The Impact of Opinion Leadership and External Events on Forum Participants Following ISIS Online

by

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Abstract

The study monitors the evolution of perceptions and opinions of the terrorist group the Islamic State (ISIS) during its involvement in Syria and Iraq in 2013-2014. Data is drawn from a web-forum discussing current Islamic affairs that followed ISIS as early as September 2013. These data are used to answer the question of whether or not there are opinion leaders facilitating the discussion of violent extremist material. An interrupted time series and ordinary least squares regression are used to address the research question by determining the most impactful events on the thread, and determining the causal role of opinion leaders on the way users connect. Results indicate that the content and success of discussion are most impacted by the involvement of opinion leaders and media related to a specific ISIS event.

Keywords: Social network analysis; opinion leaders; ISIS; violent extremism; terrorism;

Acknowledgements

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Chapter 1.   Introduction

Studies of terrorism and violent extremism have historically had a predominant focus on the subjects of recruitment, radicalization, and terrorist acts themselves**.** The networks of terrorists (Nash and Bouchard, 2015; Magouirk, Atran, and Sageman, 2008; Everton and Cunningham, 2011), the psycho-social models of their developments (Borum, 2004; Kruglanski, and Fishman, 2009), and in more recent years their virtual presence and strategies (Conway, 2012; Davies et al., 2015), are all important pieces of combatting violent extremism and are worthy of continued scholarly attention. The subject of public reception of terrorist groups is, however, underdeveloped. Under the Canadian Criminal Code definition of terrorism, the ultimate goal of terrorist action is to influence the public (through intimidation) (Criminal Code, 1985, s. 83.01), and thus the success of a terrorist group is at least in part quantified by how it affects the public. While the fear of crime has a well-developed literature (Ferraro and Grange, 1987; Stafford and Galle, 1984; Warr, 2000), it has been applied to terrorism in only a limited fashion. Missing from the literature of terrorism are answers as to how opinions and groups concerned with terrorists are formed. What events most severely impact an individual's perceptions? Are some types of events more impactful than others? What facilitates one event being discussed more widely than another?

While some previous research has been conducted on perceptions of terror, fear, and risk of terrorist incidents, it has been particularly focused on an individual's personal safety and primarily conducted through survey-based instruments (Lemyre et al., 2006) or interview-based qualitative assessment (Jenkin, 2006). The research on perceived risk to safety (Lemyre et al., 2006) has relegated to the periphery questions about how people view the terrorists themselves. The views of people that support or sympathize with their actions have been generally ignored. Furthermore, research focusing on the respondent makes it difficult to answer questions that affect groups as a whole. A gap exists in literature about how terrorist events impact the way individuals interact with their social

network. With little longitudinal research on how the same social network develops over time with repeated exposures (by way of media reports) to related terrorist events it is difficult to pose questions about what we expect to happen as a violent extremist group becomes a 'success' in terms of lifespan and media recognition. A longitudinal study of a social network enables a variety of benefits that may be hidden in other analytic strategies. Subtle changes in connections among all users becoming evident, rather than the exclusionary focus single respondents might provide. Thus, information on how a more complete group organizes and how this varies with different exposures can be evinced. These two gaps in literature predicate this study. This thesis aims to expand research on perceptions of terrorism to include social networks and to develop our understanding of how individuals concerned with discussing terrorism engage with one another. The particular focus of this research is in answering how a subset of a group facilitates the impact of a terrorist group's offline activities on the discussion and opinions of it online.

Public reaction to terrorist events, the opinion and discussion surrounding it is important to the discussion of terrorism because the support or tolerance of violent extremism material online is linked to many groups' longevity. As will be discussed subsequently, propaganda dissemination (Ducol, 2015; Davies et al., 2015) and recruitment (Davies et al., 2015) are intimately connected with independent groups providing a space to react and discuss terrorist or violent extremist events. The internet provides an opportunity to circumvent the most prohibitive restriction facing longitudinal research of large groups (the selection and retention of large, representative samples) as well as capitalize on a particularly detailed breadth of data. Data in web-forums, for instance, capture a large variety of behaviours of relevance to the discussion of terrorism (what they are saying, who they are saying it too, and how often they are saying it). These data are openly available and exists on a timeline predating many contemporary terrorist groups by years, meaning developments of both the online group and terrorists themselves are encoded therein. The internet provides the opportunity to access the supporters, fans, or those generally interested in extremists in a way a participant-based study might not present. The perceptions of terrorism among the subset of the population following terrorists online provides an insight into how support for groups such as ISIS exists out of sight. As scholars have previously noted, the internet is not disjointed from our day to day lives. In many instances the internet either becomes an extension of our

engagement to society (Haase et al., 2002) or at the very least overlap with our spheres of social activity (Ducol, 2015). Going online for discussions on civil society and news media are significantly related to such pursuits offline (Moy et al, 2005). People go online for their interests, and although this may be a more attentive subset of the population interested in these topics, it still is reasonable to assume they represent a proxy of offline involvement. For topics that can be deviant in nature and inaccessible in real world, the primary gathering place is now online (Holt, 2007). In such instance, tapping into online communities is an even more effective than attempting to study an offline analogue of the online group. These online communities (Bouchard and Westlake, 2016; Westlake and Bouchard, forthcoming), especially those formed in discussion forums, have been shown to be more open and frank about sensitive topics than groups do offline (Lea et al., 1992). These communities form based on shared foci (subjects, hobbies, etc.), they tend to test radical ideas, and use the somewhat forgiving social place to refine their articulation (Conway, 2012). What previous studies have yet to accomplish is to use online discussion forums to quantitatively test how different types of events influence the community's behaviour as a whole, and what the components are of a successful discussion about violent extremist material. As previous studies have indicated that involvement in online material reflect offline interests (Lea et al., 1992; Ducol et al., 2015), we suggest that such an expansion would be amenable to an assessment of public reaction.

This study aims to examine these online communities as a way to capture public reactions to actions associated with a major terrorist group: ISIS. Online discussion forums have a number of features that make them ideal candidates for analysis. Web-forums provide a large amount of content, publically available without requirements for an invasive and structured cohort study. Who is communicating with whom, the frequency of their interaction, and what the qualities of users interactions are (e.g., content), are all displayed and codified by virtue of the medium. These qualities mean that an abundance of narratives that can be dated and matched to specific events, and also analyzed for nature of content or sentiments. Furthermore, given the length of time many web-forums have been active, many forums can be used as a data source wherein individuals and communities can be analyzed longitudinally. The present study utilizes key turning points in such a web-forum in order to establish how particular individuals and events influence the group they are embedded in over time. Users forming groups on web-forums, a series

of connections between individuals replying to one another and self-selecting into similar thematic discussions provides an incredible richness of data. These data provide the opportunity for the online community to be analyzed as a network, meaning the evolution of users' collective behaviour and interactions can be studied. This evolution can be assessed for changes based on external events (such as ISIS' progression) and those internal to the forum (a particularly influent forum member interceding in the discussion). By analyzing the change in content and success of threads over time we can develop understand of mechanisms of how public sympathies of terrorist organizations develop. This social context and discourse will help describe the change in public reaction during the rise of a contemporary violent extremist group. By identifying changes in groups of individuals discussing ISIS before and after mainstream media coverage of it began, the most impactful events on their reaction to the group can be identified. It is of particular interest in this study to identify and describe the process of whether it is on the merits of particular events related to ISIS that changes to the online discussion occur, or whether there are other factors influencing the online community's reaction. This thesis argues that there is a facilitation between events external to the online community and the reaction to those events. This effect is tested in two ways. First, by identifying what changes occur to the content of discussion longitudinally. Second, by testing if influential individuals improve the discussion of news media events related to ISIS. These two questions will explore whether or not an evolution of the discussion about ISIS is occurring, what is most impactful, and if there are particular individuals driving it. We hypothesize that users will be more negative and connected to one another subsequent to ISIS events, and influential individuals will improve these discussions. To establish these questions, the next chapter discusses the contemporary understandings of violent extremism, how communities form, and how the internet intersects with these two areas.

Chapter 2.   Extremism, Community, and the Internet

The literature on violent extremism provides a basis for our understanding of not only the ways in which extremists behave but the process whereby they become violent. In reviewing this literature we can identify the particular risk factors and processes that underscore the contribution of the current research. Four sections below identify the most pertinent contributions to this body of literature. First, scholarship on radicalization and violent extremism as a process. Second, the extension of violent extremists into the online sphere. Third, the role of web-forums as a social place supporting violent extremist ideology. And finally, the role of opinion leaders – influential individuals – on their peers in both the online and offline medium.

2.1. Violent Extremism

Although radicalization has been defined by scholars in various ways, the conceptualization of radicalization used here is a developmental pathway whereby an individual comes to adopt increasingly extreme political, social, or religious ideals or aspirations (Borum, 2010). Although radicalism can be a positive influence on scial change, in the context of this study it refers specifically to *violent* radicalism. Violent extremism refers to the process of taking radical views and putting them into violent action – or support thereof (Public Safety, 2015). The internet has provided what Sageman (2008) has referred to as an incubator for violent extremism. By allowing the topics and narratives conducive to radicalization to traverse through social networks, users can foster sentiments and ideology that they would not have access to offline due to social buffers (Sageman, 2008). Sageman (2008) characterizes radicalization in the new wave of Islamic terrorism populated by young men seeking a fantastical adventure who mobilize through social networks. In this theoretical framework, the internet is not *the* radicalizing factor, but certainly plays a role in priming individuals otherwise vulnerable to the process (p. 82). Maintenance of network contacts is listed among its roles (Sageman, 2008) but the reinforcement of ideological messages is equally important.

Pseudo-anonymous peers debating their interpretation of news media events online seems to be connected to conspiratorial claims about who is influencing events in the world (Bessi et al, 2015), and related to Borum's framework of how an individual escalates to violence. Borum (2010) proposed a four-step process whereby an individual is socialized into the extremist mindset. First, the recognition that an event or situation was wrong. Second, that the event is framed to have been selectively unfair or punitive towards the group they identify with. Third, they hold a particular group as accountable for the misdeed. Finally, the accountable group is demonized (Borum, 2010; Borum, 2011). The confirmation and reinforcement of these narratives is what makes communities online so pertinent to the discussion of terrorism and public reaction to terrorism. The way these events are interpreted and disseminated through a community can have real implications for the members of the group –thus the way in which the group organizes becomes an important object of inquiry.

In order to better describe the importance the online community has in the discussion of violent extremism online, two concepts are introduced below. First, although being online is an activity, it is better viewed as a social place or setting. Being connected to an extremist dialogue online is often more than a single behaviour that can be deterred –individuals can be *embedded* in it. With a variety of social ties to peers or friends that may also exist in the dialogue, expectations of continued participation may be connected to social rewards or status. If in order to communicate with one's friends users must continue to engage with them in an extremist setting it makes it difficult to isolate and prune that dialogue from their activities. Second, this online space can foster radical violent ideologies offline. The relationships between an individual and their peers can have a very real effect on their attitude towards violence. Two case studies are used to illustrate this.

Web-forums for those unfamiliar with the digital medium are difficult to conceptualize as a social setting. They are in many ways a one-stop-shop for all the activities one expects from an offline social life. Education, hobbies, news media, vacation planning ideas, deal hunting, all coexist even on a thematic-specific forum (e.g., RedFlagDeals.com). This mixed content exists on sites interested in terrorist content as well. While some content may be devoted to a terror network's merits, another might help

users locate a local religious- or ethnicity- based daycare. Even the most extreme web-forums have users existing on a spectrum, from the enthusiasts to the mildly curious. One of the curious features of web-forums are the mixing of the different users on this spectrum. In discussion of news media, already having an opinion or ideology formed does not have a strong effect on the user's interest on commenting or discussing media contrary to that opinion (Garrett, 2009). The minor effect pre-conceived opinions has on the *type* of content a user views means that within discussion forums there is a mixing of those with pre-conceived opinions and those looking for answers (Garett, 2009). This is particularly pertinent in the context of discussions between supporters of terrorism and neophytes. Offline, there is usually some social distance between the curious layman and the devoted ideologue – a buffer that evaporates online. As such, whom one interacts with online will matter in a particularly novel sense; rather than self-selecting into similar groupings, users are exposed to widely radical viewpoints. As widely noted, a very small percentage of people actually radicalize, but the environments that foster radicalization include a far greater number of community members than the radicals themselves. These communities facilitates the delivery of materials that might exacerbate the process (Borum, 2011; Vidino, 2009). Bowman-Grieve (2009) stresses that Stormfront (a web-forum devoted to white supremacy) is best viewed as a social place rather than as a website for hosting hate-materials.

The organized community collectively contributes to each other in a variety of ways. They contribute news stories that they deem pertinent to the cause, indicate politicians that they think are the best fit with the 'movement,' and set up local support groups for a variety of modes of community support. Participation in Stormfront provides access to news that reinforces participant narratives, feelings of civic engagement, and may lead to social connections that go offline. On many of these web-forums, overt violence is more insidious and not always immediately apparent. The ideas of conspiracy, supremacy, and revolution are frequently embedded in otherwise innocuous activities (e.g., what are good white dentists in the area?). Ducol (2012) found that the interconnectedness of the French 'Jihadisphere' community created a resilient network that survived individual forums being removed. This was due in large part by the blending of online and offline social networks. Committed users could begin as neophytes exploring topical themes or inquiries could embed themselves in real life, non-transient networks.

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2.2. **The violent radical milieu**

Conway (2012) proposed that online communities surrounding violent extremist ideologies fits into a category of 'violent radical milieu' originally characterised by Malthaner as a social space where violent radical ideas are generated, tested, and refined (p. 3). A violent radical milieu is distinguished from sympathizers by a degree of structure to their relationships above and beyond a shared philosophy or set of values. This can be observed in violent extremist forums that are not merely discussing ways in which to engage their foe, or ways in which their group is in plight. The group is cohesive in some way (Conway, 2012, p.5). Although Conway (2012) utilized the 'Jihadisphere' to illustrate the online parallels with the offline milieu, the concept is congruent with the Bowman-Grieve (2009) description of Stormfront, a social place that centred on white supremacy but with individuals embedded in a community that developed radical attitudes. Conway (2012) emphasizes that while the counter-point to the roles of online communities in violent extremism may be that of self-radicalization via the internet, without relation to the outside world, radicalization rarely happens, at the same time, people do not radicalize offline on their own either (p. 13). Rather, the internet serves as a functional extension of social place that can facilitate the narratives that do influence radicalization. Virtual communities can be catalysts for violent ideologies just by virtue of their accessibility (Jones, 1995). The role of the internet in radicalization and terrorism is how it enables connections between individuals that may be at risk for radicalization, but are buffered merely by social distance. An aggrieved feeling teenager is only a post away from finding others curious about the merits of jihad and the ideological support for doing so.

Two young United States citizens demonstrate the 'short-cut' the internet represents particularly well. In 2011 Zachary Chesser was arrested attempting to travel to Somalia in order to join Al-Shabaab (Brachman, 2010). Chesser had moved at a rapid pace from a high school senior (participating in social clubs, basketball, and dance groups) (Brachman, 2010) without any connection to Islam to being indicted for uttering threats and providing material support to al-Shabaab (Department of Justice, 2010). Chesser's initial contact with Islam was through a girlfriend, but he began to use online resources in order to help build an identity as 'Abu Tallah al-Amrikee.' He became well known on the web-forum IslamicAwakening.com for uttering threats and decrying the United States

foreign policy (Kohlmann, 2011). His prolific activity on IslamicAwakening.com helped foster connections with the leader of the violent radical group Revolution Muslim (Berger, 2011) which had glorified the Fort Hood shooting in 2009, and called for action on the United States government by Muslims across the country (Berger, 2011). Chesser subsequently began a youtube channel 'LearnTeachFightDie,' and a website 'mujhidblog.com.' Chesser was so prolific he was able to attract the attention of Anwar al-Awlaki, the driving force behind al Qaeda's propaganda and online presence (Conway, 2012). Al-Awlaki developed the online presence of the terrorist group to develop support and "inspire" acts of terror abroad by identifying individuals active on social-media platforms such as web-forums. Al-Awlaki noted Chesser's activities and engaged him in a variety of email correspondences (Berger, 2011; Brachman, 2010). Brachman (2010) coined the term *jihobbyist* to describe Chesser's activities – people who find an identity online living out the fantasies and perceived glory of mujahedeen abroad. Although Chesser never actually fulfilled his fantasies, others that have tapped into the violent radical online milieu have a more lasting impact. While living in the United States, Samir Khan, a Pakistani-American raised in Queens, New York, ran a BlogSpot called *InshallahShaheed* (literally, "martyr, God willing") and became known in the discussion forums as an advocate for fighting the United States on home-soil – posting bomb-making instructions and justifications for violence regularly online (Liberman, 2013). Kahn's online presence in debates (on forums such as IslamicAwakening.com) and in the extremist group Islamic Thinker's Society developed a keen ability to celebrate the death of United States soldiers and glorify al Qaeda. Kahn's publication of Jihad Recollections, a magazine glorifying jihadists, attracted noticeable praise from a variety of fundamentalist bloggers and the attention of Alwaki (Berger, 2011). Kahn was ultimately recruited to publish and edit *Inspire* the al Qaeda affiliated magazine before being killed in a drone strike with Alwaki (Goodman, 2011).

The primary focus of this study is the online community and social space in which Chesser and Kahn existed. The nexus of violent radical agents, influential individuals, and interested users are important to study because of the way terrorists are using the internet. Jihadi-training videos, al Qaeda's Inspire, or most recently ISIS' propaganda are disseminated at arm's length through forums not explicitly associated with the group.

2.3. **Violent radicals online**

There are a number of reasons terrorists and violent extremists use the internet, but chief among them are soliciting support (Conway, 2006). While creating narratives and recruiting, violent extremist groups can be more or less overt in their activities online depending on the level of surreptitiousness their activities require and the level of violence their group supports. Davies et al. (2015) noted that environmental groups would have more direct links on how to get involved (p. 110). More violent groups, however, made use of propaganda and general calls to action (Davies et al., p. 110). The most prevalent content on violent extremist web sites was information (Davies et al. 2015, p. 107), but the rhetoric generally seemed to be aimed at provoking a sense of anger or outrage in a particular subset of the audience. Further, this information emphasized their weakness in relation to the state. These two factors seem to be the general narrative for a call to action and support above and beyond fact-based information – narrative creation. Online reaction to claims such as these are an incredibly potent framing device which can be regurgitated and discussed in more stable web-forums. Recruitment for these more violent groups vet users more heavily by being active online – terrorist groups exploit youth's inquiry into identity and meaning online by targeting areas in which a community structure exists and has a history of comments and ideological statements (p. 108). The narratives produced by terrorist groups can largely influence the adolescent desire for identity. Holt et al. (2015) analyzed the willingness of college students to engage in cyber-terrorist attacks (including defacement of websites and attacking critical infrastructure) in the face of different attiduinal frameworks. With appropriate framing (and perceived cultural grivence) the willingness of college students to engage in attacks against government institutions increased drastically (Holt et al., 2015, p. 133). While these results used primed narratives for who the students were attacking, it serves to illustrate the implications of a compelling narrative justifying violence.

Although terrorist groups may produce narratives of themselves online, it is the extant community that interprets them and disseminates them through discussion. The mechanisms for how these discussions unfold into narratives are somewhat underdeveloped. Previous research, however, gives rise to certain expectations of how online communities generally organize themselves. Education literature provides insight

into the effect on group-formation and dissemination based on the involvement of leadership roles. Aviv et al. (2003) studied distance education and found that those in leadership roles (e.g., a teaching assistant) who introduced relevant material increased cohesive cliques and wider discussion across all students in the test group. Better engagement of themes occurred in the test groups than those that were given access to the material without the material being introduced by central figures in the discussion. While these findings were very clearly focused on how student learning could be improved, the conclusion that specific users promoting material from within the discussions increased the success of the discussions is relevant- particularly with the emergence of cohesive groups. In anonymous and pseudo-anonymous forums perceived group attitudes have an increased effect on the adoption by the rest of the group *where a salient group identity exists* (Postmes et al., 2001; Spears et al., 2001). It then follows that users who can move the group towards group saliency hold a unique potency in the context of extremist dialouges. Empirical support exists that an effect between these contributors and influence over their peers is strengthened with increased participation, that those firm and frequent contributers have an increased influence over their peers (Watts & Dodds, 2007).

2.4. **Opinion leaders**

This study examines online communities in order to determine the impact of terrorist events – it stands to reason that individuals who have exceptional influence on those communities are well-positioned to influence the impact of terrorist events on the community. By identifying opinion leaders among forum users, the presence or absence of those users can be used to determine influence on the success of discussion of extremist material. Opinion leadership is the quality of an individual who influences the opinions, attitudes, beliefs, motivations, and behaviours of others (Valente and Pumpuang, 2007). Opinion leadership exists in the context of how our social world tends to move towards homogeneity. Individuals within a social network are more likely to be connected the more similar they are – age, ethnicity, income, and political attitudes affect seemingly endless types of ties (marriage, friendship, etc.) (McPherson, Smith-Lovin, and Cook, 2001). So strong is this fact, that access to social resources is truncated by the fact

that most resources you might be able to draw on are the same resources your close acquaintances would draw on, limiting your ability to reach other more resources through your peers. Granovetter's (1973) seminal work on the strength of weak ties is predicated on this premise, that being a close acquaintance with someone increase the likelihood that you know all their close acquaintances as well. Social resources, then, such as employment opportunities or particular skill sets (e.g., trade skills) within the network are already known. If some component of social capital is not known to the individual in question, it likely is not in any of their close acquaintances either (due to the overlap between their respective networks). The strength of weak-ties (those less well known to the individual) is that they have their own unique set of close acquaintances with their own social capital to be drawn on (Granovetter, 1973). Opinion leaders exist in this framework as someone who people look to for their novel access to social resources, their capacity to articulate it and market that resource, and move the network towards homogeneity.

Opinion leadership literature has been developed by researchers in multiple fields, but maintains a large fidelity to the original two-step flow of communication framework originally introduced by Lazarsfeld, Berelson, and Gaudet (1944). This theory posits that people tend to derive their opinions on subjects they are less familiar with (or in tune with) through social network contacts who present themselves as more competent or in tune with the content in question. More recent refinements found that this is not an absolute relationship. An individual may hear about something from media, but attach with it more importance when an influential person in their network comments on the issue or topic (Weimann, 1991, p. 270). Valente and Pumpuang (2007) tested the efficacy of using opinion leaders within communities. By using peer nominated leaders in the community, the reach of new training material and best practices was optimized – even though the individuals had *access* to these materials, the likelihood of it 'sticking' was increased by the influence of an opinion leader in the network. Rogers (2010) explained this process of diffusion through influential peer networks as similar to a logistic curve of an infectious disease. People who are close to the source of an innovation (or monitor the developments of the field) adopt it first, people connected to them in turn have access to it more quickly. The people in our social life that we look to before adopting these innovations, or dissuade us from adopting them are opinion leaders. These important relations can shape our viewpoints both negatively and positively.

Nash, Bouchard, and Malm (2013) demonstrated the potential negatives of modeling behaviours on opinion leaders with their analysis of the ERON mortgage fraud in British Columbia. In the case of the ERON mortgage fraud, certain agents in the network brought individuals into the fraud, who then recruited (not knowing it was a fraud) through their social network. Those opinion leaders facilitated the contagion and perpetuation of a fraud by being victimized themselves. The application of the diffusion framework applied to willing or active participants (e.g. political viewpoints) by Nash, Bouchard, and Malm (2013) to a more "viral" framework (*i.e.* one host spreads the infection through their network) is incredibly powerful in the context of extremism online. Similar to the ERON mortgage frauds described by Nash, Bouchard, and Malm (2013) users may believe they are delineating useful events or information, but are in many instances expounding carefully crafted propaganda pieces. Lyengar, den Bulte, and Valente (2011) have noted this pattern in contagion in popular products, but not with active deleterious effects to the individual.

Offline and online opinion leadership follow similar patterns. For instance, a valid expression of value (to the opinion followers), perceived professional competence, and strategic position in the social network all characterized opinion leaders in the original postulation of the concept (Katz and Lazarsfeld, 1957) and has been validated again in recent years online (Lyons and Henderson, 2005; Gnambs and Batinic, 2011). Opinion leaders online, however, have a greater emphasis on their involvement in the network – Lyons and Henderson (2005) found that influential users in online networks were online for longer, more frequently, and had much more exploratory behaviour. While perceived competence or knowledge has consistently been a prerequisite for leadership, in the Lyons and Henderson (2005) study, it was found that self-perceived knowledge was a better predictor. In a generation of indexed information, the interest and capacity to search for the right information to win an argument is likely an important factor. In many ways being an opinion leader online is more fluid and more antagonistic than being one offline. Being involved in broader networks, being engaged in conversations assertively, frequent engagement, and linguistic diversity are some of the strongest predictors of opinion leadership online (Huffaker, p. 608).

There are some places where the departure from online and offline opinion leadership characteristics is clearer. The nature of social networks online is worth considering – in social media such as Facebook or LinkedIn, there are very clear parallels between online and offline networks – brokered access, etc. On web-forums, however, users can access any other user's reply. Networks are frequently not who you know, but who you are talking to in that thread, in that moment. A user's social capital is diluted because one user does not always broker access to another. This is what likely drives frequency of interaction and aggression being so important in online opinion leadership (Huffaker, 2010, p. 608). Opinion leaders in web-forums create content, answer questions, and shape the conversations around them. In assessment, social network analysis terms become extraordinarily useful in quantifying the relationship of a user with their network. In web-forums, it is useful to contextualize opinion leadership as Huffaker (2010) suggested, in their centrality and importance to the structure of the network rather than terms of brokerage (p. 594). What level of attention they receive and the impact they have on their content in a very real way indicates users influence and/or control over content. Even those who are disagreed with, people come to reply to, providing continued attention to a specific topic.

The power of recruiting appropriate opinion leaders online is underscored by the psycho-social factors that exist among user online. In an environment where youth are already driven towards 'high-status behaviours" (Brechwalk and Prinstein, 2011, p. 4), social norms pressuring individuals to conform to the established ethos of the group are considerable. Being able to influence the opinions of individuals already seeking status is generally a strong position to be in, but considering the nature of content being disseminated on violent extremist websites, changing a youth's disposition towards a topic is more profound. Whether or not an event is interpreted as an affront against terrorist militants or an affront against all of Islam is an interpretation that is instrumental in escalation into violence (Goodwin, 2006). Group-level consensus can not only be very persuasive, but can solidify emerging identity salience among participant members (Ren et al., 2012).

2.5. Internet and Groups

Integral to the process of Borum's model of radicalization is the concept of relative deprivation, predominantly focused on economic hardship (Borum, 2003). In this model, where identity issues become entwined with a perceived global slight (Sageman, 2008) the implications for ISIS as a focal point are tremendous – not only do they heavily market themselves as global crusaders, but they actively recruit. The internet's tendency to blend social realms of life makes this a more advanced problem than those "jihobbyists" who have a passing fancy with jihad (Brachman, 2010). The previous discussion of a social place as described by Conway (2012) and Bowman-Grieve (2009) is not best characterized as a place where existing groups meet. Ducol (2015) describes the internet as bidirectional and mobilizing in nature – groups you meet offline may encourage you to explore online, and those you meet offline may encourage you to explore online. Using Situational Action Theory as a framework, Ducol (2015) posits that the danger of radicalization exists in the access to cognitive markets – venues of repeated exposure to extremist material. Ducol (2015) describes an individual's social experience as a plurality of "spheres" in which we are exposed to materials, ideologies, and concepts. The more frequently one activates those spheres through participation, the more primary they become to one's life. The hate-site Stormfront provides not only an ideological purpose for attendance, but a network of friendship and organized activities, and more avenues for visitation (or "reactivating" the sphere of activity) (Bowman-Grieve, 2010). The danger therein is the displacement of pro-social spheres that provide alternative narratives to the hate of violent extremist web-forums.

Thornberry and Krohn (2001) provide a framework for describing delinquency useful in categorizing the risks inherent to filling one's life with negative or undesirable individuals. Thornberry and Krohn (2001) posit an individual's risk as a balance of anti-social bonds and the opportunities they present. Conversely, having more pro-social friends – those not engaging in criminal activities or espousing delinquent statuses provide more opportunities to create social space between an individual and delinquency, inhibiting the amount of opportunities they are presented with. Thus, in this framework, blending an individual's general patterns of socialization with hateful ideologues would greatly exacerbate risk of radicalization.

The danger of the intersection between the curious and the converted is a slow development - Borum's (2011) model of radicalization is a pathway whereby individuals are socialized into the support of perpetrating terrorism. Exacerbating the risks of this intersection is the growing capacity of extremist groups to exploit the design of the Web 2.0 (Davies et al., 2015). As this paper focuses specifically on ISIS as representative of this new wave of inspired terrorism, it is useful to describe exactly where ISIS originated and how the organization came to be in the position it is today.

2.6. **Islamic State of Iraq and Syria**

Although a large number of extremist organizations have exploited the interconnectivity the Web 2.0 has to offer, the most recent and successful is ISIS. ISIS' uses for the internet are somewhat more ambitious than the general uses Conway (2012) has postulated terrorists use the internet for. Above and beyond seeking participants for jihad abroad, or soliciting funds, ISIS actively recruits and encourages emigration to the 'Islamic State' (Berger, 2015). Their active presence in social media has been strategic in depicting a glamourous purpose for the disenfranchised and identity deprived (Picart, 2015). The propaganda seems to be paying dividends with an increasing amount of foreign fighters traveling to the conflict in Syria through 2014 (Barette, 2014) and 2015 (Barnard, Gordon, and Schmitt, 2015). For their immense digital presence and branding efforts, discussion of ISIS is somewhat ubiquitous on Sunni Islamic forums that tolerate discussion of their exploits. For this, their lifecycle is useful in providing insight into the waxing (or waning) of their support.

ISIS is generally held to be an evolution of the Jordanian militant group Jama'at al-Tawhid wal-Jihad (JTJ). Al-Zarqwai's Al Qeada (AQ) militants were responsible for a slew of suicide bombings in the early 2003 Iraq invasion, before becoming known as Al Qaeda's affiliate in Iraq (AQI) (Zelin, 2014, p. 2). It was in open communication between al-Zarqawi and al-Zawahiri that the plan to announce the Caliphate was discussed as early as 2005 (Fishman, 2011), based out of Iraq and expanding to the adjacent territories. The following year, in an effort to develop this goal, AQI recruited smaller groups and sympathetic tribal groups to form the Mujahedeen Shura Council (MSC) in an effort to begin distancing themselves from particularly unpopular (with Iraqi Sunnis) AQ bombings (Fishman, 2011,

p. 4). AQI declared itself as the Islamic State in Iraq (ISI) and began to adorn itself with trappings of legitimacy, even announcing Abu Omar al-Baghdadi as its emir (Zelin, 2014, p.5; New York Times, 2010). In 2007, the leadership of ISI was severely depleted through the reinforcement of Iraq by United States military personnel, eliminating key strategic holdings that allowed it to operate in Al Anbar, Iraq with relative impunity. Throughout 2007 and 2008 ISI was forced closer to border regions, ultimately being forced into increasingly inhospitable locations such as Mosul - with less local Sunni support. In 2010 several top leaders of ISI were purportedly killed in a joint-airstrike – including Baghdadi (New York Times, 2010). Abu Bakr al-Baghdadi was instated as the new leader and took immediate action towards repopulating the leadership of ISI depleted by Iraqi and United States military operations. Al-Baghdadi began the renaissance of ISI with the beginning of the Syrian revolution.

ISI began sending membership into Syria to establish Jabhat al-Bursa li Ahl as-Sham (JaN) – led by al-Julani (Quiliam Foundation, 2014). The involvement in Syria would become a watershed development for ISI as it gave the group the opportunity to develop a (weak) theological claim to legitimacy by moving to seize Dabiq (mentioned in a hadith to be involved in the end times). Much more importantly, its involvement in Syria would provide the fantastical narrative that Sageman (2008) describes as so influential on identity-starved youth. The parallels to the AQ strategies were clear, but the level of sophistication were much greater – early strategic victories in Syria gave ISIS a substantial influx of capital to invest in production and dissemination (Barrett, 2014). Use of twitter allowed for distribution of messages including calls for spiritual emigration to the conflict in Syria – and instructions on how to avoid notice (al-Shishani, 2014). In 2013 ISI formed two media wings attempting to elicit support from neighbouring countries – producing audio and visual content above and beyond the DVDs, pamphlets, and web-blog posting that it had commenced shortly after its inception to develop its romanticized narrative of conflict (Bilger, 2014, p. 15). Al-Hayat Media Centre followed, targeting developed western countries with propaganda that compared the emerging conflict zones as "Call of Duty"-esque adventures (Barrett, 2014). Since mid-2013, the ISIS has emphasized and accelerated the Al Qaeda style propaganda campaign. ISIS advanced a magazine (Dabiq), a smart-phone application, and furthered its already burgeoning twitter presence

– similar to Al Qaeda, rather than recruiting directly ISIS is making a concerted effort to shape youth's worldviews (Brachman, in Davies et al, 2015, p. 107).

Although the formation of JaN was disputed by the two terrorist groups, al-Baghdadi announced their merger under the banner of the Islamic State of Iraq and Al-Sham (ISIL). In 2013 ISIL departed severely from the AQ network, rejecting the rulings of Al-Zawahiri regarding the new tensions between JaN and ISIL (Al Jazeera, 2013), culminating in AQ denouncing ISIL and announcing conflict between the groups (Washington Post, 2014). Subsequently ISIL announced it was declaring Caliphate and itself as the Islamic State (IS). As the conflict in Syria intensified and the scope of IS territory expanded, the UN reported on a variety of war-crimes that were being committed in Syria to both local Syrians, opposition forces, and occupied territories (Guardian, 2014). Despite the obvious peril the radicalized were facing in the conflict, and IS holding a more precarious grasp on legitimacy as 'Islamic,' the number of Western youth involved continued to increase through incredibly successful marketing and narrative building. ISIS' effort to brand themselves online has yielded substantial dividends. Governments, likewise have made efforts to engage these discussions of material pertinent to the ISIS narrative. These counter-narrative strategies seek to identify various integral components in the narrative provided by violent extremists, anticipate responses by the intended audience, and shape and/or neutralize the anticipated response by exploiting vulnerabilities or gaps in the official narrative (Casebeer, 2005). One of the difficulties faced in implementation of these strategies is determining the appropriate vector of delivery. One of the most underdeveloped components of counter-narrative strategies is appropriate development of data gathering and analysis (Briggs and Feve, 2013, p. 9). The present analysis will help develop techniques and instruments useful in furbishing these strategies by covering data from September 30th, 2013 through September 18th, 2014.

2.7. Aims of the study

Research on violent extremism online indicates that followers of extremist groups at times organize into communities. While some extremist groups independently finance and elicit support (Davies et al', 2015), others use these online communities. Violent

extremist groups can utilize these groups for material support (Davies et al., 2015), for 'branding' (Conway, 2012), or for eliciting philosophical support (Bowman-grieve, 2009; Conway, 2012, Ducol, 2012). These sympathetic communities, however, exist independently of the terrorist groups they support (Ducol, 2012). This provides us the opportunity to assess how extremist material makes it way from its source into the public – and what the reactions are. We aim to do so by capitalizing on the advantages the internet affords researchers: post-content, longitudinally oriented, and coded interactions of individuals. Our research question is in what ways do opinion leaders facilitate the affect of ISIS media events on online discussion of ISIS. The following chapter consists of the analytic strategy undertaken order to exploit the advantages the medium provides – the sample, variables, modes of analyses, are detailed therein.

Chapter 3.   Data and Methods

3.1. Sample

Data were collected from an online forum selected for its highly active user base, extremist content, English content, and history of violent extremist users. Islamicwakening.com is a web forum that mixes both pedestrian topics related to Islamic life (e.g. how to learn Arabic, literature discussions, hadith interpretations) and more pointedly controversial topics (i.e. America's purported role in destroying the Middle East, the global oppression of Muslims, e.g.). At least two known terrorist offenders previously discussed have been active on the site since its inception in 2004. Samir Kahn and Zachary Chesser were frequent commentators on the forum (Berger, 2011). These two users alone make the site a noteworthy intersection of social communication amongst a broad Muslim community and violent extremist material. The web-forum is co-owned by Abuz Zubair, a predominant conservative fundamentalist Imam in the United Kingdom (not to be confused with the deceased AQ operative Abu Zubair). An advocate against homosexuality in society and evolution being taught, and a vocal supporter of implementing Sharia in England, he promotes the web-forum as a place for ideological discussion and development. Candidate threads for analysis were selected that allowed us to follow ISIS' progression – threads that had topics pertinent to ISIS were sought out. As most web-forums are, IslamicAwakening.com is a large set of topically themed sub-forums. These range in topics from discussions of hadiths, to gender focused issues (e.g., "sister's only"), or news. A specific focus was paid to the subforum "Global Affairs" – an area specifically devoted to news media events concerning Muslims around the world. This subforum contained three of four threads utilized in analysis. The fourth ("ISIS: khawarij or not") was collected from the Hadiths and theological discussion subforum. Table 1 presents the threads ultimately selected for analysis, and the descriptive statistics of each thread.

The most popular thread in Global Affairs was a discussion of the Syrian revolution and ISIS titled 'Syria 4.0.' The thread ran from September 30th, 2013 until June 10th, 2014 when it was closed by the administration of the site for rule violations (glorifying Jihad); the thread ended with 4609 posts and 161 users. The thread encapsulates a specific

theme of discussion but a wide form of media and diverse topics (mujahedeen, hadiths, western involvement, etc.) indicating a disparate conversation with contention and competing opinions. The second thread analyzed is a more specific analysis of ISIS' military activity, "ISIS seizes Mosul." This thread was selected due to a large overlap of users who also participated in "Syria 4.0" (52%). The thread began June 10th, the same day "Syria 4.0" was closed by moderators. "Isis seizes Mosul"[1] was closed on June 19th for rule violations; the threaded ended with 319 posts and 58 users. The third thread analyzed, "ISIS: khawaarij or not," similarly had a large portion of users participating in "Syria 4.0" (42%) but was focused on the philosophical debate about whether or not ISIS members were true Muslims. This thread ran from June 15th to August 5th with 616 posts and 78 users in that period. Finally, "VICE: The spread of the caliphate"[2] was, at the time of data collection, the second largest thread in the sub-forum with 802 posts and 102 users. Data were collected from this thread from August 8th to September 18th.

The posting behaviour of these threads made analyzing each individual post complicated. On some days, these threads had no posts, whereas on other days, they had hundreds of posts. Events external to the forum, site maintenance or downtime, a national holiday, or any other number of reasons could impact a single day's posts. Given that some variables (discussed below) are networked based, an insufficient sample size for a time point could give extremely skewed results. Thus, the unit of analysis for the time series selected was a week interval. Posts per week reduced the stochastic variation implicit in forums and were a better fit in analyzing longitudinal trends.

3.2. **Coding**

Analyzing forum interactions as a network requires that participation in the thread be coded into a matrix of relations. Connections between users through posting and replying within a thread are the relations of interest. There are four ways in which we could observe an explicit link between two users and coded as such in the network. These

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[1] This thread had insufficient lifespan to be used in all modes of analysis, and so is only included in analyses explicitly stating its inclusion

[2] The timing of the events in this thread had an insufficient baseline period to be used in all modes of analysis, and so is only included in analyses explicitly stating its inclusion

possibilities are demonstrated in figure 1. First, if a user directly cited another user using the forums citation function ("reply button"), the cited user would receive a tie from the new poster. Second, if a user referenced another by username or nickname in a post, the referenced user would likewise receive a tie. Third, if a user referred to the content of another user specifically (beyond a general thematic trend of conversation), or referenced the sequence of posting so as to indicate to whom the response was intended, the author of the referenced content would receive a tie. Fourth, if no user was referenced or cited in a post the tie would be assigned to a category labeled 'OP' – 'original poster'. This coding scheme means that a single post could generate links to multiple other forum participants. Multiple citations from one user to another were not recorded - frequency of replies between two users were not recorded at this stage. This coding decision (in lieu of assigning a stronger value) was to avoid grossly inflate values as users frequently engage content point by point when refuting an argument. The 'OP' category provides a proxy for non-directed inter-user chatter – questions posed for the whole thread, general sentiments, and discussion points. All posts in the thread were extracted from the forum using the Terrorism and Extremism Network Extractor (TENE) developed in capturing and analyzing violent extremist material online (Bouchard, Joffres, & Frank, 2014). The TENE software data was then used to generate the networks depicted in Figures 4 and 5. "Syria 4.0" was comprised of 26244 ties that resulted in its network. The graph had an indegree centralization of 0.737 and a density of 0.057. The very high in-degree centralization indicates that a large amount of attention is being directed towards individual nodes in the graph. The network's low density score is driven by the large amount of activity in the highlighted "fringe activity" region, while at the "primary discussion" area is highly connected and very dense. "ISIS: khawaarij or not" was substantially smaller in size, with 6084 ties comprising the network. The network had a density of 0.056 and an in-degree centralization of 0.754. Both of these values are similar to the network of "Syria 4.0," supportive of the comparability of the two networks in subsequent analyses.

Re: All FSA joining Islamist brigades in Raqqah .

[____] said: ↑ ←——————————————————— User name indicates
original poster
You can start another thread insha'Allah.

</br>Can you change the name of this thread.

[____] said: ↑

Keep it legal guys.

</br>Inshallah

Re: Syria Thread 4.0 - READ THE RULES BEFORE POSTING! If it even resembles A4, better off not postin

No user name, but
verbatim quote is
present

thats pretty funny because its the so called secular FSA who is battling down the south, places like daaraya hama homs trying to defend lives, break seiges and property whereas the holy fighters of ISIS are busy digging trenches in raqqah and skirmishing with the kurds.

This isnt true. The kurds are attacked the islamist groups first. the PYD and other kurdish groups are all socialist/communist. Read the stuff on their websites and read what their supporters say about shariah and islam. they totally and completely hate it and this is why they are fighting.

Because of the entrenchment of nationalism in the arabs (Yes even amongst their scholars) im hoping Dawlah build a seperate Kurdish emirate so that the kurds dont look at them as yet another Arab nationalist movement in the guise of Islam.

Text is not verbatim, but refers to
specific points of another user

Also ISIS had a operation in the south where they committed over 1000 fighters only a while ago.

Shariah is fard. Yes of course groups can completely mis implement it. but in Iraq ISIS had Hanafi/Shafi Judges in some of their shari'i courts.

im not saying ISIS are perfect. some of their members have gone into excesses and this has reflected badly on all of them. But it pales into insignificance compared to the pre-planned coordinated attack on ISIS lead by the secularist nationalists in the FSA who we know are totally against ISlam being implemented

Figure 1.   Modes of citations

3.3. **Dependent Variables**

This thesis aims to explore both which events in ISIS' timeline are most impactful and what facilitates their success in drawing discussion online. Our research question is: in what ways do opinion leaders facilitate the manner in which events (news worthy terrorist events and internal forum events) affect the way web-forum users discuss violent extremist material? Further, what is the role of particular individuals in the success of those discussions? To answer this question we used two primary outcome variables: 1) sentiment score and 2) clustering coefficient.

3.3.1. **Sentiment Score**

Sentiment score is a measure that quantifies the emotionality and positivity/negativity of content. This measure allows us to address what events precipitate changes in the content and perceptions of users. The sentiment analysis producing the score aims to automatically extract the emotions or attitude of a text, or narrative, and assign a value that ranges from the "negative" to the "positive" (Kennedy, 2012). For this project we use the SentiStrength software, which uses a "lexical approach" derived from human coded data sets. (Thelwall & Buckley, 2013). The program is suited for studying an online context, specifically for forum data and short informal texts (Thelwall & Buckley, 2013). SentiStrength analyzes a text by attributing polarity values of either positive or negative to words within the text, these values can be influenced by a multitude of factors within the text including, "booster words" that can increase the perceived sentiment score of a particular term, as well as negating words and punctuation that can have similar effects on the sentiment of analyzed text.

One of the features of SentiStrength is its ability to analyze the sentiment around any given keyword. A possible example is the phrase "I hate trees and love money" which can be analyzed for the sentiment around trees (producing a negative sentiment value) as well as money (producing a positive sentiment value). After setting a specific range of words to analyze, for example the five words before and after the word money,

Sentistrength references its sentiment dictionary, applies values to the range specified, and then produces a total sentiment score for any given text.

One issue with Sentistrength is its specificity. It is necessary to include each form of a particular word being analyzed, otherwise, many forms of a particular word will be excluded. For example, in isolation, the word "shoot" would exclude derivatives such as "shoots", "shooting", "shootings" and "shot". After the list of keywords is generated and applied to the software, it iterates through each, and generates combined sentiment values for every permutation. At the end, each text is linked to multiple sentiment values - one for each keyword and its variants. Those multiple values are then averaged to produce a single sentiment score for any given piece of text. A negative value implies negative overall sentiment, while a positive value implies a positive discussion surrounding the targeted keywords.

3.3.2. Clustering coefficient

Clustering coefficient is a measure of how connected an individual is to those near them. Originally proposed by Watts and Strogatz (1998), clustering coefficient was developed to identify the variable density in a network. This is particularly useful finding out how greatly certain parts of networks adhere together. In the context of web-forums this means how well connected a user is to others in the same immediate conversation. While sentiment scores helps identify the 'what' of user interactions, clustering coefficient answers the 'how.' Clustering coefficient was selected to capture how much individual users belonged to a micro-community of other forum users who replied to each other's posts. It measures the propensity for users to be embedded in a cluster of other participants who are aware of each other. The clustering coefficient captures what each user's connection pattern is to his/her immediately proximate nodes (or the node's community). The larger the clustering coefficient, the more individual users have a tendency to form these small cohesive groups, or cliques, within the larger network of thread participants.

An alternative measure would be to use density, a ratio of how many users are connected to one another and how many users they could connected to. Although density

is more widely used in network studies, within the context of the current study the measure does not adequately represent how real time conversations form between users. Nor can it adequately predict how many users are forming cliques or small groups of discussion, and how diverse those conversations are. Clustering co-efficient is an important metric as it attends to the question of "how users are engaging one another in a thread," as opposed to a measure such as density that provides a ratio illustrating "how connected users are to all other users." In other words, clustering coefficient allows for a more concise answer to the question of how users are engaging content in the thread. The tendency of individuals to connect to their local peers has been used previously in studies of social media. Mislove et al. (2007) previously used this measure to indicate how localized users of various social media websites were, and it fills a similar role in the present study. The coefficient of this variable exists on a range from 0 to 1, the closer to 1 the coefficient is, the more a user is 'perfectly connected' to his or her neighbours.

3.4. **Independent variables**

3.4.1. **Opinion Leadership**

Social network analysis (SNA) is uniquely positioned to describe in quantitative terms an individual's interactions with their peers. Historically, studies that have described opinion leaders have relied on concepts of perceived knowledge and social capital (Lyengar, Van den Bulte, and Valente, 2011). The application of these concepts to web-forums are problematic for two reasons. First, access to knowledge is not limited to those with expertise in subject areas. The rise of indexed search engines has given end-users the ability to generate source material on a very large array of materials. Second, social capital still exists, but the concepts of brokerage are somewhat diluted – engaging participants in conversation is much easier when citing them directly. Kohlman (2011) notes, opinion leaders online are characterised by their ability to articulate and defend their positions the most eloquently and are still the best received individuals. This results in their peers more broadly organizing around them due to the wider social access they enjoy. More users thus are connected back to the opinion leader (what is referred to as centrality in SNA). However, using a raw value of centrality does not delineate the content

the user provides from their personal characteristics. In one time point if a user provides a very well received time point they could be very central due to that one point alone – their subsequent activity could be largely ignored. The present study intends to expound on the concept of centrality and propose a metric of opinion leadership that assess a user's success in garnering attention across all activity while still grounded in empirical characteristics such as popularity and volume of content. At the same time, the study is in keeping with Valente and Davis (1999) revised criteria for opinion leaders, notably the capacities to establish or reinforce norms and raise awareness. To do so, the opinion leadership metric herein uses a ratio of two social network analysis metrics relating to centrality. In-degree centrality is the measure indicative of how many connections lead towards a specific point (Freeman, 1978). For a node, an individual, this indicates how many ties they have been 'sent' towards them – or rather, how popular they are (Wasserman and Faust, 1994). Out-degree centrality, conversely, is a measure indicative of how many connections to others a node is providing (Freeman, 1978). In the present study, how much output they have in terms of posts. The proposed ratio divides the in-degree centrality of a user by their out-degree centrality, giving an effectiveness metric: how much attention do they get per post. This ratio preserves the tendency of opinions leaders to be central to activity, while also assessing how *responsive* other users were. Representing how many posts each user requires to elicit replies operationalizes the concept of influence and attention proposed by Valente and Davis (1999). However, in some instances users could have a very high score while contributing very little (two posts and two replies would be an exceptionally high score with very little contribution to a thread 4000+ post thread). In order to address this, a minimum contribution of greater than the mean for each thread was used. Opinion leadership was determined from the aggregate data at the end of each thread (all weeks together). The distribution of these opinion leaders are depicted in Figure 2. The target was 12% of thread participants, a guideline derived from Rogers' (2010) findings on early adopters – that the most influential segment of the population was housed in a category of early adopters which was estimated to be around 12% of the total population. Figure 2 contains 17 opinion leaders, highlighted in the upper right portion of the graph. In this conceptualization of opinion leaders, the most influential are those nearest the upper right corner of the graph at the maximum of both x and y axes. Those users are able to maintain relevance and interest among those reading their posts, while still contributing a significant amount to the thread. The range of posts

among these users was 30 through 245, with a mean of 95.6. The range of opinion leadership score (how many replies per post were received) was .76 through 1.31 with a mean of 0.97.

3.4.2.　Network composition

Network composition (the amount of opinion leaders in a time point) is used to assess important events to the network as a whole. Network composition is the ratio of users who are opinion leaders as opposed to all other forum participants. This variable provides an indicator of how many contributors are in a given period. The network composition variable is used in subsequent analyses to test the effect of opinion leaders on their network. Rather than using raw values of opinion leaders, using the measure as a proportion eliminates any conflation with measures such as the size of network. Further, using the network proportion measures tests the effect of a larger or smaller cohort of active participants while controlling for the population of whence they were drawn.
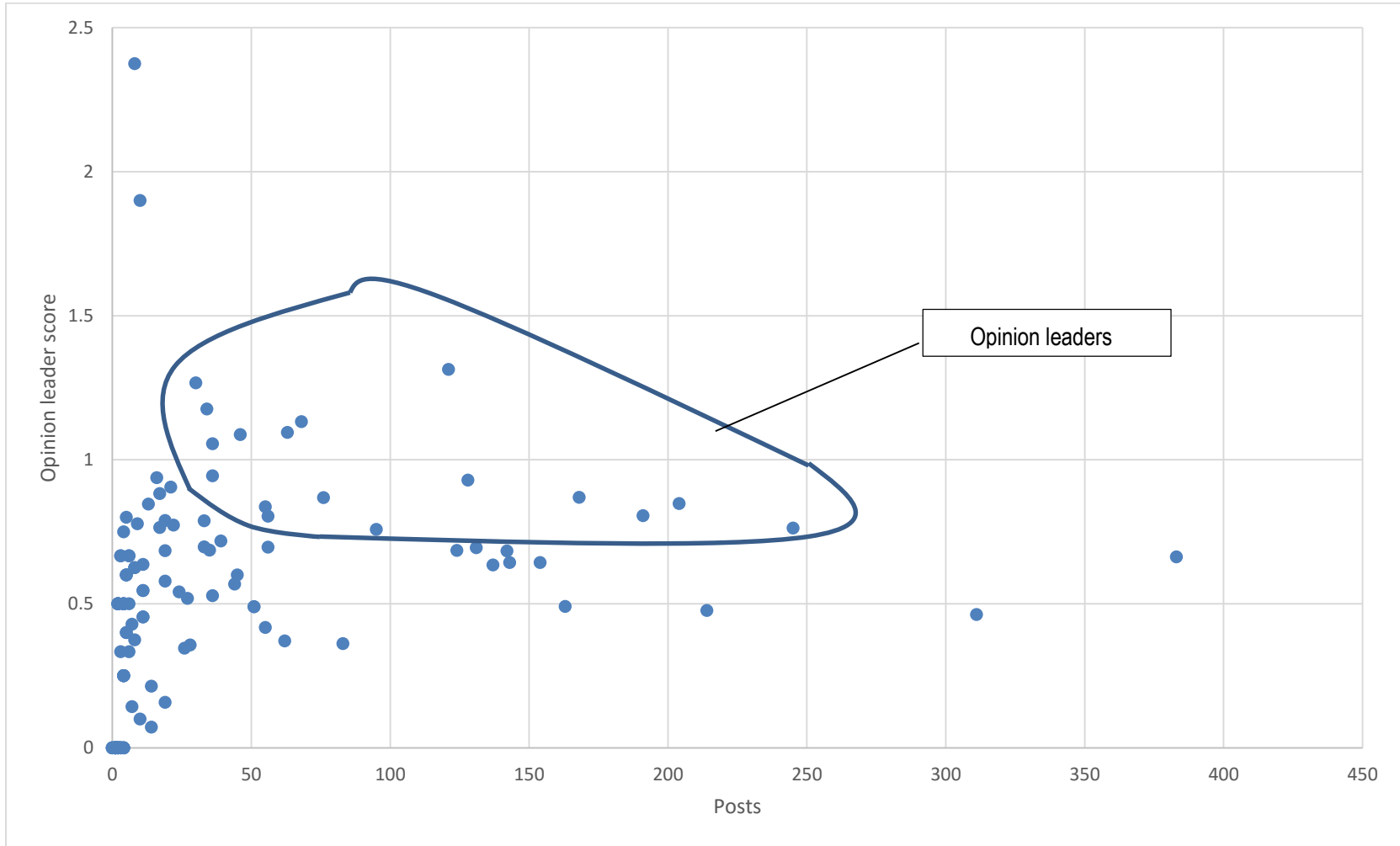
Figure 2.   **Opinion leader score by posts**
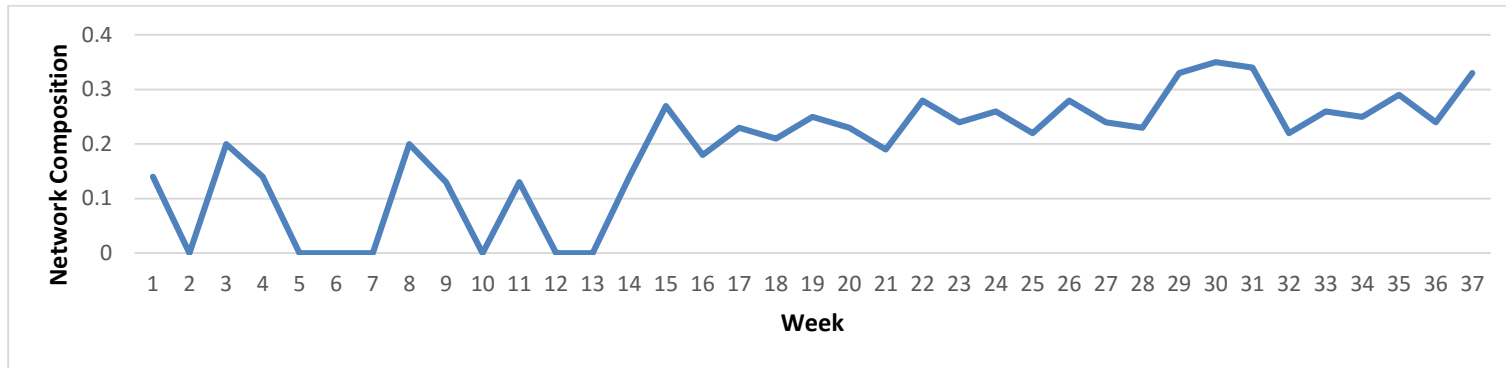
Figure 3. Network composition of opinion leaders across "Syria 4.0"'s lifespan

Table 1. Thread descriptive statistics

Thread	Users	Posts	Date range
Syria 4.0	161	4609	Sept. 30 – June 10th
ISIS seizes Mosul	58	319	June 10th – June 19th
ISIS: khawaarij or not	78	616	June 5th – Aug. 5th
VICE: the spread of the caliphate	102	802*	Aug. 8th - Sept. 18th *

Note. * thread was ongoing at time of data collection

Table 2.   Opinion leader characteristics

	Opinion leaders	Non-opinion leaders
N	46	399
Average posts	93.7	37
Average in-degree centrality	90	12
Average threads participated	2.17	1
Average sentiment score	-5.69	-19.3

3.4.3. Events

A series of external (offline) events and internal (thread oriented) events (Table 3) are used to select particular points in time that might affect the outcome measures. Two types of events are used to test changes in the outcome variables. Exogenous events were those that happened offline and independent of the activity in the forum. These events were initially selected independent of forum data collection. The events were selected from a robust qualitative analysis of news media reports regarding ISIS from September 2013 through August 2014. Two types of events were considered for inclusion: those that reinforced ISIS' objectives (or narrative) and those that were deleterious to them. Drawing on the history of ISIS' development, events were selected that related to operations in Iraq, related to ISIS' relations to Al Qaeda, and to ISIS' branded image. These events were the:

1. Iraqi military operations in November 2013 (positive),
2. The denouncement of ISIS by AQ in February 2014 (negative)
3. The beginning of the crucifixions of Syrians in May 2014 (negative)
4. Kurdish Peshmerga repelling ISIS in Kobani June 2014 (positive or negative)
5. United States beginning coalition airstrikes on ISIS August (positive).

Note, that military operations were selected as positive as it reinforces the narrative ISIS has perpetuated online of "holy Jihad." The dates for these events were selected based on the earliest reported occurrences by papers of record.

Endogenous events were selected post-data collection from the threads themselves. By analyzing demographic shifts and notable disruptions in the thread, events were selected that were representative of changes in the forum itself. Two events are tested subsequently. The first was selected by evaluating the trend of the *network composition* variable across each thread. In the primary discussion thread (the longest running and most populated) "Syria 4.0" a clear change occurred in week 15. The spike upwards followed by sustained elevation in week 15 is the first endogenous event. The second presented itself in qualitative analysis of content in "Syria 4.0." A Twitter personality had been requoted a variety of times in the thread itself, eventually taking notice and joining the conversation in the thread. The largely positive and interested

reaction to his arrival and continued presence was so notable it was included here as an endogenous change in the thread. In the subsequent threads no clear endogenous events were notable.

3.5. **Analytic Strategy**

3.5.1. **Interrupted Time Series**

To describe the change in our sample, interrupted time series (or segmented regression) will be used to evaluate the baseline of the thread and detect significant changes in the mean level and rate of change in clustering coefficient and sentiment score. Interrupted time series is used to calculate two regression lines – one for the baseline period and one for the period post intervention. Although more widely used in controlled laboratory settings, segmented regression still has a long track-record in public policy research. Control of the environment is not as complete but can be mitigated through more intensive evaluation across more time points and use of control groups (Biglan, Ary, & Wagenaar, 2000, p. 33). Even so, with post-hoc data, controls created with the intention of evaluation is not always feasible. Given a particularly strong theoretical justification that the intervention is having a causal effect, powerful conclusions can still be generated. For example, Bernal et al. (2013) used a segmented regression to analyze the impact that the 2008 financial crisis had on Spain's national suicide rate. Finding a large and immediate deviation (8% rise) subsequent to the financial crisis, the authors found significant evidence of a causal relationship (Bernal et al., 2013). In the present study such theoretical justifications are used so as to link events to the dependent variables.

Segmented regression's requirements, like all modelling techniques, are context specific. The level of specificity one requires in analysis, the scale of analysis, and the scope of probable alternatives are all determinant of both the model's specifications and the conclusions that are justifiable. In the realm of public health, causal relationships seem more easily derived and interventions much more clear. In evaluating extremely rare events, segmented regression has been used in a more evaluative sense to support existing positions in literature.

3.5.2.   OLS Regression

As previously discussed, interrupted time series carries with it certain limitations. An ordinary least squares (OLS) regression, however, enables more precise explanations of relationships. Here, OLS regression is used to circumvent analytic short comings and offer a more complete picture in tandem with the other analyses and help establish the relationship between our independent variables and clustering coefficient. Although in the segmented regression both sentiment score and clustering coefficient were dependent variables, the clustering coefficient variable was selected as the dependent variable in this regression as it is an indicator of change in how users are interacting with one another. The impact on how users engage content was deemed a more significant factor than the level of negativity in the content they introduce. In these models, it is a priority to assess change in the nature of the interactions. Do users change the way they discuss due to the changing quality of content? Sentiment score is useful as a predictor as it shows that it was, in fact, changes in opinion leadership that caused changes in posting behaviour as opposed to changes in attitude of thread participants. Sentiment is used in the OLS regression to test if any effect found for opinion leadership is in part due to change in sentiment independent of the opinion leaders. An effect shared between the two variables will be elucidated through the analysis of three models.

The OLS regression employed in these models was used the social network analysis software UCInet (Borgatti, Everett, and Freeman, 2002). This software differs from an OLS conducted in statistic software in that the algorithms it employs assumes dependence of observations (as nodes connected to one another in a network are related as a criterion for inclusion). To offset the existence of dependence of variables, UCInet's calculation uses inflated standard errors making it more punitive in calculation of F-values and significant results. Moreover, the software uses a larger amount of permutations of the calculation in order to ensure a nonspurious result. As the time points used in the OLS regression (a series of weeks) were each evolutions of the previous network (with an overlap in users), these considerations for dependence were deemed highly valuable.

Chapter 4.   Findings

4.1. Results

The objective of this research was to investigate if particular individuals facilitate the impact of offline ISIS events on online discussion. To explore this, three related but distinct approaches were employed. First, social network analysis was employed to identify the structural properties of how users related to one another. This approach enables the identification of influential users (so as to identify any facilitation effect) as as well as how users relate to one another more generally. Second the impact of different events on sentiments and clustering is tested. This will identify which events (both endogenous to the forum and exogenous) to highlight which events are impacting conversation, and in what way. For instance, what happens to the discussion when high profile ISIS-related events happen in the real world? Third, the effects of sentiment and opinion leaders on clustering coefficient are tested to identify what the most impactful factor on the way users are discussing events is. These analyses in concert each develop the answers to the research question, providing information about user content becoming more or less negative, users becoming more or less cohesive as a group, or who the group organizes around. The project's two hypotheses are that users will be more negative and connected subsequent to ISIS events and that opinion leaders will increase the connections of users.

Interrupted time series tests the impact of each event by comparing the period before and after that event in terms of slope and level of a regression line. Conversely, the OLS regression tests which variables in each time point contribute to the greatest change by regressing variables on the clustering coefficient. Together these two tests will indicate which events elicit the most change and whether opinion leaders are significantly involved in that change. Due to technical limitations of the research design, two events and threads were not utilized in the interrupted time series. "ISIL militants seize control of Mosul" and "VICE: Spread of the caliphate" did not provide enough of a baseline period (the period of time points preceding the event to establish a significant change) to their respective events to be of use. There was no adequate way to ensure that the comparison would be unbiased, hence, the two threads were instead only used in the OLS regression.

4.1.1.   Network

SNA allows for the depiction of data in visual format. By inspecting data presented in this form, patterns in the way individuals are connecting can be more easily identified. For instance, the total cumulative networks of "Syria 4.0" and "ISIS: Khawarij or not" are shown below in Figures 4 and 5. Each line in the graph are two users being connected by some number of exchanges between them. In each of these figures the discrepancies in the activity of the two groups are highlighted. In the first highlighted region, "primary discussants," the most involved discussants were connected with one another. The second is the periphery players circling the graph that failed to embed themselves in the primary discussion – but commented on the contributions of more involved users. The visual representation of the discussion threads enables a "birds-eye" view of how users organized themselves over time. This discrepancy is important because it indicates that there are certain types of users that are involved in the most popular, or successful, conversations. Users who most often communicate together form the most cohesive groups, those noted for discussion were identified visually in Figures 4 and 5. Identifying these groups[3] helps illustrate characteristics of different portions of the community. The "primary discussants" group – the most concentrated area of activity on the graph is worth noting. This region has a high concentration of opinion leadership scores – all 17 opinion leaders are embedded in the highlighted area in Figure 4. Subsequent analyses illustrate the relationship between opinion leadership and clustering, but Figures 4 and 5 indicate how involved all portions of the conversation are with these individuals, and how prolific the opinion leaders themselves are. Circular nodes denote opinion leaders while the size of node indicates how high a user scores in their ratio of in-/out-degree. This strong grouping indicates that there is a group of primary contributors to which more casual or less embedded users connected once or twice (indicated in the peripheries of the network). These users entered the thread to either commend the comments of other users, or to pose questions to them. This grouping and mode of discourse develops early and remains stable in the noted threads. The stability of the main discussion cluster over time indicates there is something special about what occurs therein– although there is a high

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[3] Both Girvan-Newman and Faction cluster analyses were conducted in UCInet to explore these groups empirically. Both analyses gave a result of 1 cluster due to the research decision to include the original post as a distinct node – greatly increasing paths through all regions.

degree of variability in the makeup of users from week to week, the primary discussion group remains stable and attracts new users to discussion with other participants there. The more limited life-span of "ISIS: khawarij or not" indicates that the primary discussant portion of the graph was less dominant, but its early development is highlighted in Figure 5. As group members leave, new disjointed groups do not form elsewhere on the graph, but either replace lost members in the primary discussion group or attach themselves to participants involved in the primary clique. The stable nature of the central clustering indicates that people did not discuss with other users at random, but instead focused on a particular discussion or groups of discussions.

The pattern of clustered activity around opinion leaders is not necessarily a given. We see it as a middle ground between two extremes that were not uncovered in the present analysis. At one extreme, we could have observed a graph that had small groups scattered more evenly across the network. At the other extreme, if it were only a few users that all users listened to (a blogger broadcasting to their audience would be an excellent example), we would see clusters of users forming around those popular nodes separately or lightly connected. The middle-ground observed in the networks of Figures 4 and 5 indicates a partial effect of specific users facilitating discussion without being independent from other groups. It is unclear from the networks alone what changes are happening in the thread, outside the thread, and what level of impact these events have on the users therein. In order to contextualize changes in group membership versus changes in content, two other forms of analysis are employed.

The interrupted time series analysis contrasts the internal and external events of the thread. If moderation is occurring, changes in the type of user-base favoring the moderation (e.g., opinion leaders) discussing content should have the most immediate impact on the thread's discussion modality and content. Given the high volume of topics introduced into the threads, it is a limitation of the analysis that definitive causality cannot be derived from one of the events. However, it is expected that the highest presence of opinion leadership being proximal to the greatest change is indicative of such an effect. To address the limitation of this assumption a second analysis is employed. The OLS regression conducted in UCINET is used to determine whether opinion leadership substantively alters the mode of discourse across all weeks individually, rather than just

the trend's change after the week. As discussed previously, this also allows the inclusion of threads that could not be included in the segmented regression.
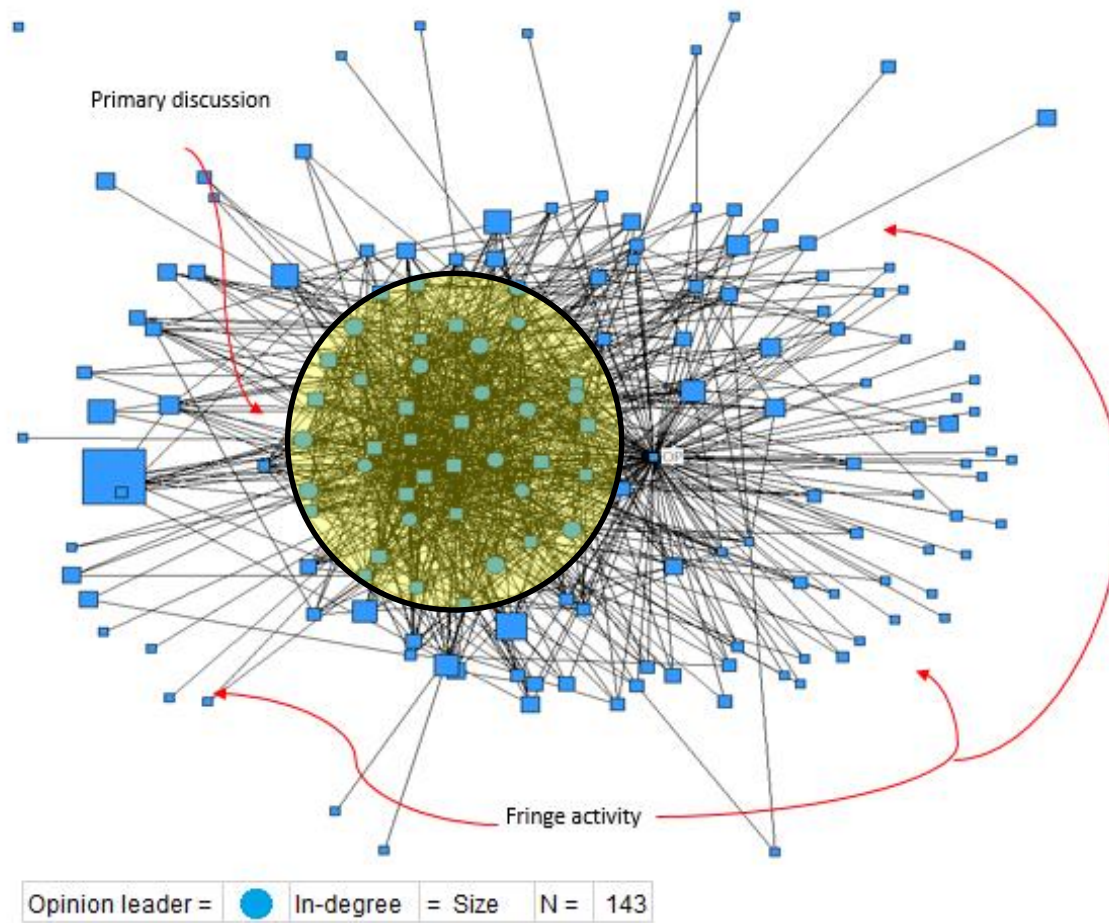
Figure 4 "Syria 4.0" thread, September 30th to June 10th
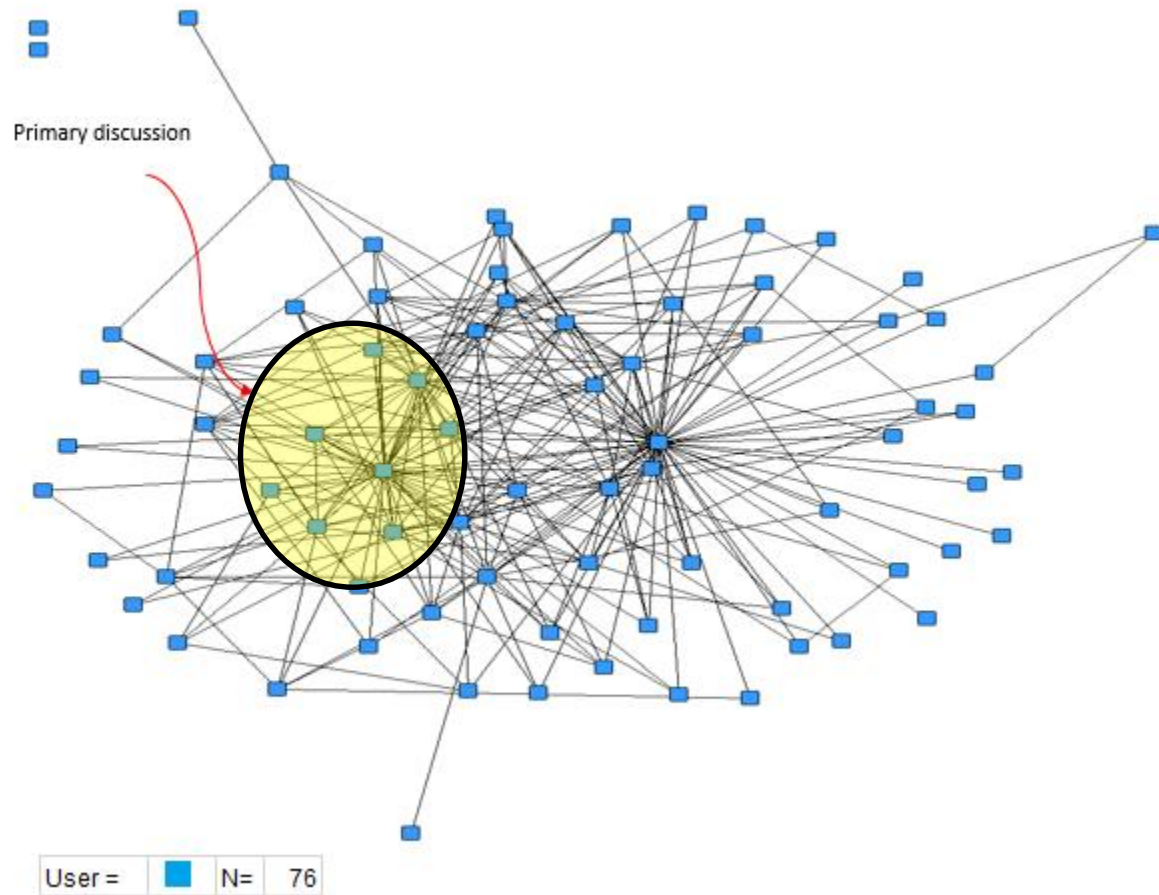
Figure 5. "ISIS - Khawaarij or not" thread, June 5th to August 5th

4.1.2.   The impact of events on sentiments and clustering

An interrupted time series was undertaken for each event identified in the study (totaling 5 models) to analyze which specific interventions (the aforementioned events) had the clearest impact. This consisted of the ISIS events happening in Syria, disseminated through news media, and events derived from either user interaction or user composition, that is, changes in the makeup of users in the thread. The two threads containing the testable intervention were "Syria 4.0" and "ISIS: khawarij or not." Table 4 contains the descriptive statistics of the data used in this analysis. The average sentiment scores across all time points was negative. Although negativity towards users and content in the thread contributed substantially to these values, the range being so firmly negative is attributable at least in part to the content being discussed. A news article that uses key words such as war, bomb, kill, or fight would all increase the negativity score of the post attached to the news article. Given that this type of content is ubiquitous through the thread, the change is what is interesting rather than the sentiment score itself.
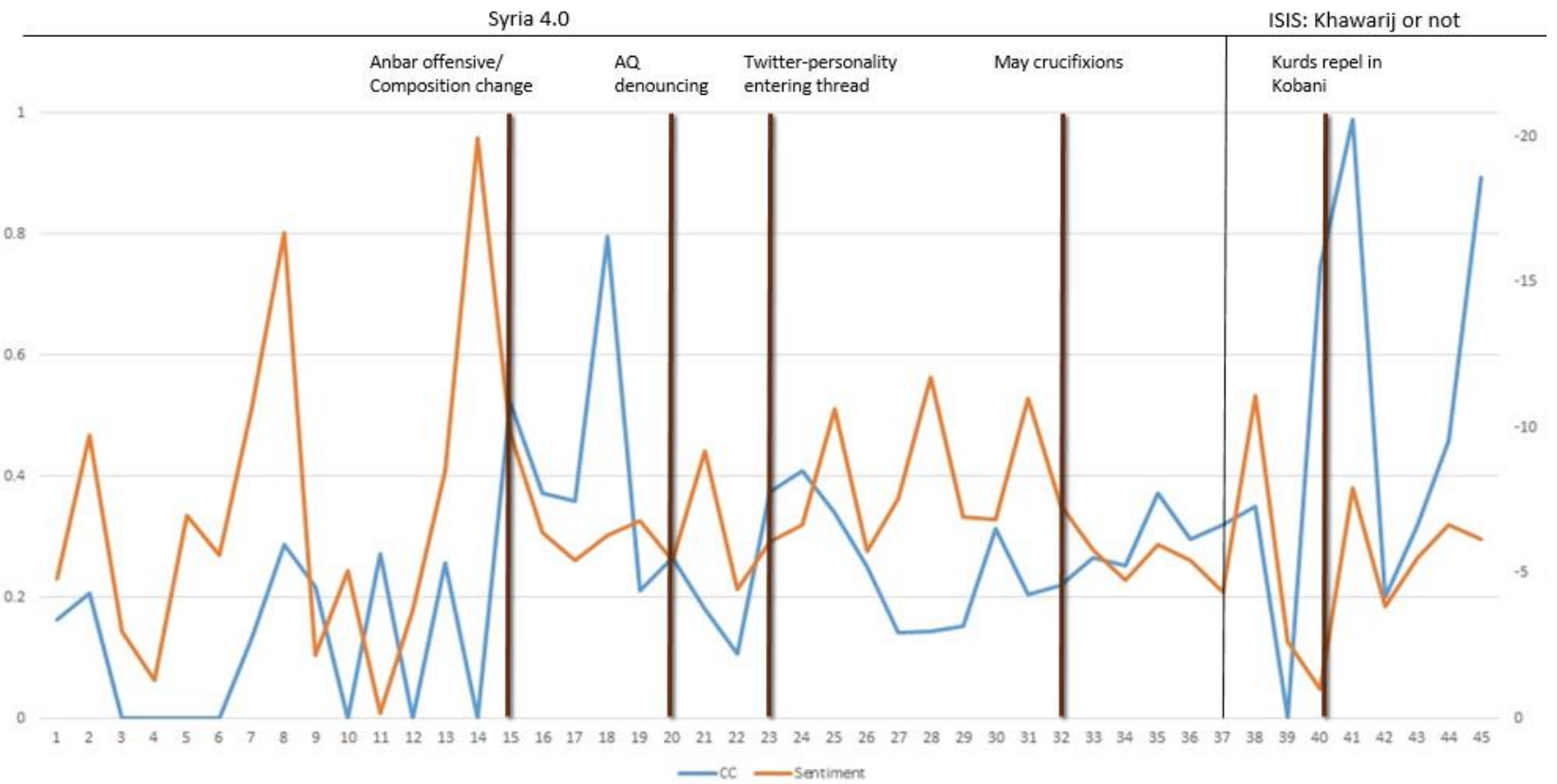
Figure 6. Interrupted time series trend lines

Table 3.   Interrupted time series events

Date	Event	Description
Week 15 – December 30th	ISIS resumes military activities in Iraq	The Anbar offensive was initially a tribal conflict resisting Iraqi security forces that escalated and was capitalized on by ISIS
Week 15	Network makeup	A large cohort of opinion leaders entered and remained in the thread
Week 20 - February 2nd	Al Qaeda denouncing ISIS	AQ formally denounces ISIS and supports JaN as the AQ affiliate in Syria
Week 23 – February 21st	Twitter star	A prominent news commentator rumored to be intimately familiar with jihadis in the region enters the thread
Week 32 – May 4th	The May 2014 crucifixions	The first news media reports of local Syrian's being crucified is published
Week 37 – June 16th	Kurds repel ISIS in Kobani	One of the first major Kurdish victories against ISIS forces
Week 42 – August 8th *	US begins airstrikes on ISIS	The US begins airstrikes in Syria, preceding the more broad coalition attacks

* Event was not used due to where the date fell in the time series, with insufficient data after the event to render a reliable result.

Table 4 .   **Descriptive statistics weeks 1 through 42**

	Mean (SD)	Minimum	Maximum
Average number of posts	3.761 (2.29)	0.75	10.34
Composition of opinion leaders	.189 (0.10)	0	0.35
Sentiment score	-6.76 (3.71)	-20	-0.14
# of users active in time-point	26.6 (15.12)	4	50
Clustering coefficient	.275 (0.23)	0	0.87
# of pinion leaders active	6.133 (4.33)	0	13

Table 5.   **Interrupted time series on clustering coefficient and sentiment score**

	Anbar offensive/ Composition – Week 15		AQ denouncing – Week 20		Twitter-personality – Week 23		May crucifixions – Week 32		Kurds repel ISIS – Week 37	
	Sentiment (SD)	Clustering (SD)	Sentiment (SD)	Clustering (SD)	Sentiment (SD)	Clustering (SD)	Sentiment (SD)	Clustering (SD)	Sentiment (SD)	Clustering (SD)
Level	6.423 (1.292)*	6.245 (1.65)*	8.888 (2.24)*	8.642 (1.91)*	9.868 (2.73)*	9.525 (2.42)*	15.073 (9.06)	14.977 (8.65)	2.145 (1.98)	3.001 (1.18)**
Slope	1.007 (0.080)*	1.007 (0.86)*	1.012 (.19)*	.961 (0.16)*	1.017 (0.26)*	0.964 (0.23)*	1.161 (0.61)	.651 (0.58)	1.04 (0.67)	.334 (0.50)

* p < 0.01, ** p <0.1

Five events are reported in "Syria 4.0," but only four are unique in this analysis. The first event drawn from ISIS' activities offline and the first endogenous event (the rise in percentage of users being opinion leaders) occurred in the same week. The overlap of the first exogenous and endogenous event was both fortuitous and problematic. Being unable to distinguish the effect of the two events somewhat clouds which event had more influence on the thread. However, the network composition variable is an on-going and sustained change as illustrated in Figure 3. It is an explicit test to see if a mediated effect (group of mediators entering a thread and a large news event) has a substantial impact on the thread. The interpretation of these results hinge on two factors. Each intervention period incorporates the change of previous events into the baseline, meaning that given certain anticipated lag effects, interesting results are those *above and beyond* the previous period's effect size. Effect sizes that are closer in size are less indicative of any new change, and more on-going effect of an existing trend – especially in instances without immediate departure from the trend. For example, in a period of eight weeks, a total volume of posts were to rise from 0 to 300 in week 4 and to 400 in week 5 and maintained a relative or slightly positive increase. The effect size of a period after week 5 would be larger than the effect size of a period after week 4 (as it compares to a baseline 0). Although the raw effect size is larger, is it sufficiently larger to be more impactful on the trend? Table 5 displays the results of this analysis.

The most impactful change occurred in week 15, following the beginning of the Anbar offensive and the dramatic shift in network composition. The largest increase from the baseline period to the post even period in sentiment and clustering coefficient occurred after these events. Clustering coefficient's mean level (of the regression line) increased by 6.245 units and was significant ($p < 0.01$). An increased clustering coefficient indicates that users are joining more centralized conversations around small hubs – the tendency for cliques to form increased markedly after the intervention. The mean level of sentiment score also changed by 6.423 and was significant ($p < 0.01$). The sentiment score of the thread increasing indicates less negativity in the later life span of the thread. There was a similar change in the subsequent endogenous and exogenous events. Al-Qaeda denouncing ISIS had a significant increase in clustering coefficient 2.4 units beyond the first intervention ($p < 0.01$) and 2.5 units in sentiment score ($p < 0.05$). While the twitter personality entering the thread increased the sentiment score and clustering coefficient

modestly, it was a much smaller effect than the previous two events. However, these differences are small enough that by evaluating the trend statistics in each event variable there would be an expected increase in mean level close to this range.

The difference between the slope of the baseline and post-intervention slope in each model ranged from between 0.96 and 1.017 across all significant results, indicating there was very little change in the trend line between events, only the mean level between periods. Thus, there was an expected increase in the mean level in both the clustering coefficient and sentiment score, meaning that the first event (despite being the lowest numbers) was indicative of the most significant change. The twitter personality entering the thread and not substantially impacting the mode of communication or sentiment of the time period is a particularly interesting finding for two reasons. First, his arrival in the thread was well remarked upon and in fact drew users who had noticed his tweets referring to the forum (as described in the thread). Second, he is the prototypical opinion leader described in classic communications literature. Despite being an outsider to the thread, many users intentionally sought replies from him or deferred to his opinion immediately after his arrival (although this effect became more moderate as users became accustomed to his presence). The twitter-personality's reputation for accurate insights into the conflicts in Iraqi and Syria had developed a large degree of social capital that was evident in other users' exchanges with him. This result indicates substantive change to the mode of discussion or the tone (i.e. clustering coefficient and sentiment score) are not based on the impact of one prolific user, but their role in community formation. This finding is discussed further in the context of the OLS regression below. The third exogenous event in "Syria 4.0," the May 2014 crucifixions had the most dramatic increase in values but was not significant. The lack of sufficient data-points contributed to both the likely inflated and non-significant values, for the same reason two of the previously proposed events were excluded (sample size of the baseline period).

The final exogenous event (Kurdish repelling of ISIS in Kobani) was in the second thread "ISIS: khawarij or not." Although this was a new thread, after the closing of "Syria 4.0" a large cohort continued the discussion in this thread (52% of the thread had been posters in "Syria 4.0"). With no "water-shed" shifts, or largely disruptive entrants to the thread, no endogenous events were present, allowing any noticeable news events to

stand on its own merits. After the intervention the mean level of the clustering coefficient increased by 4.007 and was significant ($p < 0.05$). There was no significant change in the slope of the clustering coefficient post-intervention. There was no significant difference in either the mean level or slope post-intervention. Although there is fluctuation in clustering coefficient post-event, it was both mild and not accompanied by indicators of debate or refutation changing (e.g., sentiment score). The significant change in clustering coefficient, then, indicates that there was an up-take in general discussion, but either spurious to the event (as there was a high degree of variable in clustering coefficient through the time period), or it was discussed briefly without substantive change because it lacked the community interest that accompanied previous significant events in "Syria 4.0."

Of these four unique models, the most significant change was between before and after the network composition/Anbar offensive intervention. The implication of this combination of events being the most successful is that the having an interaction between opinion leaders and content is necessary for it to make an impact on the community of the forum – but the more limited impact of particularly notable individuals (e.g. the twitter personality) also indicates that their interactions in larger numbers provide a greater contribution. This hypothesis is tested below.

4.1.3. The effect of sentiment and opinion leaders

In order to test the impact opinion leaders had in a more causal model, and also to test the implication that opinion leaders as a group had a more substantive impact as the count of opinion leaders increased, a number of variables were regressed on the clustering coefficient of each time point. The correlations of each variable were first assessed in order to identify any potential complications in the analysis: these relationships are presented in Table 6. Number of users, number of opinion leaders, and network composition of opinion leaders all had strong relationships and thus presented the problem of multicollinearity. To circumvent this issue, the number of opinion leaders was removed from the analysis due to its strong relationship with both number of users and network composition. Although network composition and number of users had a strong correlation, the need to differentiate the effect of population versus the effect of opinion leaders warranted its inclusion.

The first model regressed the number of opinion leaders, the number of unique users, the sentiment score, and the average posts on clustering coefficient, presented in Table 7. This regression was a test of which variables led to a more connected group of users. Average posts per user is a measure to remove variance attributed to having a more active user base (inherent to the measures used to construct the opinion leader variable). Average posts allow for the effect of network composition to be above and beyond having a more involved user composition in the time point. As sentiment score controls for clustering coefficient possibly increasing due to users being more negative or more positive, average posts ensures that having a cohort of more active users is discrete from having a large number of opinion leaders. Network composition was excluded in order to ensure that using the proportion did in fact improve the model, by reducing the conflation of total population and opinion leaders as well as isolate the effect that sentiment (or how positive users were) had on users participating with one another. Model 1 was insignificant, in part due to the association between users and opinion leaders. Model 2 introduces the additional variable of network composition and removes sentiment to a) test the improvement in model fit over users and opinion leaders and b) isolate the effect of network composition with and without changes in sentiment score being accounted for. Model 2 improves the model fit substantially and is significant ($p<0.1$). The boost to the model's R^2 is almost entirely driven by the network composition variable. Little change occurred to the variables relating to number of users - opinion leaders are still not significant and users have a very small coefficient ($p<0.01$). Average post count provided a control for activity in the thread, and had only a minor coefficient compared to the network composition variable. Model 3 reintroduced sentiment score in order to identify any change in the model. The model was significant ($p < 0.01$) and had a marginal increase in model fit. These findings indicate two things. First, sentiment had little impact on clustering coefficient. While it was significant ($p <0.01$), its effect size was so minor that it contributed very little to the model. Second, its inclusion in the model did not decrease the coefficient of network composition, indicating it did not contribute to the explanatory power of network composition.

Network composition's significant effect ($p <0.01$) in Model 3 has two implications. First, that opinion leaders have an effect that increased as their proportion of the network versus non-opinion leaders grew. The effect of opinion leadership is indicated to be related

to how much of the population they can reasonably reach. When they represent a larger share of the population, the effect is increased. Sentiment scores emergence as significant in Model 3 only when it is present with network composition – indicating with its small effect that while significant, it contributes very little to the model in explanatory power. However, the improvement of network composition's β from model 2 to 3 indicates that sentiment's explanatory power was still large enough to improve model fit. This improvement was likely driven by time points that include ad homonym attacks on dissenting users (note the negative relationship in Table 7). This would not be significant without the large amount of variance removed in calculation by network composition. Second, the strength of network composition is above and beyond that of having a more prolific cohort in the network. By controlling for average posts per time period in the model, we can see that the impact of network composition is beyond the effect of having a more active group of users in the time point – clustering coefficient increases above and beyond the number of posts being introduced.

Table 6. Bivariate correlation matrix

	Opinion leaders	# of users	Average sentiment scores	Average posts per user	Network composition
# of opinion leaders	1*	0.926*	-0.016*	0.679*	0.812*
# of users	0.926*	1*	0.016	0.667*	0.616*
Average sentiment scores	-0.016	0.016*	1*	0.125*	-0.032*
Average posts per week	0.679*	0.667*	0.125*	1*	0.535*
Network composition of opinion leaders	0.812*	0.616*	-0.032*	0.535*	1*

* $p < 0.05$

Table 7. Regression of independent variables on clustering coefficient

	Model 1	Model 2	Model 3
R^2	.213*	0.312*	0.314*
Adjusted R^2	0.136	0.243*	0.256*
F value	3.706	5.233	5.311
Intercept	0.038*	-0.174*	-0.198*
# of users	0.001	0.02**	0.021
Average sentiment scores	-0.003	-	-0.003*
Average posts per week	0.038*	0.036*	0.036**
Network composition of opinion leaders	-	.821**	.833***

* $p < 0.1$ **$p < 0.05$ ***$p < 0.01$

Chapter 5.   Conclusion

How do offline events compare to online events in terms of impact on discussion? Is it the people or the topic that determine that impact? These are two of the questions that the research aimed to answer by identifying six important events occurring over the life course of an ISIS discussion thread, and analyze the impact of each. Furthermore, the role of users nested in that discussion was tested to elucidate whether or not it was the network makeup causing change or the event itself. The findings support that network composition favoring opinion leaders were required for offline events to have a substantial impact on the discussion. Further, opinion leaders had a substantial role in making a discussion more engaged, more positive, and more homogenous. These findings and implications are discussed below.

5.1.   Discussion of main findings

This study aimed to capture public reactions to ISIS events by monitoring a community of ISIS followers online. This was done using two modes of analyses. The first was a segmented regression, identifying which key turning points had the greatest impact on the community's content and interaction behaviour. The results indicate that the most dramatic change occurred when a major ISIS event was accompanied by a substantial increase in opinion leadership in the community. Afterwards, users were less negative and more likely to form small, cohesive cliques. These results indicate that the conversation became less hostile and more homogenous over time for two reasons. First, the decrease in negativity scores were not accompanied by a noticeable change in the types of material being discussed. As acknowledged in the methodology, sentiment scores are in part driven by the type of content being discussed – but this is a relatively *stable* effect. This indicates that the effect observed is driven by the reactions to the content and users interacting with one another. Second, users becoming more cohesive in their conversations indicate less focus on specific users – disagreement with specific users

would be characterized by a focusing of ties on specific individuals and greater centralization. These results support our hypothesis that the discussion of major-ISIS events is facilitated by opinion leaders. These individuals are facilitating the discussion around ISIS and are influencing what content remains visible for casual users. Clustering coefficient – indicating users' tendencies to converse more widely with those close to them in the discussion – is indicative of this improved capacity for the dissemination of news media. Sentiment score, how positive or negative users are being, indicates the change in discussion caused by an event. These two variables changing most drastically after the combination of a major ISIS-event *and* a shift of the network composition indicate that discussions pertaining to ISIS are insufficient for a major change in discussion, it requires particular participants. However, the content others rely on these opinion leaders for still needs to have a draw.

The Anbar event was one of the first very widely discussed events of ISIS in some mainstream media outlets. The wave of suicide attacks and seizures of territory held by a government rather than conflicts with either tribes or other insurgents marked a tonal change in the way ISIS was being portrayed. This event then in many ways proxies the shift of ISIS into a more broadly successful existential threat – both contentious and interesting for a community so sensitive to jihadis abroad. The interaction between opinion leaders and content supports the argument of a facilitation effect occurring – each subsequent event involving ISIS continued to draw discussion, but never with as strong a change as the first event. Likewise, the twitter personality entering the thread was highly noted yet failed to create any serious change to the trends of *how* users were discussing – how likely they were to engage other users, and how positive they were being in the thread. The total composition of opinion leaders to non-opinion leaders was a better predictor of change. Sufficient *community* leaders supporting *relevant* content is what created the most substantial impact. The regression model supports this, with more active users not being a particularly apt predictor, the most powerful coefficient is network composition. Thus, opinion leaders are gatekeepers to the impact of news on the thread – even when news are discussed on the forum, it is discussed less and thus has fewer opportunities for users to engage the material or view it if they are a casual user. The news passes by as it were, while opinion leaders keep the story prevalent and topical. Not indicated by our hypotheses, but an interesting implication, is that this is a group-based

effect. The effectiveness of a shift towards a higher percentage of opinion leaders having a greater impact on the modality of discussion than a twitter-personality entering the thread (despite being widely acknowledged). This likely means that it is the community forming effect rather than the individual users, their interactions with each other and other users are shaping the structures of the network – rather than just having a particular draw to the thread. The "May Crucifixions" event was surprisingly non-significant. This finding was likely driven by the very small period subsequent to the analysis with which to compare the baseline period. Qualitative readings of the data, however, indicates that this event was indeed commented on and discussed – perhaps due to how late this event occurred in the discussion, there did not seem to be arguments persuading (visibly) whether this detracted from ISIS' goals and appeals. Those that vocally supported ISIS dismissed it as propaganda, those that were critical of how ISIS operated pointed to this as new evidence they had gone astray from more admirable jihadi goals.

We then tested the role opinion leaders had on the increase in cohesion among users. By regressing the proportion of opinion leaders in the network on the clustering coefficient we demonstrated that opinion leaders have a strong effect on the cohesion of the groups. As more opinion leaders were present in the network, users were more successful in forming groups to discuss material – in times with fewer opinion leaders these conversations tended to devolve into arguments, increasing negativity and increasing centralization around particular individuals. These results corroborate existing literature on communities focusing on violent extremism, and describe an underexplored area of how these communities evolve over time.

Although it can rarely be identified as the main cause for radicalization (Ducol et al., 2015), the internet often acts as an incubator for radicalization because of two key features. First, discussions online help foster narratives beneficial to violent extremist organizations (Sageman, 2008). Second, it helps mobilize populations vulnerable to being radicalized by connecting them to social networks they might otherwise be unable to access (Sageman, 2008). The fact that the internet has these opportunities is supported by the way terrorist organizations use the internet for eliciting material and philosophical support (Davies et al., 2015). One of the large risks of the internet, however, is how groups sympathetic to extremists create a space where violent ideologies can flourish. Stormfront

was an example of a community that centres on white supremacy, but encapsulates a multiplicity of activities (Bowman-Grieve, 2009). These environments help perpetuate radical ideologies by continually reinforcing radical attitudes, blending online and offline social networks (Ducol, 2012; Ducol, 2015). The discourse therein normalizes concepts and helps users test and refine their violent ideologies (Conway, 2012). It is these exchanges where narratives benefiting extremist groups either succeed or fail (Ducol, 2012; Conway, 2012). Our findings indicate that certain users have such a central place in discussions that they will be able to influence these successes. Further, even though important ISIS events were happening online – the most dramatic shifts in sentiment score and conversation were associated with the composition of users participating in the conversation. We propose that these influential users facilitate this discussion and are a key characteristic of why certain extremist narratives gain traction and are proliferated through the online violent *milieu.* By exploring how a social place is influenced and managed by its membership, we can generate better understandings of how extremist organizations elicit support.

These findings have strong implications for policies designed at affecting these online social places. For instance, the United States State Department's 2014 "Think Again, Turn Away" Campaign seeks to deliver fact-based realities that are contrary to the romanticized Syrian conflict. This campaign, despite a heavy emphasis on targeting youth at risk of radicalization, was never cited or referred to in our sample. Some literature has suggested the perceived intervention by a state agency may deleteriously affect any counter-narratives that were attached to the effort (Brigg and Feve, 2013). These results indicate that although highly attentive to news relating to ISIS, discussion was being directed and shaped by the involvement and direction of opinion leaders in the group. If dissemination of fact-based strategies remains a goal of government, it is necessary to create the media in a format these particular users are both interested in (due to their personal ideological constraints) and able (due to the expectations of their behaviour by their peers in the social network) to bring to the conversation online.

5.2. **Limitations and future research**

This study aimed to use the reactions of online followers of terrorist events to gauge public reaction to those events. We further identified which types of events had the most influence on discourse online. The role of opinion leader on discussion online was found to improve the saliency of the group, and the success of the conversation. From this we inferred how this structure was conducive to the dissemination of extremist material. Our postulations are limited in at least two ways. First, we have made inferences regarding the way content is disseminated based on structural characteristics of the community. The process of information diffusing through the population was not the focus of this project, and so not fully explored. However, to better expand on why specific users become central to the community, and what the characteristics of successful narratives are, a greater emphasis on content analysis could be employed. An extrapolation of the research presented in this work could identify key themes of conversation and identify which users a) introduced the concept or b) modified it. Identifying the origins of information and the route of dissemination would help identify which hands were more instrumental in a topics success. Further, identifying which users approved or disapproved of the topic would assist in identifying what processes exist in some users persuading others. Second, due to the limited nature of stable, public, and English speaking forums discussing ISIS at length, we had an inordinate focus on one specific community. Although literature supports this mode of community existing online elsewhere, it would strengthen the propositions posited in this work to expand the study to alternative data sources. One such data source would be forums anonymized through services such as TOR. Validating the findings here on both ISIS focused forums and other violent extremist web-forums – namely, that events important to the community still require key individuals in the network for the discussion to be successful – would further fill the gaps in literature surrounding group formation online. This thesis focused on the interplay between opinion leaders and external events, but the motivations of the opinion leaders at the individual level were relatively unexplored – why do opinion leaders focus on one event over another? This question could be explored through qualitative analyses expanding on the selection process posited in this research, and qualitatively analyzing their behaviours. Two subjects for analysis are particularly pertinent to the discussion of what makes them successful – what are their motivations for participation and what are their strategies for engagement. This study focused on one

particular platform for discussion, but the analytic strategies employed herein could be extrapolated to a variety of other platforms as well. Twitter is a particularly attractive venue for analysis as it opens more direct lines of communication. That is to say, while on public forums research tends to be constrained to people concerned with ISIS (due to government interventions on terrorist websites), Twitter includes social networks of individuals claiming to be members of the organization. While this study could not answer all of the research questions the topic promises, the methodologies and analytic strategies can be extrapolated to platforms and data that can continue to expand the growing body of literature that can.

5.3. **Concluding thoughts**

While large gaps remain in research on how violent extremist communities evolve over time, how opinion leaders influence their community online, and why certain narratives are successful, this study focused on the intersection of all these topics. The importance of this intersection was to begin an assessment of how the public- specifically, those interested in jihadi activity – followed and discussed terrorist events. The findings of this thesis indicate that it is not merely the worthiness of a news story in the eyes of the community that creates a more cohesive and interested discussion, rather it is a suitable event that has important community participants discussing it. These findings support existing literature that suggests the social place of online activity exists independently from terrorist groups with its own leadership, interests, and organizational tendencies. This is not to suggest these forum members are insular from outside influence, as outside topics and personalities were referenced and included in the thread. However, the trends of the thread were better explained by how many opinion leaders were in the thread at any point throughout the period of observation. While the implications of this in terms of existing literature and future research are discussed above, here it is important to stress what these findings mean in terms of practical application. An increasing interest in counter narratives exists in governments domestic and abroad. Big data studies are increasingly common as well. These findings underscore the need for studying structural and organizational factors before moving forward in policy or research design. In terms of outreach, online or offline, the point of ingress into these communities seems to be

important. In terms of analyses, by ignoring the social context of how users are connecting, false positives in terms of what impact events are having is a serious concern. This study found that social context remains as instrumental a variable online as it is offline and should be explored further in both policy and study of violent extremism and radicalization online.

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