418)

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