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The Arab Spring
The Role of ICTs

Digital Media in the Egyptian Revolution: Descriptive Analysis from the Tahrir Data Sets

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The Tahrir Data Project gathers empirical data on media use during the Egyptian revolution of January and February 2011. The Project consists of three data sets documenting media use by protesters, by coordinators, and by transnational audiences. Preliminary descriptive analysis of the data suggests that social media use was not dominant in demonstrations, but may have played an important role in connecting and motivating protesters. Metrics for media use by protesters indicate a strong presence of activities and characteristics commonly associated with communication in protests to social media and social media users. These metrics, along with preliminary data on coordinator strategies and preliminary analysis of the #jan25 tweet set, suggest an important but complex role played by social media in the Egyptian revolution of 2011. The data and preliminary analysis are presented here, together with a number of research questions for further study.

Introduction

The Internet's potential for toppling authoritarian regimes has been a widely popular trope following revolutionary efforts in Iran, Moldova, Georgia, and now across the Middle East and North Africa. The debate has long been deeply polemic in both punditry and academic circles,[2] relying largely on

[1] The views expressed in this article are those of the authors and do not necessarily represent those of the United Nations, including UNDP, or their Member States.

[2] For a good overview of how popular debate has coalesced around the lightning rod of the *New Yorker*'s Malcolm Gladwell, see Jon Evans' *End of History* blogpost from Feb 13, 2011, on Tech Crunch at http://techcrunch.com/2011/02/13/the-end-of-history-part-ii. *The Guardian*'s *Technology Blog* provides a solid review of the most recent academic contribution, Evgeny Morozov's (2010) highly critical book *The Net Delusion.* Available at http://www.guardian.co.uk/technology/2011/jan/25/net-activism-delusion

anecdotal evidence in the absence of empirical data. Mary Joyce's introduction to *Digital Activism Decoded* (2010) presents a compelling argument for how studies in this field would benefit from a structured and empirically oriented research agenda. Recent developments in Arab states provide an excellent opportunity to contribute to this research, and Egypt is especially ripe for a holistic empirical analysis, given the open climate following the movement's equivocal success.

The Tahrir Data Project addresses this opportunity by collecting empirical data on how media were used by protesters, coordinators, and spectators during the demonstrations that led to the ouster of President Hosni Mubarak. At the time of this writing (March 2011), data collection is concluding for the last of three data sets, and the revolution is, for many Egyptians, uncertain in the wake of a constitutional referendum and the criminalization of incitement to protest.

Whatever the results of revolutionary efforts in Egypt (and we sincerely, if anxiously, hope for the best), Egyptians' pragmatic and enterprising use of media platforms in revolutionary protest merits careful consideration. The three data sets collected by the Tahrir Data Project document specific media-use patterns and strategies enacted by specific and complementary groups of actors in a balanced analysis of media use by the Egyptian protest movement. We hope this can make a long-lasting contribution to the developing field of digital activism studies. The data sets and their preliminary findings are presented here toward that aim.

The Tahrir Data Sets

At this writing, the Tahrir Data Project continues to gather empirical data on the role of digital and traditional media in the Egyptian Revolution of 2011. The data will be publicly released on a creative commons license to foster broad and collaborative analysis, as well as to promote a structured and empirically grounded research agenda for the study of digital media and political activism (http://tahrirdata.info).

The Tahrir Data Project was initiated through informal interviews with central digital actors in the Egyptian protest movement, which led to the design and implementation of structured surveys and the composition of three distinct data sets, each addressing a specific grouping of media users: (a) a broad swath of protest participants, (b) the transnational public that followed developments and spread information online, and (c) the tech-savvy coordinators who used sophisticated media strategies to mobilize popular participation and attention for the protests. Data analysis is ongoing. What follows is a brief description of Tahrir Data Sets (TDS) a, b, and c, followed by preliminary descriptive analysis for the first two.

TDS-a: Protester Survey

The survey on protester media use was conducted from Friday, February 24 through Tuesday, March 1, nearly two weeks after the ouster of President Mubarak and coincident with the return of both antiprotester thugs and also military violence against peaceful demonstrations. In light of these tensions, protest participants were treated as a hidden population and selected through snowballing (Salganik & Heckathorn, 2004).

Some 1,200 interviews with protest participants were conducted during a four-day period, producing a sample set of 1,056 valid questionnaires. Though the sample was broadly divergent across demographic strata, it is notoriously difficult to weight against the Cairo population, or against the Egyptian population writ large due to inconsistencies and political obfuscations in national census data. While the resulting sample may thus not be considered representative of either the larger population, or of the protests itself (as protester demographics changed dramatically from day-to-day over the three weeks leading to Mubarak's departure), the sample frequencies for age, gender, residence, education, Internet access, and political activity are in keeping with popular assumptions about protest participants and are sufficiently distributed to provide rough proxy measures for class and political engagement.

Respondents in the sample are predominately male (75.5%) and young (from 11 to 67 years old, with a mean age of 38 and a standard deviation of 9.067). The sample is also largely well educated (77% reported some kind of college or university degree) and reported wide access to the Internet (80.4% with access in their homes, 50.1% on their telephones). In keeping with widely held views regarding political apathy in Egypt, 65.3% of respondents in the sample identified themselves as not politically active in any way (including being nonactive in trade unions, political parties, charities, or social movements), and 66% had never before participated in a protest.

Survey interviews were conducted in semi-controlled public spaces such as cafes and parks to avoid undue attention and required 25–45 minutes to complete. The bulk of the questions addressed 10 specific kinds of media and were posed only if the respondent reported using that particular media for protest-related communication during the protests. These media include text messaging, telephone (mobile and landlines), satellite television, radio, print media (including newspapers and revolutionary leaflets), Twitter, Facebook, blogs, E-mail and live communication (face-to-face conversations, graffiti, banners, and speeches at the protests). These media-specific questions covered frequency of use, information types, perceived reliability of content, reasons for use, and how information received on that media was communicated on other media. Respondents were also asked to identify any media they used to view or distribute citizen-produced documentation, such as videos or pictures, and to rank media by its importance, informativeness, frequency of use, and motivating effect. Lastly, participants were asked about how information blockages affected their media use.

This survey thus provides superficial data on media-use patterns by protest participants and does not explore or differentiate between the political affiliation of media content (for example, by distinguishing between the state-run television channel NileSat and Al Jazeera) or sequential developments (how media patterns changed over time during the protests). We hope that this survey can lay the groundwork and identify entry points for such study, which we argue would provide rich and compelling insights when analytically focused toward contingent and hybrid media use (see Wilson & Dunn, 2011).

TDS-b: Transnational Twitter Set

Twitter users constitute an infinitesimal proportion of the Egyptian population (.001%), and there has been much debate regarding Twitter's role in the revolution. One certain fact, however, is that Twitter use by Egyptians coordinating protest communications was deliberate and well considered. This was

evident in the days before the protests erupted, as coordinators debated via tweets which *hashtags* should be attached to protest-related tweets. Hashtags are spaceless character stings preceded by the "#" symbol. They are attached to tweets to facilitate searching and are regularly used to spontaneously organize Twitter discussions around specific topics. Several hashtags were eventually used in connection with the Egyptian protests. The first of these and by far the most widely used is the #jan25 hashtag.

An archive of all tweets bearing the #jan25 hashtag between January 25 and March 20 was accessed through Twapper Keeper.[3] From this, the 675,713 tweets sent by 106,563 users between January 21 and February 11—the day that Mubarak resigned as president of Egypt—were compiled and analyzed for relationships between Twitter users and transnational communication patterns.

Using this tweet set as a sample for analysis carries two limitations. First, there is no definitive method for determining if the tweet set is complete. Twapper Keeper relies on Twitter's API archiving service, and it is reasonable to assume that some tweets were missed. Given the sheer size of the data set, however, it is unlikely that the missed tweets would significantly impact results.

Second, this data set likely excludes a large number of protest-related tweets sent by active protesters in Arabic. Since many Egyptian protesters tweeted "on-the-go" in dynamic situations—reporting attacks by thugs, the movements of police—it is likely that many did not include the #jan25 hashtag, as for some users this would require switching from an Arabic to English keyboard on mobile phones. While this excludes a potentially significant number (and category) of tweets from the tweet set, it does not exclude many that were clearly intended for non-Arabic speaking Twitter users. The #jan25 tweet set should thus be sufficient for evaluating the use of Twitter to develop transnational communication networks engaged with the Egyptian revolution.

TDS-c: Coordinator Survey

Based on previous research (Wilson & Dunn, 2011) and informal interviews immediately following the ouster of President Mubarak, 25 actors were identified as central to the coordination and communication supporting Egyptian protests in January and February 2011. Semistructured, in-depth interviews with these individuals aim to identify perspectives on the enabling social and technical factors underpinning the coordination and momentum of the revolution; patterns of learning and skill development that supported protest activities; differential strategies associated with synchronous and asynchronous media; and the impact of government repression on strategies and organizing. Interviews are ongoing, with interview structure and coding methodology being developed according to a grounded-theory approach (Glaser & Strauss, 1967).

Preliminary results emphasize the importance of grounded social networks and indicate that Facebook was important for coordination during the months and years ahead of the protests, and more important symbolically than instrumentally, during the protests themselves. Twitter was widely viewed,

[3] See http://twapperkeeper.com. Unfortunately, Twapper Keeper's archive download function has recently been discontinued due to conflict with Twitter's TOS.

moreover, as a key resource for getting information to the outside world, perpetuating the feeling that the world was watching, which was an important factor for morale and coordination on the ground.

The other two data sets have been designed with this in mind, and preliminary analysis supports a clear association of transnational network building with Twitter, symbolic association with Facebook, and a complex set of hybrid communication behavior employed by protesters on the ground.

Preliminary Analysis

Local Communication

Media Use

Questions on protester use patterns for 10 distinct media were prefaced by two questions on how respondents used that media. The first question identified respondents who used a media generally, and the second identified respondents who used a media for protest-related information during the protests. The second question was used to assess the bulk number of protest media users for each media and determined whether respondents were to be asked further questions regarding their use of media.

An initial review of frequencies for general users and protest-media users supports a dismissive understanding of digital media's role in the Egyptian protests. Traditional media, such as telephone, satellite television, and print media, dramatically outscore social media, blogs and E-mail, while text messaging—commonly associated with digital activism, but excluded from hype surrounding the Egyptian revolution—falls in-between the lowest scoring traditional media (print, with 57% of respondents) and the highest ranking digital media (Facebook, with 42%). These relative scores are especially striking considering the highly wired nature of the sample.

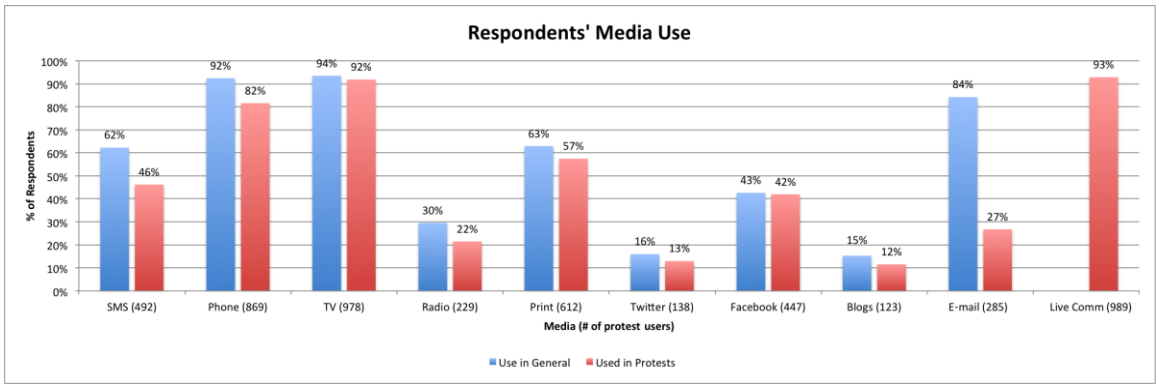

Figure 1. Respondents' Media Use.

It may be tempting to attribute the lower number of protest media users to media censorship. This data identifies users of media and not degrees of use, however, so periods of intermittent censorship cannot generally explain a low number of protest media users (having used a media at least once during the 18-day period is sufficient for classification as a protest media user). It might be argued that the more regular disruption of text messaging and mobile services in protest areas impacted protesters' ability to use media for the entirety of their engagement. Yet, this argument is only plausible for protesters who were either very heavily engaged (because they did not leave protest areas) or very lightly engaged (because there was a shorter window during which they would have used that media, which also coincided with that media's disruption). Such arguments are, in any case, not demonstrable with the data at hand. Moreover, respondent rankings for most used media during the protests (discussed subsequently) largely correspond with frequencies for protest media users.

A comparison of the general user and protest media user frequencies highlights a more compelling distinction for digital media. All media scored here in Figure 2 experience a drop from the number of general users to the number of protest users, as no media was used in the protests by all of the respondents who reported using that media generally. This drop varies dramatically, indicating that some media were more regularly applied by users to protest activity. The dramatic variance of these "drop rates" across media may, in turn, suggest that some media are better suited to use in protest scenarios.

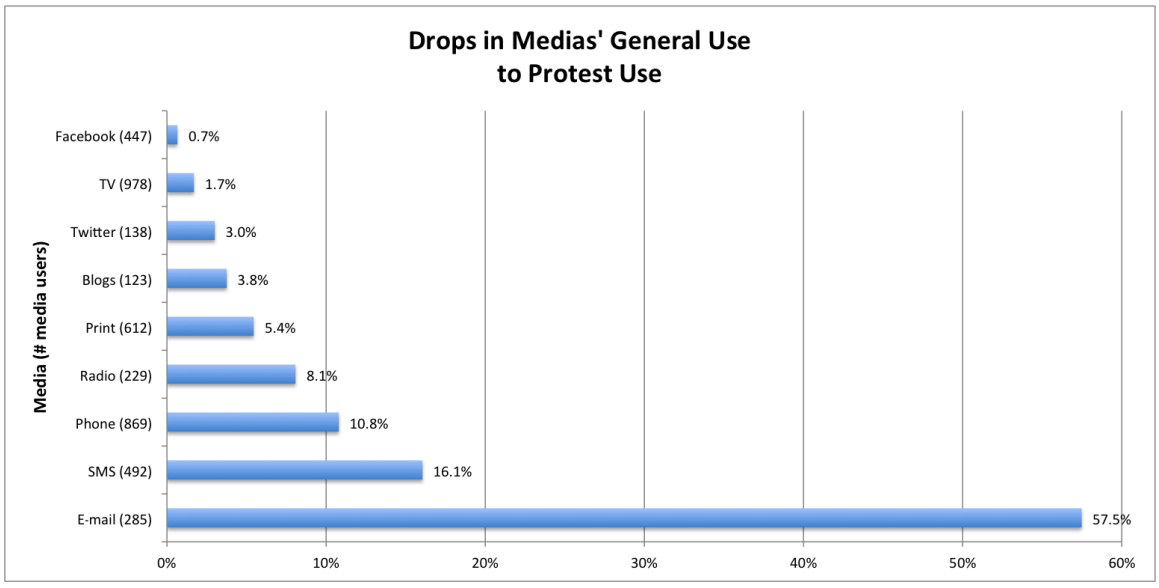

Figure 2. Drops in Media's General Use to Protest Use.

Compellingly, Facebook tops the list of small drop rates with a differential of 0.7%, followed closely by TV, Twitter, and blogs. Figure 2 shows a normal distribution from 0.7% to 16.1% until the outlier of email at 57.5%. One explanation for E-mail's extreme differential might be the combination of intermittent access to Internet and the time delay involved in asynchronous media—two factors not shared by any other media.

Similarly, the one-to-one media of telephone and SMS occupy the bottom of the normal distribution curve, while synchronous social media and satellite television at the top of the curve are well suited to tracking dynamic situations in real time. Such an explanation would suggest the hypothesis that real-time, multiparty synchronicity of communication is more important than is accessibility as an indicator for whether media is used in protest contexts.[4] Demonstrating such a relationship would, in turn, support the argument that some digital media are inherently and demonstrably well suited to use in the highly dynamic context of protest movements, despite a low absolute number of users.

Protest media users were asked to identify types of information, amount of use, reliability, and motivation for using specific media. Information types were distributed comparably across media, with a clear predominance of news and updates (identified by an average of 74% of respondents across all media, compared with 41% for opinions and slogans, followed by documentation, jokes and other. As expected, documentation of protest activity peaked with Satellite TV and Facebook.

Reliability of content for each media was recorded by protest media users on a Likert Scale of 1 (*not reliable*) to 4 (*very reliable*) (See Likert, 1932). Blogs scored the highest median score with 3.69, followed by a distribution from 2.85 to 2.33 for Twitter and radio, respectively. Twitter, Facebook, and live communication received a significant number of top scores (between 19%–25%, compared with a remaining mean of 13%). Twitter received the fewest bottom scores (2%), while radio received the most (14%).

Twitter's high scoring on reliability in this section of the survey is initially perplexing, given the high volume of rumors and false alerts tweeted in the early days of the protests, but that scoring is supported by respondents' reasons for using specific media (see following). One possible explanation is that a significant proportion of the 138 protest Twitter users sampled may not have been exposed to these tweets, either because they had not yet engaged in protest communication,[5] or because they are not

[4] The implication that synchronous media is somehow "better suited" to communication in dynamic protest contexts is only indicated in the current analysis for general users of any given media. We hope that further analysis against metrics for media reliability, motivation, and ranking will produce further insights. For a pithy description of the distinctions between synchronous and asynchronous media, see Richards (2010).

[5] Though respondents responded to questions about when they joined the protest movement, this data has been rejected, as it displayed a strong social preference bias for early participation.

"power users" (with 48% of users sending and receiving less than 50 tweets during the course of the protests).[6]

Among the reasons identified for media's protest use, "ease of use" was dominantly attributed across all media. "Content reliability" showed strong attributions for Twitter, Blogs and print, while "no access to other media" was most attributed to the use of satellite TV, radio and live communication, which corresponds to data on censorship responses that follows.

All respondents reported communicating information through a media other than the media on which they received that information. This phenomenon, which we term "relay," was most commonly reported for information received on Satellite TV, live communication, phone and Facebook. When viewed as a function of the number of protest media users, Facebook users relayed most regularly, followed closely by live communication users and Twitter users—all above 80%.

While the widespread nature of this practice is perhaps not surprising, it has important implications for how we understand the role of digital media in protest movements and digital activism more generally. Further analysis of the target media platforms may suggest patterns for specific content types and motivations, as well as the ways in which digital and traditional media operate in tandem. This initial review notes that ease of access was the most common reason cited for relaying information across media platforms, while 47% of respondents relayed to access larger or different audiences than those that were available through the source media. The content types relayed tended generally to correspond with the content types associated with specific media just noted, with documentation peaking even more strongly for social media, though not for TV, given the obvious difficulties.

[6] The term *receiving* here connotes receiving relevant information, as understood by the respondent, rather than simply counting the number of tweets delivered to that user's wall.

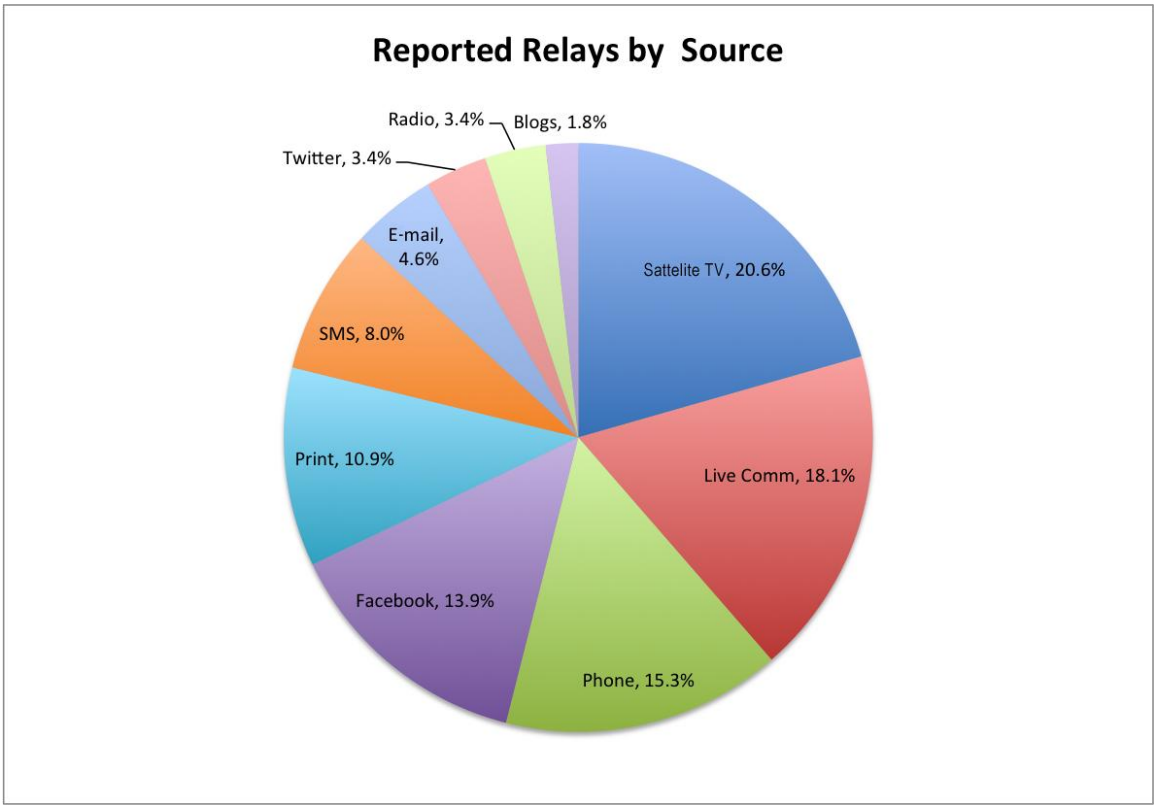

Figure 3. Reported Relays by Source.

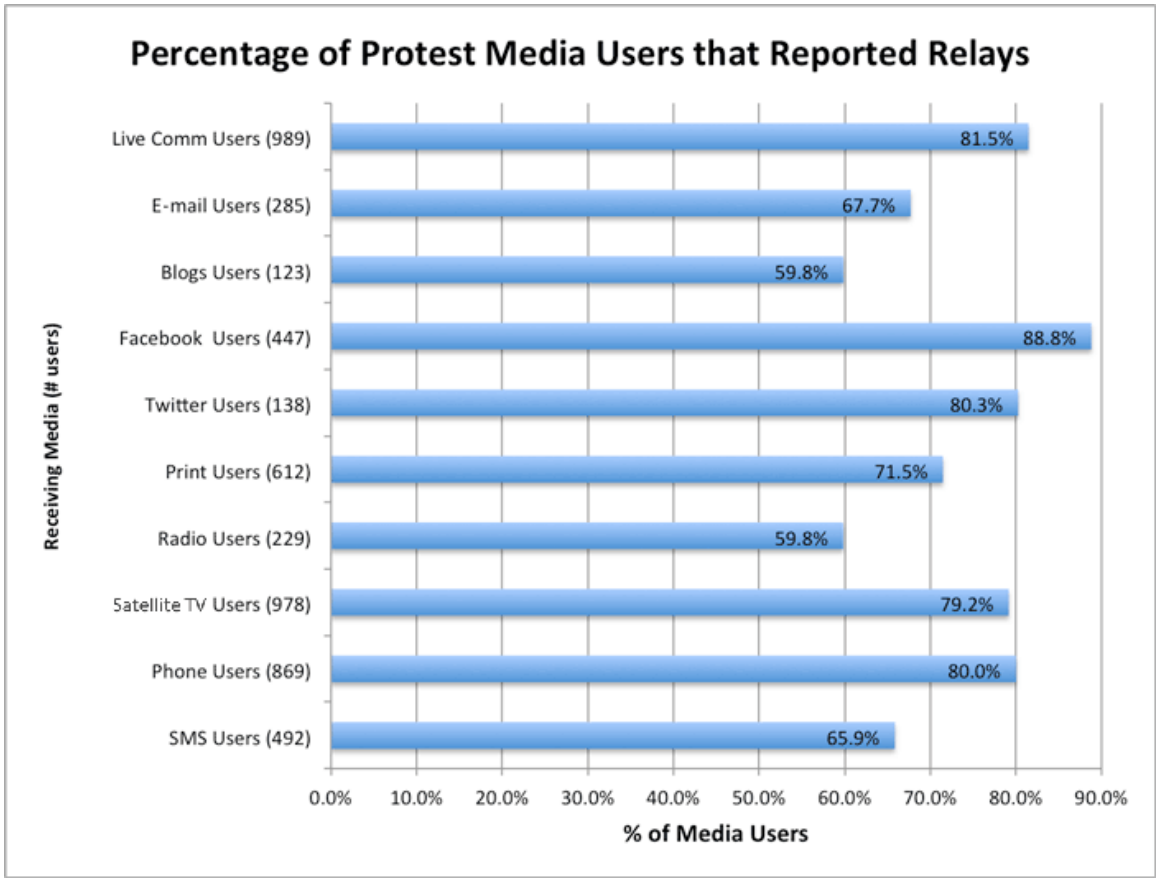

Figure 4. Percentage of Protest Media Users that Reported Relays.

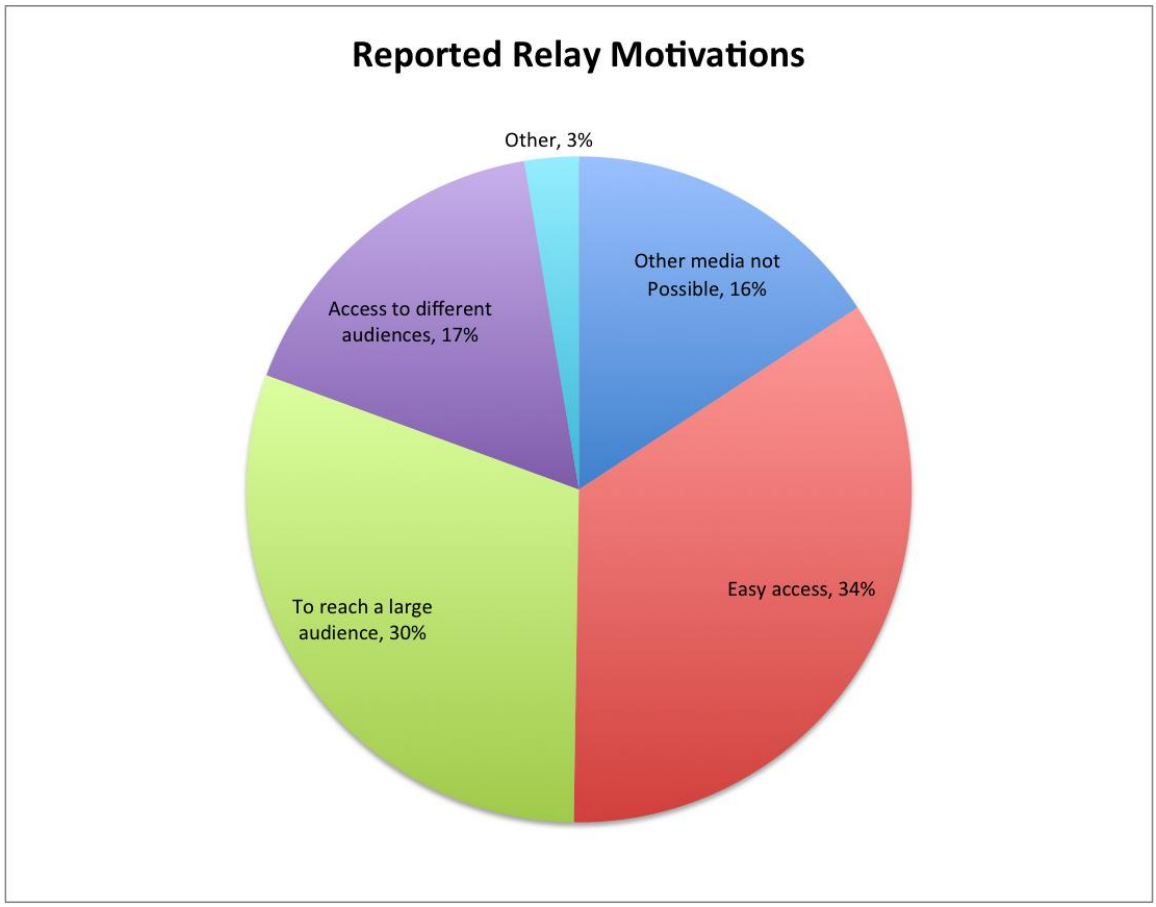

Figure 5. Reported Relay Motivations.

Ranking and Responses to Censorship

Respondents were asked to rank the media that (a) were most important to their protest activity, (b) were most informative regarding the protests, (c) were used the most in relationship to the protest, and (d) most motivated them to participate in the protests. Respondents were asked to rank the top three media for each of these four categories, as personally experienced. Expressed in Figure 6 as a percentage of the total possible score for the entire sample, the four ranking scores are largely comparable within individual media.

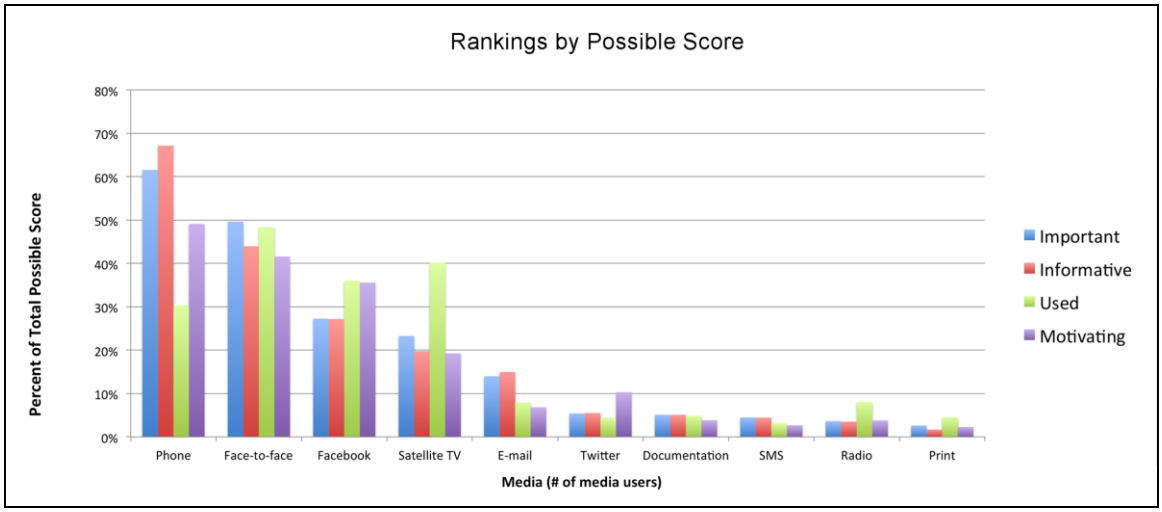

Figure 6. Rankings by Possible Score

When discrepancies do occur, they appear to correlate with a difference in the degree of use. This appears in the table as a negative difference for the most used category in phones, and as a positive difference for the most used category in Satellite TV and radio. These differences may be simply due to differences in media availability—insofar as state-run radio and Satellite TV were always available—while phone cards, on which many mobile phone users rely, quickly became a scarce commodity when shops and banks closed in the face of widespread protests. It is also possible that these differences say something qualitative about the utility of the media and the efficacy of individual media uses. A significant negative difference for frequency of use would, in this reading, imply that individual phone calls tended to be more "important," "informative," and "motivating" compared with individual instances of other media

use than what is indicated by the scores alone. Simultaneously, the positive difference for radio and Satellite TV would not simply imply that TV and radio are always on, but also that any given segment of television viewing was comparatively less informative and important than the overall ranking indicates.

Media ranking scores as expressed by total sample scores map loosely onto frequencies for protest media users, with the exception of print, radio and SMS, which were largely under-represented in ranking. When ranking scores are expressed as a percentage of the total possible score for that media's protest users, the graph flattens as shown in Figure 7. The relative distribution across media remains largely the same, however, except for a dramatic spike in the degree of motivating content for Twitter.

Twitter and Facebook are both clear and anomalous leaders for motivational content when ranking is expressed as a function of protest media users. This distinction is especially clear in Figure 8, which compares aggregate ranking scores for each media, expressed as a percentage of the maximum score for both the entire sample and the number of protest media users.

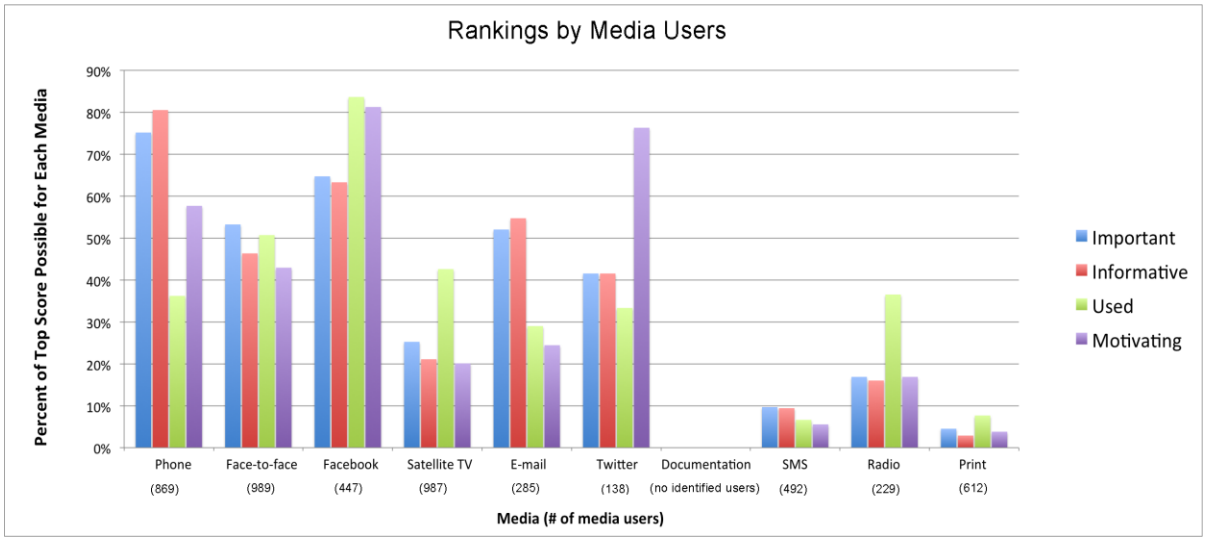

Figure 7. Rankings by Media Users

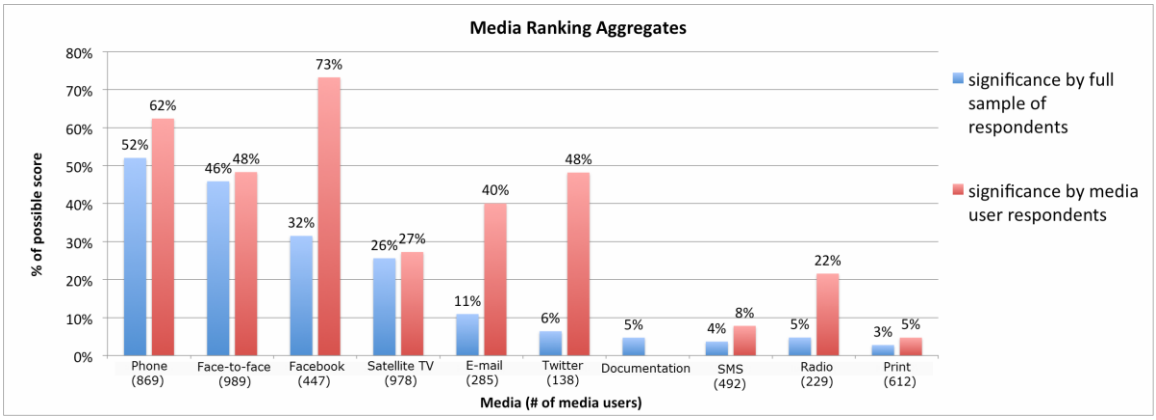

Figure 8. Media Ranking Aggregates.

Respondents were also asked about whether information blockages such as network shutdowns, website blocking, and Satellite TV signal jamming posed serious problems during the protests, and what media they used more as a consequence of those blockages. As shown in Figure 9, shutdown of the mobile phone network was the information blockage most commonly described as a serious problem (90% of respondents) and the SMS network shutdown the least problematic (45%). Curiously, nearly 100% of responses altered their media behavior for every information blockage, regardless of whether they felt it was a serious problem (see parenthetical rates following media types on the vertical axis).

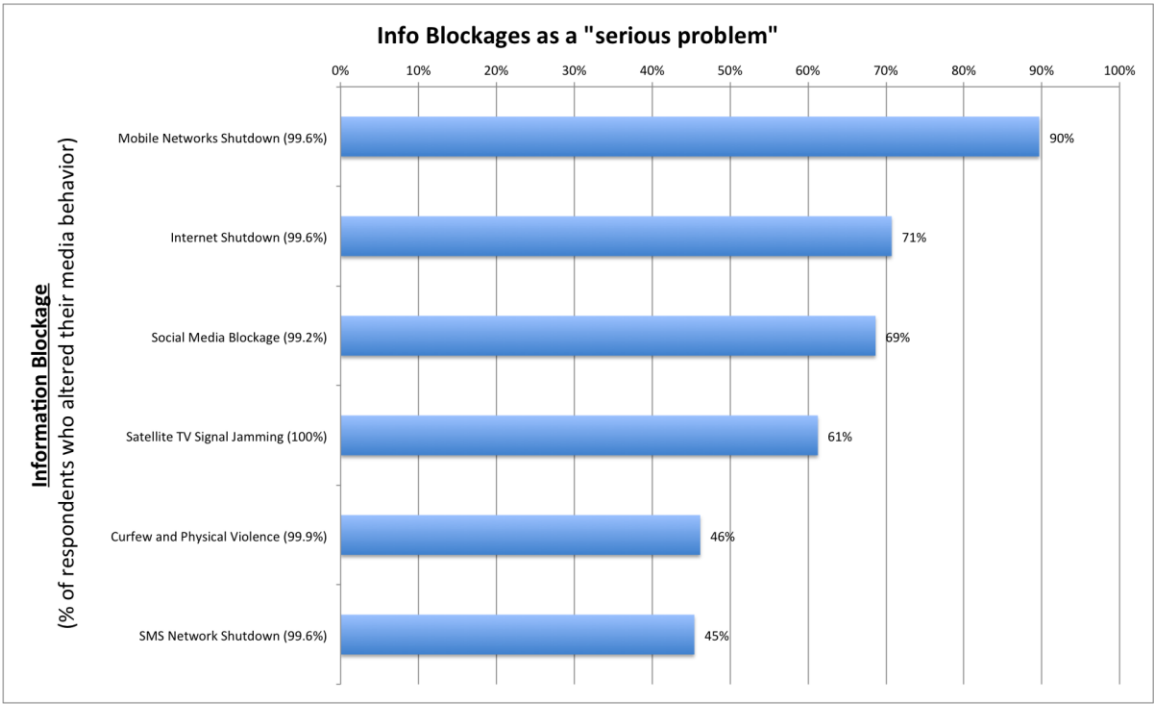

Figure 9. Information Blockages as a "Serious Problem."

Disaggregating altered media behaviors shows that respondents consistently turned to traditional media such as Satellite TV, telephone, and live communication in the face of all information blockages.[7] Variations in the behaviors across media were few, but suggestive. Facebook made its only significant showing as alternative media (though still modest at 6% to 6.5%) in the face of Satellite TV jamming and curfew/threats of physical violence. Internet proxies made a single showing (equally modest) in the face of social media blockages.

[7] Some 35% of respondents reported increasing their use of Satellite TV in response to the jamming of satellite TV signals, highlighting that these data do not explore media content and that respondents were likely switching from independent to state-run satellite TV. It also recalls that satellite jamming was characterized as a "serious problem" by a relatively minor 65% of respondents.

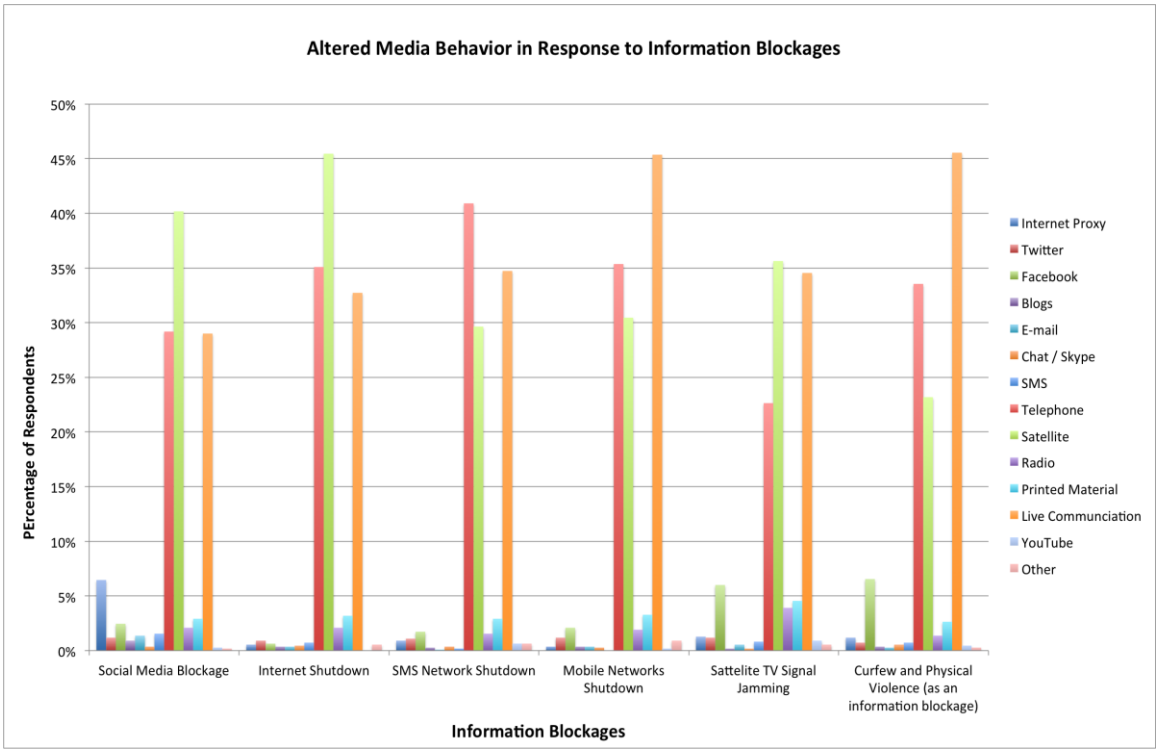

Figure 10. Altered Media Behavior in Response to Information Blockages.

Summary

The most immediate conclusion to be drawn from this descriptive and preliminary analysis is that digital media was not as central to protester communication and organization on the ground as the heralds of Twitter revolutions would have us hyperbolize. This is observable across the protester survey data, from user frequencies to relay frequencies to rankings and censorship response.

There were, however, a number of metrics in which social media distinguished themselves, especially in terms of perceived reliability, relay rates, and indicators that can be associated with motivation to participate. Moreover, metrics for social media increased significantly and consistently in comparison to traditional media when expressed as a function of protest media users, rather than as the full sample set. This suggests exploring whether these media are inherently better suited to dynamic protest activity, and whether their users—however great or small in number—relate to these media in a manner distinct from traditional media use.

Transnational Communication (#jan25)

Power Dynamics Among Twitter Users

The ease and speed of relaying digital content via Twitter makes it possible for users to participate in wildly diverse degrees. The #jan25 tweet set is large (including 675,713 tweets and 106,563 unique users) and demonstrates the diversity of Twitter user engagement (featuring users with anywhere from 1 to 41,150 followers, tweeting anywhere from 1 to 3,953 times).

To better understand the distribution and relationships between users with varying degrees of engagement, the tweet set was sorted according to frequency of users' tweets. It was then plotted with unique users along the x-axis and number of tweets along the y-axis. This calculation produced Figure 11 and was repeated with retweets to produce Figure 12. Each of these figures immediately suggests power law distributions.

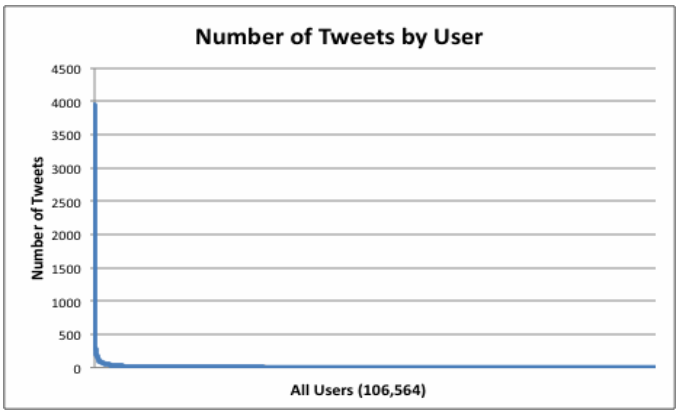

Figure 11. Number of Tweets by User.

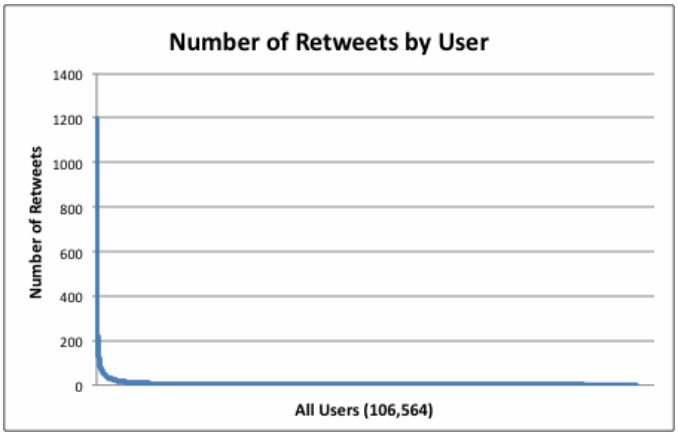

Figure 12. Number of Retweets by User.

To confirm this, a regression analysis was performed, testing the degree to which a power law distribution explained the change in *y* as a relation to a change in *x*. These calculations quickly confirmed the presence of a power law paradigm[8] recognized in social media analyses as the phenomenon whereby each user participates at a higher rate than does the next user. Shirky (2003) explains that "a power law describes data in which the nth position has 1/nth of the first position's rank. In a pure power law distribution, the gap between the first and second position is larger than the gap between second and third, and so on" (p. 125). This pattern of intensive contribution by the small minority of a large group is commonly observed in social systems and is clearly also present in this tweet set.

The clear manifestation of a power rule among #jan25 users justifies isolating the top 200 tweeters as a group of "power users." Using this group as a proxy for the entire #jan25 tweet set allows for more detailed analysis of the tweet set's composition.

Language and Geography

English language tweets dominate the #jan25 tweet set (96%), while Arabic constitutes one of the smallest language categories (1%). Running language metrics for original tweets and retweets produced comparable distributions, suggesting that language was not a determining factor in the redistribution of information on Twitter.

[8]The r-squared values were, in order of the graphs, .953 and .957 and show that a high percentage (95.3% and 95.7%, respectively) of changes in the y-values can be explained by a change in x-value when the data set is compared to a power-law regression.

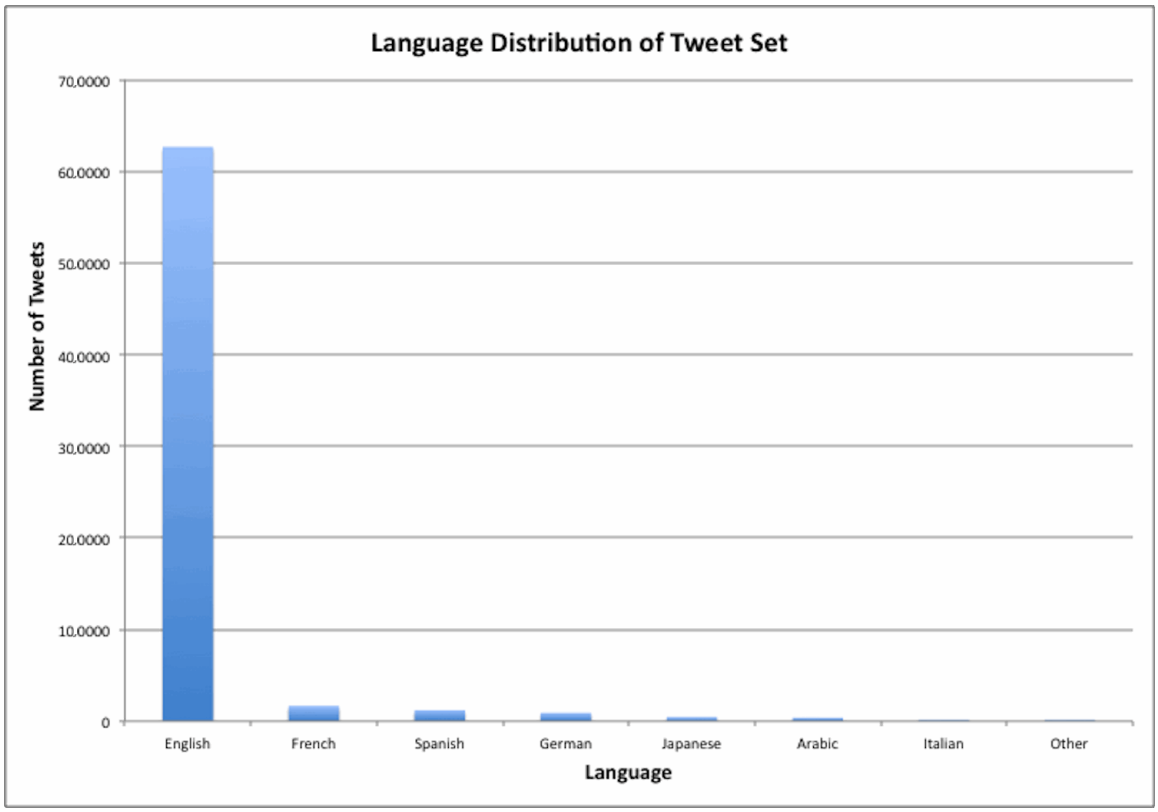

Figure 13. Language Distribution of Tweet Set.

The massive predominance of English in the total tweet set and English's wide use as an international language complicates analysis of #jan25 hashtag users' transnational composition. To address this, tweets by the top 200 power users identified above were analyzed for geographic location.

Only 25% of power users are based in Egypt. Of the remaining 75% percent, the majority are from Western countries, with a minority from elsewhere in the Middle East and North Africa MENA region.

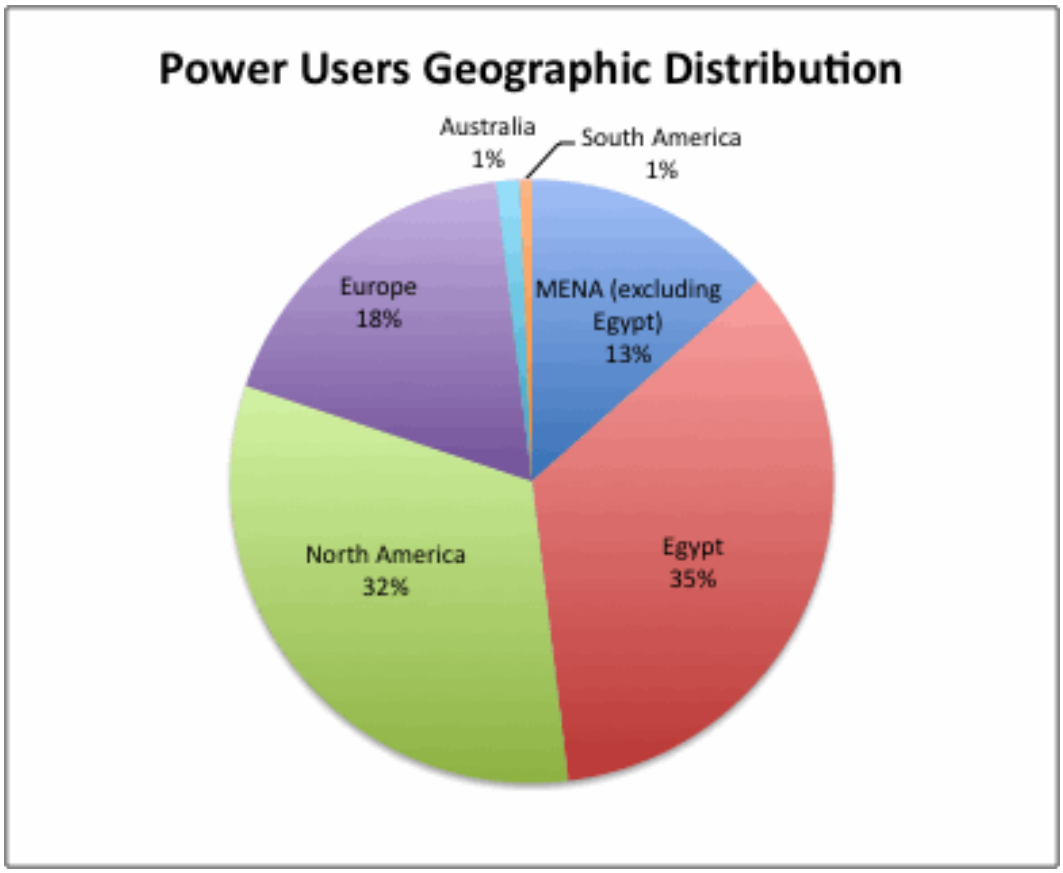

Figure 14. Power Users Distribution.

Mapping the actual number of tweets by power users produces a distribution dominated by Egypt, North America, Europe, and other MENA countries, which corresponds roughly to the distribution of power users shown in Figure 14. Reproducing this matrix for the number of retweets, however, dramatically magnifies the representation of Egypt. This indicates a clear tendency to favor redistribution of content originating in Egypt. While not surprising to any casual observer of the hype surrounding the Egyptian revolution, these data provide an important counterpoint to assertions that the significance of social media in protest contexts can be determined solely on the basis of how many active users that media has in-country.

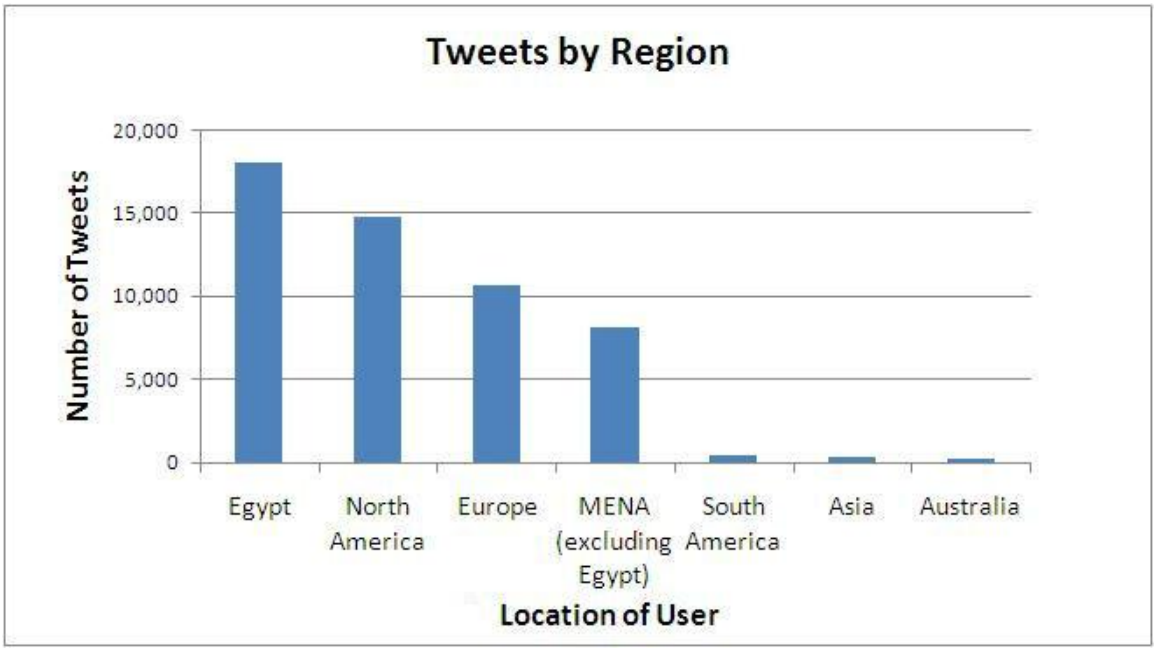

Figure 15. Tweets by Power Users.

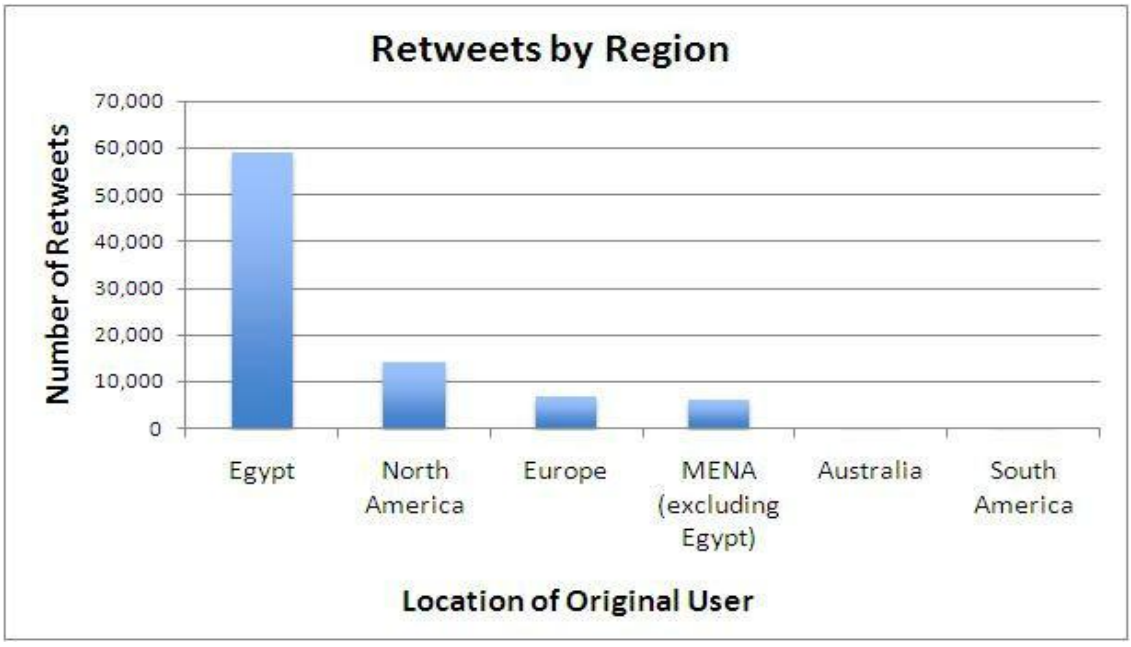

Figure 16. Retweets of Power Users by Location

A preliminary analysis of other hashtags associated with #jan25 supports the suggestion that Twitter supported the development of a transnational dialogue surrounding the Egyptian revolution. Compellingly, a large number of these related hashtags are associated with protest movements in other Arab states. Analysis is underway to determine how the frequency of such cross-references increased or decreased in response to protest activity in specific countries and to ascertain the correspondence of country references in tweet content and hashtags within individual tweets. A preliminary reading suggests that hashtags directed at target audiences were often used other than to simply indicate tweet content, and that hashtag cross-referencing increased as a function of comparable developments in countries.

Summary

The vast size of the #jan25 tweet set is a challenge for detailed analysis. Despite the lack of comprehensive metrics, however, there is a clear indication that Twitter was used to actively and successfully engage an international audience in the Egyptian revolution. It also appears that the resulting discourse was dominated by a relatively small group of power users within a massive group of relatively passive users who offered expressions of support, shared related content, and retweeted power user content.

The dichotomous composition of the discourse is especially compelling, considering its geographic distribution and retweet frequencies. These characteristics suggests a model in which a small group of Twitter users in Egypt generated a significant amount of content that was consumed and mobilized by a small group of transnational actors, spawning discourse with very broad and largely passive participation.

This fits well with understanding Twitter as a technology well suited for broad information dissemination and fostering low-intensity transnational network activity. The transnational intentionality of such activity is especially clear in light of the data set on coordinator strategies and is important when considering the structural role of transnational digital communication in protest movements. Such activities never occur in a strategic void, and a small number of local users cannot be considered evidence for a platform's centrality in social movements.[9]

Though Egyptian power users constituted only a third of all power users, a minority among protesters, and an infinitesimal percentage of the Egyptian population, they managed nevertheless to propel a significant transnational discourse and support network. While documentation of this network's impacts at the international level remain to be documented, it seems to have clearly impacted international media coverage and had important motivational consequences for protesters.

Preliminary Conclusions and Implications for Further Study

A preliminary descriptive analysis of the Tahrir Data Sets suggests that while digital media was not dominant in Egyptian protest activity, digital media—and social media, especially—were nevertheless an integral and driving component in the media landscape.

[9] The argument that a media's number of users correlates with its political instrumentality was often implied following prominent Twitter use in Moldova and Iran in 2008. See Bennet (2008).

This is particularly obvious in the transnational discourse manifest on Twitter. The transnational composition and the real-time nature of this discourse is novel and compelling, though its consequences—in terms of international advocacy and pressure on the Mubarak regime—invite wild speculation that may be impossible to test. The Tahrir Data Sets, however, suggest a demonstrable relationship between the scope of transnational discourse and grounded protest activity. Geographical dynamics identified in the #jan25 tweet set and the high rates of protesters attributing Twitter with motivational content fit well with assertions by protest coordinators that the transnational attention represented by Twitter made a significant contribution to protest morale by conveying the impression "that the world was watching."

Social media also displayed distinctive characteristics for protester media use. In addition to strong associations with characteristics and communication relevant to protest activity such as documentation, motivating information, content relay, and perceived content reliability, the drop rates—the comparative rates at which media users continued to use specific media for protest activities—indicate that social media may be distinctively well suited to dynamic protest contexts. Considering this in tandem with the tendency of social media metrics to peak dramatically when expressed as a function of protest media users, suggests that the relationship between social media's functionality and users' behavior in protest contexts merits further study.

The preliminary nature of this analysis does not allow for any concrete conclusions. Nevertheless, we see compelling reasons for academic and popular discourse to move beyond debates about whether or not social media played a significant role in the Egyptian revolution.

The key contribution of social media according to this analysis involves altering the larger structures and premises of information economies—though not explicitly for all social groups. This flies (productively) in the face of both cyber utopianism and fundamentalist arguments about power relationships à la Malcolm Gladwell (2010). It also seems to place the discussion firmly in media's potential, rather than in actual consequence. Any discussion of digital activism in Egypt must note that the country has a 16.8% Internet penetration rate; that discourse should also recall Metcalfe's Law whereby a network's value increases with each additional member node (Hendler & Golbeck, 2008). As more individuals are connected to the same communication network through tools and platforms, the potential impact of that network increases exponentially. Connections between individuals within national contexts are critical for coordinating protests and spearheading movements as are connections manifest in the global Internet, and the relationship between the two is especially relevant for how and at what rate they develop.

Though it may be disturbingly difficult to predict how the political revolution will develop in Egypt, there is little doubt about whether the number of Egyptian Facebook users or blog readers will increase, or whether that will be relevant for future political activity—that cat seems to be definitively out of the bag. Digital media are likely to play an ever-increasing role in Egyptian politics.

To understand what this means in concrete terms demands empirical study of contingent media use. The Tahrir Data Sets provide rich material for such work and will soon be made public on a Creative Commons license. We hope that this will facilitate wide and rigorous analysis of the data, and that this

will, in turn, lead to further empirical study on the use of digital media in protest movements, as well as on digital activism more generally.

Specifically, we would encourage widespread engagement with the Tahrir Data Sets to investigate this, beginning with three key analyses. First, a close analysis of metrics for media relay, reliability, motivation, and rankings (especially regarding ranking differentials within media) would likely offer compelling insights on what distinguishes digital media use in protest contexts. This would be especially compelling when compared across user types. While the protester data set is largely biased toward a specific type of protester (well educated, young and wired), no cross-frequencies have yet been run to compare media use habits for distinct groups. Second, the rich collection of data on media relay, including motivations, content types, and relationships between source and content media, is not yet analyzed in any detail. We expect these data to provide compelling insights on how digital media interact with traditional media in protest and activism contexts, and to contribute to our understanding of a complex and hybrid media ecology. Third, a network mapping of social media users involved in the protests would, when analyzed in tandem with TDS background data on coordinator strategies, likely demonstrate that social media users consistently act to bridge digital and grounded social networks.

As struggles for revolution and counter-revolution continue in Egypt, throughout the region, and the world, there is little doubt that digital technology has changed the premises upon which social forces are mobilized and contested. The question is not whether repressive or progressive forces benefit most from technological advances, because that happens only in context. The most productive question—for future research, for a balanced understanding in popular media, and for individuals seeking to mobilize technology in the pursuit of political and social aims—is how technologies and information relate to highly contingent power structures. This question will always be answered first by individuals challenging these structures. For these reasons, we hope that the Tahrir Data Sets can encourage academic research to assume an empirical and grounded perspective.[10]

[10] For an analytic approach to digital activism study that is premised on the characteristic of contingency and hybridity, see Wilson and Dunn (2010).

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