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## **Agenda Setting in a Digital Age: Tracking Attention to California Proposition 8 in Social Media, Online News, and Conventional News**

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### **Abstract**

This study compares the agenda-setting cues of traditional media alongside those of online media in general and social media in particular. The main line of inquiry concerns (a) whether people posting content to openly accessible social media outlets may be acting in response to mainstream news coverage, possibly as a “corrective” to perceived imbalances in that coverage, or (b) whether such posts seem to have influenced professional media coverage of the issue, possibly reflecting broader opinion dynamics. We do not view these as competing hypotheses, as this relationship may run in both directions and shift at different points in the evolution of an issue. Our goal is to establish important preliminary findings by addressing these questions in the context of a particular issue that is (a) prominently covered in professional media, and (b) contentious enough to inspire individuals to “take the media into their own hands” by producing and publishing their own “coverage.” Proposition 8 in California, which amended the state constitution to define marriage as the exclusive right of opposite-sex couples, provides this context. Our analysis focuses on the thousands of videos posted to YouTube and coverage of Proposition 8 in professional news media, tracing the relationships among them.

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## Introduction

The definition of “news” among media consumers is in flux. Traditional news sources and especially newspapers, while they remain important, are giving way to emerging platforms for conveying issue coverage and providing perspective on social controversies. Traditional media companies are also in an ongoing process of adapting to and adopting some of these new modes of communication that have given rise to social media. The Internet is at the center of this change, expanding the definition of news sources and news producers. So-called citizen journalists, as well as activists, are availing themselves of Internet-based platforms in the form of personal and cooperative blogs, social networks, and photo and video sharing sites. Among these options, a leading venue for citizen expression and personal storytelling is YouTube (<http://www.youtube.com>).

The 2008 general elections saw YouTube take on a prominent role. Although it is certainly true that campaigns used the site to post video messages with the hope they would garner a wide audience virally, and subsequently draw media attention at little or no cost, the most popular clips, namely the “Yes We Can,” “Dear Mr. Obama,” and “Obama Girl” videos, were produced by people outside of the news industry or campaign teams. As Andrew Rasiej from the blog Techpresident stated, “The power to control the message is no longer in the hands of the political parties and candidates or the mainstream media. It’s now shared by the public at large. They can distribute a piece of media on YouTube faster in a 15-minute news cycle than traditional media can in a 24-hour news cycle” (Vaidyanathan 2008). As such, YouTube videos may act as fire starters among the media, giving editors enough reason to investigate and report the given subject matter as news and draw the public’s attention to it. This would suggest a shift away from typical agenda-setting dynamics, yet these relationships have not been explored at great length.

What has made YouTube a new force to be reckoned with is summed up in its marketing slogan: *Broadcast yourself*. In a way that far surpasses a letter to the editor or call to a talk-radio program, a YouTube video has the potential to accumulate hundreds of thousands, even millions, of viewers in a matter of days. With this power, YouTube is both vox populi and public media with the power to influence the issue dialogues in the mainstream media and among citizens. The interplay between old and new media is becoming a genre in itself, especially projects studying blogs and online news sites (Hennessy and Martin 2006). Research exploring these issues speaks to deeper normative questions about the relationship between public opinion and the press, and the mutual influence among media

institutions and public sentiment (Zaller 1992). Specifically, we seek to examine the degree to which the timing and volume of YouTube videos are related to or operate independently from traditional media coverage in the context of California's 2008 ballot measure regarding same-sex marriage, Proposition 8, and the subsequent state Supreme Court ruling affirming the measure's passage and constitutional legality. Proposition 8 was the most expensive social issue campaign in U.S. history, was emotionally charged on both sides, and played out for several months past the November vote. In the 14 months studied, over 17,000 YouTube videos included keywords "Proposition 8" or "Prop 8." A sample of this content was paired with content specifically mentioning Proposition 8 in the Google News archive and eight of the leading daily California newspapers.

In order to investigate if, when, and to what degree YouTube videos may have led or followed traditional news media in covering specifics of the Proposition 8 story, we employed time series analysis. As argued by Yanovitzky and VanLear (2008), "one commonly hears that communication is a process, but most communication research fails to exploit or live up to that axiom. Whatever the full implications of viewing communication as a process might be, it is clear that it implies that communication is dynamically situated in a temporal context, such that time is a central dimension of communication" (89). We take this assertion seriously in our approach to research and analysis of the collected data. As a result of this analysis, we were able to identify key news periods and determine when and how traditional media led or followed YouTube content in their attention to Proposition 8 over the 14 months studied.

### **Proposition 8 Background**

"California Proposition 8—Eliminates Right of Same-Sex Couples to Marry" is the complete name of what came to be commonly known as "Prop 8," the 2008 statewide ballot initiative that ultimately added an amendment to the California Constitution. This amendment states that "only a marriage between a man and a woman is valid or recognized in California," effectively banning same-sex marriage.

Proposition 8 and its attendant legal challenges are the most recent of a series of efforts to define marriage in California. In 1977, the state legislature passed a law (Assembly Bill 607) that included language that described marriage as a "personal relation arising out of a civil contract between a man and a woman." While not a specific definition, this marked the first time the California Civil Code section on marriage law included a specific exclusionary reference to gender (State of California 2009). The

definition of marriage was further strengthened with the passage of a voter initiative in 2000. Known as Proposition 22, the initiative enacted a statutory change in the California Family Code. This initiative specifically defined marriage as being between one man and one woman.

Several developments ultimately led to court challenges of Proposition 22, including shifting public opinion and efforts by municipalities such as San Francisco to conduct same sex marriages. Being a statutory law, it fell under the purview of the California State Supreme Court, which agreed to hear the case. Proposition 22 was overturned in May 2008, clearing the way for same sex couples to marry in the State of California (Supreme Court of California 2008).

While the California Supreme Court deliberated on Proposition 22, organizers opposed to same-sex marriage moved to qualify a version of Proposition 8 for inclusion in a statewide ballot. Originally titled the California Marriage Protection Act, the passage of Proposition 8 would write into the state constitution the definition of marriage as only between a man and a woman. The initiative was qualified and placed on the November 2008 general election ballot and was passed by the voters in a 52.3 percent majority (California Secretary of State 2008a).

Within weeks, challenges emerged, with the California Supreme Court agreeing to hear three of the lawsuits. The court ultimately upheld the process that brought Proposition 8 to the ballot while also sustaining the legal standing of approximately 18,000 same-sex marriages that occurred in California during the brief period such unions were legal (Dolan 2009).

More than \$82 million was spent trying to educate and influence voters about Proposition 8. Opponents to the same-sex marriage ban spent more than \$44 million, representing 53 percent of the total. Leading opponents of the ban included the Human Rights Campaign, several California political action committees formed specifically around equal rights or the initiative (No On 8), and numerous celebrities and entertainers. Supporters of the ban included the Church of Latter Day Saints (Mormon Church), the Catholic Church, and several other religious organizations and high-profile religious leaders (*Los Angeles Times* 2009).

While the text of Proposition 8 was brief and clear, the issue of same-sex marriage was framed in a complex mixture of political, religious, and civic arguments. Supporters of the ban argued that it would take away individual rights by forcing people to provide services for homosexuals, that homosexuality would be taught in schools, that it was an attempt to overrule activist judges, and that it was less about gay people and more about traditional marriage. Opponents argued for uniform application of rights for all citizens, for not leaving such a serious constitutional amendment to a

simple majority vote, for the recognition of loving and committed lifelong relationships, and for equal protection under the law (California Secretary of State 2008b).

The arguments were of a nature that made them difficult to communicate in 30-second television ads. The issue at hand was emotionally charged and highly personal. These elements combined with an assortment of rallies, media coverage, and outside influence from political and religious groups to make Proposition 8 a ripe subject for emerging media such as YouTube. While a good deal of the pre-election YouTube content concerning Proposition 8 was part of coordinated campaigns by both sides, personal YouTube postings in response to the passage of Proposition 8 and activity surrounding the subsequent legal challenge were of a far more individual nature. YouTube postings surged in the days following the November election as people took to the streets to protest the same-sex marriage ban. This surge was repeated in the days surrounding the California Supreme Court's decision in May 2009.

In the months leading up to the November ballot, the primary focus of both news media and social media content appeared to be attempts to inform and influence voters. From the night of the election forward, social media content expressed emotions ranging from shock and dismay to outrage and calls to action. Traditional news media was left to cover reactions while social media often embodied reactions, as shown in a companion study that worked from the same set of Proposition 8 YouTube data (Thorson et al. 2010).

### **The Application of Agenda-Setting Theory to YouTube**

With the rise of new media, the potential agenda-setting power of traditional media is called into question. Scholars have long discussed the ability of the mainstream media to shape which issues the public considers to be salient, based on the relative attention provided to some issues over others (McCombs and Shaw 1993; Tan and Weaver 2007; Scheufele and Tewksbury 2007). As the fathers of agenda-setting theory put it, "Readers learn not only about a given issue, but also how much importance to attach to that issue from the amount of information in a news story and its position" (McCombs and Shaw 1993, 176).

The ascendance of digital media has the potential to alter this function in three distinct ways, each of which has dramatically different consequences. First, it is possible that alternatives to the mainstream media considerably attenuate traditional media's ability to set the nation's political agenda. We know that most people consuming digital media continue to use

more traditional media sources as well (Dutta-Bergman 2004). If the cues available across these sources differ, the strength and influence of any one is likely to be diminished.

On the other hand, it is possible that the advancement of new media has slightly modified the nature of the mainstream media's ability to set the agenda, rather than eliminating it entirely. If new media are following the cues of traditional media, then the agenda-setting power has not diminished but has instead simply gained another channel. Mainstream media could set the agenda of blogs, social networking sites, video sharing sites, and others, which then deliver those cues to the general public in a modern version of the two-step flow (Katz and LaFzarsfeld 1955). The role of traditional media would remain unchanged, and new media outlets such as YouTube would essentially take the place of opinion leaders in years past. Moreover, it seems likely that the end result in this scenario—which issues are discussed by the public and how—would remain the same.

Finally, some have suggested that the rise of new media has the potential to result in a reverse flow of information. Particularly due to the speed with which many social media outlets such as YouTube and Twitter function, they may actually have the ability to influence the agenda of traditional news outlets. As author Jonathan Last (2006) put it, “An informal network—the new media—has arisen that has the power to push stories into the old media” (309). As the relationship between old and new media develops, it is important that we learn the nature of that relationship, and particularly its effects on the classic agenda-setting power of the media.

Literature is beginning to examine the dynamics and potential consequences of this evolving relationship. As this literature develops, its scope is widening. However, much of it now centers on democratic theory, normative consequences, and speculation, rather than broad-scope empirical work (see, e.g., Downey and Fenton 2003; Dutta-Bergman 2004; Dunbar-Hester 2009). There has also been some emphasis on new media's ability to change the way news and information is delivered. Differences in structure, medium, journalistic or other norms, and the ability to set aside objectivity and “make the personal political” have the potential to change the way information is received by new-media users (Simmons 2008).

Agenda-setting processes among conventional and digital media sources have only recently been considered in academia. Theorists acknowledge that the relationships established decades ago are facing new pressures from new media (Gurevitch, Coleman, and Blumler 2009). The results of such pressures are still being debated, and may depend on which new media outlets are considered. Coleman and McCombs (2007), for instance, have found that differential media use between generations failed



to disrupt the agenda-setting power of the media. Along similar lines, blog agendas seem to coincide with the agenda of the mainstream media, again resulting in a fairly stable political agenda presented across widely varying outlets (Lee 2007). On the other hand, during the recent election cycle, scholars discovered that the *New York Times* (among the most dominant of the mainstream media) paid quite a bit of attention to new media in its 2008 election coverage (Schudson 2009). It is worth noting that blogs, Internet news, and generic “new media” may function quite differently than YouTube. For instance, YouTube is most similar to blogs, as both are means of cheap self-publication to a potentially limitless audience, and both have content that ranges from entirely professional to completely amateurish, but the centrality of images in YouTube and text in blogs leads to different strengths and weaknesses. Blogs are an easier platform for frequent and more in-depth coverage of an issue, but it is hard to imagine a blog entry describing the shooting of a young woman during the 2009 Iranian protests having the same impact as the short video that quickly traveled around the world.

### **YouTube as a Political Forum**

YouTube has a number of unique features that merit consideration. Despite YouTube’s growing prominence, academia has only just begun to consider it as a growing source of information in the modern world. From 2006 to 2009, the percent of adults who reported watching videos online skyrocketed, from 33 percent to 62 percent (Pew Internet and American Life 2009). Perhaps even more importantly, the number of respondents who use video-sharing sites on a daily basis more than doubled, from 8 percent in 2006 to 19 percent in 2009.

This growth is evidence that online video viewing, particularly within the realm of YouTube, is increasing not only in use, but also in importance and integration into the everyday habits of users. Other scholars have noted how this integration into everyday life has led to the creation and maintenance of social networks and relationships between users (Lange 2007). These relationships combine to create a YouTube community in which shared values and norms are emerging (Jones 2008). How that community engages with and responds to the mainstream media remains underexplored, especially in the context of political controversies.

The idea that YouTube can act as a new public sphere is also being considered. The interaction and discussion facilitated by the discourse that goes on, both in video content and in user comments, provides a potential forum for a digital public sphere (Milliken and O’Donnell 2008). Minority

opinions in particular are likely to take advantage of alternative media in order to make their voices heard (Silverstone 1999; 2001; Downey and Fenton 2003). The exchange of majority and minority opinions in a forum such as YouTube provides a ripe environment for discussion and deliberation to transpire. Of course, it is also possible that these exchanges are devolving into monologues and incivility. Exploring these possibilities in the context of a specific political issue is important for understanding whether, and if so how, such a public sphere is developing on YouTube.

The political implications of YouTube in election contexts also remain unclear. Several scholars have begun to investigate the intersection of YouTube and election campaigns, considering the various challenges and benefits a YouTube environment might confer on candidates (Gueorguieva 2008), as well as how specific candidates have used or failed to make use of YouTube channels in conjunction with traditional campaign techniques (Cortese and Proffitt 2009), but these are generally limited to candidate-centered elections. A large part of YouTube's effect may be felt outside of the influence of candidates, and specifically in its relations with the mainstream media. It is certainly true that for most voters, traditional media are much more a part of their daily lives, and therefore a greater source of information; however, as some have suggested, "it is also likely that the greatest impact of YouTube material will have come through its amplification by the parties and the mainstream media" (Cornfield and Rainie 2006). It is all the more important, therefore, to investigate this relationship between social media and conventional news.

Important questions abound at the intersection of traditional, mainstream, professional media, on the one hand, and newer, often amateur and largely social online media, on the other—two spheres that definitely overlap at many points but are understandable as distinct spheres nevertheless. These questions concern the nature of opinion formation, citizens' styles of engagement in political life, the current makeup of the public sphere, campaigns' ability to shape and control their messages, and much more; but in many ways a prior concern or a more basic concern is the question of whether these new social media forums produce different agenda-setting cues than those the public is already exposed to in other, more established media.

Given the shifting terrain of social media and the exploratory nature of this study, we choose to present a single research question:

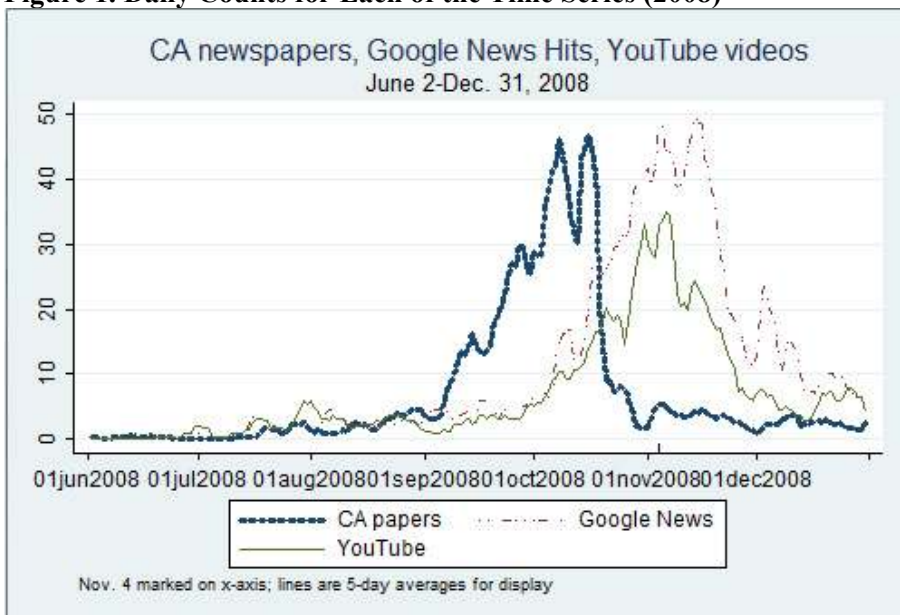
*Will activity on YouTube anticipate the volume of mainstream coverage and online media in general, follow them, or operate independently?*

## Data

To examine these relationships, we tracked over a period of 14 months the volume of content referring to Proposition 8 in three types of news sources: eight of the top daily newspapers in California, Google News search results, and YouTube videos (including comments). The data for all our analyses were gathered using the same search string—“prop 8” or “proposition 8”—to search for all related content from all of the sources of interest during the time period of June 2, 2008, through July 31, 2009. Samples were drawn from three searchable databases: LexisNexis, Google News Archive, and YouTube.

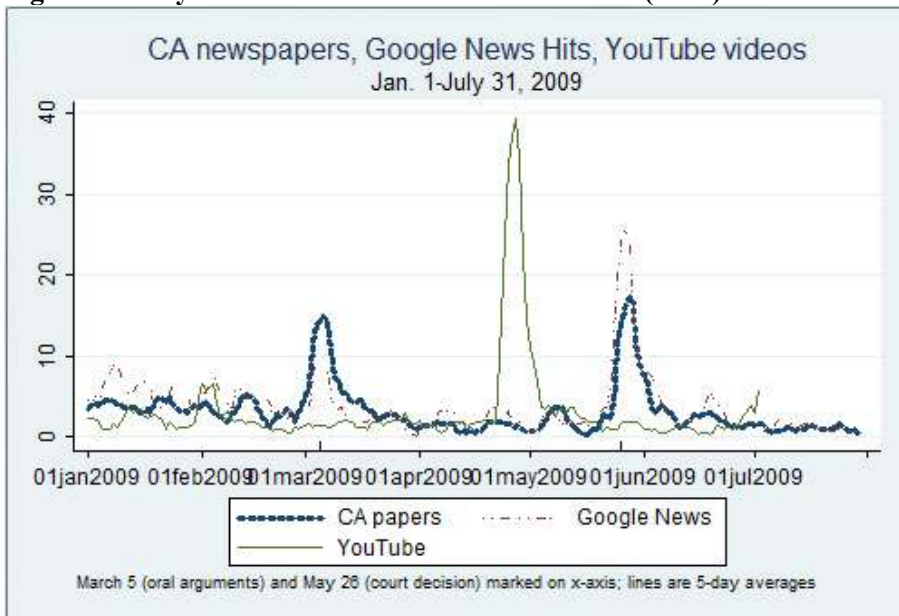
LexisNexis was used to search through the content produced by eight of the ten highest-circulation papers in California. These papers included the *San Diego Union-Tribune*, the *San Jose Mercury News*, the *San Francisco Chronicle*, the *Sacramento Bee*, the *Orange County Register*, the *Fresno Bee*, the *Los Angeles Times*, and the *Los Angeles Daily News*. These papers are taken to represent the core of the mainstream media within the state of California. An average California voter would be exposed to this content on a regular basis. The collection of articles from California papers included 2,150 total stories, with a mean of 5.07 per day.)

**Figure 1. Daily Counts for Each of the Time Series (2008)**



The Google News website allows users to search for terms on specific dates of interest, and this function was used to produce a time series composed of the number of “hits” on Google News for each of the days in the period of interest (each hit represents a link to an article including some mention of Proposition 8 or Prop 8). Although Google does not specify sources searched to produce the Google News hits, to provide a sense of the scope of this archive we randomly selected 10 days within the time period and recorded all the sources included in the list of Google hits; they are listed in an appendix to this paper (see appendix). Many of the papers included in the LexisNexis search also appear in the Google data, which is to be expected, including many sources of national prominence, a handful of international outlets, and conventional and online news magazines. The collection of web pages included in the data included 3,124 Google News hits, with a mean of 7.37 per day.

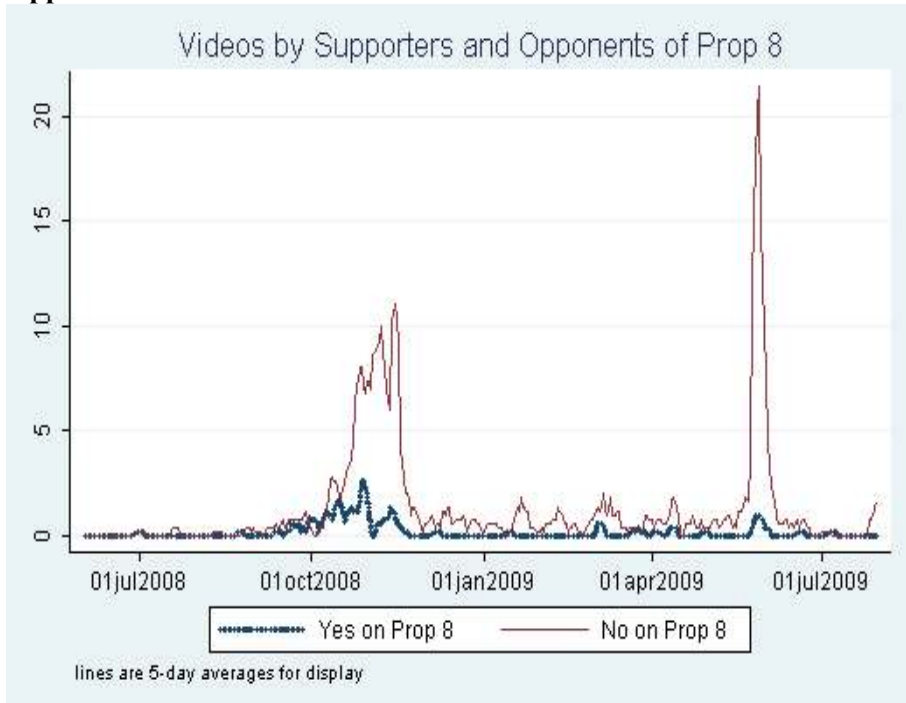
**Figure 2. Daily Counts for Each of the Time Series (2008)**



Another aspect of our data that bears mentioning is the makeup of the Google News hits, which appears to be something of a hybrid between the mainstream professional media and newer online alternatives. In particular, it is true that the Google News hits and California papers overlap somewhat, but first, it is not safe to assume that a newspaper will post everything it prints or print everything that it posts; and second, Google

News certainly represents a distinct avenue by which audiences are exposed to news content, and we are interested in it for this reason as well.

**Figure 3. Videos Posted per Day among Proposition 8 Supporters, Opponents**



Finally, the set of YouTube videos was collected using a web crawling tool built specifically for the purpose, TubeKit (see <http://tubekit.org> for details). As this collection was conducted retrospectively in August 2009, it was not possible to gather all of the over ten thousand videos returned by the search string. YouTube's database only returns the first 1,000 hits for any search string (a common limit in SQL-based databases), so the sample we used was derived from collecting all the videos returned by searches sorted by relevance, ratings, most viewed, and recency (all categories by which you can search via YouTube). This resulted in a total of 2,852 videos, from which a random sample of 801 videos was drawn for content coding (for more details about video sampling procedures see Thorson et al. 2010). Hand coding was conducted on this set of videos to produce a number of variables (assessing such things as the amateur/professional qualities of the video, the use of borrowed footage

from other sources, mainly TV, and more), but the only one mentioned in this study was a variable reflecting whether the video was in support of Proposition 8, opposed to it, or neutral. A subset of 130 videos was coded by each of the eight hand coders, with a Cohen's Kappa of 0.72 and a percentage agreement of 84 percent. There were 771 YouTube videos, with a mean of 1.82 per day. As can be seen in Figure 3, by far the larger proportion of YouTube videos was posted by opponents of Proposition 8. (Neutral videos were so few as to be undiscernible in the same graph as the pro and on videos.)

There are shortcomings in our YouTube data. We collected our sample from videos still available on YouTube up to 14 months after they were posted. Previous research suggests that as much as a third of videos posted to the site could be removed by the owner or due to posting violations (e.g., copyright, offensive content, etc.). Because of this, we had to draw our sample in a manner that did not produce a truly representative sample, which limits the generalizability of our findings to videos still on YouTube at the time of data collection. The only other significant bias we might expect to arise from our sampling is in favor of videos that were posted earlier in the time period of interest, since being posted earlier increases the chances of having a higher view count. In spite of that possibility, we still found that the most videos were posted toward the end of the period, in the aftermath of state court's decision in favor of Proposition 8. Therefore, if the view-count bias is affecting our sample, it is actually only watering down one of our most interesting findings rather than creating an artifact of sampling procedure.

## **Analyses and Findings**

The first phase of the analysis was to examine and describe the main features of each of the three main time series—LexisNexis Newspaper Archive, Google News Archive, and YouTube. The main points of interest in this phase are when each of the time series reaches its highest points and how those peaks correspond to the main events in the history of Proposition 8: its beginnings, the November 4 election, oral arguments, and the final decision of the California Supreme Court.

We used time-series analysis to examine the relationships among the three sources of coverage on Proposition 8. This set of techniques can be demanding regarding data requirements (measurements that are equally spaced in time, a bare minimum of 30–40 time points and often many more) as well as in the collection and organization of that data. But once those requirements are met, the techniques can be quite interesting and are bound

to become more common in communication research as such data become easier to collect.

Time-series models are numerous, but they share the characteristic of controlling for a given time series' past values when making predictions (statistically speaking) about its present value. For example, media content and particularly newspapers tend to follow weekly cycles, with the least content on Saturdays and the most on Sundays. Because of this, if you have daily numbers on newspaper content, controlling for the level of content "7 lags back" (7 days ago) will be key so you do not attribute a surge due to this cycle to something else, or fail to measure anything due to the extra noise for not accounting for this cycle.

The particular time-series model we use in this study is vector autoregression (VAR). In the clearest terms, a VAR model is a set of multivariate regression equations; if the analysis has three time series (say, newspaper content, TV content, and radio content on a given topic), there will be three total equations, and each one will have one of the time series as the dependent variable, with the independent variables being the current and past values of the other two series as well as the past values of the dependent series itself. This would mean predicting today's newspaper content based on the previous measurements of newspaper content as well as the current and past measurements of TV and radio content.

VAR modeling has been noted as a good approach for exploratory research such as the present study; while it is not the method used in the noted recent work on Twitter and public opinion by O'Connor et al. (2010), those authors suggest that VAR is a particularly promising avenue for future time-series work in communication research. Another interesting study to consider alongside ours is Simon and Jerit (2007); although we arrived at our analytical strategy before we were aware of this work, it is notable for using VAR analysis in roughly the same manner we do. The authors (1) establish an approach, (2) determine the number of lags to include, (3) fit a set of VAR equations for their three time series, (4) perform necessary post-estimation diagnostics (testing whether the residuals of the equations are "white noise"), and (5) employ "Granger-causality tests" to provide statistical summaries of any significant time-order relationships. The Granger-causality test is a test of the significance of the joint effect of a group of variables on the dependent variable. This results in a number of pair-wise tests of the joint significance of one series' present and past values on the present value of the dependent series for each equation. In our example above, one test would assess the significance of the combined impact of present and past TV content on present newspaper content, holding constant past newspaper content and present and past radio content;

a second test would assess the combined impact of present and past newspaper content on present TV content, holding constant past TV content and present and past radio content; and so on. The result of such an analysis could be a finding that suggests TV content tends to follow newspaper content, or that radio content is unrelated to TV news or newspaper content.

We should emphasize—especially since the word “causality” is in the name of our main post-estimation tool—that we do not mean to violate the correlation-is-not-causation principle. Our interpretation of Granger-causality tests is the more relaxed claim that can be made of any finding of statistical significance: it suggests a nonrandom relationship. That relationship may still be due to some missing factors not included in the model; the relationship could disappear or reverse if those factors were included, but it nevertheless suggests a nonrandom relationship, with a directional component, controlling for the factors that are explicitly modeled in the time-series data. As with any social-science work of sufficient complexity, it takes more than a study or two to establish that any nonrandom statistical relationships uncovered are being accounted for by the simplest explanation, much less the right one.

Another key component of our analytical approach, and one that is paralleled in the analysis in the study by O’Connor et al. mentioned above, is the strategy of segmenting the time series if no model will fit the entire stretch of data. If a set of VAR equations is fitted to the data and the residuals are not white noise, that may be the only thing to do; and, as O’Connor et al. note, it is a good way of highlighting a potential “regime shift” in the nature of the relationships among the time series being analyzed. This is one of the ways that VAR can be used effectively for exploratory analysis; the fact of being able to fit adequate models after segmenting the series into two or three parts can itself be a substantive finding, possibly reflecting different phases in a historical dynamic. As discussed shortly, this turns out to be the case for the set of time series analyzed in this study, which need to be split into two phases in order to fit a model with randomly distributed residuals.

Examining the development of the time series over the entire course considered in this study (Figures 1–3), some main features are readily notable. Looking first at the phase during 2008, the California papers have a steady buildup to the election and then never return to the same level of attention after the campaign ends. The Google News hits pick up earlier and to a greater extent than the California newspapers leading up to the election, and the level of attention for this trend line is sustained and even increases in the aftermath of the election. The YouTube videos, in contrast to the other two content sources, do not show much activity until just before the election,



and like the Google News hits, the YouTube videos reach their high point only after the election is over. However, the falloff in YouTube videos is much faster than in the Google News hits.

Turning to the time series for 2009, the most notable feature here is that, in contrast to the California newspapers and Google News hits, the largest number of YouTube videos were being posted around the time of the California Supreme Court's decision affirming Proposition 8, surpassing even their levels during the 2008 election and its aftermath. Google News hits and newspaper content certainly displayed a spike at that time, but it was only about two-thirds of their levels around the election period, whereas there were about two-thirds more YouTube videos as compared to their high in the aftermath of the election. Another notable feature is that Google News hits and the California newspapers both respond to the oral arguments phase of the court case, while YouTube videos do not exhibit any notable change in light of that event.

A further point of interest is the relative proportion of YouTube videos produced in opposition to Proposition 8, in contrast with supportive videos and those neutral to the proposition (Figure 3). As can be seen, the vast majority of videos posted before the election expressed opinions in opposition to Proposition 8. This contrast grows even starker after the election, when videos expressing support for Proposition 8 were almost nonexistent. They were even outnumbered by videos that were judged to be neutral with regard to Proposition 8, which increased in frequency during the Supreme Court's decision.

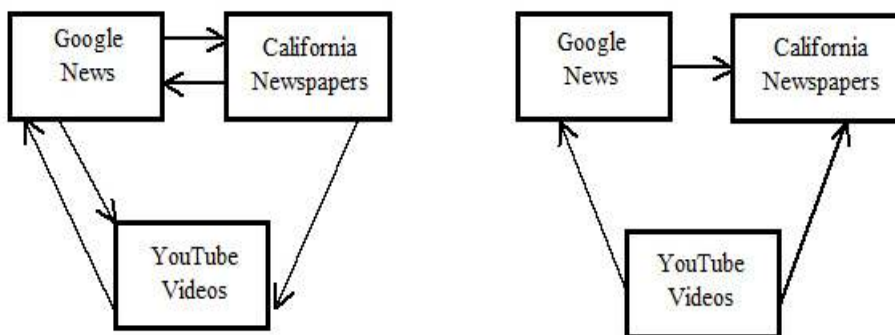
As mentioned, a good-fitting VAR model could not be specified for the entire time period of the data; post-estimation diagnostics indicated nonrandom error terms and poor stability conditions. Nonrandom error terms mean the same here as in the context of basic linear regressions, pointing to a correlation between the dependent variable and the difference between the model estimates and the observed data, which suggests incomplete models and biased estimators. The math behind assessing stability conditions is complex, but the basic indication given by those tests is whether the model suggests a system that is stable versus one that leads to predictions that defy face validity because they lead to such things as ever-increasing estimates as time moves forward (i.e., the Internet is big, but we still should not be comfortable with a model that predicts an infinite number of Google News hits as time moves far enough forward). Reviewing the main features of the time series indicated that segmenting the data into 2008 and 2009 would result in better fitting models, and that was indeed the case, which is indicative of two different regimes in the two time periods. Lag-exclusion tests also gave best support to a model including seven lags of each of the

three time series in the data set, which again is due to the consistent weekly cycles common to many forms of media-based communication data.

Having specified two models for the two time segments, Granger tests were conducted for both models to look for any consistency in the time ordering of shifts in volume of Proposition 8–related content in each series. Figure 4 shows the results. In 2008 (left panel of Figure 4), the Google News hits were found to “Granger-cause” subsequent activity in California newspapers while YouTube videos were not. The newspapers were also found to Granger-cause subsequent activity in Google News, indicating a reciprocal relationship between the two. YouTube videos were also a significant predictor of Google News hits, indicating that the volume of posting to YouTube preceded the search volume in Google News. Finally, state newspaper coverage and Google News hits were strong predictors of YouTube activity.

In 2009 (right panel of Figure 4), the picture changes dramatically. Google News hits remain a strong predictor of attention to Proposition 8 in the newspapers, but now YouTube videos are a strong predictor of newspaper volume as well. As for predictors of Google News hits, newspapers fail as a predictor in 2009, while YouTube videos were a strong predictor. The newspapers and Google News hits, meanwhile, both fail as predictors of YouTube activity, suggesting that YouTube was leading the charge in terms of attention to Proposition 8 in 2009. That finding suggests that online outlets such as YouTube do indeed have the potential to set the agenda independently of, and even in advance of, more professional media outlets.

**Figure 4. Informational Flows of Proposition 8 in 2008 (left) and 2009 (right)**



*Note: arrows indicate significance levels of  $p < 0.01$ .*

## **Discussion**

The results of our analysis may shed some new light on the relationships among old and new media in the context of Proposition 8. The picture is more complicated than we might have expected, but there are signs that newspaper coverage, search traffic, and posting to YouTube are interrelated and to some extent determined by public events (elections, court decisions, etc.). The connections between social media and mainstream media in the case of Proposition 8 shift dramatically over the course of the period studied. Before the election, it was clearly the mainstream media leading the way, but after the election, and especially during the period surrounding the 2009 California Supreme Court decision, YouTube videos are the only factor in the time series that tested positively as a predictor of the other two series. That is an interesting result with implications for the evolving relationship between “old” and “new” media.

All that being said, we still find that our data are useful for addressing our principal question of interest as to whether activity on YouTube anticipates the volume of mainstream coverage, follows it, or operates independently of it. Between the descriptive information and the VAR analysis, we find that attention to Proposition 8 on YouTube followed the mainstream media coverage before the November 4 election, but thereafter the picture changes dramatically. YouTube videos actually increased in number in the aftermath of the election, while the newspapers’ attention to the issue faded, not recovering much until March 5, when the state supreme court took up the issue. As it was opponents of Proposition 8 who accounted for nearly all of the activity on YouTube following the election, our tentative conclusion is that YouTube was being used as a platform for people to register opinions that they felt were not being represented in the mainstream. We know that videos against Proposition 8 accounted for nearly all the ratcheting up in YouTube activity after the election, and nearly all of the buzz after the state court decision, when videos judged to be in favor of Proposition 8 didn’t increase at all. This is consistent with longstanding and recent work on the responses of people who strongly identify with a minority position when that cause’s prospects take a turn for the worse (Mutz 1995; Viguierie and Franke 2004). More recent work by Hwang et al. (2006) finds evidence that opponents to the War in Iraq used the Internet as a platform for their activism due to a sense of “dissociation” from the mainstream media. These results fit nicely with that set of insights.

We believe this has important implications for social movements, and especially those related to civil rights. The opposition to Proposition 8 seems only to have truly mobilized its followers after the election in

November 2008. While the reaction to the passage of Proposition 8 may have refueled the movement for gay marriage, it did so only after a point in time at which a meaningful legislative victory could be achieved. Moreover, that mobilization failed to spark other legislative victories in future contests (Question 1 in Maine, for instance, which was nearly identical to California's Proposition 8, also passed in November 2009). This suggests that while YouTube can be an important voice for both mainstream and opposition movements, the timing of its use as a tool is important. Those in favor of Proposition 8 used YouTube more before the election, when there was still something clear to be gained, whereas those opposing Proposition 8 used YouTube to a much greater extent in the year following the election.

In this respect, the potential for YouTube, and social media more broadly, to offer a new voice to minority viewpoints may have been overstated to date. Sarah Oates (2008) has noted, "The non-centralized, inexpensive, and non-hierarchical features of the internet make it useful for disseminating information when the traditional mass media within a nation do not choose to cover a cause" (179). We find some evidence for this, in that YouTube was able to continue bearing witness to Proposition 8 protests even when the mainstream media had stopped covering such stories. However, it is important to note that this ability is context dependent. It is not likely to happen in all circumstances, or even all protest-related contexts. While it is true that anyone may use YouTube, for instance, our evidence suggests that strategic use of it by the opposition was only done to great effect after the battle had already been lost. Future research, of course, should examine whether these patterns hold up beyond the case of California's Proposition 8, to other locations and issues, in order to begin to define under which circumstances the Internet may serve as a conduit for information lacking in the mainstream media.

The different results identified by our time series analyses for 2008 and 2009 are even more striking. Our tests do not provide indisputable evidence that increased volumes in one time series "cause" increases in the other, but we find evidence of the YouTube and mainstream media series moving independently in 2009. Over the course of January 1–July 31, 2009, YouTube was out in front in terms of attention to Proposition 8, and it also did not show a tendency to increase its attention to the issue just because the mainstream press did, as indicated by the contrast with news volume during the oral arguments in the state court in March. This provides some evidence that YouTube both reflected and shaped news coverage of Proposition 8.

In order to overcome the shortcomings of our sample in this paper, future research will collect video samples on a daily basis as they are posted. Real-time sampling will allow us to obtain the complete universe of videos

attached to a given search string or tag, and we will be able to sample from that universe in a fully random manner, lending us greater power and confidence in our results. Real-time YouTube harvesting will also offer the opportunity to track content and velocity of comments with a sharper focus on periods around specific newspaper and Google News activity. Other work emanating from a companion paper in this project has demonstrated the usefulness of conducting computer-assisted content analysis on the comments attached to YouTube videos. Combining comments with other elements we already have assessed will provide additional dimensions to the time-series data.

It is our hope that this framework of analysis will become more familiar to and used by communication researchers and related professionals. Data that meet the criteria for time-series analysis (equal spacing, sufficiently large N) will only become more available and less labor-intensive to gather as time goes on, which is good because the potential of the analytical approach here can only be realized if there is a lot of cumulative evidence generated by multiple studies. Our study is a set of suggestive findings and an interesting way to study a variety of social phenomena in general and communication in particular. As those methods become more developed and understood, work along these lines may suggest new means for policymakers of all sorts to gauge the public's sense of what issues the public finds most pressing. As is the case with academic research, which benefits from a convergence of multiple methods on the same object of study, policymakers may gain a more complete understanding if they are able to combine multiple methods for assessing what is on the public's mind. Policymakers should also take note of the fact that it was mostly the losing side that used YouTube after the election, which stands in stark contrast to professional media's tendency to move on once the election is over. This may mean that vocal minorities have a means of keeping their voices in a way that they could not when professional media sources had the field to themselves.

This study represents a preliminary yet, we feel, interesting finding. YouTube allows individuals an opportunity to help drive—and at times lead—public discourse on socially relevant and politically important issues. It provides an example of how a social media platform is now being used to bring attention to an issue when the mainstream media are not. Whether in response to lack of perceived interest or attention, or because of the public's misinterpretation of popular sentiment, people are operating independently of the mainstream media. Regardless of the motivation to use YouTube, it is symptomatic of a traditional media system that may be losing some of its agenda-setting ability to emerging social media.

## **Appendix. Random Sample of Sources from Google News**

Ten randomly selected days between June 2, 2008, and July 31, 2009, and the sources included in the Google News Archive data for those days. The names in this appendix are listed as they appeared in the lists of search results from Google News.

3/4/2009  
12/31/2008  
2/2/2009  
10/22/2008  
6/16/2008  
9/6/2008  
10/3/2008  
3/26/2009  
2/7/2009  
5/24/2009

San Jose Mercury News  
Argus, The (Fremont-Newark, CA)  
Pittsburgh Post-Gazette  
EDGE Boston  
Good Times (Santa Cruz, CA)  
Deseret News (Salt Lake City)  
NPR  
ChicagoPride.com  
AsianWeek  
NPR  
Assyrian International News Agency  
Advocate.com  
San Francisco Chronicle  
Sacramento Bee  
Bakersfield Californian  
San Francisco Chronicle  
PolitickerCA  
Fresno Bee  
Appeal-Democrat (Fairgrounds and Yuba City, CA)  
Bakersfield Californian  
San Jose Mercury News

Sacramento Bee  
San Francisco Chronicle  
San Gabriel Valley Tribune  
Ojai Valley News  
Oakland Tribune  
sbcbaptistpress.org  
christiantoday.us  
Access Hollywood  
Forward  
Common Ground  
Access Hollywood  
Los Angeles Times  
Stockton Record  
Santa Barbara Independent  
Times-Standard  
signonsandiego.com  
Signal (Santa Clarita Valley, CA)  
Celebuzz  
Lake County Record Bee (Lakeport, CA)  
National Public Radio  
Hartford Courant (Conn.)  
Salt Lake Tribune  
San Jose Mercury News  
Los Angeles Times  
Fresno Bee  
Tucson Weekly

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