Fifteen Minutes of Fame:

The Place of Blogs in the Life Cycle of Viral Political Information

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Abstract

This study addresses dynamics of viral information in the blogosphere, and is interested in empirically understanding how blogs play a role in the virality process. More specifically, we develop a new methodology that creates a map of the 'life cycle' of blogs posting links to viral information. Our dataset focuses on the linking practices of blogs to the most significant viral videos of the 2008 US presidential election. To do so, we gathered data on all blogs (n=9,765) and their posts (n=13,173) linking to 65 of the top US presidential election videos that became viral on the Internet during the period between March 2007 and June 2009. Among other things, our findings illuminate the importance of different types of blogs: elite, top-political, top-general and tail blogs. We also found that while elite and top-general blogs create political information, they drive and sustain the viral process, whereas top-political and tail blogs act as followers in the process.

Introduction

The topic of information virality in networks is drawing increasing attention from scholars and practitioners, who seek to understand factors that influence the process of virality (J. Bardzell, S. Bardzell, and Pace 2008). We define virality as the process which gives any information item (picture, video, text or any other audio-visual-textual artifact) the maximum exposure, relative to the potential audience, over a short duration, distributed by many nodes. Despite a growth of interest, the body of literature remains slim in theory development, empirical investigation and an in-depth understanding, and is drawn mainly from five different fields: Communication, Political Science, Marketing, Information Science and Sociology (Boynton 2009; Helm 2000; Wallsten 2007; Barzilai-Nahon and Hemsley 2011). Theories of information diffusion pose two diametrically opposite approaches to viral information diffusion: one that suggests that virality is a process governed by reliance on powerful gatekeeping nodes or elites (Adamic and Glance 2005), while the other argues that it is a much more dynamic bottom-up process where gatekeepers may play an important, but not a crucial role (Herring et al. 2005). The topic of political information diffusion and virality in the blogosphere is even scarcer (Boynton 2009; Wallsten 2010). Additionally, most literature on blogs has focused mainly on top-blogs as representatives of the blogosphere, ignoring the role of the vast long tail of non-authoritative blogs which we refer to as tail blogs (Karpf 2008b; Adamic and Glance 2005; Hargittai, Gallo, and Kane 2008).

This study addresses dynamics of viral information in the blogosphere, and is interested in understanding how blogs play a role in the virality process. More specifically, the goal of this article is to address the debate presented in the literature about whether virality is caused by a top-down or a bottom-up process. In other words, whether the process is driven by top-blogs or tail-blogs. We empirically test for these dynamic phenomena and create a map of the 'life cycle' of blogs posting links to viral information. More specifically, we examine the linking practices of blogs to most significant viral videos of the 2008 US presidential election. To do so, we gathered data on all blogs (n=9,765) and their posts (n=13,173) linking to 65 of the top US presidential election videos that became viral in the Internet during the period between March 2007 and June 2009.

Our paper is structured as follows: first, we provide a literature review regarding studies on viral marketing, we map the scholarship on blogs into three main phases and we present literature that discusses structures and dynamics of blogs in diffusing information. We then introduce a new methodology to examine dynamic behavior of different types of blogs in the diffusion of information. Lastly, we discuss our findings regarding the unique role of each one of the

following types of blogs: elite blogs, top-general blogs, top-political blogs and tail blogs.

The Beginning: Viral Marketing

As the use of social networks has grown, so has the marketing research concerned with web-advertising and information virality. Viral Marketing was first coined by Jurveston and Darper (1997) as "network-enhanced word of mount", which in other words refers to "a communication and distribution concept that relies on customers to transmit digital products" (Helm 2000). Montgomery (2001, 93) later explained this term with biology-related nomenclatures: "a type of marketing that infects its customers with an advertising message, which passes from one customer to the next like a rampant flu virus". The motivation of marketing scholars to study the topic was clear: to increase the chances of successful diffusion of a message via electronic networks. This motivation led to a body of scholarship focused on developing mathematical models that might ignite a viral process (Kiss and Bichler 2008; van der Lans et al. 2010). Additionally, other scholars attempted to identify factors, such as motivation and social conditions, that influenced the recipient's acceptance and active participation in further diffusing the message (Palka, Pousttchi, and Wiedemann 2009; Phelps et al. 2004).

This body of literature referred to a bottom-up approach, where factors like trust, perceived risk and perceived cost were crucial in determining whether users would engage in the viral process (Palka, Pousttchi, and Wiedemann 2009; Phelps, Lewis, Mobilio, Perry, and Raman 2004). However, most of the marketing literature focused on a top-down approach. That is, they tried to identify focal points or influencers, who could serve as initial sets of customers with the intent of achieving maximum dissemination of messages for a marketing campaign. This came to a peak through the work of Malcolm Gladwell in the "Tipping Point" (2002). Gladwell and the majority of marketing literature suggested identifying gatekeepers or elites who could ignite the process of virality (Kiss and Bichler 2008). This is similar to the work of Katz and Lazarsfeld (1955), who suggested identifying opinion leaders as a pathway to reaching the masses with a message. Some voices criticized this approach and suggested that these "hubs", or highly connected people, weren't crucial to the virality process. For example, Duncan Watts suggests that situational factors determine whether or not someone will pass information on, rather than any particular quality of the people. This implies that non-authoritative people (represented as tail-nodes in networks) are just as likely as "hubs" to be the ones who drive virality (Watts and Dodds 2007).

Recently, the topic of information virality has started to received some attention in information science, political communication and political science (Boynton 2009; Wallsten 2010; Barzilai-Nahon and Hemsley 2011), that focused mainly on political participation via social networks in cases where information becomes viral. However, social scientist were more interested in understanding the political impact of viral information rather than analyzing the process itself or its technicalities, as their peers in marketing did (Robertson, Vatrapu, and Medina 2010; Ricke 2010; Klotz 2010; Gulati and C. B. Williams 2010). Since viral diffusion of information is a behavioral phenomenon that cannot be properly understood without the contextual environment in which it operates, we next, delve into the literature that analyzes blogs within the context of information politics.

Blogs and Political Information Diffusion

Starting in the mid-90s, Internet studies scholarship began addressing questions of both the impact of politics on information flows in the Internet and the impact of the Internet on politics (Hughes 1997; Schneider 1996). Since the mid-2000s, political communication scholarship on new media has come to recognize the fundamental importance of new ecologies of information and communication. Early inquiries were focused primarily on new media technologies, particularly political blogs and interactivity on candidate websites, as alternative pathways for political participation (Stromer-Galley 2000; A. P. Williams et al. 2005; Xenos and Foot 2005). As these fields of research have grown, paralleling the rapid developments in the landscape of digital politics, scholarship on political blogging has undergone at least three important progressions.

In the first phase, the majority of scholarship pointed to the relevance of political blogospheres, directly in relation to formal political participation, usually in the context of US electoral politics. The focus was primarily on the interactions between these new forms of actors (the political bloggers), their communication vehicles (their political blogs) and the changing dynamics of their relationships with more traditional political actors and activities, such as electoral candidates and election campaigning (Williamson 2009). Scholarship in this domain investigated political blogging as a space for: formal party/campaign communications (Auty 2005; Jackson 2006); election PR (KD Trammell 2006); and negotiating electoral deliberation (Campbell 2009; Koop and Jansen 2009). A major theoretical consequence of this thread of inquiry was the recognition and highlighted importance of political blogospheres as constituting new outlets of the public sphere (S. Wright 2009).

The second important thread of scholarship on political dynamics of blogospheres focused on the interrelationship between bloggers and traditional mass media (e.g., the appropriation of news in blogs and usage of the blogosphere by mass media as an alternative). The comparative line of studies served an evaluative impetus. Scholars have been both curious and critical of these increasingly popular competitors to mass media sources for political information (Johnson and Kaye 2004; Kwon and Moon 2009), as well as examined how mass media in turn understands political bloggers (Garden 2010; Jones and Himelboim 2010). Furthermore, a major normative concern, coming from this thread of inquiry into political blogs, has been regarding the lack of adherence to professional norms of balance and objectivity of political blogs (Macias, Hilyard, and Freimuth 2009; Munger 2008), and the potential of balkanizing public information (Baum and Groeling 2008; Sunstein 2008).

While the previous two threads of inquiry engaged topics of power and politics in comparison to existing hierarchies of elite political actors and mass media gatekeepers, the latest progression of scholarship on the political blogosphere does so more directly. Here, scholars have begun to investigate the unique structuring of power and influence *within* the blogosphere and the digital information ecology (Karpf 2008a; Drezner and Henry Farrell 2008; Ulicny, Matheus, and Kokar 2010). Most comprehensively, this body of work investigates the structural dynamics of the political blogosphere and its impact on information diffusion, political communication, and mobilization (Park and Jankowski 2008). Scholars have identified that these structural differences have an impact on: agenda setting and political participation (Woodly 2008; Liu 2010; Wallsten 2007); blur public and private spheres of civic activity (Keren 2010; Youngs 2009); and shape political learning and deliberation (Lawrence, Sides, and H Farrell 2010; Leccese 2009).

Of particular importance to our paper is this third phase of literature, that highlighted the power law distribution of actors in networks (Adamic et al. 2000) and particularly of political blogs (Adamic and Glance 2005; Drezner and Henry Farrell 2008). The claim was for the existence of a skewed distribution in the blogosphere, where top blogs capture the majority of attention from mainstream media elites and readers, and receive a disproportionately large number of links compared to other blogs. In other words, nodes that are rich in ties are likely to become even richer over time. Farrel and Drezner also claimed that the top blogs influence political elites through media actors who read them frequently (Drezner and Henry Farrell 2008) and act as network gatekeepers (Barzilai-Nahon 2008).

Our investigation arrives at this key intersection, positioning both *elite* and *non-elite* blogs as having different types of power to shape the flow of information, especially in the political domain. Contrary to the general consensus, which focuses on elite actors within the political blogosphere, we present

empirical evidence illustrating that the interactions between elites and the general networked-tail of blogs are more complicated. Moreover, we introduce a new methodology for studying the dynamics of the behavior of blogs linking to content, wherein causalities between the different types of blogs and information diffusion are uncovered. This is a contribution to the existing literature that in contrary concentrates mainly on identifying static patterns of links between blogs and not between blogs to content.

Research Design

This paper attempts to address a gap in the literature about the way in which political blogs link to content. Specifically, the content that we consider are videos that went viral during the 2008 US presidential election. Our hope is to illuminate structures of behavior of political blogs in reference to content. More specifically we address the following research questions: What are the relationships between different types of blogs and political viral information diffusion? What is the difference between elite blogs and tail blogs in that process? Are there other types of blogs worth our attention as scholars? What would a life cycle that represents the chain of information diffusion in context of blogs and content posting look like?

The literature presented above has certain limitations that we hope to overcome. First, it focuses mainly on static maps of blogs linking to blogs, surveys or static design analysis of blogs. Second, it focuses on elite political blogs as representatives of the blogosphere, neglecting the role of other types of blogs, which may distort our understanding of the ecology of the political system. Our methodology is aimed towards minimizing these limitations. Moreover, the contributions of this paper to the literature are numerous: First, we provide a *dynamic* analysis of real behavior of bloggers linking to content. Second, we identify four types of blogs that are factors in driving a process of political information diffusion, not only elite-blogs. The four types of blogs are: 1) elite, which refers to the "elite of the elite" political blogs; 2) top-political blogs; 3) top-general blogs; 4) tail blogs. The next section defines each one of these types of blogs. Finally, we suggest that general blogs (and not only political blogs) should also be taken into account when analyzing political information diffusion. Their role, as we will see later, is critical to the understanding of the political virality process.

Data Collection

Collecting the Viral Videos: Since we are looking at political blogs linking to content (specifically, videos), we collected data that represents those links. We aimed to collect data which represents the videos that went viral during the 2008 election, as well as data about the blogs that linked to those viral videos. We used the following methodology in collecting that data. The set of videos was drawn from ViralVideoChart.com on January 20th, 2009. We drew the top 100 videos over the preceding year in the following categories: over all Top videos, top 100 political videos, and top 100 election videos. The lists were combined and any redundancy was removed. Four researchers (a faculty member and three PhD students) coded the videos as related to the election by answering the question: "Was the content related to the 2008 presidential campaign?" For a video to be included, all four had to agree that it was related to the election. The result was 120 videos. Daily view data was collected for these viral videos using the data service TubeMogul. We were able to gather complete daily view data for 65 of the 120 videos that spanned from March 2007-June 2009.

Collecting the blogs: Our next goal was to identify blogs linking to those videos. For that purpose, we identified the most popular YouTube URL (i.e., unique identifier) for each of the 120 viral videos identified in the previous stage. We created scripts which automatically harvested all of the blog posts[1] linking to these viral videos on a given day for a given video. The scripts harvested the list of blogs through the Google Blog Search tool. These searches gave us a dataset of over 13,173 blog posts from 9,765 unique blogs linking to these viral videos during March 2007 and June 2009.

Identifying four types of blogs: For the purpose of separating our list of blogs into logical types, we gathered monthly unique-visitors traffic data from data service Compete.com. Compete.com tracks viewing data at the site level (i.e., site.domain.com and domain.com), so blogs in folders (site.domain.com/myblog) and blogs without a full domain match were excluded. Where there was no Compete.com data, we assumed the blog had a very low unique-visitors traffic data and kept those as tail blogs. The resulting list contained 3,101 blogs. Figure 1 shows the power-law distribution of these blogs in terms of daily unique-visitors, which also helped us categorize the types of blogs into four types: elite blogs, top-political blogs, top-general blogs and tail blogs. Next, we will give justifications for the existence of each type, define them and explain how they were created.

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[1] We harvested any blog post, not just from top-blogs nor political blogs as done in previous studies.

Figure 1: Power-law Distribution of Blogs Lir
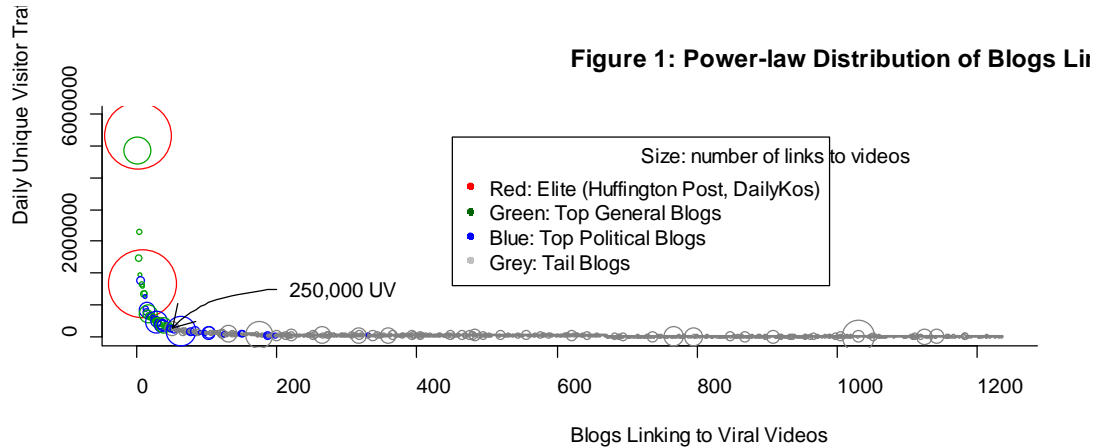
Elite Blogs: We found that Huffington Post and Daily Kos were unique blogs in our dataset, in that they have the highest number of blog posts linking to videos (64 and 49 respectively). They are recognized as influential political blogs, for example, David Karpf calls them "the elite of the elite" (Karpf 2008a, 40), and they receive high unique visitors traffic. Furthermore, when doing statistical analysis, results show that differentiating this group is significant.

Top-political Blogs: Most scholarship on the blogosphere focuses on this group of elite political blogs. Note that in the literature they are often called elite blogs or A-top blogs, and that in our study we have three types of elites: elite, top-political and top-general blogs. Our set of top-political blogs was drawn from David Karpf's Blogosphere Authority Index (BAI) (Karpf 2008a, 2008b), which is one measure of a blogs authority. Note that the rankings of blogs may change from week to week. Our set contains the top 25 conservative, and top 25 liberal blogs from the week of August 8th of 2008. Also note that since we place Huffington Post and Daily Kos in our elite group, they have been removed from our list of top-political blogs.

Top-general Blogs: Our set of top-general blogs was created by taking all blogs from our dataset (excluding those listed in the top-political and elite blog types) that had more than 250,000 unique visitors as listed by Compete.com. Figure 1 shows that 250,000 unique visitors is around the inflexion point, meaning, this is roughly the point when the curve goes horizontal, and therefore, anything above it seems to be more influential in terms of traffic than the ones below it.

Tail Blogs: Every other blog that linked to our viral videos, that is not in the other three types of blogs, is considered a tail-blogs. In other words, tail blogs would represent blogs of users without high authority.

Modeling

Multiple-Regression: In this section we describe the quantitative method employed in testing our research questions, a multiple-regression model. The model tests for relationships between our blogs sets and daily view counts of the viral-political videos. The model is as follows:

$$
\begin{aligned}
views_i = \beta_0 &+ \beta_1 elite\_t1_i + \beta_2 elite\_t1_{2i} \\
&+ \beta_3 top\text{-}political\_t_{3i} + \beta_4 top\text{-}political\_t1_{4i} \\
&+ \beta_5 top\text{-}general\_t_{5i} + \beta_6 top\text{-}general\_t1_{6i} \\
&+ \beta_7 tail\_t_{7i} + \beta_8 tail\_t1_{8i} \\
&+ \beta_9 views\_t\text{-}1_{9i} + \beta_{10} uv\_sum_{10i} + FACTOR\big(video\_id_{ij}\big) + \varepsilon_i
\end{aligned}
$$

In other words, our model generally examines relationships with the flowing independent variables' groups:

VIEWS = ELITE + TOP-POLITICAL + TOP-GENERAL + TAIL + CONTOLS $+\varepsilon^2$

Following, we will explain each one of these variables:

VIEWS – Our dependent variable is the daily view count for any given video on any given day. Figure 2 is an example of what a viral video looks like, in terms of daily-views. It plots the video "Yes We Can Obama Song by Will.I.Am" from when it was released, February 2008, until May 2009. As frequently happens in our collection of videos, the number of views spikes within a day or so of release, and generally declines more slowly over the next few days or weeks. In this example, the video "went viral" twice.

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[2] Error - represents unexplained variation in Y (the dependent variable).

Figure 2: "Viral Video Yes We Can Ob...
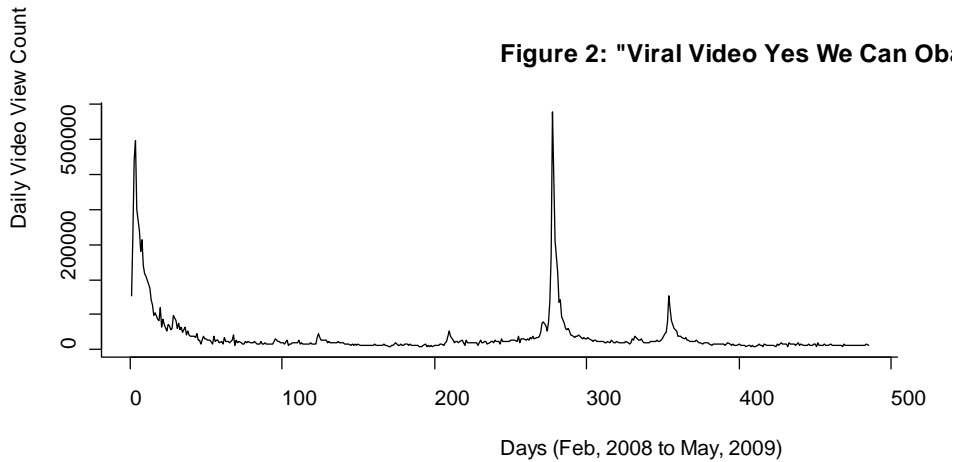
ELITE – This variable set represents our Elite Blogs type (Huffington Post and DailyKos). It contains the number of links from these blogs to a given video on a given day.

TOP-POLITICAL - This variable set represents our top-political blog type.
TOP-GENERAL - This variable set represents our top-general blog type.
TAIL - This variable set represents our tail blog type.
CONTOLS – These are variables that attempt to hold constant exogenous factors that could influence the virality process in our model. These includes: *VIEWS_t-1, SUM_UNIQUE_VISITORS, VIDEO_ID* (these sub-variables are explained later).

Since our primary goal is to present a life–cycle of blog-post timing in the political information diffusion process, each independent variable group contains two variables:

1. A count of links from blogs in that category to a given video. For example, *ELITE_t,* would represent all the links from the elite blogs to a given viral video on a given day *t*.
2. A one day forward-lagged version of the link count variable to the views. This variable associates links from day *t*+1 (tomorrow) to view counts of day *t* (today). For example, *ELITE_t1,* would represent all the links from the elite blogs on day *t+1* to view counts for a given viral video on day *t*.

Thus, our model is:
$$VIEWS = ELITE\_t + ELITE\_t1 + TOP\text{-}POLITICAL\_t + TOP\text{-}POLITICAL\_t1 + TOP\_GENERAL\_t + TOP\_GENERAL\_t1 + TAIL\_t + TAIL\_t1 + CONTOLS + \varepsilon$$

For each of our independent variables[3] a negative or a positive relationship to daily video views has the following meaning: If *[variable]$_t$* is positive, it means we find evidence that blogs of this type are posting links to a video on the *day of* the peak[4]. If *[variable]$_t$* is negative, it means we find evidence that blogs of this type are posting links to a video during the wind-down from its peak. This can be seen, for example, in figure 1, where after the first peak daily views decline. If a blog posts during the decline, the link count is increasing while daily views is decreasing, which is a negative relationship. If *[variable]$_{t1}$* is positive, it means we find evidence that blogs of this type are increasingly posting links to a video on a day *t+1*, when the views on day *t* are increasing. When we look the peak as a reference point, it means that blogs of this type are posting on the *day after* the peak.

The *CONTROLS* variables include the following sub-variables:
VIEWS_t-1: this variable represents the views of a given video on a day *t-1*. This variable tries to control the momentum effect, wherein people who view a video may watch it again.
SUM_UNIQUE_VISITORS: this variable controls for the effect where some proportion of blog visitors will click on the link: traffic begets views.
VIDEO_ID: This variable controls for the specific characteristics of a particular video. It contains an id number for each of the 65 videos in our dataset.

Hypotheses:

H$_{1A}$: We expect *ELITE* to have a positive relationship with *VIEWS* because we expect these blogs to be posting links as the daily view count is rising. Since daily views rises sharpest at the peak (generally at the beginning of the viral process), a positive relationship here implies that our elite blogs are posting links at the very beginning of that process.

H$_{2A}$: We expect not to find a relationship between *ELITE_t1* and *VIEWS*. Since we expect the elite blogs to post on the day of the peak, we do not expect them to post on any other day.

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[3] *ELITE_t, ELITE_t1, TOP-POLITICAL_t, TOP-POLITICAL_t1, TOP-GENERAL_t, TOP-GENERAL_t1, TAIL_t and TAIL_t1*

[4] In our data set, the vast majority of posts from blogs containing links to viral videos are on, or soon after, the day when the video receives its maximum number of views – its peak. Thus, we assume that statements made about the relationships between blogs and a video view count will be most applicable around a video's peak in the viral process.

H$_{3A}$: We expect to find a negative relationship between *TOP-POLITICAL* (H$_{3A1}$), *TOP-GENERAL* (H$_{3A2}$) or *TAIL* (H$_{3A3}$) and *VIEWS*, which reflects the idea that if they are followers and not leader blogs they will be unlikely to post as the view count is rising, and more likely to post while the view count is falling.

H$_{4A}$: We expect *TOP-POLITICAL_t1* (H$_{4A1}$)*, TOP-GENERAL_t1* (H$_{4A2}$) or *TAIL_t1* (H$_{4A3}$) to be positive with *VIEWS*, which means that a higher number of views of a video on a given day would cause blogs in these respective types to link to it on the *day after* the peak.

Results:

The results (see table 1) show that the model explains 96.5% of the variance of the daily-view count, and fits the data well. Moreover, it appears to be statistically significant (see F-statistics), indicating that our selection of variables explains the majority of the variation in daily viral video views. Table 1 also shows our variables and their associated coefficients.

Table 1: The Model

Variables	Coefficient Est.
ELITE	0.082*
ELITE_t1	0.003
TOP-POLITICAL	0.033
TOP-POLITICAL _t1	0.142***
TOP-GENERAL	0.067*
TOP-GENERAL_t1	0.114***
TAIL	-0.004*
TAIL_t1	0.053***
CONTROL VAR: VIEWS_t1	0.912***
CONTROL VAR: SUM_UNIQUE_VISITORS	0.010***
CONTROL VAR: VIDEO_ID$_X$	X<0.05
*Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05*	
Model Performance	**Coefficient Est.**
R-Squared	0.965
F-Statistics	7831 (74 & 21099 df , p-value: < 2.2e-16)

Verifying Regression Assumptions: We ran Variance-Inflation Factor (VIF) tests, to ensure that multicollinearity does not negatively impact our results. Each variable's VIF was under 4, indicating that multicollinearity was not an issue in our model (Kahane 2001). We also ran a Durbin-Watson test, which tests for autocorrelation in the model. The resulting test statistics was 2.49, indicating a lack of autocorrelation (Ott and Longnecker 1993). Also, our Durbin-Watson test statistic is higher than our R-squared, which is generally accepted as indicating that our model is not suffering from spurious regression (Gujarati and Porter 1992).

Finally, note that because the dependent variable and the control variables (*VIEWS_t1* and *SUM_UNIQUE_VISITORS)* follow a power-law distribution, we transform these variables using a natural log, so they are closer to a normal distribution.

Next, we will explain the relationships found, which relate our hypotheses 1-4 to our findings (see figure 3). In figure 3 the arrows denote the causal relationship that we infer from our findings.

Figure 3: Illustration of Relationships Found
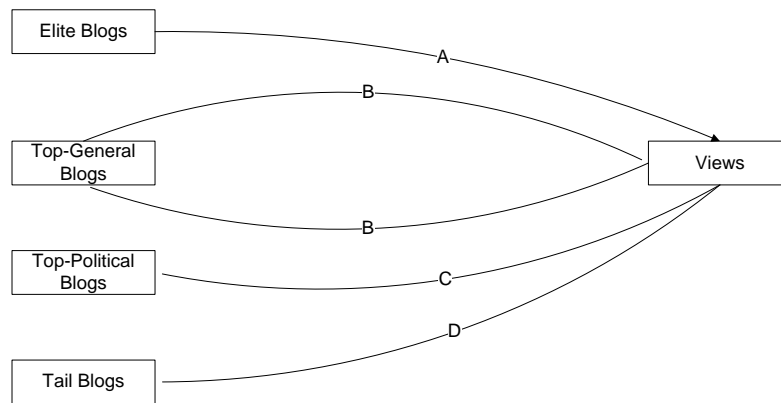
Elite Blogs (H_{1A} & H_{2A}): We found that there is a positive relationship between the number of links from elite blogs and the number of video views (H_{1A}). We also found no evidence that elite blogs are responding to video-view counts, meaning that H_{2A} was not significant, as expected. This means that elite blogs are posting as the video is going viral, however we don't find any evidence that they post during any other time in the life cycle.

Top-General Blogs (H_{3A2} & H_{4A2}): An important finding suggests a recursive relationship wherein top-general blogs both drive and were driven by video views. This finding is supported by a positive relationship between top-general blogs and views both on day *t* and day *t*+1 (H_{3A2} & H_{4A2}). This means that they are posting right around the peak, but in contrast to tail blogs, they don't post to a video that is beyond its prime time. This also suggests that top-general blogs will generally refrain from posting news or content that is old.

Top-Political Blogs (H_{3A1} & H_{4A1}): We found that top-political blogs respond to video views. However, we found no evidence that they drive views. The relationship between top-political blogs posting the day after is positive with

video views (H_{4A1}). Moreover, we do not see any correlation between posts from these blogs on day t with the views on day t (H_{3A1}). Consequently, we find that top-political blogs are followers, posting only after the elites and the top-general blogs.

Tail Blogs (H_{3A3} & H_{4A3}): Here we found strong support that tail blogs respond to views (H_{4A3}), and that the relationship of tail blogs posting links to viral videos is negative with the views (H_{3A3}). This is strongly suggests, that they post on the day after the peak and when the viral cycle is winding down from its peak. In other words, one might infer that this group of blogs are following all the different top-blogs (elite, top-political and top-general blogs).

Figure 4 represents our findings in an illustrative way. It shows the life cycle of a viral process of a video during the 2008 US presidential election. In this life cycle, one can see when different groups of blogs are driving the view count for videos. Clearly, elites and top-general are first, followed by top-political and finally tail blogs. Note that top-general blogs are the only group that drive and are driven by views in the initial viral process (see figure 3, arrows B).

Figure 4: The Life Cycle of a Viral Video in the Blogosphere
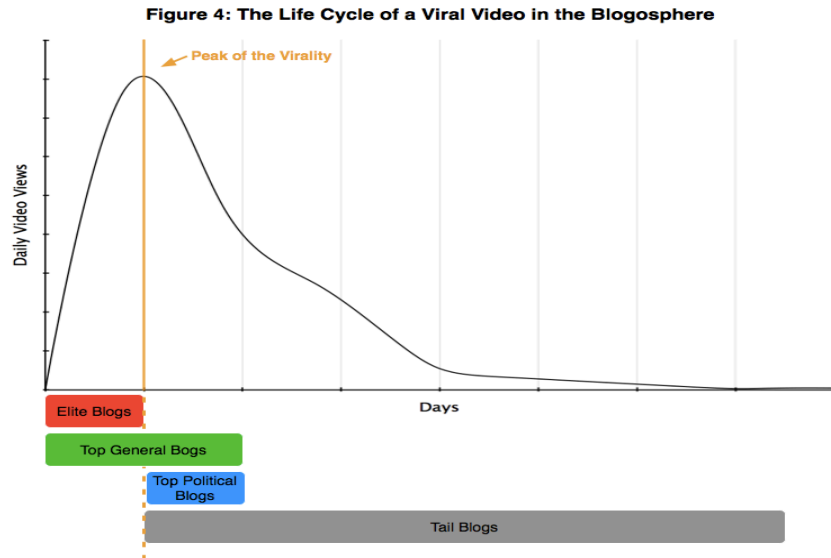
Discussion

In the following discussion we would like to discuss two phenomena found through our results. First, the blogosphere is not a monolithic sphere and therefore, researchers should not study only elite blogs and expect them to represent the entire blogosphere. Also, scholarship should acknowledge the important role of top-general blogs and tail blogs in this ecological-blogosphere. Second, while the power law distribution exists when information goes viral; powerful actors cannot exist as elites without the masses. We discuss these phenomena, while acknowledging that a presidential election might have specific characteristics that influence virality.

First Phenomena: Blogs are not monolithic

Elite blogs do not represent blogs: Most blogosphere research focuses on elites, either as explicit representatives of the blogosphere (Hargittai, Gallo, and Kane 2008; Adamic et al. 2000; Karpf 2008b), implicit representatives of other blogs (Benkler and Shaw), or as boundary spanners and intermediaries between blogs and other political and media actors (Wallsten 2007). Regardless of how studies have used blogs in the literature, they overlook the heterogeneity of this sphere. Some researchers acknowledge the un-monolithic nature of the blogosphere (Benkler and Shaw; Munger 2008), but our research is one of the first studies that is able to empirically show the how these different types of groups in the blogosphere are significant factors in the process of information flow. More than that, it argues that top-political blogs are followers of the top-general blogs. Therefore, in many cases the top-political blogs do not socially construct frames nor do they set the political agenda. Instead, they replicate the agenda according to the frames created by the elite (the "elite of the elite") and top-general blogs.

Political Information is Spread via General Channels: The role of top-general blogs in diffusing political information needs elaboration. Bennett suggests that new-media forms, like blogs, transformed public communication by removing intermediaries and emphasizing direct contact with individuals (Bennett and Manheim 2006). According to this, blogs impact decision-makers and influence agenda-setting directly. On the other hand, Drezner and Farrell (2008) suggest that journalists play the role of boundary spanners between political elites and the blogosphere by focusing the attention of political actors on important information that exists in blogs. For them, the journalists are intermediaries in this process. Our paper shows, by looking at the life cycle of virality, that the chain of political information diffusion during elections is much more complicated. There are several intermediaries in the viral process before information comes to the attention of the public. More importantly, virality is ignited mainly by the top-

general blogs who are the *first movers*. This finding is of high importance since "bloggers possess first-mover advantages in formulating opinions" (Drezner and Henry Farrell 2008, 17). Now we know that elite and top-general blogs mainly possess that advantage. But, in order for political information to reach the general public and decision makers, boundary spanners (the top-general blogs) need to diffuse this information to an audience that is more general, and less focused on politics. Otherwise, the chances for that information to go viral are slim. This is also why we see the top-political blogs and tails as followers.

The Chicken and the Egg Question: As previously mentioned, Farrell and Drezner suggest, that top-blogs scan the blogosphere and highlight important information for decision makers. This implies that tail blogs create content, and that top-blogs are mainly responsible for replicating and highlighting original content. When it comes to viral information we see otherwise. While we don't get into the discussion of who creates the original content, such as, the viral video itself, we see that elite and top-general blogs are mainly responsible for creating new information in the form of blog posts. These posts act as both a means of propagation of the original content, and add value through additional analysis and spin. According to our picture, tail and top-political blogs serve as followers. They are far less influential than previously thought. Even when taking into consideration the vast number of tail-blogs, they are not powerful enough to create or sustain the viral process alone. Rather they are responsible for reducing the rate of decay of viral information.

Thus, like Wallsten argues (2007), we see that tail blogs are dependent on the elite and top-general blogs to ignite the viral process and reach the attention of wider audiences. Nevertheless, since attention here is measured not only in passive terms of viewing, but also in active terms of posting links and creating content, this may imply that the tail blogs are also dependent on their tail-peers. In contrast, top-general blogs show a recursive relationship, implying that they respond to and generate their own information eco-sphere. So basically, top-general blogs would post information that is similar to their peer-competitors. For example, if BoingBoing posts information about Obama's contributions, Wired.com would quickly pick up and report on the same story. This was supported also in a study done by Barzilai-Nahon and Hemsley, which found a bandwagon effect among top-blogs (2011).

Second Phenomena: Transient Elites are Constituted by the Masses

The phenomenon of a power law distribution in the blogosphere is documented in many empirical studies (Adamic et al. 2000). Farrell and Drezner point out that this skewed distribution has important consequences for the salience of different blogs respective to their position on the distribution (2008). They also argue that a high degree of disparity in visibility of blogs leads some blogs to become elite blogs; attracting attention from both other bloggers and political elites. In other words, they imply that the role of elite blogs is a transient and dynamic one. Similarly, Karpf suggests that YouTube creates "a dissolution of elite control and the creation of more porous elite networks" (2010). Our empirical investigation shows that their role in the viral life-cycle determines the salience of a blog within the blogosphere. Therefore, it supports the idea that elites are transient, and that the identification of what constitutes an elite on the Internet changes dynamically over time. Castells asserts that power relationships between elites and non-elites are mainly framed by domination (2009). Moreover, he asserts that "Conflicts never end. They simply pause through temporary agreements and unstable contracts that are transformed into institutions of domination" (Castells 2009, 14). However, if the role play of elites vs. non-elites is so dynamic and interchangeable, then the meaning of domination by elites needs to be revisited. In our case, the elites are not only determined by their ability to attract views; they are also constituted by the masses (all other blogs) that actively link to them, and actively crown them as elite. In the blogosphere, these transient elites cannot rule without active participation and support by the masses.

Conclusion

Our paper identifies dynamics of virality of information on the Internet (specifically videos) at the time of the 2008 US presidential elections by looking at relationships between blogs producing information (posting links) and users following these links and watching the videos. We present a new methodology in Information Science borrowed from econometrics that is allows us to do a time series analysis through multiple regression. In this paper we examine the linking practices of blogs to the most significant viral videos of the election.

Our methodology addresses some gaps presented in the blogosphere literature. These gaps are exemplified by: i) focusing mainly on static maps of blogs linking to blogs, surveys or static design analysis of blogs instead of dynamic behavior of blogs linking to content; and ii) focusing on elite political blogs as representatives of the blogosphere, neglecting the role of other types of blogs.

Among other things, our findings illuminate the importance of different types of blogs: elite, top-political, top-general and tail blogs. We also found that while elite and top-general blogs create political information, they are responsible on driving and sustaining the viral process, whereas top-political and tail blogs act as followers in the process, who reduce the rate of decay of viral information.

While this research explicates the life cycle of information virality of blogs linking to content during the election, further explanations and analysis need to be made to explain the results from an electoral point of view.

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