

Channeling Hearts and Minds: Advocacy Organizations, Cognitive-Emotional Currents, and Public Conversation

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Abstract

Do advocacy organizations stimulate public conversation about social problems by engaging in rational debate, or by appealing to emotions? We argue that rational and emotional styles of communication ebb and flow within public discussions about social problems due to the alternating influence of social contagion and saturation effects. These “cognitive-emotional currents” create an opportunity structure whereby advocacy organizations stimulate more conversation if they produce emotional messages after prolonged rational debate or vice versa. We test this hypothesis using automated text-analysis techniques that measure the frequency of cognitive and emotional language within two advocacy fields on Facebook over 1.5 years, and a web-based application that offered these organizations a complimentary audit of their social media outreach in return for sharing nonpublic data about themselves, their social media audiences, and the broader social context in which they interact. Time-series models reveal strong support for our hypothesis, controlling for 33 confounding factors measured by our Facebook application. We conclude by discussing the implications of our findings for future research on public deliberation, how social contagions relate to each other, and the emerging field of computational social science.

Keywords

public deliberation, diffusion, social contagion, emotions, computational social science

Conversation is often described as the soul of democracy (Dewey 1991; Habermas 1981; Rorty 1991). This is not only because it spreads awareness about social problems, but also because it stimulates deliberation about how these problems might be solved (Eliasoph and Lichterman 1999; Katz and Lazarsfeld 1955; Perrin 2006; Polletta 2004). Yet advocacy organizations that aim to stimulate conversation face considerable competition for public attention. This is particularly evident in the age of social media, when myriad public conversations unfold each day. To date, social

scientists have produced two competing theories of how advocacy organizations stimulate public conversation. The first suggests advocacy organizations succeed by making rational arguments that appeal to people’s shared interests in solving social problems (e.g.,

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Dewey 1927; Guttman and Thompson 1998; Habermas 1981). The second challenges this account as overly idealized and elitist, arguing advocacy organizations succeed by appealing to the public's appetite for emotions and drama (e.g., Adut 2012; Alexander 2004; Berezin 2002; Hilgartner and Bosk 1988; Mansbridge 1983; Sanders 1997).

In this article, we offer a new explanation of how advocacy organizations stimulate public conversation. This account reconciles long-standing debate about the power of cognitive versus emotional appeals. We argue that both types of messages hold the potential to draw people into public conversations. However, groups of people discussing social problems usually cannot sustain rational or emotional deliberation indefinitely. Instead, rational and emotional styles of conversation spread across public conversations via social contagion. Yet the rapid spread of one conversational style eventually creates saturation effects that facilitate the spread of the other. This creates what we call "cognitive-emotional currents," or a negative correlation between the frequency of cognitive and emotional language within public conversations about a social problem over time. Finally, we argue that cognitive-emotional currents create an opportunity structure whereby advocacy organizations succeed in two ways: either by dispatching emotional messages amid prolonged rational debate, or by delivering cognitive (or rational) messages after lengthy emotional discussions. We thus provide a novel account of how public conversation unfolds within the public sphere. This approach has important implications for future studies of public deliberation, cognition and emotions, and social contagion or diffusion.

Until recently, social scientists lacked the capacity to track the ebb and flow of different styles of conversation across the vast social networks that comprise the public sphere. Yet the rise of social media sites such as Facebook and Twitter and the emerging field of computational social science provide new opportunities to do so with significant qualitative and longitudinal detail (e.g., Bail 2014; Evans and Aceves 2016; Golder and Macy 2014; Lazer

et al. 2009). In this article, we use automated text analysis techniques to measure the frequency of cognitive and emotional language within public conversations about two different social problems over 1.5 years: autism spectrum disorders and human organ donation. We address alternative explanations of how autism and organ donation advocacy organizations stimulate public conversation. To do so, we created a Facebook application that offered advocacy organizations in each field a complimentary audit of their social media outreach. In return, these groups shared nonpublic data about their organization, the social media users who view or engage with their messages collected by Facebook, and the social context in which they interact with such audiences. We find significant evidence of cognitive-emotional currents within both fields and support for our hypothesis that organizations draw more people into conversation if they produce emotional messages after extended rational debate, or vice versa.

HOW ADVOCACY ORGANIZATIONS STIMULATE PUBLIC CONVERSATION ABOUT SOCIAL PROBLEMS

Scholars have championed the importance of public discourse for societal cohesion since Aristotle. Early studies focused on formal deliberation within town halls or legislative hearings. However, there is growing consensus among sociologists and political scientists that most people engage in public conversation in less formal settings, ranging from community centers to social media sites (e.g., Bellah et al. 1985; Carpini, Cook, and Jacobs 2004; Elia-soph 1998; Mansbridge 1983; Perrin 2006; Polletta and Lee 2006; Sanders 1997).

In line with this work, we define public conversation as a discussion between at least two people about a social problem in a setting that can be observed by others. Stimulating public conversation is a central goal of advocacy organizations and other collective actors for two principal reasons. First, public

conversation is an important conduit for the spread of information about social problems (Dewey 1927; Gamson 1992; Tarde 1901). Most advocacy organizations are principally concerned with raising awareness about their cause. Second, stimulating public conversation is a critical precondition for shifting public attitudes about social problems or the behaviors that are thought to create them (Barber 1986; Fishkin 1996; Guttman and Thompson 1998; Katz and Lazarsfeld 1955; Merton, Lowenthal, and Curtis 1946; Schneiderhan and Khan 2008). It is beyond the scope of the present analysis to specify the mechanisms that lead people to become active supporters of organizations—either discursively or in terms of direct collective action. Instead, we ask a more basic question: how do advocacy organizations draw people into conversation about social problems amid widespread competition for public attention within the public sphere?

Before addressing this question, we begin with several definitions. Following Andrews and Edwards (2004:485), we define advocacy organizations as groups that “make public interest claims either promoting or resisting social change that, if implemented, would conflict with the social, cultural, political, or economic interests or values of other constituencies and groups.” Advocacy organizations compete to shape public conversation about their cause within what we call a conversational field. Conversational fields are the social spaces where public discussion occurs about a given social problem. Historically, conversational fields were located within salons, town halls, or community centers where the co-presence of individuals was required for discussion. Technological advances from the printing press to the Internet have created new forms of conversational fields, such as newspaper op-ed pages and social media sites Facebook and Twitter (Anderson 1993; Habermas 1989; Tarde 1901). Indeed, 62 percent of Americans accessed news through social media in 2016—up from 49 percent in 2012 (Gottfried and Shearer 2016). These technological shifts have fundamentally transformed the scale, pace, and

relative anonymity of public conversation. Nevertheless, these media provide the same function as previous forms of conversational fields insofar as they help spread awareness about social problems. They also serve as a forum where groups of people exchange multiple viewpoints about how to resolve such problems.

Among other factors, social science research on how collective actors such as advocacy organizations stimulate public conversation has focused on the style of language used in public appeals. The first account, championed by Habermas and his contemporaries, emphasizes the power of rational or cognitive appeals to draw people into conversation due to shared interests in tackling social problems. According to Habermas (2006:413), such appeals “mobilize relevant topics and claims, promote critical evaluation . . . and lead to rationally motivated yes or no reactions”—in other words, public discourse is “[a] competition for better reasons.” We use the term “cognitive conversational style” to describe this type of discourse, because it requires deliberate processing to diagnose the root causes of a social problem, compare social problems to each other, or evaluate the overall merit of solutions proposed to redress them.

A more recent wave of studies built on a broader critique of Habermas suggests the public sphere is more often guided by passion than pure reason (e.g., Adut 2012; Alexander 2004; Hilgartner and Bosk 1988). These scholars argue that high-minded debate about the root causes of social problems based on the merit of empirical evidence is relatively rare. By focusing on this type of debate, critics of Habermas argue that he overlooks the political participation of large segments of the public. In addition, such critics argue that Habermas underestimates the power of emotions to channel public conversation in productive ways.

For example, a rich interdisciplinary literature shows that public displays of emotion focus collective attention (Collins 2001; Ledoux 1998), improve information recall (Schacter 2001), shape the way people search for information (Valentino et al. 2008), activate collective identities (Banks 2016), and

increase the likelihood and duration of interactions between individuals (Collins 2005). These effects hold for positive emotions, such as joy, as well as negative emotions, such as fear or anger. We use the term “emotional conversational style” to describe such discourse, involving expressions of affect rather than the rational language characteristic of cognitive conversational styles.¹

Cognitive-Emotional Currents in Public Conversation about Social Problems

Scholars continue to debate the power of cognitive versus emotional appeals for stimulating public conversation. Nevertheless, we argue that these two accounts are not mutually exclusive. There is considerable evidence that both cognitive and emotional conversational styles stimulate conversation. Accordingly, we believe the more important question is: when is one style more likely than the other to stimulate public conversation? To address this question, we draw on macro-level theories of social contagion and diffusion as well as micro-level theories of cognition and social psychology. Historically, neuroscientists have argued that separate regions of the brain are responsible for cognition and affect. Yet there is growing consensus that the regions of the brain responsible for these two mental processes are interdependent (Pessoa 2008). Emotional reactions routinely focus cognitive processes (Damasio 1995; Ledoux 1998) and vice versa (Ochsner and Gross 2008). Instead of separate dimensions of mental processing, cognition and affect feed off each other across neural networks within the human brain, not unlike a seesaw (Jack et al. 2013). This idea also has deep roots in pragmatist traditions. Dewey (1934:14), for example, wrote that “emotion is the conscious sign of a break—actual or impending. The discord is the occasion that induces reflection” (see also Elster 1999).

Among the many factors that determine whether people are in an emotional or cognitive state of mind at any given moment is

social context. Early studies in sociology and social psychology highlight the tendency of people within crowds to assume the mental state of those around them (Le Bon 1895; Tarde 1890). Although this tradition fell out of fashion, a new wave of work initiated by Hatfield, Cacioppo, and Rapson (1994) and Collins (2005) shows that emotions routinely spread across groups of people in a contagious manner. More recent studies indicate the effect of emotional contagion holds for both positive and negative emotions. These processes can also be observed across large populations such as businesses and social movement organizations (Barsade 2002; Gould 2009; Summers-Effler 2010), geographic regions (Cacioppo, Fowler, and Christakis 2009; Fowler and Christakis 2008), and social media sites (Bail 2016; Coviello et al. 2014; Kramer, Guillory, and Hancock 2014). Numerous studies also document cognitive contagion, or the spread of rational mental states, across individuals. These include studies of public deliberation about public health problems (e.g., Coronges, Stacy, and Valente 2011), herd behavior within business and political organizations (Erdogan and Bauer 2010; Finkel, Muller, and Opp 1989), and stock market runs (Hirshleifer and Hong Teoh 2003).

The mechanism of emotional and cognitive contagion, first identified by Adam Smith, refers to humans’ innate capacity to assume the perspective of others. Early work on this phenomenon indicated propinquity was necessary for social contagion. For example, Hatfield, Cacioppo, and Rapson (1993) argue that the mechanism of emotional contagion is motor mimicry, or humans’ tendency to emulate each other’s facial expressions. This creates feedback processes wherein both parties to an interaction become more emotional than they would have without interpersonal contact. Yet Hatfield and colleagues (1994:126) also suggest that emotions spread via virtual contact enabled by communications technologies relaying emotion-laden images and text. Numerous studies have since uncovered evidence of how emotional orientation can spread contagiously within telephone and e-mail

conversations and on social media sites such as Facebook and Twitter (Bail 2016; Coviello et al. 2014; Kramer et al. 2014; Pugh 2001; Stieglitz and Dang-Xuan 2013).

Recent work also shows that the Internet facilitates contagion of cognitive orientations toward social issues. Online spaces enable access to a large number of competing truth claims. These, in turn, facilitate cascading conversations about social problems, drawing people into arguments about their root causes (e.g., Weng et al. 2012). Neuroscientists and psychologists have uncovered evidence that physical interaction is not necessary for the activation of mirror neurons enabling emotional or cognitive synchrony. Instead, they find people change their mental state in response to audiovisual cues or text alone (e.g., Gallese 2002; Green and Brock 2000; Lizardo 2007; for more detailed discussion of these literatures, see DiMaggio et al. 2017). These studies indicate emotional and cognitive contagion can occur if a critical mass of people experience a shift in their mental state after being exposed to emotional or cognitive language, regardless of whether it is experienced in person (e.g., Brady 2011; Pennebaker 1997; Smith-Lovin and Heise 1988).

A key limitation of the literature on emotional and cognitive contagion is that it accounts for the spread of conversational styles but not their decline. Emotions are often likened to a pathogen or consumer innovation that can either diffuse or not (e.g., Fowler and Christakis 2008). However, as Jasper (2011) argues, groups cannot sustain high levels of emotion indefinitely. In-depth qualitative studies of civil society groups and social movement organizations suggest emotions ebb and flow over time, not unlike a battery that must occasionally be recharged (Gould 2009; Jasper 2011; Summers-Effler 2010).

For example, Summers-Effler (2002, 2010) documents how the initial excitement surrounding the establishment of a new civil society group often gives way to disenchantment when the group's aims are not met. In this way, Summers-Effler (2010:174–75) shows how “unfolding cycles of involvement

[in civil society groups] generate the tempo of their emotional rhythms.” Other work shows that groups of people involved in public conversation or collective action have limited tolerance for complexity and reason (Elster 1999; Marcus, Neuman, and MacKuen 2000; Martin 2010; Simon 1979).² Cognitive conversational styles often spread across groups of people discussing the root causes of social problems and how to solve them. However, individuals routinely experience cognitive overload as the number of competing explanations, arguments, or possible solutions steadily increases as new people are drawn into the conversation (Feng et al. 2015). This leads to our first hypothesis.

Hypothesis 1: Cognitive and emotional conversational styles spread across conversational fields because of social contagion but decline with equal intensity over time because of saturation effects such as cognitive and emotional overload.

Our second hypothesis concerns the relationship between cognitive and emotional conversational styles. Here, we build on work highlighting the synergy of cognition and affect within small groups. More specifically, we consider studies dealing with the tendency of cognitive overload to facilitate the contagious spread of emotional conversational styles, or vice versa. For instance, in a longitudinal study of a small scientific community, Parker and Hackett (2012) observe an inverse relationship between the level of affect and cognition over time. In particular, emotional reactions to new scientific discoveries—particularly positive emotional reactions—quickly give way to skepticism and criticism. The oscillation of cognition and affect, they argue, fuels the progress of scientific fields.

Similarly, numerous studies document how social movement organizations survive by channeling collective emotions such as anger into more rational forms of action necessary to create long-term social change (Gould 2009; Jasper 1998; Summers-Effler 2002). Conversely, Summers-Effler (2010:60) argues that more mundane forms of day-to-day

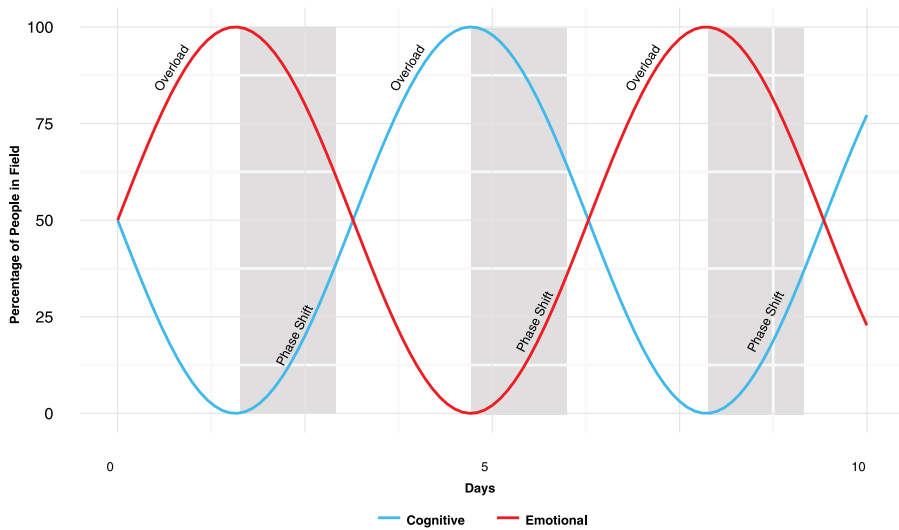


Figure 1. Idealized Opportunity Structure Created by Cognitive-Emotional Currents

practical reasoning within social movement organizations can create “emotional vacuums” that facilitate the rapid spread of emotional energy across members. We use the term “cognitive-emotional currents” to describe the inverse relationship between cognitive and emotional conversational styles over time.³

Hypothesis 2: The frequency of cognitive and emotional conversational styles are inversely related to each other over time within conversational fields because widespread use of either style facilitates the contagious spread of the other.

Our third hypothesis deals with the effects of cognitive-emotional currents for advocacy organizations in terms of their effectiveness at stimulating public conversation about their message within a conversational field. Here we build on a long-standing tradition within the study of social movements. We argue that cognitive-emotional currents create an opportunity structure benefiting advocacy organizations dispatching the “right” messaging style during opportune moments. In other words, advocacy organizations will stimulate more public conversation if they help create what we call a “phase shift” within their field. A phase shift is indicated by their use

of language aiding the ascendance of one conversational style while the other is in decline. To provide some intuition, Figure 1 illustrates three phase shifts within a highly idealized cognitive-emotional current over 10 days. In real settings, the wavelengths of cognitive and emotional language will be much more irregular, varying by the pace of public conversation about the social problem, the degree to which that conversation is isolated from other communications, and the resultant intensity of saturation effects such as social contagion or overload.

Hypothesis 3: Advocacy organizations will stimulate more public conversation if they dispatch messages with emotional language during periods of prolonged rational debate within a given conversational field, or when they dispatch messages with cognitive language when emotional conversations dominate.

Case Studies: Public Conversation about Autism Spectrum Disorders and Human Organ Donation on Facebook

We evaluate our hypotheses about how advocacy organizations stimulate public conversation by examining discourse about social

problems on Facebook. As we noted, technology has always played an instrumental role in the nature of public conversation about social problems. This is because media technologies enable virtual contact between individuals who might not otherwise meet in person (Anderson 1993; Tarde 1901; Tarrow 1994). Yet social media is unlike newspaper op-ed pages or television talk shows. In contrast to traditional outlets, social media provides a decidedly public forum for conversation about social problems unencumbered by media gatekeepers, geographic constraints, and even time. Anyone with Internet access can join most public conversations. However, social media dialogue is undoubtedly shorter, more disjointed, and less intimate than the interpersonal conversations emphasized in early work on the subject (e.g., Katz and Lazarsfeld 1955). Nevertheless, social media conversations hold the potential to spread much more quickly while involving more diverse groups (Benkler 2006; Castells 2012).⁴

Before describing our case studies, we first consider the implications of the unique properties of social media just described for our theoretical framework. Hatfield and colleagues (1993) argue that emotional contagion occurs without propinquity. Yet Collins (2005) is more circumspect. In Collins's view, contagion via virtual contact will be less powerful due to the absence of facial cues and other physiological reactions that occur during physical interactions. As already noted, many Facebook messages involve audiovisual content that might provoke motor mimicry (Coviello et al. 2014). Yet Collins argues that individuals involved in social media conversations are less likely to be mutually entrained. The reason for this is that social media conversations often occur amid a cacophony of other messages, over long periods of time, and across vast geographic or social chasms (see also DiMaggio et al. 2017). In these respects, social media provide a conservative test of our hypotheses. We do not expect that all people who are exposed to social media conversations will experience emotional or cognitive contagion and overload. Instead, we expect the likelihood of contagion to be proportional

to two factors: (1) the scale and frequency with which people participate in public conversation about a given social problem and (2) the amount of exposure they have to other actors within the conversational field.

The specific empirical implications of our theoretical framework may be sensitive to the type of social problem discussed within conversational fields. Our study therefore uses a "least similar" comparative research design. We implement this approach by comparing how advocacy organizations stimulate public discourse in two public health fields: Autism Spectrum Disorders (ASDs) and human organ donation.

Autism is a condition that creates difficulties in social interaction. These range from nonverbal individuals to those who experience moderate social anxiety. In the 1960s, 1 in 2,500 U.S. children received an autism diagnosis; recently, however, this figure surpassed 1 in 68 (Centers for Disease Control 2014). A virulent debate about the root causes of this increase has emerged in response. Some attribute autism to epigenetic factors. Others blame routinely administered childhood vaccines (Bearman 2010; Offit 2010). Still others argue that autism is not a disorder at all. For this last group the behavior of those labeled as "autistic" is a form of "neurodiversity," or natural human neurological variation. Advocates of this last approach also highlight the coincidence of the rise of autism diagnoses with the deinstitutionalization of mental health diseases more broadly (Eyal et al. 2010). As we will discuss in further detail, public discourse about autism on Facebook reflects these and other debates, such as treatment, schooling, and insurance, each of which generate a significant degree of controversy.

Public discussion of human organ donation on Facebook, by contrast, is far less controversial. Organ donation was once viewed as risky or unusual. More recently, it has become the preferred treatment for many chronic diseases such as liver cancer and diabetes (Healy 2010). Debates occasionally emerge on Facebook about the equitable distribution of human organs, particularly across disadvantaged populations. However, the

majority of social media discourse concerns the urgent need for more people to register as organ donors. In 1991, 23,198 people were on the waiting list for a human organ; by 2012, the waiting list grew to more than 125,000 people (U.S. Department of Health and Human Services 2012). The number of registered organ donors has not kept pace. More than 21 people die each day because less than half of all Americans are currently registered as organ donors—even though recent surveys indicate over 95 percent of Americans currently support the practice and express willingness to donate their organs after they die (Spital 2002; U.S. Department of Health and Human Services 2012). No advocacy issue lacks controversy. Nevertheless, the significant differences between public discussions of autism and organ donation enable us to determine whether support exists for our hypotheses within two distinctive conversational fields.

RESEARCH DESIGN

Our analysis is divided into two stages. First, we use time-series models to evaluate Hypotheses 1 and 2. These hypotheses jointly predict an inverse relationship between cognitive and emotional language within public conversations about autism and human organ donation on Facebook over time. Second, we evaluate Hypothesis 3. According to this hypothesis, phase shifts within cognitive-emotional currents should mediate the effectiveness of advocacy organizations in stimulating public conversation. We use data from a web-based application we created to collect more than 100 variables that describe 92 advocacy organizations' efforts to shape public conversation over 1.5 years.⁵ These data enable us to evaluate Hypothesis 3 while addressing alternative explanations of how advocacy organizations stimulate public conversation. These include the role of organizational characteristics and tactics, features of their social media audiences, and the broader social context in which they interact. We begin by describing our web-based application because it was employed to develop the sampling strategy to collect the

longitudinal text data necessary to address our hypotheses.

Developing a Facebook Application for Social Science Research

To collect information about organizations within the autism and organ donation advocacy fields on Facebook, we created a web-based Facebook application called "Find Your People."⁶ This application offered advocacy organizations a complimentary audit of their Facebook outreach comparing various engagement metrics of an organization to all other organizations in the study. In return, organizations agreed to share nonpublic data about their Facebook outreach and answer a brief survey embedded within the application. This survey queried the manager of each organization's Facebook fan page about the organization's social and financial resources and the tactics used to call attention to their cause. After obtaining permission from this individual, our application collected more than 100 variables describing aggregate characteristics and behaviors of individuals who interacted with the organization's posts on a daily basis. The application also collected information from Google about the context in which the organization and users interacted. For additional details about the development and function of our Facebook application, see Section 4 of the online supplement or Bail (2017).

Sampling Advocacy Organizations

We developed a three-pronged sampling strategy to identify a complete sample of all organizations within the United States vying to shape public Facebook discourse about autism and human organ donation on "fan pages." We began by searching a database of nonprofit tax forms from the Internal Revenue Service for the terms "Autism," "Asperger's," and "organ donation."⁷ Yet filing for nonprofit status requires significant resources. Our research team therefore conducted searches for these terms within Facebook itself to identify groups who might not have the resources necessary to obtain nonprofit

status. Finally, we allowed advocacy organizations to recruit each other, thereby increasing the breadth of our sample via respondent-driven sampling.⁸ In total, we identified 134 autism advocacy organizations and 79 organ donation organizations as a target sample. We collected all posts produced by each of these organizations for 500 days between June 2011 and December 2012, as well as any comments about them.⁹ We used these data to measure our dependent variable (the number of unique people who make comments more than three words long about each organization's posts by day). We also used these data to construct a measure of our key indicator (whether an organization's posts help create a phase shift on a given day).

Our research received an "exempt" determination from Institutional Review Boards at three major U.S. universities because we did not collect nonpublic information about individual Facebook users. Instead, our application collected nonpublic data that describe aggregate characteristics of each organization's Facebook audience.¹⁰ Nevertheless, we obtained informed consent from representatives of each organization when we recruited them via e-mail, letter, or phone. After one month of recruitment, 33.81 percent of autism advocacy organizations and 59.5 percent of organ donation advocacy organizations installed our study's Facebook application.¹¹ These response rates are above average among studies of organizational populations (Baruch and Holtom 2008). This is particularly encouraging given the unusual research design. Furthermore, the use of incentives related to social media outreach did not create response bias in terms of the types of organizations that participated in either field (see Section 5 of the online supplement).

ESTABLISHING THE EXISTENCE OF COGNITIVE-EMOTIONAL CURRENTS

We collected a large volume of texts: 223,218 posts and comments across the two advocacy fields. In this respect, identifying cognitive or

emotional language within each post or comment via hand coding was not feasible. A variety of automated techniques have emerged to identify latent themes or topics in large corpora, but our key indicators emphasize the style of conversation rather than its substance. To measure cognitive and emotional language within each of our advocacy fields, we use Linguistic Inquiry Word Count (LIWC). LIWC is a dictionary-based automated text-analysis technique that was developed to identify individuals' mental states via the types of words they use (Tausczik and Pennebaker 2010).

To determine which words best indicate different mental states, the research team that developed LIWC used an iterative process combining expert-coding and external validation in real world settings over more than a decade. First, eight researchers collected every unique word in several English dictionaries, as well as an additional sample of texts from blog posts, Facebook posts, Twitter posts, and novels. LIWC therefore includes a range of colloquialisms. For example, the LIWC algorithm classifies the term "b4" as a preposition, and the text ":" as an indicator of happiness. Second, words were assigned to a set of categories that describe different types of mental states if they were categorized similarly by four to eight coders. Finally, the research team conducted numerous studies in which individuals were asked to write about experiences of different mental states (e.g., anger). The words used by these respondents were used to further refine term categorization within the LIWC dictionary.¹²

LIWC measures 90 psychological states and other characteristics of texts. We use this tool to identify the frequency of emotional and cognitive language within posts and comments in each of our social media advocacy fields over 1.5 years. LIWC's "affect" category includes words associated with both positive and negative emotions (e.g., "hate," "heartless," "cheer," "scary"). The following is an example of a text within our sample that received a high score on the affect category: *"My 11 year old nonverbal son just had his 1st grand mal (tonic -clonic) seizure a week*

ago in the tub!!! Very very scary!!!! He's enjoying this beautiful new England weather outside today!!!!" The "cognitive process" category includes words associated with cognitive processes such as cause and effect (e.g., "because," "therefore," "reflect," "prevent"). The following is an example of a text within our sample that received a high score on the cognitive process category: "[This recent tragedy] shows the government and everyone else there is a need for therapy paid for by insurance. It is crucial that these children are able to express their ideas because they are geniuses, and what they know could be crucial for our futures. Just look at Albert Einstein!" For additional examples of texts that received high scores in the cognitive process and affect categories, see Table S1 in the online supplement.

As with all dictionary-based techniques, LIWC has limitations related to the polysemy of words in natural language use. For example, the term "hate" would be associated with negative emotions in the following two sentences: (1) "I hate the president" and (2) "I'd hate to be the president." Yet such subtle distinctions would also be masked by other forms of automated content analysis, such as Latent Dirichlet Allocation. In these approaches, it is customary to remove common words such as "to," "be," and "the" before identifying themes of interest in texts. Moreover, such unsupervised approaches to text classification lack the external validation of LIWC, which has been verified in more than 100 studies across a broad range of disciplines (Tausczik and Pennebaker 2010), including sociology (e.g., Golder and Macy 2011).¹³ As we describe in the online supplement, we further validated the appropriateness of LIWC for measuring cognitive and emotional conversational styles by comparing its codes to those of human coders.

Figure 2 plots the percentage of words in posts and comments in the autism and organ donation advocacy fields between June 2011 and December 2012. The black line (red line in the online version) describes the frequency of emotional language and the gray line (blue line in the online version) describes the

frequency of cognitive language during this time period. We evaluated the independence and inverse relationship between cognitive and emotional language specified in our first two hypotheses via a combination of Wilcoxon Signed Rank tests and cross correlation analyses (Flores 1989; Podobnik and Stanley 2008).

As Figure 2 shows, cognitive and emotional language in posts and comments are interdependent and have a highly significant inverse relationship in both the autism field ($W = 114200$, $p < .001$; $CCF = -.124$, $p < .001$) and the organ donation field ($W = 41306$, $p < .001$; $CCF = -.123$, $p < .001$). Interestingly, Figure 2 also reveals that the overall frequency of emotional language is higher in the autism advocacy field than in the organ donation field, perhaps because the former is a more contentious issue.

EXAMINING WHETHER PHASE SHIFTS STIMULATE PUBLIC CONVERSATION

Dependent Variable: Number of Unique Social Media Users Who Make Substantial Comments about an Advocacy Organization's Posts by Day

Having established that cognitive-emotional currents exist within our two social media advocacy fields, we now turn to the evaluation of Hypothesis 3, which predicts that organizations whose posts help create phase shifts, either by using emotional language during periods of extended rational debate or using cognitive language after prolonged emotional conversations, will be more likely to stimulate conversation. To measure this outcome, we create organization-day panels defined by the date of the first and last post produced by each organization. For each day, we calculate the number of unique social media users who made comments about an advocacy organization's posts that were more than three words long. We restrict our analysis to comments longer than three words to exclude reactions that are so brief they could



Figure 2. Cognitive-Emotional Currents in Two Social Media Advocacy Fields

not be construed as substantial conversation between users (e.g., “That’s great!”). We focus on comments by unique users instead of the total number of comments each organization receives by day, given the likelihood that commenting follows a skewed distribution where a minority of people produce a majority of comments about each post.

Identifying Phase Shifts

We create a binary indicator (α) that describes whether organization i contributed to a phase shift on day t as follows:

$$\alpha_{it} = I(E_{t-1} - e_{it} > 0 \& C_{t-1} - c_{it} < 0) | \\ I(C_{t-1} - c_{it} > 0 \& E_{t-1} - e_{it} < 0)$$

The indicator is positive if the difference between the percentage of emotional words (e) in organization i ’s post at time t is greater than the percentage of emotional words used

within the entire social media advocacy field during the previous day (E) and the percentage of cognitive words (c) within the organization’s post is less than the average percentage of such words across the entire social media advocacy field during the previous day (C). The indicator is also positive if the organization uses more cognitive language and less emotional language than all other actors within the conversational field during the previous day. Table 1 shows that phase shifts occur during 5 percent of organization-day observations within the autism advocacy field and 15 percent of organization-day observations within the organ donation advocacy field.

Alternative Explanations: Organizations’ Characteristics

Organizational capacity. Previous studies indicate financial and social resources enhance

Table 1. Descriptive Statistics

	Autism Spectrum Disorder Advocacy Field				Organ Donation Advocacy Field			
	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.
Number of Unique People who Make Substantial Comments	.19	1.11	0	48	1.11	6.44	0	334
Organization Contributes to Phase Shift (1 = yes, 0 = no)	.05	.21	0	1	.14	.34	0	1
Number of Posts by Organization Previous Day	.37	.95	0	20	.39	.75	0	9
Organization's Total Yearly Budget	2,328,663.71	6,315,633.87	0	35,569,995	11,962,014.84	22,840,665.25	0	150,000,000
Organization's Number of Facebook Fans	1,375.60	2,623.21	31	18,127	5,778.61	16,323.53	31	100,812
Organization's Age (in years)	11.16	15.76	1	88	26.02	16.13	3	66
Organization's Number of Full-Time Staff	37.66	119.95	0	716	62.82	105.79	0	650
Organization's Number of Volunteers	566.44	2,781.13	0	17,136	195.00	390.55	0	2,000
Betweenness Centrality of Organization within Field Previous Day	.01	.28	0	29	2.51	353.52	0	59426.33
Closeness Centrality of Organization within Field Previous Day	.00	.00	0	.01	.00	.00	0	.12
Number of Audiovisuals in Organization's Posts Previous Day	.14	.61	0	25	.57	1.34	0	12
Number of Page Views Organization Received from Facebook Advertising	17.63	466.93	0	36,048	1,697.88	19,607.30	0	430,511
Organization's Posts Discuss Influential Topics (1 = yes, 0 = no)	.00	.06	0	1	.03	.06	0	1
Total Number of People Who Viewed Organization's Page	1,817.28	11,018.60	0	347,644	15,396.23	116,017.19	0	1,581,395
% of Organization's Page Viewers under Age 35	29	24	0	1	29	21	0	99
% of Organization's Page Viewers Female	51	34	0	99	52	33	0	99
% of Organization's Page Viewers from Eastern U.S.	45.97	205.80	0	7,997	3.34	16.39	0	1,064
% of Organization's Page Viewers from Midwestern U.S.	45.90	330.35	0	7,965	43.86	364.89	0	28,336
% of Organization's Page Viewers from Southwestern U.S.	79.88	252.39	0	4,404	49.57	340.63	0	28,271
% of Organization's Page Viewers from Western U.S.	135.49	408.93	0	7,848.85	79.87	212.86	0	1,400.04
Homophily Index (Dissimilarity of Audience Demographics)	2.00	1.09	0	4.07	2.50	.97	0	4.08
Opinion Leadership (Popularity of Users Who Comment on Post) Previous Day	2.05	24.63	0	1,035	7.79	37.59	0	889
Number of Blog Mentions of Organization Previous Day	.10	.39	0	7	.16	.74	0	27
Number of News Articles about Organization Previous Day	.00	.06	0	2	.04	.47	0	20
Relative Volume of Google Searches Previous Day	29.81	13.40	0	93.28	33.93	16.67	4.29	92.87

Note: Unit of analysis is organization/day. *N* = 18,456 (Autism Spectrum Disorder advocacy field); *N* = 28,388 (organ donation advocacy field).

advocacy organizations' capacity to win media attention (e.g., Andrews and Caren 2010). To examine whether such resources also help organizations stimulate public conversation on Facebook, the survey embedded within our application asked representatives of each organization to report their total annual budget, number of full-time staff, and number of members or volunteers who participate in the organization's activities on a regular basis. As Table 1 shows, the average autism advocacy organization in our sample has a budget of \$2.3 million, 38 full-time staff, and 566 volunteers. The average organ donation advocacy organization has a budget of \$11.9 million, 63 full-time staff, and 195 volunteers. Our application also queried respondents about the age of their organization, because more established organizations might have dedicated infrastructure for public outreach, or younger organizations may be more likely to depend on social media precisely because they lack such resources. The average age of autism organizations in our sample is 11.2 years, and 26 years for organ donation organizations. Finally, our application extracted data on each organization's total number of Facebook fans by day. This variable is critical because it determines the number of people who might view a post from the organization within their individual news feeds. As Table 1 shows, our sample includes organizations whose daily number of fans range from 14 to more than 100,000.

Organizational networks. Because Facebook is a social network, the position of an organization within this social structure may enable or constrain its capacity to stimulate conversation. For example, posts produced by organizations that are centrally positioned within a social media advocacy field, or those that occupy brokerage positions between different clusters of advocacy organizations or social media users, may be more likely to attract comments. Unfortunately, Facebook does not provide a publicly available list of the names of each organization's fans. We therefore assign network ties between advocacy organizations using a two-mode network projection (Breiger 1974).

Here, edges describe organizations that receive comments from the same individuals within the conversational field. We then calculate the closeness and betweenness centrality of each organization within this network during the previous day.

Alternative Explanations: Organizational Tactics

Online tactics. Numerous studies examine the tactics advocacy organizations use to mobilize new members (Rojas 2006; Taylor and Van Dyke 2004). Our application collected data describing the online tactics of social media organizations. Our first measure indexes whether each organization's post contains audiovisual information, because previous studies suggest such media help focus attention on an organization's message (Halfmann and Young 2010; Jasper 1998; Morrison and Isaac 2012; Vasi et al. 2015). Roughly 14 percent of autism organizations and 57 percent of organ donation organizations produced audiovisual content each day. Next, our application collected data on whether organizations pay Facebook to "promote" their posts in the news feed of users who are not already fans of the organization on Facebook. As Table 1 shows, most organizations did not use this service, but a single organization received 430,511 page views via such Facebook advertising on a single day.

Discursive tactics. Our phase shift indicator measures the tone or conversational style of advocacy organizations' posts. Yet the substance of such posts may also stimulate conversation within social media advocacy fields. To identify latent themes within advocacy organizations' posts, we use topic models. This form of automated text analysis has become increasingly popular among social scientists in recent years (DiMaggio, Nag, and Blei 2013; Mohr and Bognadov 2013). We use a recently developed form of topic modeling known as Structural Topic Modeling (Roberts et al. 2014). This method uses meta data—for example, data about who wrote the text, when it was written, or where

it was published—to improve identification of latent themes. We created a corpus of all posts produced for each field and used the month in which the text was produced as a covariate to improve topic classification. We identified 75 topics within the autism advocacy field and 39 topics within the organ donation advocacy field.¹⁴ Because we cannot include predictors for each of these topics within our model, we ran separate models to identify which topics had a positive and significant association with our outcome. We then created a dichotomous indicator to describe whether an organization's posts discussed these topics on a given day.

Offline tactics. Our application also surveyed organizations about the offline tactics they use to call attention to their cause. We asked respondents how often their organization participates in each of the following activities on a scale from 1 (never) to 5 (frequently): (1) paying for television or radio advertising; (2) using another social media site; (3) promoting their cause by distributing pamphlets or other publications; (4) hiring a social media consultant; (5) coordinating leisure activities designed to spread awareness; (6) arranging letter writing campaigns; (7) conducting political lobbying; (8) organizing protests or boycotts; (9) organizing door-to-door outreach; and (10) recruiting celebrities as spokespeople. Unfortunately, these tactics were measured across the lifetime of each organization, instead of the organization-day level. We elected not to include these variables in our main models for a variety of reasons, which we describe in Section 6 of the online supplement. The supplement also presents an alternative model that includes these indicators alongside our key indicators.

Alternative Explanations: Characteristics of Social Media Audiences

Number of people who view each post. Perhaps the most important predictor of the number of people who make substantial

comments about an advocacy organization's posts is the number of people who see them. Using data collected by our Facebook application, our models include a daily measure of the number of unique people who view any of an organization's posts each day. This measure describes the number of people whose eyes passed across the post as they scrolled through their Facebook news feed or their list of updates from all of their contacts on the site. As Table 1 shows, organizations across both fields received a minimum of 0 and a maximum of 1.5 million daily views. Our Facebook data also describe the age range, gender, and geographic region of individuals who viewed an advocacy organization's posts or page each day. Because previous research indicates the most active social media users are young people (Perrin 2015), we calculate the percentage of page viewers who were under age 35 each day. Previous studies also suggest women are slightly more active social media users than are men (Polletta and Chen 2013). Accordingly, we created a variable that describes the percentage of women who viewed a post by day. As Table 1 shows, roughly half of page viewers were women across both fields and 30 percent were under age 35. Finally, we use the city-level geographic data collected by our Facebook application to categorize viewers into the same geographic regions used by the General Social Survey, because previous studies indicate that individuals who live on the coasts of the United States are slightly more active on social media (Mitchell et al. 2013).

Homophily index. The homogeneity of individuals who view an organization's posts on a given day may also influence the number of comments it receives. One study suggests that civic engagement is most likely when networks are heterogeneous because of the likelihood that people engage with differing views (Huckfeldt, Mendez, and Osborn 2004; Lee et al. 2014). Still other studies suggest that social media inhibits political engagement with alternative views because people tend to form network ties with like-minded

individuals (e.g., Sunstein 2002). Organizations that only receive views from people of the same age, sex, or geographic location might therefore provoke less conversation. Therefore, we created an index of network homophily based on these variables for each organization and day within our dataset. This measure calculates the Shannon Entropy for 24 variables from the Facebook data generated by our application that describe the gender, age range, and geographic region of people who viewed each post. The measure ranges from 0 to 4.07 in our data; higher values indicate less homophily.

Opinion leadership. Classic studies of mass persuasion highlight the influence of “opinion leaders” who bring political issues to the attention of others within their social networks (e.g., Katz and Lazarsfeld 1955). To account for this, we take advantage of the fact that Facebook users can like comments made by other Facebook users, in addition to liking posts by the focal organization. For each post in our dataset, we identify everyone who commented on the post and aggregate the number of “likes” their comments received across all previous days in the study period. We consider these highly liked posts as indicating opinion leadership. We include this variable in our model to measure the effect of comments made by opinion leaders on the overall number of people who make substantial comments about an advocacy organization’s posts each day.

Alternative Explanations: External Opportunity Structures

External opportunity structures. Earlier we suggested that endogenous processes within conversational fields generate cognitive-emotional currents. Yet it is also possible that exogenous factors shape the number of people who comment on organizations’ posts.¹⁵ Students of collective behavior emphasize the role of various extra-organizational factors that facilitate mobilization processes. These include crises or other factors that heighten public attention about an issue or individual

organization (Koopmans and Olzak 2004; McAdam 1988). To account for these factors, we first measure the number of mentions each organization received on television or print media on the day it makes a post as well as the previous day. Our Facebook application obtained this information by recording the date of any media mentions within the Google News database for each organization. Second, our application recorded the number of times the organization is mentioned within the Google Blogs database. As Table 1 shows, news and blog coverage is relatively rare. Finally, an organization may be more likely to stimulate conversation if public interest in its topic is high at a given time. Therefore, our application counted the relative volume of Google searches for the terms “autism” and “organ donation” for each day during the study period (on a scale of 0 to 100).

Modeling Strategy

Because of the heavy skew in our outcome, we use generalized linear models for panel data with a negative binomial link function and fixed effects for each organization and day within the study period. Our models also control for the number of posts each organization makes during the day and the previous day to ensure that our phase shift measure does not simply capture the effect of making a post—regardless of its relationship to cognitive-emotional currents.

RESULTS

Figure 3 plots standardized coefficients from the models we used to estimate the association between our phase shift indicator and the number of unique people making at least one substantial comment on the organization’s post each day. This estimate is net of 19 of the additional predictors described earlier within the autism and organ donation fields. As this figure shows, our phase shift indicator is the strongest predictor, in terms of magnitude, in the model. Transforming our regression coefficients into incidence rate ratios indicates

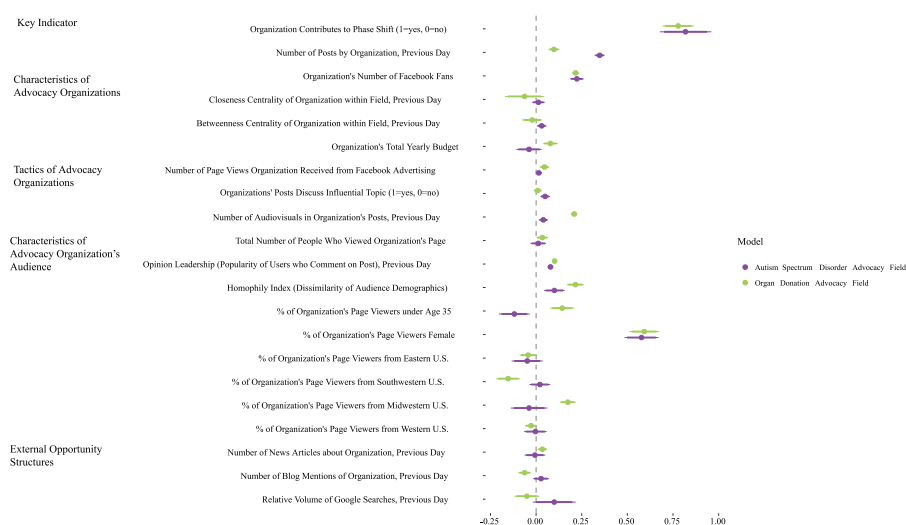


Figure 3. Negative Binomial Panel Regression Models Predicting Number of Unique People Who Make Substantial Comments about Advocacy Organizations' Posts (by day), Controlling for Organizational Resources and Tactics, Characteristics of Social Media Audiences, and the Broader Social Context in Which They Interact

that organizations contributing to phase shifts initiate social media conversations at rates between 2 and 2.5 times larger than organizations that do not.

Overall, organizational characteristics have relatively small or no association with our outcome. As expected, an organization's total number of Facebook fans is positively associated with the size of conversations they generate each day. Yet the closeness and betweenness centrality of each organization within the social media advocacy organization by day—as well as the size of its total annual budget—have either no or negligible associations with our outcome. Similarly, online tactics have very small or no statistically significant associations with the outcome, including use of audiovisuals, discussion of influential topics, and use of Facebook's advertising tools to promote posts.

Characteristics of an organization's Facebook audience have mixed relationships with our outcome. The number of women who viewed an organization's post by day had a very strong significant association with the outcome in both the autism and organ donation advocacy fields. This may be due to

women being more likely than men to be employed within public health fields, or autism disproportionately affecting parents—as women generally provide more childcare than do men. However, this interpretation does not explain the negative association between age and our outcome within the autism advocacy field. Our homophily index and our opinion leadership measure have substantively small yet statistically significant associations with our outcome, consistent with theoretical expectations. No clear pattern exists among the region of an advocacy organization's audience, although organ donation organizations appear to stimulate more substantial comments if they receive more views from the Midwestern United States. Finally, our three measures of external opportunity structures have little or no statistically significant association with the number of people who make substantial comments about an organization's posts.

Robustness Checks

Our time-series and multivariate analyses provide strong evidence of the existence of

cognitive-emotional currents and the importance of phase shifts in stimulating public conversation about Autism Spectrum Disorders and organ donation. Nevertheless, we performed several robustness checks to further substantiate our findings. Our model indicates that individual members of social media advocacy fields regularly switch between cognitive and emotional conversational styles due to social contagion and saturation effects. However, the same pattern could be generated by a purely between-person process of selection into the field by individuals with fixed preferences for cognitive or emotional language.¹⁶ In other words, people who prefer rational debate—or people with high “need for cognition” (Cacioppo and Petty 1982)—may leave public conversation when it becomes overly emotional and re-emerge when emotional people retreat from conversation. To examine this possibility, we identified all individuals who made at least four substantial comments about an advocacy organization’s posts within each field. We then calculated the number of people who only used cognitive or emotional language. This analysis revealed only 4.1 and 4.2 percent of commenters did not switch between cognitive and emotional styles within the autism and organ donation fields, respectively. We obtained similar results using different thresholds for the number of comments analyzed in this manner. This indicates that the great majority of people are prone to shift between conversational styles rather than having fixed preferences for one or the other.

Another important limitation of our research design is that we do not directly observe whether individuals experience cognitive or emotional overload—and more specifically whether people shift conversational styles in response to trends within the broader conversational field. We cannot retrospectively survey users about their mental state more than five years ago. However, we can gain insight into this issue by examining whether individuals are more likely to respond to phase shifts if they are more active members of the social media advocacy field. If our

interpretation is correct, individuals who regularly comment on a range of messages produced by different organizations within the field should be more likely to perceive the ebb and flow of cognitive and emotional language, experience an overloaded state, and be more responsive to a change of tenor.¹⁷ To assess this hypothesis, we ran models that determine whether people are more likely to comment in response to a post that contributes to a phase shift if they have previously commented on messages produced by a large range of advocacy organizations. We found a substantively strong and statistically significant association between the number of organizations engaged and the phase shift indicator in the autism advocacy field ($p < .05$), and a substantively sizeable association within the organ donation advocacy field, although this last result did not reach conventional levels of statistical significance ($p < .10$). These results lend some credence to our claim that cognitive and emotional overload contribute to cognitive emotional currents. However, saturation could result from other aspects of discourse, such as the topical content of conversations. Future studies that collect micro-level biometric markers or conduct participant observation of social media consumption are needed to determine whether cognitive and emotional overload are the primary mechanism responsible for the patterns identified here—and to further isolate these mechanisms from other saturation effects.

A third possible objection to our analysis concerns exogenous events. We argued that cognitive-emotional currents are created by mechanisms endogenous to the field. Yet, it is also possible that crises, high-profile events, or other exogenous factors create surges and declines in emotional or cognitive language. To investigate this possibility, we used lagged panel models to examine whether sudden increases in the volume of Google searches for “autism” or “organ donation” created increases in the frequency of emotional or cognitive language in each field. We observed a *negative* association between Google searches and emotional language in the autism

advocacy ($b = -.04, p < .05$) and organ donation ($b = -.026, p < .05$) fields. We observed a negative association between Google searches and cognitive language in the organ donation field ($b = -.017, p < .05$), but a small and statistically non-significant negative association in the autism advocacy field ($b = -.001, p < .15$). Together, these analyses suggest that exogenous factors—at least those that can be approximated via Google searches—do not create regular increases in cognitive or emotional language within either field.

DISCUSSION AND CONCLUSIONS

We set out to resolve a long-standing question in the literature on deliberation within the public sphere: do advocacy organizations stimulate more public conversation if they appeal to people's innate capacity for reason or to their passions? Synthesizing this literature with theories of social contagion, we argued that cognitive and emotional conversational styles are likely to ebb and flow across social media advocacy fields at the collective level. We then showed that these cognitive-emotional currents create an opportunity structure wherein autism and organ donation advocacy organizations stimulate substantially higher rates of engagement if they dispatch messages that contribute to a phase shift. This is indicated by the use of emotional language during a period of prolonged rational debate or the use of cognitive language after lengthy emotional conversations. Our analysis shows this effect holds even after controlling for organizations' characteristics, their social media audiences, and the broader social context in which they interact.

Contributions to Studies of Social Contagion and Diffusion

These findings have important implications for future research on social contagion, public deliberation, and the emerging field of computational social science. A very large literature explains why products and innovations spread

(e.g., Rogers 1962). However, much less is known about why social contagions recede. Previous studies treat the spread of cognitive or emotional conversational styles as a simple contagion, not unlike the spread of a product or pathogen across a population where it remains indefinitely (e.g., Fowler and Christakis 2008). Yet, as Centola and Macy (2007) argue, the spread of behaviors such as conversational style most often involves a more complex form of contagion requiring social reinforcement. Other work details the social feedback processes underlying the spread of such complex contagions (e.g., Hodas and Lerman 2014). Going beyond this work, our study provides evidence for a new mechanism that helps explain why they decline. Social reinforcement not only enables the spread of cognitive and emotional styles across public conversations about social problems. This contagion process also foreshadows their decline by increasing the likelihood that people experience some type of saturation effect, such as cognitive or emotional overload. We believe this occurs because actors observe the rapid spread of a given communication style. These types of interdependent processes could explain the decline of other complex contagions as well. Future studies might examine how processes of social reinforcement occurring near the concave and convex inflection points of a diffusion curve relate to each other.

This study also identifies the existence of cognitive-emotional currents within public conversations about social problems and provides a preliminary account of how different social contagions relate to each other. By and large, previous studies treat social contagions as independent. Yet countless contagions are continuously spreading across human populations all the time. There are plenty of reasons to expect they affect one another. For example, they may do so by competing for limited resources such as public attention (Hilgartner and Bosk 1988).

To our knowledge, ours is the first study to show that the saturation of one type of social contagion can hasten the contagious spread of another. Our theoretical insight was grounded

in an interdisciplinary literature on neural cognitive and emotional processing suggesting that these two ways of interpreting information have a competing yet symbiotic relationship. We showed that the oscillating relationship between cognition and emotion can also be observed with discourse at the field level. We theorized this phenomenon as the result of the interplay between underlying social contagion and overload effects. Our article thus provides a model of how conversational styles compete with each other in the public sphere, but it is likely that other social contagions also have synergistic relationships. The diffusion of a religious ideology, for example, might make people more receptive to certain political messages. Alternatively, the rise of new musical styles may create the conditions necessary for new consumer behaviors to spread (e.g., Hebbridge 1979).

Contributions to Work on Deliberation and the Public Sphere

We also contribute to the literature on advocacy groups and deliberation within the public sphere. Many studies examine the discursive framing strategies advocacy groups use to shape public discourse about a social problem (e.g., Gamson and Modigliani 1989). A key insight from this literature is that messages are more likely to succeed if they resonate or dovetail with other popular messages or ideologies (Benford and Snow 2003). Yet much less attention has been dedicated to the tone of advocacy organizations' messages, whether they are consistent with the mood of their audiences, and what consequences this consistency (or lack thereof) has for the organization. Previous studies of social movement organizations document the rhythmic qualities of collective emotions within mobilization processes (e.g., Gould 2009; Summers-Effler 2002). We build on and go beyond this work to show that emotional and cognitive language alternate within public conversations about social problems over time at the discursive field level. We argued that these cognitive-emotional currents create an opportunity structure for organizations to enhance their

effectiveness. This may provide a first step toward a broader theory of public mood. Future studies of advocacy organizations might also consider the implications of this opportunity structure for the capacity of such groups to channel collective emotions, such as anger or joy, into concrete shifts in logic among large populations, which may be necessary to sustain social change in the long term.

Contributions to Computational Social Science

Finally, our study has important implications for the emerging field of computational social science. Social media has created an explosion of text-based data that can be used to address a number of pressing questions in social science. However, computational social scientists too often ignore the broader social context in which such texts are produced. This is not only due to the considerable challenge of collecting such data, but also because many computational social scientists hail from non-social science backgrounds and therefore ignore critical issues such as sampling or omitted variable bias. As a result, many social scientists view computational social science with a healthy degree of skepticism (Salganik 2017). By developing innovative applications for social science research on social media sites, however, we provide a new model for future work in computational social science. Our strategy combines the qualitative and longitudinal detail of social media texts with more conventional and systematic survey methods. We believe our approach has the potential to open new horizons for rigorous empirical analysis of social media data—not only within the study of public deliberation and social contagion, but also within the study of cultural tastes, health behaviors, public opinion, and many other topics.

Limitations and Suggestions for Future Research

Despite these contributions, our study has important limitations in addition to those

already noted. Although we provided an explanation of how advocacy organizations stimulate public conversation, it remains to be determined whether this outcome has broader consequences for behavioral shifts, attitudinal change, or mobilization and fundraising. These concerns are doubly important in the age of social media, given recent studies that reveal a loose coupling between online and offline behavior. Lewis, Gray, and Meierhenrich (2014), for example, argue that much social media discourse about social problems can be considered “slacktivism”: a low-cost form of participation that does not generate substantial social change. On the other hand, a number of recent studies indicate online and offline activism have become closely intertwined. Fisher and Boekkooi (2010), for example, show that social media-based activism increases the number—and perhaps more importantly the diversity—of people who attend offline events. More recent studies indicate social media activism has critical implications for political participation (Lee 2014; Shah et al. 2005), coordination of protests and strikes (Qi et al. 2016; Vasi et al. 2015), presidential campaigns (Karpf 2012; Kreiss 2012), and even some aspects of revolutions (Tufekci and Wilson 2012).

Debates about the relationship between online and offline settings are unlikely to be resolved in the near future. More work is thus needed to determine whether cognitive-emotional currents and the opportunity structures they create shape deliberation in other settings, such as legislative hearings, judicial debates, television news programs, business meetings, or municipal town council meetings. As previously stated, we expect the social contagion and saturation processes creating cognitive-emotional currents may be even stronger in these settings. The reason for this is that people can experience the visceral cues that create motor mimicry and other physiological cues more directly. Such contexts also allow conversations to unfold across shorter periods of time, making it more likely people will remain mutually entrained.

Future studies should also address the existence of cognitive-emotional currents in

online platforms beyond Facebook and in other forums that do not require propinquity, such as newspaper op-ed pages. Extending and adapting the theoretical framework developed here to new contexts will allow future studies to determine how much cognitive-emotional currents and phase shifts are dependent on audiovisual cues, discussant anonymity and diversity, time horizons, and linguistic constraints such as text character limits. Studies of other fields are also needed to verify that conversational styles spread across individuals via influence and mimicry mechanisms. Alongside our findings, such future studies would advance long-standing debates on the social dynamics of the public sphere and how advocacy organizations generate awareness about their causes.

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Notes

1. Rational and emotional conversational styles are not the only types of conversational genres that hold the potential to draw people into public conversations. For example, humor or irony may also draw people into conversations (Tavory 2014). Other studies suggest that different forms of rational debate can be identified, such as civic versus non-civic culture (Dahlgren 2005; Ferree et al. 2002), or that different types of emotions may create different reactions in deliberative settings (Jasper 2011).
2. There is further precedent for this type of argument within the literature on ego-depletion within social psychology (Baumeister et al. 1998). This

theory argues that individuals have a limited store of resources for exercising self-control. As a result, individuals have finite capacity to process information in a controlled, rational manner. After this limit is reached, they are likely to switch to a more intuitive mode.

3. We present a formal version of our theoretical model in the form of an agent-based model in Section 1 of our online supplement.
4. As we will discuss in further detail, there is also evidence that homophily within social media networks prevents exposure to ideologically diverse streams of information (Sunstein 2001).
5. Data from this study are available at the following link: <https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/EHSGJ>.
6. We present a detailed discussion of our decision to study Facebook in lieu of Twitter in Section 2 of our online supplement.
7. This sampling source has become popular because it provides the most complete sample of advocacy organizations available at present (Andrews, Hunter, and Edwards 2012; Brulle et al. 2007).
8. Only a small number of organizations were recruited to join our study via respondent-driven sampling. Because the literature on respondent-driven sampling indicates this practice has mixed effectiveness (Salganik and Heckathorn 2004), we took additional steps to assess possible response bias (see Section 5 of the online supplement).
9. Because important text messages often appear within images on Facebook, we hired human coders to transcribe any text within images associated with all the posts in our target sample to more accurately measure the prevalence of emotional or cognitive language over time.
10. See Section 5 of our online supplement for additional details about the protection of human subjects in this study.
11. We also offered organizations the option of e-mailing us their nonpublic Facebook data instead of transmitting it to us via the Facebook application. Unfortunately, much of this data was incomplete, and several of the variables used in our models were only available via direct interface between our application and Facebook's Application Programming Interface. Therefore, we excluded these organizations from our final models.
12. For additional details about the design and function of the LIWC software, see Section 3 of the online supplement, where we also provide examples of texts from our sample and the codes they were assigned by this software.
13. To further validate our findings, we also applied Liu's (2010) sentiment analysis detection algorithm to our data. The correlation of the LIWC classification of emotional texts in our data and the Liu sentiment analysis method is .73 ($p < .001$). We are unable to calculate Krippendorff's alpha or

Cronbach's alpha because both algorithms produce continuous—instead of dichotomous—measures of emotion.

14. We calculated the held-out likelihood and semantic coherence for values of k (the number of topics) that ranged from 2 to 300. Together, these metrics suggested the ideal number of topics was between 70 and 80 in the autism advocacy field and between 35 and 42 for the organ donation advocacy field. We elected to use models where $k = 75$ and $k = 35$ based on qualitative inspection of the topic models produced within this range.
15. We will also discuss the potential of exogenous events, such as crises or unprecedented events, to disrupt cognitive-emotional currents because they often create significant emotional arousal.
16. We thank an anonymous reviewer for bringing this possibility to our attention. We also note several recent studies that further demonstrate the potential for network homophily and contagion to be confounded with each other (Aral, Muchnik, and Sundararajan 2009; Shalizi and Thomas 2011).
17. We thank an anonymous reviewer for this suggestion. We also note that previous studies document that opinion leaders have lower thresholds for network effects than do others (Valente and Davis 1999).

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