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Studying the Internet and Violent conflict

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Abstract
The role of the Internet in contemporary violent conflicts is receiving increasing scholarly attention. In this article, I review some of the pioneering studies that investigate how the emergence and penetration of modern communication technology across the world influences violent conflicts. Building on these important findings, I propose four entry points for future research. First, research on the link between the Internet and violent conflict needs to account for the profound changes the Internet has undergone in past decades, as well as the extent to which its nature is becoming increasingly endogenous to local contexts. Second, little is currently known about the effects of communication technology in violent conflict that move beyond initial mobilization. Third, architectural and algorithmic designs of social media platforms heavily influence the possibilities and constraints of human interactions on the Internet, but to date remain understudied. Fourth, further studies are needed to understand how the Internet has changed how violent conflict is communicated and portrayed both online and offline.

Keywords
Civil war, conflict, cyber, Internet, new media, social media, violence

Introduction

When in the spring of 2011, Syrian people took to the streets to protest the brutal violence committed by the country's autocratic regime under the leadership of president Assad, pictures of protesters, violent state responses, and the subsequent armed rebellion quickly flooded social media platforms. Armed opposition fighters used the video-sharing platform YouTube to announce the creation of new battalions, pledge allegiance to existing groups, or secede from their former affiliation (The Carter Center, 2014). Syrian regime forces were known to request—often by force—usernames and passwords of people's Facebook and Twitter accounts (SalamaTech, 2015). While anti-government groups made use of smartphone apps to calibrate their weapons and locate military facilities (Keating, 2013),

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pro-government sympathizers formed the so-called *Electronic Army*—hackers with the intent of supporting the Assad regime and attacking opposition groups by all virtual means available (Youmans and York, 2012).

The Syrian conflict has by now become known as the first "socially mediated" conflict in the history of armed conflicts (Lynch et al., 2014). The lines between online and offline activity have been blurred, and the vast majority of reporting on the conflict has relied on social media posts by citizen journalists posting videos, pictures and updates on the dire situation within the country. Syria is, however, not the only conflict that has been profoundly mediated through the Internet. Recent conflicts in Ukraine, Libya and Gaza were heavily featured on social media, both as documented by civilians and as orchestrated by the respective conflict parties. And while not all ongoing conflicts are as intricately intertwined with the tools made available through the Internet, there is no way in which countries currently caught in the midst of war remain unaffected by it.[1]

In this article, I review some of the pioneering studies that have attempted to investigate how the emergence and penetration of modern communication technology across the world have influenced both the outbreak and dynamics of violent conflict. Research in this field can broadly be subsumed into three categories. The first category of studies is interested in understanding whether modern communication technology has increased the likelihood of political violence, by lowering costs for collective organization (Christensen and Garfias, 2016; Pierskalla and Hollenbach, 2013). The second strand includes those interested in understanding how conflict dynamics are affected by changes in access to communication technology (Gohdes, 2015; Shapiro and Weidmann, 2015) and changes in domestic and international audience effects (Jones and Mattiacci, 2017; Zeitzoff, 2017). Lastly, scholars have tried to understand how the Internet may or may not be used as a weapon during armed conflict (Gartzke, 2013; Lee, 2016; Lindsay, 2015).

Building on these important studies, I offer an assessment of how future research can move toward more fully investigating the role of modern communication technology in conflict. First, recognizing that the Internet is rapidly changing and becoming increasingly endogenous to local contexts will help us gain a deeper understanding of how communication technology is changing the face of violent conflict, and allow us to reconcile seemingly conflicting research findings. Second, more theoretical models are needed that move beyond initial violent mobilization. With Internet penetration steadily increasing, theories need to incorporate the role of the Internet into models that do not treat it as a "novel" or "exogenous" shock, but rather as a tool that has been adopted and adapted by all conflict actors, be they pro-government, anti-government, or caught in the middle. Third, social media architecture, algorithms, and corporate interests of digital platforms heavily influence the use of the Internet during contentious politics, yet their role remains almost entirely understudied. Fourth, thinking in more detail about the ways in which modern communication technology has changed the portrayal of conflicts in both the media and politics is now more important than ever.

The next section gives a brief overview of early research on resistance and popular protest through the Internet, followed by a discussion of how the Internet has been studied in the context of violent conflict. I then turn to discussing possible entry points for future research, and conclude with a short discussion of ethical considerations when analyzing Internet data in conflict situations.

Civilian uprisings and the Internet

Popular uprisings from Spain, to the Philippines, to the Middle East and North Arica have inspired an exponential increase in research on the role and general significance of modern communication technology for non-state actors in contentious politics (see e.g. Bennett and Segerberg, 2013; Castells, 2012; Diamond, 2010; Earl and Kimport, 2011; Hounshell, 2011; Howard and Hussain, 2013; Shirky, 2011; Tufekci, 2011). In the broadest terms, researchers have attempted to study to what extent online activity, for example, through the consumption and exchange of information, is associated with political activism, both online and offline. The majority of studies rely on in-depth analyses of individual cases, such as studies on Burma (Chowdhury, 2008; Danitz and Strobel, 1999), Venezuela (Valenzuela, 2013), Ukraine (Goldstein, 2007), Kenya (Goldstein and Rotich, 2008), Tunisia, Egypt and Libya (Breuer et al., 2015; Bruns et al., 2013; Lotan et al., 2011; Lynch, 2011; Rasha, 2011), Spain (González-Bailón et al., 2011, 2013), Russia (Enikolopov et al., 2016), and the United States (Conover et al., 2013; Theocharis et al., 2015).

Changes in the barriers to—and costs of—collective action are frequently mentioned as the underlying theoretical mechanism linking the Internet to protest. While some contend that online communication is assumed to help overcome issues surrounding preference falsification (Kuran, 1997), others highlight lower coordination costs (Enikolopov et al., 2016), the reconfiguration of traditional collective action problems (Bimber et al., 2005), or the acceleration of information cascades (Hussain and Howard, 2013; Lohmann, 1994).

Studies show how the Internet has lowered the costs of collective coordination for protest movements. Studying the Tunisian revolution, Breuer et al. (2015) find that new media acted as an important platform for different protest groups to coordinate and structure their anti-government campaigns effectively, and posting invitations and successes of the protest movement online attracted further supporters. It also provided an opportunity for digitally active users to maintain a constant information supply when the traditional media was being censored by the government. The authors further argue that documenting the government's coercive response led to a consolidation of domestic and international sympathy for the protesters. Little (2016) argues that communication technology is likely to be more important for reducing "hands-on" coordination costs than it is to overcome challenges pertaining to preference falsification. He presents a formal model to investigate the relationship between communication technology and protest, and shows that the costs of protesting are most likely to be lowered through spreading logistical information and details on the kind of protest that is scheduled to occur. Mechanisms related to the spread of information on how discontented individuals are with the government are less clear in their theoretical predictions regarding protest outcomes.

Researchers have also attempted to understand the role of social media in the context of other, "offline" activities and choices. For example, Tufekci and Wilson (2012: 363) administered a survey of participants in Egypt's Tahir Square protests in order to figure out what role social media played in people hearing about the protests and coordinating and documenting their own involvement. Their findings highlight the importance of understanding the context in which social media is used: according to their sample, nearly half of all surveyed participants heard about the protests in face-to-face discussions, while roughly one-third heard about it via Facebook (Tufekci and Wilson, 2012: 370). Thus, only looking at online activity would miss large parts of the population whose primary contact with protest movements is inter-personal. However, evidence from the Arab Spring by Steinert-Threlkeld

et al. (2015) shows a clear correlation between the increased use of protest-related hashtags and an increase in protest activity the following day. Thus, while not all parts of the population might be represented on social media, offline protest during the Arab Spring correlated strongly with online activity.

Others have focused on questions pertaining to protesters' social media network position and protest dynamics. Looking at Twitter users who participated online in the Spanish protests in May 2011, González-Bailón et al. (2013) categorize users depending on their network position and messaging activity (see also González-Bailón et al., 2011). Network positions are identified using the ratio of accounts a user is following vs accounts they are followed by, while messaging activity is determined by the ratio of messages received vs messages sent. The authors find that so-called "hidden influentials", users who receive above average numbers of messages, but have a marginal network position, play an important role in the collective mobilization process during protests (González-Bailón et al., 2013: 958). Evidence by Steinert-Threlkeld (2017) on protest mobilization during the the Arab Spring shows that protest activity was more dependent on the online activity of peripheral Twitter users than those who were at the core of the movement, a dynamic he refers to as "spontaneous collective action".

The role of social media during protests goes beyond initial mobilization. Social media has also evolved as a vital instrument by which citizens document protest activities (Tufekci and Wilson, 2012). Chowdhury (2008: 8) analyzes the crucial role online platforms played in ensuring the dissemination of critical information during the Saffron revolution in Burma, where the government heavily censored conventional news outlets. He emphasizes the importance of citizen journalists in countries where the traditional media is heavily censored and controlled by the government. Upholding the flow of information is not only crucial for the domestic population, but it also keeps the international community informed. He asserts that:

> [t]here were far fewer deaths in 2007 than there were in 1988. It is possible that the Internet saved the lives of many protesters, because the Junta feared even greater criticism from images of troops killing monks and civilians. (Chowdhury, 2008: 14)

Similarly, Christensen and Garfias (2016) argue that, next to reducing coordination costs, the presence of modern communication technology increases the audience costs for governments who use violent repression to quell protests. In their global analysis of cell phone coverage and incidence of protest between 2007 and 2014 they find a positive relationship between coverage and protest activity. Howard and Hussain (2011) also highlight that opposition groups are dependent on international recognition, and access to the Internet has facilitated the task of reaching out to foreign governments and international non-governmental organizations considerably (Howard and Hussain, 2011: 44). The role of information technology thus moves beyond being an aid for revolutionary ignition; it is also assumed to help legitimize such processes in the long run by providing platforms for opposition groups to position themselves favorably in front of the international community (Keck and Sikkink, 1998).

From uprisings to violence

The literature on the role of communication technology in civilian uprisings has provided a rich set of theoretical arguments that have been adapted to the context of violent conflict. Yet not all popular protests turn into organized violent hostilities, and not all violent conflicts commence as mass uprisings. Conflict theories referring to the problems of collective organization, free-riding, information asymmetries and audience costs have been re-evaluated with the introduction of cell phones and online communication. In addition, research on government behavior against the backdrop of the digital revolution has required the development of new theoretical arguments.

The first set of studies investigate the relationship between communication technology and organized political violence. While many of them look at cell phone coverage and not direct Internet accessibility, the peer-to-peer communication and information exchange effect is assumed to be similar. In a cross-country comparison of cell phone coverage and violence in Africa, Pierskalla and Hollenbach (2013) find that locations with better access to wireless phone networks display higher numbers of violent events. Taking a closer look at the insurgent side of internal conflict, the authors argue that cohesive rebellious activities are a challenge to coordinate—especially when groups are secretly operating across different locations—and therefore strongly benefit from the availability of cheap communication tools (Pierskalla and Hollenbach, 2013: 210). However, Weidmann (2016) argues that violent events are more likely to be reported where communication is facilitated by mobile networks, possibly biasing inferences based on observational violence data.

A number of studies provide evidence for the fact that modern communication technology has been used to incite and exacerbate ethnic tensions. The post-election crisis in Kenya in 2007 and 2008 that quickly turned violent is one of the first cases in which this relationship was studied. Goldstein and Rotich (2008) find that cell phones were not only used to coordinate violent events, but were also used to incite ethnic hatred. All across Kenya, citizens received text messages on their mobile phones motivating them to stand up and violently voice their dissatisfaction with the way the elections had been conducted. The use of media platforms to incite ethnic hatred is not new, one of the most prominent examples being the role of radio announcements in the Rwandan genocide (Kellow and Steeves, 1998; Yanagizawa-Drott, 2014). However, the degree of precision with which individuals can be targeted by messages sent directly to their mobile phones is unprecedented. Comparing traditional mass media and cell phones more generally, Warren (2015) shows that across African countries, increased penetration of mass media has a pacifying effect, whereas increases in cell phone connectivity have the opposite effect. Cross-country evidence by Bailard (2015) shows that cell phones can help ethnic groups overcome barriers to effective organization, such as being geographically dispersed, as well as allow them to communicate more effectively about shared grievances. Both of these mechanisms are positively associated with an increase in violence.

A further set of studies have looked at the dynamics of conflict violence from the position of state actors. Shapiro and Weidmann (2015) argue that increased networking opportunities also increase the possibility of civilians unwittingly sharing knowledge about planned opposition attacks with state forces, thus throttling rebellious actions. Analyzing cell phone usage in the Iraqi conflict, they find that insurgent violence is significantly lower where increased mobile communication is available. The availability of digital communication technology thus affects the information flow of both government and non-government

actors. It can help non-traditional citizen journalists have their voices heard in larger contentious discourses, where state forces are censoring traditional media outlets. It can also assist governments in gathering information shared by ordinary citizens concerning the location and planned activities of armed non-state actors or terrorist organizations (Deibert, 2003; Deibert et al., 2010).

The Syrian conflict exemplifies these dynamics at an intense scale. Youmans and York (2012: 323–324) discuss the role of the Syrian "Electronic Army" which has worked to discredit, obstruct and inflict damage on Syrian oppositions groups, while actively supporting the Assad regime through targeted virtual propaganda. At the same time, the Syrian regime—like many other governments who have felt threatened in their political authority—has regularly shut down all Internet access within its borders. Syria is not alone in doing this—countries such as Sudan, Iran, Vietnam, China, and Egypt, are but some of the recent cases where governments have decided to cut off their citizens' ability to go online (Gohdes, 2016).

There are a number of reasons why this might be a useful tactic. First, states might have a strategic incentive to shut down Internet access during periods where they are planning on using excessive force to repress opposition forces (Gohdes, 2015: 352). Results from Syria show that Internet shutdowns go hand in hand with heightened state repression, in particular in areas where the government is actively fighting opposition groups (Gohdes, 2015). Second, states' incentives to shut down the Internet might stand in contrast to the benefits of the intelligence they are able to reap from surveilling opposition groups and other activists while the Internet is accessible and used for collective organization by those non-state groups. Abruptly shutting down the Internet might also lead to an increase of protest activity, as evidence from the Tahir protests in Egypt suggests (Hassanpour, 2013). Further research on the Syrian case shows that regional restrictions to the Internet are significantly associated with higher proportions of indiscriminate violence, whereas areas with good accessibility to the Internet witness higher proportions of targeted violence against civilians (Gohdes, 2014). Current studies thus indicate that Internet access brings with it advantages for both state and opposition forces, but that local conditions are likely to affect the overall outcome (Shapiro and Siegel, 2015).

The Internet has also been deemed important for the delivery of real-time information to the domestic and international audiences, and this is likely to affect conflict dynamics. Studying the 2012 Gaza Conflict, Zeitzoff (2017) shows how changes in public support on Twitter significantly affected conflict intensity. Looking at violent actions by both Hamas and the Israeli government, the study finds that public support on Twitter was a better predictor of changes in conflict intensity than changes in the official positions of important international mediators, such as the United States or the United Nations. The results show clearly that conflict actors are not only using the Internet to their own advantage during violent conflict, but they are also paying extraordinary attention to what others are saying about them on social media. Jones and Mattiacci (2017) show how in the recent Libyan war rebel groups used social media as a tool for public diplomacy, helping them form their own conflict narrative, and increasing their opportunities for cooperation with international actors. The fact that communication technology allows non-state actors to orchestrate a narrative that diverges from the state's central narrative surrounding violent events has time and again been identified as critical for opposition groups to operate effectively (Castells, 2012; Chowdhury, 2008; Goldstein and Rotich, 2008).

Lastly, scholars have studied the extent to which the attacks via the Internet, often known as cyber-attacks or cyber-conflict, may or may not constitute an effective weapon in the context of violent conflict. While the majority of research in this area has focused on interstate wars (see e.g. Gartzke, 2013; Valeriano and Maness, 2014), many of the concepts are applicable to intra-state conflict as well. Ample evidence of distributed denial of service attacks as well as attempts at planting malicious software in the enemy's military control systems in both the Ukrainian and Syrian conflicts confirm that "cyber" capabilities are becoming increasingly important during episodes of domestic political violence (Deibert, Rohozinski and Crete-Nishihata, 2012; Lee, 2016; Shevchenko, 2014). The actual impact of such capabilities on modern warfare still remains to be seen.

Moving forward

I suggest four ways forward in the study of the Internet and violent conflict. This list is far from exhaustive, and is instead intended to stimulate discussion for future research topics. I propose that we take into account the fact that the Internet is rapidly changing, making it all the more important to study disaggregate effects that are context dependent. Second, we require further models that theorize about the mechanisms through which the Internet affects conflict beyond the outbreak of violence. Third, questions pertaining to the architecture of social media platforms have largely been ignored in research on digital communication and conflict. Fourth, the portrayal of conflict through social media is changing how we perceive and learn about violence, and the consequences thereof are still mostly unclear. I conclude with a brief discussion of ethical considerations when conducting research on the role of the Internet in conflict settings.

Changing causes

Since its invention, central features and characteristics of the Internet have changed quite dramatically. These changes are, however, not adequately reflected in the literature on contentious politics and the Internet. One of the early political groups to make use of the Internet in their activism was the predominately US-based Burmese pro-democracy movement. Danitz and Strobel (1999: 258) recall that with the introduction of the Internet, the Burmese diaspora suddenly had access to the same kind of information as available in their homeland. Highlighting the possibilities of fast information dissemination and organization via mailing lists and the copying and pasting of faxes, Danitz and Strobel (1999) show how the Internet and fax technology allowed the movement to facilitate and speed up their activism immensely.

From today's perspective, the communication channels and coordination opportunities provided by the Internet of the 1990s seem quite antiquated. With the development from predominately static webpages to the "Web 2.0" (DiNucci, 1999), with its dominance of user-generated, dynamic content on blogs and social media platforms, communication and information distribution underwent a second profound change. The move toward the "social" Internet sparked much of the contemporary research on social media and contentious politics, not least owing to events surrounding the Arab Spring (Farrell, 2012). Less discussed are the dramatic changes brought about by the exponential increase in users who access the Internet via mobile devices (such as smart phones or tablets). October 2016 marked the first month in which, worldwide, more websites were accessed via mobile devices

than from ordinary computers (StatCounter GlobalStats, 2016). The implications for contentious politics of not only moving from static to dynamic websites, but also moving from regular cell phones toward smart mobile devices still remain understudied. Moving forward, the drastic increase in personal and household devices being connected through the Internet of Things (Howard, 2015) is likely to have important consequences for violent conflict that currently also remain understudied.

Beyond temporal variation, the nature of the Internet also varies substantially across countries, regions, and local context. At the beginning of the 1990s, Internet pioneer and activist John Gilmore famously said "The Net interprets censorship as damage and routes around it" (Elmer-Dewitt, 1993), referring to the fact that originally the Internet was intended to give users all over the world access to the same kind of communication and information. More than 20 years later, research demonstrates just how much of the average Internet user's experience is now shaped by national laws and regulations (Deibert et al., 2010, 2011). The Internet looks very different to an average user in China than it does to a user in Ethiopia, or Germany. National-level institutions as well as Internet service providers have critical leverage over what information and tools are available. Countries across the world make use of different types of censorship tools, some of which are highly sophisticated (King et al., 2013), while others are more crude, or bought "off the shelf" from surveillance software companies (Marquis-Boire, 2015). Countries have also become increasingly willing to shut down their entire Internet access during political unrest (Gohdes, 2014, 2016).

Availability and accessibility of the Internet also vary substantially within countries. Countries with highly unequal access to the Internet are likely to see other patterns of violent mobilization than those with equally high or low access. Research has shown that next to the frequently found urban–rural divide, often those populations who are more likely to suffer from other forms of political exclusion are also digitally disadvantaged (Weidmann et al., 2016). When studying the role of Internet during violent conflict, both country-level characteristics and local-level dynamics need to be taken into account.[2]

Rapid changes in accessibility are likely to lead to very different patterns and effects of online behavior. The effects of the Internet on contentious politics are likely to be much stronger in countries or regions that recently experienced a massive increase in Internet penetration than in places where Internet access has been widespread for a long time. The timing and trajectory of Internet penetration are thus likely to mediate how online behavior translates into offline actions. To give an example, up until 2014, less than 1% of the population in Burma had access to the Internet. With the introduction of Facebook, the number of users skyrocketed to around 10 million a month by June 2010 (Trautwein, 2016), and suddenly around 20% of the country was online (Frenkel, 2016). Amidst the ongoing violence committed against the Muslim minority group Rohingya, reports indicate that Facebook has given extremists a platform to rapidly garner support for their islamophobic ideas all across the country (Frenkel, 2016). Investigating to what extent online radicalization is connected to the speed at which Internet penetration occurs, as well as to the online tools that are predominately available for use, will be an important topic for future research.

Moving beyond initial mobilization

The mechanisms through which facets of the Internet influence dynamics of violence beyond initial mobilization are still largely under studied. It is not clear whether and how theoretical

arguments referring to preference falsification and reduced coordination costs remain relevant beyond conflict outbreaks. Social media may help overcome initial problems related to preference falsification, but it is still not clear how the disclosure of political positions affects civilians in the midst of civil conflict. Sensitive information regarding loyalties may be surveilled by the conflict parties, making it increasingly difficult for civilians to hide their support for one side from the other. Likewise, digital records may make it increasingly hard for civilians to switch sides as comment histories and follower patterns on social media would reveal past preferences.

Research on social movements suggests that over time, networks with an overly strong reliance on digital communication will increasingly encounter problems in maintaining momentum, motivation, and attention for their cause (Conover et al., 2013; Tufekci, 2017). If increased Internet usage leads to increased successful coordination among individuals who are willing to use organized forms of violence to challenge the status quo, then findings based on non-violent social movements would suggest that conflicts in digitally connected regions may not be as persistent as conflicts that grew more slowly through interpersonal, "real life" connections. However, it is not clear whether the dynamics of non-violent groups translate directly to the experiences of violent groups. Online documentation of combatants' activities may be a successful strategy to simultaneously attract new recruits and hamper seasoned combatants' ability to return to their previous lives.

With regard to armed opposition groups' organizational dynamics, communication technology is likely to affect issues related to internal mechanisms of command and control (Dafoe and Lyall, 2015; Hoover Green, 2016). Commanders faced with the challenge of controlling their troops may use social media to better monitor the activities of their combatants and enforce discipline. Increased Internet penetration and adoption among armed violent groups may result in less violence in circumstances where combatants are monitored and reprimanded for being too violent. Alternatively, it may lead to a change in the type and form of violence committed, bringing it more in line with what the group's leadership expects. It may also lead to more violence where combatants have shirked away from executing the levels of violence commanded by their superiors. The effect of increased Internet usage by armed organized groups on manifestations of violence during conflict is thus likely to be conditional on the leadership's preferences and ability to enforce said preferences in light of increased monitoring.

Increased communication technology is also likely to affect the strategic interaction between armed opposition and state forces during violent conflict (Zeitzoff, 2017). Social media may reduce information asymmetries among conflicting parties, possibly motivating them to find agreements faster than was previously the case (Dafoe and Lyall, 2015: 408). With the rise and proliferation of online propaganda, whereby conflict parties take to social media to enforce a specific discourse, it is not clear whether increases in Internet penetration are in fact decreasing information asymmetries, or rather exacerbating them. During the conflict in Ukraine, armies of online commentators spread pro-Russian content across social media and did their best to depict the new pro-European Ukrainian government as fascists (Yuhas, 2014). Since then, the government of Ukraine has attempted to build its own, albeit less successful, online propaganda army (Benedictus, 2016). Social media discourses surrounding contentious politics have been shown to be largely isolated from each other (Zeitzoff et al., 2015), and the rise of online propaganda during conflicts is likely to lead to a growing segregation of online experiences. How increased propaganda and online segregation affect the dynamics and duration of violent conflict remains to be studied.

Understanding social media architecture

To date, almost completely understudied question is how corporate interests of large Internet companies affect the nature of violent conflict. When looking at the influence of communication via social media, those platforms in question are generally treated as neutral transmitters. This approach glosses over the private interests and corporate power that platform providers have over how messages are sent and received, who sees them and who does not, and what kind of information is permissible (Zittrain and Palfrey, 2008). Variations in platform adoption have serious consequences for the structure and perimeter of public online discourse. Survey evidence from Indonesia and Nigeria shows that users in these countries do not distinguish between "being on the Internet", and "using Facebook" (Mirani, 2015), as Facebook has become so ingrained in their daily life, and calling up other websites is clearly seen as a separate activity. In Burma, reports show that Facebook and the Internet are treated as synonymous terms (Frenkel, 2016). Holding virtually monopolistic power over a country's online communication means that even the smallest changes in Facebook's legal and algorithmic architecture are likely to have significant consequences on social interactions and behavior.

In 2013, Facebook launched what is now called "Free Basics", a programme that allows users in less economically developed countries to access specific websites and applications on the Internet for free. Net activists have sharply criticized the initiative as violating the principle of net neutrality, whereby everyone should have the same opportunity of accessing information through the Internet, not a preselected set of sites curated by a corporation (Global Voices Netizen Report Team, 2016). If free and unfiltered information exchange and freedom of expression through the Internet have reconfigured the means of modern popular protest, then the expansion of such selective Internet access has the potential to undermine these new dynamics in so far unforeseen ways. Access to even the most basic information and communication in previously disconnected regions may help groups more effectively voice their grievances and lead to increased mobilization in hitherto marginalized communities. However, since Free Basics has to date excluded VoIP services (such as Skype or Viber) or video from its participation guidelines (Facebook, 2017), the expansion of this programme may have no such effects, since visual and audio communication are likely to be crucial tools in poorer areas with lower levels of literacy. Free Basics may also open up new channels for propaganda or strategic disinformation, whereby content moderation either remains in the hands of Facebook or is legally prescribed by national legislatures.

Social media companies' community guidelines can be detrimental to activists' efforts in trying to mobilize supporters online. During the uprisings in Egypt, droves of pro-government actors reported the Facebook accounts of opposition activists for allegedly violating Facebook's guidelines (Youmans and York, 2012), while in Sudan they flooded activist pages with pornography. In both cases, the oppositions' accounts were at least temporarily removed by Facebook (Boswell, 2011). To the outrage of many Syrian activists, videos depicting violence in the Syrian conflict were initially banned from YouTube for showing graphic content. Both the algorithms that determine the architecture of social media websites and the enforcement of their community guidelines often remain hidden, or fail to take into account local context. These factors, among many others, make it challenging to study how they affect actors caught in the midst of violent conflict (Milan, 2015). It is crucial that we study how specific features (see Crawford and Gillespie, 2016) or changes

in features on widely used social media platforms affect conflict actors and the dynamics of violence during conflict.

Changing portrayals of violent conflict

Key challenges in understanding the effects of the Internet on violent conflict are linked to issues of how conflicts are portrayed through social media platforms. While social media has increased access to diverse viewpoints on contentious events (see Hamdy and Gomaa, 2012), relying on these new sources of information is also not without challenges. Problems of representativeness arise during theory development at the case selection stage, and finally in the process of collecting and analyzing empirical evidence.

Many theoretical intuitions are informed by the most prominently publicized cases, which are often the conflicts where a significant portion of the information shared on social media is in English, thus making it easily accessible for researchers at Western institutions. Online discourses that are predominantly in English, but address contentious politics in countries where the first language is not English, may reflect the fact that social media is being used less for local mobilization, and more to garner international attention (Aday et al., 2012). In other contexts, discourse in the local language may follow very different dynamics than that in English (Lynch et al., 2014), and during international disputes, different online networks in different languages are likely to reflect entirely different policy positions and viewpoints (Zeitzoff et al., 2015).

Relying on information generated and shared via the Internet is likely to over-emphasize the experiences and behavior of the demographic group most heavily represented online; in the majority of cases these are young, urban, and educated elites. Twitter data collected during Hurricane Sandy offer "perspectives that are inherently skewed toward the privileged urban-dweller's experience of the disaster" (Crawford and Finn, 2015: 497). The extent to which their experiences of the Internet and violent conflict represent larger patterns within a country remains to be studied. Taking into account the architecture and limitations of individual social media platforms is crucial. Public information about violent events is formed not only by event characteristics, individual motives, and accessibility, but also by platform constraints and culture (see Papacharissi, 2012; Vis, 2013). For example, with the increase in bots—non-human content creators—on social media platforms, researchers need to be increasingly aware of the fact that their social media datasets include a significant amount of content that does not reflect human thoughts or behaviors (Ferrara et al., 2016).

Research on the role of social media data from natural disasters points to specific questions of platform bias, as well as risks for those whose information is included in the analysis. Crawford and Finn (2015) remind us that

> [i]t is critically important for researchers to assess and account for gaps in their [social media] dataset … determining which kinds of individuals and communities are excluded … recognizing that these communications are also created for—and shaped by—the platforms where they appear. (Crawford and Finn, 2015: 497)

Similar analyses in the context of violent political conflict will add to our understanding of what we are actually measuring when analyzing social media data.

The degree to which data gleaned from social media reflects events on the ground is highly context dependent. In information-rich environments social media can be a useful data

source to measure conflict dynamics, as Zeitzoff (2011) shows for the 2008/2009 Gaza conflict. Inferring conflict intensity using social media, for example in the Central African Republic, is likely to be highly inaccurate. In contentious environments where the majority of information on violent events is only available through the work of citizen journalists, the probability of violence being reported is likely to be a function of Internet availability (Weidmann, 2016), and the presence and willingness of individuals to report on what they witnessed. As such, it is important to keep in mind that exponential increases in the amount of information on conflict settings should not be equated with increases in the representativeness of events on the ground (Price and Ball, 2014; Price et al., 2015). Analyses of the relationship between the Internet accessibility and violent events are likely to be endogenous, thereby possibly over-estimating the effect of the Internet on violence. In addition to Internet accessibility issues, information provided by civilians in conflict is likely to be highly dependent on personal safety considerations, and can therefore not necessarily be equated with "objective" reporting. Lastly, conflict actors will be motivated to portray violent events on the ground to their advantage, by taking full credit for them to signal power and resolve, by blaming their enemies to deny responsibility, or by attempting to cover up their atrocities from view to evade accountability. Partisan reporting might also resolve to fabricate stories online, for the reasons just mentioned.

Remembering research ethics

While the digital archives of online behavior have opened up unrivaled amounts of data that are now available for analysis, it is important to not lose sight of researchers' inherent ethnical responsibility to not endanger the subjects of their research (Boyd and Crawford, 2012; Crawford and Finn, 2015). Debating hard questions surrounding consent, privacy and unintended impact when scraping and analyzing people's personal social media stories is now more important than ever. In a recent article, Zook et al. (2017) formulate 10 rules for researchers to engage responsibly with big data. Most importantly, the authors highlight the need to acknowledge that data, even when gleaned from publicly accessible sources, such as Twitter or YouTube, still "represent and impact people" (Zook et al., 2017: 2), and that unmindful sharing, linking and publishing of such data can seriously harm individuals. Furthermore, they argue that questions regarding the privacy, confidentiality, and consent do not have simple answers, but are highly context dependent and require careful choices on the side of researchers.

Studying the role of the Internet in violent conflict falls squarely into the realm of such ethical decision-making. The ability to study conflicts in real time through social media simultaneously increases the chance of exposing individuals or conflict-affected communities to security risks. In the aftermath of violent conflict, researchers' documentation of organizational networks through social media data may endanger former or clandestine combatants, and put their families and communities at renewed risk. While it is true that social media collected from public websites and applications is freely available, ample structural problems exist that put individuals' privacy at risk when combining such data (see Solove, 2013). First, individuals are generally unable to cope with managing their own privacy across multiple platforms (Solove, 2013). In particular, during times of crisis, such as violent conflict or mass popular uprising, privacy concerns may be even less of a priority than otherwise. Second, users of social media websites may reveal pieces of private information that only turn into a

risk for them when pieced together. Referring to this as the aggregation problem, Solove (2013: 1889) contends that even "little bits of innocuous data can say a lot in combination". Lastly, he argues that most individuals revealing information on social media have a hard time assessing the harm this may cause to themselves or their community, both in the short and the long run. Researchers engaging in social media analyses need to be aware of these potential ethical problems, and address them head-on in their research. Furthermore, keeping such sensitive data stored in a secure manner is the responsibility of every researcher, as is learning about the possible risks of transporting said data across international borders (see Parkinson, 2017).

In 2011 (MacKinnon, 2011: 27) wrote:

> It is time to stop debating whether the Internet is an effective tool for political expression, and to move on to the much more urgent question of how digital technology can be structured, governed, and used to maximize the good it can do in the world, and minimize the evil.

If we want to move toward designing policies that help mitigate and resolve violent conflict, further research on the causes, mechanisms, platform characteristics, and the portrayal of conflicts through the Internet is going to be indispensable. In this article, I have summarized some of the most exciting and innovative studies on the relationship between the Internet and contentious politics, paying special attention to the study of violent political conflict. Future studies will need to dig even deeper into the intricate mechanisms that are affected by the many different facets of digital communication and information exchange.

There is no denying that information consumption and expression via the Internet has affected contentious politics over the past decades. Taking into account the complexity of these different causes and mechanisms in a nuanced way will help us arrive at specific conclusions that will also make it easier to think about policy initiatives aimed at improving conflict resolution.

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Notes

1. One might argue that those places that are "cut off" from the Internet are experiencing an increasing lack of attention from the international community. The effects of this lack of social media attention are yet to be scientifically investigated.
2. For example, Weidmann and Rød (2017) study how local levels of Internet access are related to protest occurrence in autocratic countries.

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