Assembling Strategic Narratives: Information Operations as Collaborative Work within an Online Community

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Social media are becoming sites of *information operations*—activities that seek to undermine information systems and manipulate civic discourse [26,36,44,47]. Through a mixed methods approach, our research extends investigations of online activism to examine the "work" of online information operations conducted on Twitter. In particular, we analyze the English-language conversation surrounding the reemergence of Omran Daqneesh (the "Aleppo Boy") on Syrian state television, almost a year after his family's home was bombed in an airstrike conducted by the Syrian government. We uncover: a network of clustered users that contributes to a contested and politicized information space surrounding Omran's story; the presence of undermining narratives that serve to disrupt the mainstream media's narrative and confuse the audience; and the techniques used when promoting, defending, or undermining narratives. In the current climate of increasing polarization in online social spaces, this work contributes an improved understanding of information operations online and of the collaborations that take shape around and through them.

CCS Concepts: • **Human-centered computing~Empirical studies in HCI** • **Human-centered computing~Empirical studies in collaborative and social computing**

KEYWORDS

social media; collaborative work; information operations; Twitter, strategic narratives; online activism

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1 INTRODUCTION

There is increasing awareness and concern regarding political propaganda, disinformation and "fake news" online. The same affordances of social media that enable individuals to connect with others and share content also present a weakness that can be exploited to undermine communities and manipulate civic discourse [48]. Large social media companies have publically confirmed that their platforms—and therefore their users—had been subject to information operations conducted by state and non-state actors during the 2016 US Presidential Campaign [36,44]. *Information operations* is a term used to describe the suite of methods that are used to influence others through the dissemination of propaganda and disinformation [27,47], for example through the deliberate

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amplification of false news that contains intentional misstatements of fact. Information operations are longstanding methods that have been used as a tool to gain asymetric influence for centuries [26,47] and an effective alternative for, or complement to, kinetic ("boots on the ground") warfare [13,27]. The advent of social media, and the associated interconnected online social networks and abundance of user data, mean that information operations are now both easier to implement and (likely) more effective [26,47].

This research aims to understand how the manipulative mechanisms of information operations manifest online, specifically on social media. We focus on a particular episode of the Syrian conflict, which began in 2011—specifically the contested narratives surrounding Omran Daqneesh (the "Aleppo Boy"), as it exemplifies a case of online information operations. Omran was photographed in the back of an ambulance, in an image that garndered global media attention, after his family's home in Aleppo, Syria was reportedly destroyed by an airstrike carried out by Syrian government forces or their allies. Our research looks at a time period in June 2017, about nine months after the viral photo, when Omran and his family reappeared in interviews broadcast on outlets loyal to Syrian President Assad. In those interviews, new and contested facts were presented that challenged the original narrative presented in the mainstream media. We examine the English-language Twitter conversation about the reemergence of Omran, and the competing narratives that formed within online discourse on the platform.

Omran's story takes place within the context of a prolonged political conflict, and our work focuses on social media use in that context. Social media use is a common feature of crisis events, including natural disasters [12,38,46], protests, terrorist attacks, and war or unrest [2,20]. The Syrian conflict is no exception, and has been described as the the most socially-mediated conflict in history [23]. One salient dimension of social media use in the crisis context involves people coming together to collaborate and work together towards a common cause. This includes "digital volunteerism" that helps to meet the needs of disaster-affected people [24,39,49] and "online activism" where people use available platforms to garner support and express solidarity for a political cause [40] or a population affected by war [2]. Our research extends these investigations of online activism to examine the "work" of online information operations. We look to the online conversation—and competing narratives—around Omran's story to identify and understand information operations through the lens of computer-supported cooperative work (CSCW).

In other words, we want to understand *who* was participating in these conversations, *what* they were doing, and *how* they were doing it. Using an iterative, mixed methods approach, we conduct analysis at three levels: 1) at the macro level we use network representations to determine the actors involved in the Omran conversation and their roles; 2) at the meso level, we analyze how information is added to the conversation and assembled to form competing narratives; and 3) at the micro level we focus on the specific actions of Twitter users engaged within this information space.

This analysis reveals that the Omran conversation represents a digital battlefield of sorts, where two (or more) "sides" worked to shape the information space to support their political goals. They did this by propagating their preferred narratives (in some cases) and working to undermine the other side's narratives (in others). They utilized specific techniques, such as *introducing uncertainty into the information space* and *discrediting information providers* to promote, defend, or challenge narratives. Though there is evidence that government-funded media and accounts were active in these conversations, these efforts were not merely constituted by a single set of "agents" from a particular government or other organization, but were integrated into the social fabric of online interactions and, in this case, online activism.

Adopting a CSCW perspective, we examine and unpack this collaborative (but not necessarily explcitly coordinated) activity as a form of information operations—pushing our understandings of this pheonomnon to account for complex and sometimes organic effects that emerge from interactions within the online crowd. In the context of an internationalized conflict and climate of increasing polarization in online social spaces, this work contributes an improved

understanding of information operations online, and of the collaborations that exist between groups of users, who consciously or not, are involved in producing and amplifying politically-charged narratives.

2. RELATED WORK

2.1 Information Operations and their Use on Social Media

Information operations refer to a collection of methods that seek to disseminate crafted messages (propaganda) within an opponent's information system [47]. Information operations are longstanding methods that have persisted for centuries, albeit under various guises such as 'information warfare' [26], 'weaponization of information' [47], and 'active measures' [5]. Referring to operations orchestrated by Kremlin during the Soviet era, Bittman [5] describes clandestine operations that seek to extend influence by focusing on vulnerabilities and festering malaise. These rifts are exploited to propagate disinformation, forgeries, rumors, and clandestine broadcasting through print media, television, and radio. Speaking of more recent strategies of information operations that leverage online connectivity, Pomerantsev and Weiss [32] explain that the purpose is not to persuade the audience and bring them around to a particular way of thinking, but to 'muddy the waters'—to confuse, distract, and distort information spaces. Such measures, ultimately paralyze the decision-making capabilities of the public as increasing uncertainty leaves individuals unsure of what to believe and how to react [32].

The interconnected structure of online social networks and the abundance of user data collected by social media platforms allow information operations to be implemented more easily and more effectively [26,47]—collecting personal and log data and segmenting communities along demographic information, political ideology, and 'likes' is fundamental to the advertising revenue of social media platforms. Recent reports point to the suspected misuse of personal data by companies seeking to disseminate highly targeted and personalized messages to manipulate the public [1]. Social media platforms such as Facebook admitted that information operations—which they define as "*actions taken by organized actors (governments or non-state actors) to distort domestic or foreign political sentiment, to achieve a strategic and/or geopolitical outcome*" [48] (p.4)—were posing a significant risk to the social media platform. This risk became reality when Facebook confirmed it had been misused, with a network of 470 inauthentic accounts spending $100,000 on advertising between June 2015 and May 2017 [36]. In January 2018, Twitter also notified 1.4 million users that they may have engaged with suspected "trolls" from the Russian government-funded Internet Research Agency during the 2016 US Presidential Election [44]. The realization that these information spaces—the fabric of online social networks—are being exploited to manipulate the public, stifle discussion, and sow discord is disconcerting. It also underscores the need for more research to understand how information operations work.

2.2 Shaping Narratives as a Form of Information Operations

One aspect of information operations involves the intentional creation, propagation, and shaping of narratives for (geo)political purposes [8]. Narratives allow humans to structure information, giving meaning to actions that facilitate sensemaking [22]. Aside from broad categories of fiction or nonfiction, researchers have characterized various types of narratives: Miskimmon et al. [29] describes *strategic narratives* that are employed to shape discussions within international relations, to manage expectations, and shape the future behavior of domestic and international actors [29]; Corman [9] identifies *master narratives* as broad social narratives which are persistent over time and familiar to members of a particular culture; Rogers and Tyushka [33] define *counter-narratives*, which symmetrically confront an existing narrative and offer an alternative, and *anti-narratives* that aim to spread negativity and cynically spoil the existing narrative without offering an alternative explanation. The conversation surrounding Omran

includes multiple and often conflicting narratives, and in this research we examine those narratives as they emerged on Twitter—conceptualizing them as specific types narratives, describing the communities they emerged from, and identifying the techniques used to shape and propagate them as one aspect of online information operations occurring on social media.

2.3 Information Operations as Collaborative Work

Information operations represent a type of collaborative work undertaken by groups of actors integrated within online social networks. Recent studies have uncovered concerted and coordinated efforts to conduct information operations online. In the Philippines, Ong and Cabanes [10] found that PR professionals are employed as 'architects of networked disinformation' [p.6], using fake accounts and paid influencers to distort trending topics on social media and 'hack' the attention of the public. In China, bots supplement low-level government workers, who are incentivized with additional vacation time, to promote anti-Taiwanese and pro-Chinese government propaganda on social media. These efforts that are so well orchestrated that it appears wholly automated [30]. And what has been termed a "troll factory" was discovered in St. Petersburg, Russia. As part of a sophisticated operation to interfere with the 2016 US Presidential Election, young Russians with a strong command of English and knowledge of American culture worked in teams of three to 'hack' the comments sections of news sites and social media [43,45]. In these examples, the information operations illustrate a formalized coordinated action—a central node is orchestrating the accounts within the disruptive network. Participants are likely aware that they are part of a network, motivated by financial, political, social, or psychological reasons [10]. In our research, the nature of the network is distinctly different. Although we cannot rule out coordination between some nodes in the network, the collaborative work of information operations has an emergent property as journalists, media organizations, government officials, and information activists converge online to conduct information operations at least somewhat organically—i.e. not exclusively orchestrated through a centralized and coordinated effort.

CSCW provides a lens through which to study this phenomenon, allowing us to explore collaborations that are emergent, as demonstrated in prior research of computer-supported cooperative activities, specifically "digital volunteerism" [31,39,49] and "online activism" [16,20,34,40]. Palen and Liu [31] introduced the term "digital volunteerism" to describe computer-supported cooperative activities that social media facilitate, which allow a collective public to play an active role in disaster response, aiding their own recovery but also participating as digital volunteers to help others [49]. Studies regarding the role of social media in online activism occurred in the wake of the 2011 Arab Spring. Local, affected individuals took to social media to apply political pressure, shape political discourse, and to extend their reach—informing western audiences about events on the ground [20]. Starbird and Palen uncovered the collective work conducted as individuals on Twitter considered what information they shared (amplified) through Twitter's retweet mechanism—leading to a collective, crowd-powered recommendation system [40]. In other contexts, Savage and Monroy-Hernández [34] demonstrate how the online presence of a militia group leveraged social media to facilitate the mobilization of individuals for participation in collective efforts offline. And a longitudinal study of a politically active Reddit community described how the online community worked together to sustain itself—more active users work to mobilize others and deploy technical tools (e.g. bots) to sustain engagement and help develop the groups' shared identity [16].

In each of these (pro-social) examples, emergent collaborations are formed as individuals converge online to engage in collaborative work to meet a collective goal. Our research extends this idea to explore how similar emergent collaborations form to conduct the "work" of online information operations. Situated within a prolonged and internationalized conflict, this work aims to improve our understanding of information operations online. Through integrated analyses of

the *who*, *what*, and *how*, we examine the collaborations that exist within groups of users who collectively work to produce, support, and challenge various narratives that reflect the goals and strategies of information operations.

3 BACKGROUND

3.1 Syrian Civil War

The Syrian civil war began in 2011 after anti-government protests calling for President Bashar al-Assad to step down turned violent, leading to armed conflict that escalated into a full-scale civil war [21]. Although technically a civil war between government loyalists and rebel opposition groups, the situation is further complicated by the presence of Islamic State (IS) militants, and the involvement of other countries including Russia, Iran, and the United States [18]. Russia and Iran support the Assad government, targeting Syrian opposition forces and IS militants [3], while the U.S. and Gulf League states provide assistance to the Syrian opposition groups and Kurdish forces that are also fighting IS [19]. The result is a complex, multi-faceted, and internationalized conflict in which the warring parties have demonstrated a "*lack of adherence to the norms of international law*" [12].

3.2 Event Background

Within the context of this protracted and bitter conflict, Omran Daqneesh, the 'Aleppo Boy', gained widespread media attention in August 2016 after his family's home in Aleppo was reportedly destroyed by an airstrike carried out by Syrian government forces or their allies. After being rescued from the rubble by the local volunteer group Syrian Civil Defense (the White Helmets), Omran was photographed in the back of an ambulance—an image that helped garner attention for and sympathy with the plight of the besieged citizens of Aleppo.

Shortly afterwards, media aligned with Russian and Syrian government interests began to question Omran's story, and Syrian President Assad reportedly claimed the photograph was fake [17]. Initially, efforts at introducing such counter-narratives did not spread widely. However, that changed on May 26 2017, when the Kuwaiti telecommunications company Zain released a video advertisement to mark the start of Ramadan. The video featured a child actor playing the role of Omran as part of an anti-extremist message. Contrary to the version of events presented in the global 'mainstream' media the previous year, the video portrays Omran as the victim of a suicide bomber affiliated with a terrorist group rather than a Syrian-government airstrike.

After the release of the Zain advertisement, Omran and his father reappeared in a series of interviews that were featured in media outlets loyal to Syrian President Assad in Syria and other countries including Russia, Iran, and Lebanon. These interviews presented new and conflicting information. For example, Omran's father claimed that his son had been used as 'propaganda' and asserted that the family home was not destroyed in an airstrike but by a bombing conducted by anti-government 'rebel' groups—contrary to the narrative presented in the media in 2016.

This research centers around the release of the Zain advertisement at the end of May 2017 and the reemergence of Omran in June 2017, and is situated within a conversation that involves voices that are pro-Syrian government, anti-Syrian government, and from representatives of the mainstream media. Emerging from this dialog are a series of contested and often conflicting narratives. These are both challenged and promoted by networks of interconnected accounts on 'both sides' of this conversation and disseminated to a wider audience.

4. METHODOLOGICAL APPROACH

In this research we adopt a mixed methods approach, iteratively blending quantitative and qualitative analyses. We first generate tables and graphs of the data from a high level to identify

patterns and anomalies, and then using these as 'entry points' for more in-depth investigation of the data using qualitative approaches, expanding upon methods developed for the investigation of online rumors in the context of crisis events [28,42]. This approach reflects an adaptation of constructivist grounded theory methods [25] to large-scale online interactions.

Within the context of the Omran case study, we conduct our analysis at three levels: At the macro level we use network representations and descriptive statistics to determine who is involved in the conversation and their positionality within the network. Using a temporal chart of tweet volume over time we transition to the meso level, unpacking how information is assembled to form narratives as the conversation around Omran progresses. And at the micro level we identify specific actions that Twitter users perform when promoting or contesting narratives, or when challenging others within the information space. We provide additional detail about specific methods in each section of our findings (Sections 5, 7, and 7). Though we present these in three distinct Findings sections, these analyses were conducted iteratively, often moving back and forth from one level to another, as insights from one informed new questions to investigate at another.

4.1 Data

Data was obtained from a larger collection related to the Syrian conflict, which consists of tweets posted between May 27 and September 9, 2017. We collected the data using the Twitter Streaming API, tracking various keyword terms related to the Syrian conflict in real-time, including geographic terms of affected areas. We then scoped this data to tweets that contained the term "Omran", were posted between May 28 2017 (00:00:00 UTC) and June 16 (23:59:00 UTC), and that Twitter identified as English (denoted by the language code "EN" in the tweet metadata). The rationale for collecting English tweets was based upon our interest in how information operations designed for western audiences are taking shape in online spaces. We acknowledge that conversations around these same topics in other languages would likely look different. Our dataset consisted 2,966 original tweets, 21,940 retweets, authored by 17,284 distinct accounts.

4.2 Account Coding

To help describe the underlying network and the collaborative work being undertaken while still preserving the privacy of individual account owners, we categorized each of the accounts that authored a tweet featured (i.e. excerpted) in the text of this paper. Two authors of this paper conducted the classification using consensus coding, which involved discussion between researchers to resolve any disagreements. The categories and the categorization process were informed by both a long-term study into the information ecosystem surrounding the broader Syrian conflict, and through analysis of users' Twitter profiles and tweets specifically related to Omran's story. Through this process five account types were identified: Journalists—accounts that were identifiable as real people who produce content for one or more blogs, news sites, or media organizations; Media organizations—accounts associated with websites or other outlets that publish news and other content both in the "mainstream" (e.g. CNN) and "alternative" (e.g. 21WIRE) media; Government Officials—individuals who are verifiable members of state governments; Academics—individuals who are researchers at academic institutions; and Information Activists—accounts that authored high volumes of politically charged content and were active within this and other spaces. Many of the information activist accounts appeared to be genuine accounts (of people who are not affiliated with a government or political organization), however at least one is suspected of being an agent of a political group [4]. Other account types, such as celebrities, concerned citizens, and everyday users appear in the larger dataset, but not among the highly retweeted users featured in our graph or data excerpts.

4.3 Statement about Account Anonymization

To respect the privacy of individuals who may not understand their content is public and persistent, we have anonymized all account names in this paper with the exception of media organizations (e.g. CNN, RT, The Daily Telegraph). In lieu of account names we have used account types (derived from the account coding explained in 4.2 above) to characterize the accounts, providing insight into the types of accounts that are involved in this information ecosystem. Due to their influence and significance within the information space, accounts within the top-10 most retweeted users (Table 1) were assigned a persistent handle denoting their account type and position within the top-10 (e.g. Journalist1; InformationActivist3). For other non-media organization accounts, we provide the account type based upon their classification (e.g. Government Official; Information Activist), for context.

4.4 Paper Organization

Our findings are organized around the three levels of analysis in increasing order of granularity: First at the macro-level we describe the structure of the information space that takes shape through Omran-related tweets, following retweet patterns to reveal the most retweeted users and the broader patterns of information flow. Second, at the meso-level, we present a temporal analysis of the contested events and conflicting narratives within the Omran conversation, demonstrating the evolution of the dialogue and providing exemplar tweets which characterize the various phases of the conversation. And third, at the micro-level we explore three salient activities we observed in this conversation—the techniques of introducing uncertainty into the information space, and discrediting information providers.

5. STRUCTURE OF THE INFORMATION SPACE (MACRO LEVEL)

To understand who is involved in the contested and politicized information space surrounding Omran's story, we conducted and integrated two complementary analyses: 1) exploring the structure of the conversation through a retweet network graph; and 2) identifying and analyzing the most highly retweeted accounts.

5.1 Retweet Network Graph

We developed a shared network graph (Figure 1) to determine the information-sharing patterns across Twitter users. In the graph, each node represents an account, sized by the number of times they were retweeted—i.e. large nodes represent highly retweeted accounts. Nodes are connected via a directional edge from a retweeting account to a retweeted account. Each edge is weighted by the number of retweets between the two. The structure of the graph was determined using the ForceAtlas2 algorithm [22]. The colors represent clusters or "communities" determined by the Louvain algorithm [6]. In the following sections we analyze the main clusters of the network, and describe the positionality of the most retweeted users within the information space.

5.1.1 Blue Cluster: An Active, Cohesive Group of Pro-Syrian Government Journalists and Activists

The graph reveals a large central cluster, in blue, featuring many of the most highly retweeted accounts (Section 5.2) in the Omran dataset. These influential blue accounts occasionally retweet each other, but the cluster is primarily held together by a large number of small accounts (not highly retweeted) who send many Omran-related tweets, retweeting several of the influential blue accounts. This cluster was by far the most active in the Omran conversation, containing more than half of the participating accounts and producing 63% (15,807 tweets) of the entire dataset. The content shared within this cluster was supportive of the Syrian government and President Assad and highly critical of "mainstream" media. Accounts in this cluster produced and amplified many alternative narratives to the original story of Omran and his family.

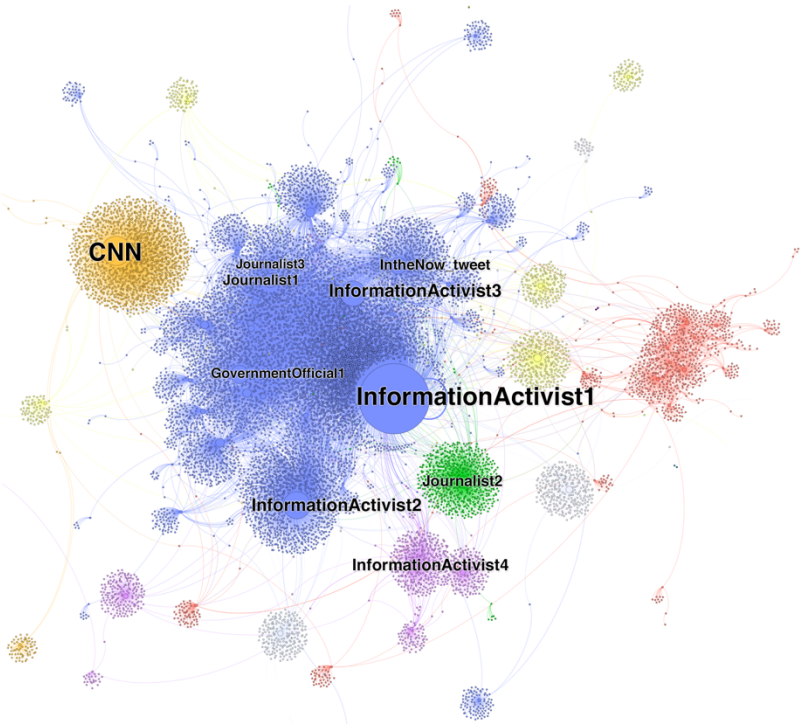

Fig. 1. Network graph of the accounts involved in the Omran conversation.

Seven of the ten most-retweeted accounts (Table 1) appear in this cluster. Examining these accounts underscores both the diverse and multi-faceted nature of the Syrian conflict and the informational operations within that conflict. It also highlights their convergence around a set of common themes.

Central to the Blue cluster are several diverse political actors and "information activists" who are highly retweeted within the Omran conversation, each of which expresses a decisively pro-Syrian government stance. **@InformationActivist1** is the most heavily retweeted user in our dataset. This politically-active account, which features an attractive young woman in its profile image, consistently tweets pro-Syrian and pro-Russian government content, including commentary challenging politicians in the U.S. and other NATO countries. In the Omran data, this account criticizes both the White Helmets and western media for producing propaganda. **@InformationActivist2** is another highly politically active account whose tweets often focus on issues in the Middle East. In the Omran conversation, this account expresses an anti-rebel (pro-Syrian government) stance with tweets centered around claims that Omran is well and living in Aleppo, and describing a prior situation when rebel fighters kept civilians hostage in Aleppo. **@InformationActivist4,** a self-described citizen of a south Asian country and Twitter commentator, participates in various political conversations all around the globe, often as a critic of "mainstream" media and Islam. During the Omran conversation, he reports Omran's father saying he was "coerced to do interviews and attack Assad regime."

There were two other highly politically active accounts that focused almost exclusively on the Syrian conflict (from a pro-government stance). **@InformationActivist3**, which claims to be reporting from the "battlefields" of the conflict, live-tweets statements from Omran's father during the interview and is critical of the White Helmets who reportedly rescued Omran (suggesting they fabricated the whole event) and the opposition rebel forces (labeling them as

terrorists). **@GovernmentOfficial1**, a serving member of the Syrian government, is highly critical of the "mainstream" media, referring to Omran's case as a "fake story" and using terms such as "presstitutes" and "NATO media".

Within the Blue cluster we also note the presence of two independent journalists who are supportive of the Syrian government: @Journalist1, and @Journalist3. **@Journalist1** is a European independent journalist, visitor to Syria as a guest of the Syrian government, and prominent voice in the Twitter conversation surrounding the Syrian conflict. @Journalist1 is critical of NATO, foreign intervention in Syria, and of the mainstream media's reporting in the region. Her tweets seek to correct the version of events presented by the mainstream media, using excerpts from the interview with Omran's father to support a counter position that Omran is alive and well. **@Journalist3** is also a North American independent freelance writer who has spent time reporting from Syria, including interviewing Omran's father in June 2017. @Journalist3 is also critical of mainstream media, calling Omran a child victim of propaganda (at the hands of the White Helmets and "mainstream" media).

Finally we note the presence of Russian media within the blue cluster: @RT_com (RT or Russia Today) and **@IntheNow_tweet**. RT_com is not among the ten most retweeted accounts (11th with 423 retweets), but @IntheNow_tweet, an account connected to RT's digital platform, is. @IntheNow_tweet reports that Omran supports Syrian government forces and that the family were furious at being used for anti-Syrian government propaganda—an alternative, competing narrative to that presented by the mainstream media.

5.1.2 Orange, Yellow and Green Clusters: The "Mainstream" Media

In Orange, Yellow, and Green are three clusters that are primarily constituted by mainstream media accounts (**@CNN** in Orange; **@Journalist2** in Green; and @Independent, @WashingtonPost, @NYTimesWorld, and @Telegraph in Yellow). Together, these three clusters constitute 17% of the participating accounts and produced 12% of the content in the dataset. The mainstream media clusters are somewhat integrated into the other clusters, through a few common retweeters, but mostly have their own lightly-engaged (in terms of this topic) audiences who only participated in the Omran conversation through retweets of that media outlet. Each of the highly retweeted accounts in these clusters only posted a single Omran-related tweet. For example, @CNN tweeted a link to an article on their website that ran after the interview with Omran's family, describing his return to the media spotlight, but aligned with the original 2016 narrative of how his family's home was hit by Syrian-government airstrikes. After posting that article, @CNN is subject to a great deal of criticism and directed challenges by accounts from the Blue Cluster (which results in the proximity between those two clusters in Figure 1), but they do not respond.

5.1.3 Red Cluster: A Small Cluster of Anti-Syrian Government Activists

The third largest cluster in the graph is colored in Red, spread along the right side of the graph. This cluster includes 5.7% of participating accounts, which generated about 6% of the content in the Omran conversation. This cluster does not contain any of the top-10 most retweeted accounts, but it does contain some of the most highly-retweeted accounts during specific time periods within the Omran conversation. This cluster includes a few dedicated, politically active accounts similar to those that we see in the Blue, but on the opposite "side" of the conversation. Tweets from accounts in this cluster were highly critical of the Syrian government and primarily focused around defending the original story of what happened to Omran and his family. We explore some of the content from these accounts in the temporal analysis below.

5.1.4 Other Clusters

In purple are a few other peripheral influencers who have a mostly distinct audience (from other nodes in the graph) but are also connected, via common retweeters, to the blue cluster.

Hundreds of other tiny clusters at the periphery of the graph are not featured in the analysis here. The largest of these are colored grey. Others have been excluded from the edges of the graph.

5.2 Most Retweeted Users

Table 1 lists the top-10 most retweeted accounts in the Omran data. Retweets of these accounts constituted more than half of the entire dataset. We also include a qualitative characterization of these accounts derived from long-term (10 month), ethnographic study of the information ecosystem surrounding the Omran story and broader Syrian conflict.

Later in this section we describe some of these accounts in the context of the cluster that they appear in the retweet network graph (Figure 1). The Cluster column in Table 1 refers to the account's position in that graph.

Table 1. Top-10 most retweeted accounts in the Omran dataset.

Screen name and description	No. followers	No. tweets (retweets)	Cluster
@InformationActivist1: Profile claims she is an "Independent Lebanese geopolitical commentator." Posts are consistently supportive of the Syrian government and its allies, including Russia and Iran	88,793	5 (3772)	Blue
@CNN: Official account of western "mainstream" media outlet. Related tweet states that Omran reappeared on Syrian TV containing two images of Omran and a link to an article (with a video of his father's interview).	35,947,914	1 (1522)	Yellow
@InformationActivist2: Profile claims that s/he is Syrian and "not a rebel", positioning her/him as a supporter of the Syrian government. Posts mix pop culture and political messaging.	43,186	4 (1403)	Blue
@InformationActivist3: Account focused on news related to Syria, including updates from battlefields. His posts are consistently strongly supportive of the Syrian government.	28,570	15 (1307)	Blue
@GovernmentOfficial1: Member of the Syrian parliament for Aleppo and Chairman of the Syrian Federation of Industry. Posts are strongly supportive of the Syrian government.	20,581	5 (912)	Blue
@IntheNow_tweet: Account of In The Now, an online video channel operated by Russian government-funded RT.	53,387	2 (838)	Blue
@Journalist1: Western European journalist who reports on the Syrian conflict from a pro-Syrian government stance. Omran-related posts were critical of the mainstream media and cast doubt on the original Omran story.	18,138	5 (692)	Blue
@Journalist2: British journalist and former writer and editor of several UK tabloids. On Syria, tweets are anti-Syrian government, e.g. questioning the UK's inaction of chemical weapons. Posts one tweet about Omran, relief that he was 'alive and well'.	5,824,512	1 (597)	Green
@InformationActivist4: Concerned about the rights of the Hindu population. Syria-related tweets have an anti-opposition stance, critical of 'ISIS rebels'.	46,367	2 (488)	Purple
@Journalist3: North American journalist who reports on the Syrian conflict from a broadly pro-Syrian government stance: "…ample experience in Syria and occupied Palestine." Interviews Omran's family during this study.	25,095	5 (436)	Blue

6. CONTESTED FACTS, CONFLICTING NARRATIVES (MESO LEVEL)

To understand the conflicting narratives within the Omran conversation, and the nature of participation in the conversation, we: 1) generated temporal charts to identify patterns and spikes in the conversation, helping us identify and distinguish between interesting phases in the Omran conversation, which became entry points for; 2) an in-depth investigation of the data at the individual tweet level, including the various contested facts and narratives surrounding Omran. All times are in UTC.

6.1 Temporal Analyses

We generated temporal graphs of the volume (per hour) of English language tweets and retweets from May 28 2017 00:00 until June 16 2017 23:59 (Figure 2). By analyzing the contents of the original tweets (not retweets) that occurred around the spikes in volume, we were able to identify (and subsequently describe) key events in the conversation (Figure 3).

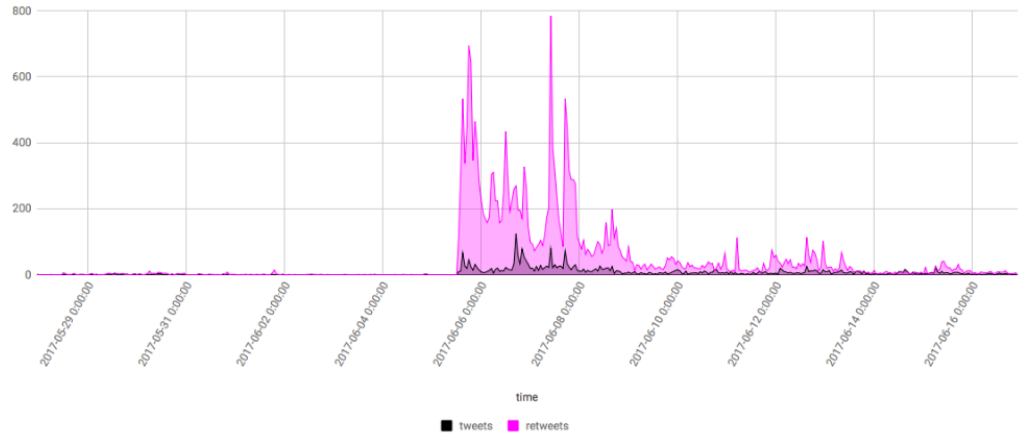

Fig. 2. Temporal graph showing the volume of tweets and retweets during the Omran conversation (2017-05-28 - 2017-06-16).

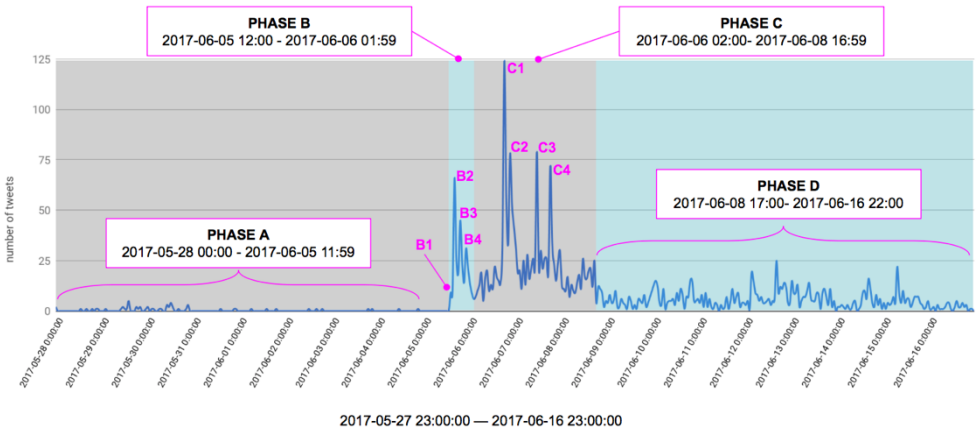

Fig. 3. Temporal graph showing various phases in the Omran conversation.

The volume of tweets can broadly be characterized as a low volume conversation (Phase A) followed by sudden spikes in activity, demonstrated by several peaks in the center of the graph (Phase B and C). After that there is a sustained low-volume conversation (Phase D). In the following sections we describe the conversation during the various phases (A-D), with a particular focus on the tweets sent around the peaks in volume (B1-B4 & C1-C4). We contextualize the phases and peaks by illustrating the kind of content that was circulating on Twitter at that time.

6.2 Content Analysis

The presence of contested facts was identified through a process of open coding conducted by two researchers. In an iterative and collaborative process, individual tweets were examined in temporal order, with researchers independently noting new information that was being introduced into the information space. This procedure was carried out for the (temporal) first 150 tweets within the dataset and also for the 752 tweets that were retweeted once or more during the study period. This process resulted in the identification of dozens of pieces of 'new' information that were added to the conversation. A process of affinity-diagramming was used to remove redundancy and inductively assemble the narratives that were present in the conversation. We analyze each phase in more detail in the following sections.

6.2.1 PHASE A: Controversy Surrounding Release of Zain Advertisement.

In Phase A tweets are predominantly critical of the advertisement released by Kuwaiti telecommunications company Zain on May 26 2017, which implied that Omran was the victim of a suicide bomber—an alternative and in significant ways conflicting narrative to that presented in the mainstream media (Table 2). Tweets posted during this period criticize the Zain advertisement, calling it out as 'propaganda' or a 'distortion of facts'. Authors also use tweets to correct the version of events presented in the advertisement, clarifying that they believe that Syrian (or Russian) airstrikes were responsible for injuring Omran, not a suicide bomber affiliated with a terrorist organization (e.g. A_2). Much of this content during this period came from accounts in the Red (anti-Syrian government) cluster of the retweet network graph (Figure 1). However, tweet A_3, posted from an account in the Blue cluster, goes against this trend, defending the alternative narrative presented in the Zain ad, suggesting that the Zain ad was frustrating to the anti-Syrian government forces (referred to by the tweeter as 'jihadists'). This tweet also implies that Omran was used for propaganda by the western, "mainstream" media. From both sides of this argument we see people calling the others' perspective out as propaganda or a distortion of the truth.

Table 2. Exemplar tweets from Phase A

	RTs	Time	Text	Cluster	Account Type
A_1	51	5/29/17 01:13	Omran and other Syrian children are primarily victims of criminality by Assad, Iran and Russia, before any other criminal.	red	Information Activist
A_2	4	5/29/17 10:03	this is beautiful, but IT IS NOT ISIS WHO KILLED OMRAN. so get your research together @zain	red	Journalist
A_3	63	5/30/17 05:38	@zain ad for Ramadan pisses off #Syria's jihadists by portraying the star of their biggest propaganda coup, Omran, as a victim of ISIS	blue	Information Activist

6.2.2 PHASE B: Pre-interview Speculation followed by Response to the Interview

B1 (Table 3): This short (~30 minute) period consists of a small, but important, increase in activity caused by speculation surrounding what Omran's father would say in the imminent interview. Almost all of the prominent tweets during this period come from accounts within the Blue (pro-Syrian government) cluster of the network graph (Figure 1). The consensus is that Omran's father will '*speak the truth*', refuting the mainstream media's version of events and providing an alternative explanation—implying that these users, (93% of which are from the Blue cluster), are anticipating (positively) a challenge to the mainstream media's narrative and promoting this idea on Twitter. **@**GovernmentOfficial1 sends two tweets (B1_1, B1_2), referring to the mainstream media's narrative as a "fake story" and accusing them of abusing Omran for political purposes. The family, it is claimed, are free in Aleppo and will speak the truth.

Table 3. Exemplar tweets from Phase B (Around B1)

	RTs	Time	Text	Cluster	Account Type
B1_1	233	6/5/17 13:42	Remember Omran?! His family tells the true story of an Aleppo boy abused by western media presstitutes for political propaganda!	blue	@Government Official1
B1_2	398	6/5/17 13:50	Omran Daqneesh.. the fake story that shocked the world! Another White Helmets lie as his family in free Aleppo tells all..!	blue	@Government Official1
B1_3	380	6/5/17 13:50	my friend @[hidden] with Omran Daqneesh,Aleppo boy whom pictures spreaded by MSM 2 demonize Syrian gov.revealed his family were pro-gov	blue	Journalist
B1_4	5	6/5/17 13:51	According to pro-Assad media sources, The father of Omran child will be on the Syrian state TV to talk about the real story of his son Omran	red	Journalist

Table 4. Exemplar tweets from Phase B (Around B2-B4)

	RTs	Time	Text	Cluster	Account Type
B2_1	74	6/5/17 14:28	After 5 months under arrest, Omran is used by the regime media. We know he must say what Assad wants	red	Information Activist
B2_2	5	6/5/17 14:43	Omran's father refused to give interviews after the regime's bombing of his home. Chose to stay in Aleppo under the regime	red	Academic
B2_3	54	6/5/17 15:09	Remember Omran @CNN used to push its 'regime change' propaganda? He's well living under Assad gov	blue	Information Activist
B2_4	412	6/5/17 15:11	Omran raising the syrian flag .. in aleppo	blue	Information Activist
B2_5	188	6/5/17 15:13	Little Omran is safe and happy in government-controlled Aleppo.	blue	Journalist
B2_6	65	6/5/17 15:13	After being under house arrest, Omran is "giving interviews" with Syrian media. Threatening and coercing a child #Assad	red	Information Activist
B2_7	325	6/5/17 16:28	Omran alive & well in #Aleppo. Father talks of bribes offered by NATO terrorists. Airing Syria TV tonight	blue	@Journalist 1
B3_1	312	6/5/17 18:46	Omran Daqneesh is fine and living in Aleppo. (For those who understand Arabic, watch the video)	blue	Information Activist
B4_1	51	6/5/17 21:48	#Omran's Father: I didn't hear any noise caused by fighting jets, I don't know how things happened. #Aleppo #Syria	blue	Information Activist

B2-B4 (Table 4): After the speculative behavior, we see the first large spike in volume (B2) as the first interview is broadcast, followed by two downstream peaks (B3 and B4). During this period, the conversation shifts back and forth from anti-Syrian government accounts in the Red cluster to pro-Syrian government account in the Blue cluster, with collective claims and counter-claims about Omran's story. Accounts from the Red cluster defend the original Omran narrative (as presented by the mainstream media) and challenge the new events that are introduced.

The Daily Telegraph (UK daily newspaper), publishes an article on the reemergence of Omran, including photos of Omran and his father being interviewed on Syrian state television. @Telegraph offers quotes from the interview (in which the father provides alternative version of events), but they also point out that the family could be participating in the interview for their own safety. Others (e.g. B2_1, B2_6) challenge these new revelations by discrediting the interview—introducing the idea that the family have spent several months under house arrest and that the interview is being conducted under duress.

Counter to this position, accounts from the Blue cluster post tweets (e.g. B2_3, B2_5, B3_1) describing Omran as "alive and well" or "free and happy" in (government-controlled) Aleppo. Tweet B2_4 (the most highly retweeted during this period) celebrates Omran's—and by extension his family's—pro-Syrian government political leanings. The accounts from the Blue cluster, and hence the pro-Syrian government voices, are much more highly retweeted during this time.

As excerpts from the interview being to appear on Twitter, it becomes apparent that Omran's father did challenge the mainstream media's August 2016 portrayal of events—providing additional information that is itself inconsistent and therefore contested. B2_2 (Red cluster) describes how the father refused to give interviews following the regime's *bombing* of his home (supporting part of the original narrative that the family's house was bombed in an airstrike), but B4_1 quotes the father saying that he did not hear any fighter jets (above his house on the day of the attack), suggesting another, unspecified cause (*not a bombing)* for his family's home being destroyed. Additional information to support this narrative are not provided.

Three of the most retweeted accounts in our data are also active at this time: @InformationActivist1 posts a link to the interview showing Omran "fine and living in Aleppo". @InformationActivist3 and @Journalist1 raise the issue of bribes (by the mainstream media and others during the initial telling of Omran's story in 2016). @InformationActivist3 doesn't mention the source of the bribes but @Journalist1 places the blame with "NATO terrorists"—direct criticism of their involvement in the Syrian conflict.

6.2.3 PHASE C: Release of Post-Interview Articles in the Mainstream and Alternative Media

Phase C sees the release of articles from both the mainstream and alternative media reporting on the reemergence of Omran in televised interviews (Table 5). Consistent with their earlier reporting, The Independent, CNN, BBC, Washington Post, and New York Times (Yellow cluster), support the narrative that Omran was a victim of an airstrike and is now appearing on Syrian television in what could be propaganda. Countering the original narrative, Russian news agency Sputnik (Blue cluster) releases an article that promises the "true story". Outlets that position themselves as "alternative" media—21stCenturyWire (21WIRE), Veterans Today (VT), and ActivistPost—also publish articles about Omran which offer an alternative version of events.

Several of the most retweeted users are active at this time. @Journalist2 sends his only tweet, relief that Omran is alive and well, engaging his followers in the Green cluster (C1_1).

A variety of challenges to the mainstream media's narrative originate from the Blue cluster. @Journalist1 promotes her article on 21WIRE, questioning the western (mainstream) media's lack of interest in Omran's reemergence (C1_2); @InformationActivist1 levels criticism at the White Helmets for using Omran for propaganda (C4_1, C4_2); @IntheNow_tweet promotes Omran's support of the government and the family's fury at being used for propaganda; and @Journalist3, who interviewed Omran's father, quotes him as saying he was a member of the Syrian Army.

Table 5. Exemplar tweets from Phase C

	RTs	Time	Text	Cluster	Account Type
C1_1	600	6/6/17 12:36	Alive, well & smiling again! Fantastic. ????	green	@Journalist 2
C1_2	243	6/6/17 15:30	ALEPPO: The Return of Omran to No Fanfare from Western Media	blue	@Journalist 1
C1_3	60	6/6/17 16:27	Suffering and propaganda: The true story of #OmranDaqneesh	blue	Media Organization
C2_1	40	6/6/17 19:29	When last we saw Omran, his home was destroyed in an airstrike. Now he's appearing on Syrian TV	blue	Media Organization
C2_2	462	6/6/17 21:00	Turns out the family of THAT Syrian ambulance boy, Omran Daqneesh, 'supports' government forces #Aleppo	blue	Media Organization
C3_1	46	6/7/17 09:01	#Omran father: "The Syrian Army always protects the country. I served in the Syrian army. The army is the people."	blue	@Journalist 3
C4_1	2040	6/7/17 17:16	Father of little Omran Daqneesh from #Aleppo, describes how the White Helmets used Omran as a tool in their propaganda against #Syria	blue	@Information Activist1
C4_2	414	6/7/17 18:54	Remember Omran? His family is furious he was used for anti-government propaganda	blue	Media Organization

Phase C also features criticism leveled at the White Helmets, the local humanitarian group (based in rebel-held territories) that are reported to have rescued Omran from the rubble in August 2016. Tweets suggest the White Helmets lied, the truth has been revealed, and that the group had used Omran for propaganda purposes.

6.2.4 PHASE D: Post-interview — Anti-media sentiment

Phase D is characterized by a sustained conversation from the Blue cluster that is predominately critical of the mainstream media and their Omran narrative. The general feeling is that the mainstream media lied to spread propaganda about Syria and Russia (Table 6).

Table 6. Exemplar tweets from Phase D

	RTs	Time	Text	Cluster	Account Type
D_01	611	6/8/17 16:10	CNN's Christiane Amanpour used Omran's story to spread lies about Russia. Will she now go to #Aleppo for the truth?	blue	Information Activist
D_02	0	6/8/17 16:21	@USEmbassySyria @CNN's @camanpour used Omran's story to spread lies about Russia. Will go to Aleppo for the truth?	blue	Information Activist
D_03	17	6/8/17 20:39	#MSM coverage of #Syria #Aleppo #Omran 'PR support to terrorist organizations'	blue	Media Organization
D_04	168	6/12/17 15:36	Child victims used for Syrian war propaganda (Op-Edge by Eva Bartlett)	blue	Media Organization
D_05	4	6/13/17 23:49	White Helmets filmed #Omran before providing first aid @camanpour #CNNisISIS #NATO	blue	Information Activist

Tweets in Phase D include directed challenges (using the mention function) at journalists and news organizations, in particular at CNN and CNN journalist Christiane Amanpour. This stems

from an RT article in which Russian Foreign Ministry spokeswoman Maria Zakharova challenges Christiane Amanpour to travel to Syria and speak to Omran and his family to get the *real story*[1]. @InformationActivist1 amplifies this article and the challenge. In a barrage of tweets, one user (not highly retweeted information activist) sends 14 tweets in 13 minutes, each directly targeted at organizations such as the US Embassy in Syria, the UN Human Rights Agency, BBC World News, and the Democratic National Convention to disseminate that CNN, and Amanpour specifically, had used Omran to spread lies about Russia.

Throughout Phase D there is a common message that the truth is now out and that the "MSM"—the "mainstream" media—spread lies when reporting the story of Omran. Tweets such as D_05 attack the mainstream media for lying, insisting that Omran was not injured in an airstrike, but offering no alternative explanation. @21WIRE's attack on the mainstream media suggests they 'provide PR support to terrorist organizations' (D_03), while D_05 implies CNN is a terrorist organization by using the hashtag "#CNNisISIS".

7. TECHNIQUES OF INFORMATION OPERATIONS (MICRO LEVEL)

At the micro level we sought to identify the specific actions that that tweet authors engaged in as they participated in the Omran conversation i.e. *how* tweet authors were involved in information operations. Our approach was inspired by Charmaz's [25] construction of grounded theory—coding for the actions of the participants and providing an 'insider's view' while avoiding biased analytical insights. This process began with a series of inductive open coding, with three researchers independently listing the actions they felt were present within two samples from our Omran data: 1) a random sample of 50 retweets; and 2) the first 50 tweets temporally from the start of the dataset. Through affinity-diagramming we came to consensus around the specific actions observed. We focus on two specific actions that are salient to the discussion here: *introducing uncertainty into the information space*, and *discrediting information providers*. We unpack these in the following sections.

7.1 Introducing Uncertainty into the Information Space

In long-standing work from social psychology on rumoring, particularly in the context of crisis events, researchers have found that a lack of information, anxiety, and uncertainty contribute to the spread of rumors [7,14,35]. During these times, people participate in collective sensemaking that—although it can help reduce uncertainty—also contributes to the development and spread of rumors [7,35]. In the Omran conversation, we observe some elements of sensemaking behavior, particularly milling, which includes interpreting, speculating, theorizing, debating, and challenging various explanations of events [41]. This activity can be viewed as a collective attempt to resolve uncertainty, however we also see specific efforts to highlight existing uncertainty and to introduce new uncertainty into the conversation—for example by *suggesting we don't know the truth*. We found users actively talking about the 'truth'—that it is 'coming soon' or about to be 'revealed'. Around B1, speculative tweets cast doubt on the current understanding of events, suggesting that we don't (currently) know the truth but that soon the truth is coming:

> ***Maybe the world will get to know the truth*** *about Omran! (2017-06-05 15:21, Blue cluster, Information Activist)*

> *Recovered from WHAT?* ***You'll hear the truth on TV tonight****. (2017-06-05 16:05, Blue cluster, Information Activist)*

[1] This in response to a 2016 interview with Russian Foreign Minister Sergey Lavrov in which Amanpour used the picture of Omran to question Russia's support of Damascus in the Syrian conflict.

The real story *of Omran in Aleppo with his family. Soon on Syria TV (2017-06-05 16:16, Blue cluster, Journalist)*

In addition to implying that the current narrative is false, these claims also imply that until now there has been an orchestrated cover up that prevented the revelation of the truth, which contributes to the doubt. Post-interview, there is collective satisfaction within the conversation that the truth was revealed by Omran's father:

Truth emerges*. New photos of Omran, the boy who became a symbol of Aleppo's suffering (2017-06-06 13:03, Other cluster, Journalist)*

Finally, the truth *about Omran (2017-06-06 02:45, Blue cluster, Information Activist)*

Omran: the true story*! (2017-06-08 23:23, Blue cluster, Journalist)*

Tweets of the 'true story' emerge after the interviews and continue into Phase D of our data. In Phase D, the notion that the *truth is now revealed* is 'weaponized' and used to attack the mainstream media—the emergence of the 'truth' proves that the mainstream media had lied. This leads to calls of "fake news" that work to undermine the mainstream media.

Despite frequent references to the 'truth' in tweets, there is little convergence around a single, coherent version of the events. Instead, alternative versions of events are presented that challenge aspects of the mainstream media's narrative (e.g. there was no airstrike) but do not provide a viable alternative explanation. At other times new information is introduced (e.g. Omran and his family are free and living in Aleppo) but the details surrounding the family's whereabouts since the reported airstrike in 2016 are not provided. Omran is accused of being a "child actor" in one tweet while being labeled a victim of NATO or ISIS propaganda in others. The use of this kind of action does not reflect sensemaking as previously theorized—as a collective-problem solving effort to converge around a shared understanding of what actually happened [7,35]—but rather reflects efforts to cast doubt on the existing narrative, destabilize the information space, and make others question what, if anything, they can believe.

7.2 Discrediting Information Providers

Within the Omran conversation we observed numerous actions that can be characterized as attempts to discredit the credibility of institutions (e.g. NATO, UN), large media corporations (e.g. CNN, BBC), and individual journalists. This behavior was not limited to one side of the Omran conversation. While some tweets (originating from the Blue cluster) would call out CNN's "fake news", others (from the Red cluster) would seek to discredit the Syrian journalist that was interviewing Omran on Syrian state television. Most salient in this category is the opposition towards the mainstream media. This anti-media sentiment, concentrated in the Blue cluster, occurs throughout the conversation, but is particularly notable during the sustained anti-media conversation that occurs during Phase D.

7.2.1 Calling Out Fake News and Propaganda

The hashtag *#MSM* or abbreviation *MSM* is popular within this conversation. MSM is not simply a succinct reference to the mainstream media, but a label of disrespect, signifying disdain with the large media corporations and a distinct lack of trust in their reporting. In our data, the hashtag MSM was exclusively used in tweets attacking the credibility of the mainstream media, often co-occurring with the tweet's author pointing to what they viewed as "lies":

Omran's Father ***Exposes the MSM****'s* ***lies*** *which lead to air strikes (2017-06-06 23:42, Blue cluster, Information Activist)*

These attacks become more pointed as organizations and individual journalists are labelled as "fake news media" or "propaganda". This technique—accusing each side of fake news or

propaganda—occurs in both the red and blue clusters, as demonstrated below. The yellow cluster (the target of such attacks) was not heavily involved (i.e. there is little, if any, response to these accusations):

> ***#FakeNewsMedia*** *staged event for* ***Anti-Assad #propaganda*** *(2017-06-06 03:43, Blue cluster, Information Activist)*

> ***Pro-Damas journalist announces*** *he's met Omran and his father.* ***Typical propaganda*** *(2017-06-05 15:08, Other cluster, Journalist)*

7.2.2 Targeting Attacks

Targeted attacks, made possible by Twitter's mention (@twitter_user) and reply functions, were conducted at organizations and individuals associated with the media. In a technique that can be seen in other types of online activism, one user single-handedly sent 57 such tweets to news organizations, journalists, and other information providers such as U.S. government agencies and the UK Foreign Secretary, which all sought to discredit the mainstream media, CNN, or Christiane Amanpour. In the following example CNN Journalist Christiane Amanpour's journalistic credentials are challenged:

> *@camanpour Fake Journalist Amanpour worked with White Helmets Propaganda studio using child actor Omran (2017-06-13 21, Blue cluster, Information Activist)*

The targeted attacks were also used to demand action from journalists and media organizations:

> ***Hey, @BBCNews*** *@euronews @SkyNews @Channel4News* ***Quickly broadcast the True Story of #Omran*** *(2017-06-05 17:52, Blue cluster, Information Activist)*

Targeted attacks were most prevalent from the Blue cluster, and we did not see any responses to these attacks from news agencies, journalists, or other information providers in our data. However, these kind of attacks did also emanate from the Red cluster, with the Syrian journalist who conducted the interview being subjected to strong personal criticisms that aimed to undermine her credibility. The following tweet was in reference to a selfie that the journalist had apparently posted (prior to our collection period) showing her with dead opposition fighters:

> *same smile with bodies of prisoners tortured to death and Omran.* ***Assad's journalist ready to commit atrocities*** *(2017-06-05 21:40, Red cluster, Journalist)*

7.2.3 Suggesting Unproven Affiliations

Another form of discrediting was to suggest affiliations with institutions or groups with which others may hold negative views, for example NATO, the CIA, and terrorist organizations. This type of attack was used against the mainstream media in particular. Highly retweeted user @Journalist1 was the first to introduce the term "NATO terrorists" into the Omran conversation:

> *Omran alive & well in #Aleppo. Father talks of bribes offered by* ***NATO terrorists****. Airing Syria TV tonight (@Journalist1 2017-06-05 16:28, Blue cluster)*

An hour later, influencer @GovernmentOfficial1 tried to discredit the mainstream media referring to them as "NATO media", implying that they nothing more than the propaganda arm of the military alliance:

> *Now that the ultimate Aleppo story of Omran turned out to be false as we expected,* ***will NATO media*** *apologize for this terrible mistake?! (@GovernmentOfficial1 6/5/2017 17:52, Blue cluster)*

Paradoxically, rather than suggesting that the media are part of a structured military alliance, an alternative approach was to suggest the mainstream media collude with terrorist organizations and support their PR efforts:

*MSM coverage of Omran is **PR support to terrorist orgs** (2017-06-08 19:19, Blue cluster, Media Organization)*

Other users took this further. A more succinct way to expunge a mainstream media's credibility is to simply state that mainstream media organizations *are* terrorist organizations, specifically ISIS:

***CNN is ISIS**. Skilled in image propaganda for their own purposes (2017-06-03 18:12, No cluster, Information Activist)*

*Omran's Father Exposed How the US & White Helmets Lied to the World **#CNNisISIS** #CIAisISIS (2017-06-08 03:48, Blue cluster, Information Activist)*

The technique of associating individual journalists, the mainstream media, and other information providers with propaganda efforts, immoral behaviors, and terrorist groups, is an action we observed by users engaged in the Omran conversation. Tweets making these unsupported claims are generating negative sentiment toward the targeted individual or group and challenging their credentials and (perhaps) instilling uncertainty in the information they provide. Although it remains important to question the source of information, this sort of behavior goes beyond simply doubting the information provider. These appear to be attacks on a more personal and emotional level, specifically targeted at the credibility of the provider with the aim of diminishing trust and introducing further uncertainty.

8. DISCUSSION

The multi-part story of Omran Daqneesh, characterized by contested facts and conflicting narratives, has acute geopolitical significance in a multilateral military conflict. In his initial appearance, his photo, taken in the wake of a family tragedy, was used to garner attention in the West to the human impacts of the war, particularly those caused by the actions of the Syrian government and their primary ally, Russia. Omran therefore became a symbol of suffering at the hands of Syrian President Assad. His reappearance, about a year later, introduced new information—and importantly new alternative narratives—that worked to undermine the initial "mainstream" narrative about the causes of innocent citizens' suffering in Syria. In this work, we consider social media activity around the reappearance of Omran from a perspective of online "information operations"—investigating the underlying structure of the conversation, the techniques used, on both "sides", to create, promote, defend, and challenge narratives that support geopolitical aims, and the emergent collaborations that facilitate the "work" of information operations.

8.1 Information Operations as Collaborative Work in an Online Crowd

From the macro-level, the retweet network graph reveals a highly polarized conversation, characterized by distinct communities or clusters of participants who primarily share messages from within their own groups. A closer look reveals the work of information operations taking shape within heterogeneous assemblages of actors. These assemblages consist of information activists, bloggers and journalists, non-profit organizations (NGOs), government officials, and government-funded media outlets. This work is geographically distributed, including people from within the affected areas (in Syria), western journalists (some of whom travel to the area), and online "volunteers" from around the world. These entities work together to produce, amplify, and spread a preferred set of narratives.

Interestingly, it was the pro-Syrian government voices of the Blue cluster that dominated the conversation as they made up more than half of the participating accounts and content; this included seven of the ten most-retweeted accounts. Within this cluster, accounts of journalists and "alternative" media outlets (including Russian-government funded media outlets) were

integrated into a larger community of accounts, including concerned citizens, online activists and diverse political actors. The influential accounts occasionally retweeted each other and shared many common retweeters—whose sustained work to retweet the influential, pro-Syrian government accounts led to the dense and interconnected Blue cluster as represented in Figure 1.

It can be productive to view these information operations as a form of collaborative work within an online crowd. This perspective allows us to conceptualize this "work" as not simply coordinated—i.e. there is no central node controlling all of the accounts in these networks—but instead as an assemblage of diverse actors, driven by a variety of motivations, loosely collaborating in the production and propagation of strategic narratives. This view extends previous descriptions of online information operations as perpetrated by armies of automated accounts (or "bots") [50] and factories full of paid trolls [43], and suggests, at least in this case, a complex and in some ways organic system with emergent properties, similar to other configurations of online volunteerism [37,39] and online activism [34].

In this graph, we can see that actors and organizations with specific geopolitical agendas, including government-funded media and "cloaked" [15] agents of political organizations, are integrated into the online "communities" working to spread conflicting narratives related to Omran's story. This is especially true for the pro-Syrian government (Blue) cluster, where the voices of Russian-government funded media, Syrian government officials, and Western activist-journalists are retweeted by a set of common amplifier accounts that include both automated accounts and sincere online activists. This perspective suggests a strategy of cultivation, rather than purely coordination, and aligns with historical accounts of information operations perpetrated by specifically Russian government campaigns [27,47].

The activities of the anti-Syrian government (Red) cluster and the mainstream media (Yellow, Orange and Green) clusters can also be seen through this same lens—i.e. as a form of information operations (broadly interpreted), whereby participants, knowingly or unknowingly, work to spread, support, and defend the western, mainstream media narrative. However, this activity was far less organized, in terms of the structure of collective action (represented in the retweet network graph) than the pro-Syrian government operations in this dataset.

8.2 Collaborative Operating: Collective Efforts in Information Operations

In this work we also examined *what* kind of information operations were present in the Omran conversation, and *how*. Through our in-depth analysis of actions at the account level, we noted two particularly salient and related complementary techniques that were employed by accounts in the pro-Syrian government blue cluster: assembling "facts" into alternative narratives that could be propagated into the information space; and challenging the credibility of other information sources (e.g. mainstream media organizations and journalists)—undermining integrity and introducing doubt that would serve to make the alternative narratives more acceptable (to some). We unpack these concepts in the following sections.

8.2.1 Assembling "Facts" into Undermining Narratives

As we analyzed the Omran conversation at the tweet level, we identified the presence of contested facts. These are new pieces of information that are introduced to the conversation and then assembled into new narratives, which could be used to challenge the existing narrative. Rogers and Tyushka [33] outline two approaches to this type of narrative challenge. The first approach is by means of a positive competing counter narrative—a confrontation and replacement of the existing narrative. Another is through an *anti-narrative*, which, rather than attempting to replace the existing narrative, seeks to undermine it. Within the Omran conversation on Twitter there are persistent challenges to the mainstream media's narrative, however there is no single counter-narrative that coherently presents and fully explains the story and how it came to be.

Rather, we observe the presence of *anti-narratives* that seek to "*replace the established order with disorder*" [33].

These *undermining narratives* do not offer robust, standalone versions of events that provide closure to the reader. *Anti- or undermining narratives* are formed by introducing multiple, inconsistent, and often conflicting "facts" or "events" into the information space, which in turn destabilizes the "mainstream" narrative by distorting the information space and confusing the audience [32,33]. This, and other techniques such as *suggesting we don't know the truth,* align with a known information operations strategy termed "cognitive hacking" [11]—which is defined as an attempt to alter the perception of reality through the intentional introduction of false information. Reflecting a tactic theorized to be part of the Russian disinformation apparatus, the intentional introduction of uncertainty serves to distort the information space leading to "muddled thinking" and undermining trust in information providers and the institutions of western democracies [26,32]. Pomerantsev and Weiss [32] argue that the goal of these kinds of information operations is to reduce trust in institutions, weaken societies, and demotivate political action such as resistance.

8.2.2 Challenging the Credibility of Information Sources

The concerted, collective, and sustained efforts to challenge the credibility of information sources can be seen in this same way—as a form of "information operations" [26,32,33]. Interestingly, we saw this technique in action on both "sides" of the Omran conversation, as accounts in both the Blue and Red clusters attempted to discredit voices within the opposing cluster by referring to the other as propaganda or suggesting unsavory affiliations between them and other groups. Within the Red cluster, efforts focused around discrediting the interview with Omran's father, describing it as propaganda, questioning the past actions of the pro-Syrian government interviewer, and suggesting that the interview was being conducted under duress. However, the most salient activity of this kind involved the Blue cluster's attempts to discredit individuals and organizations in the "mainstream" media. Within the pro-Syrian government Blue cluster, accounts demonstrated a sustained and collaborative effort to discredit the media—using hashtags such as #MSM, sending targeted tweets to directly confront media accounts and garner attention, and suggesting affiliations with controversial organizations such as NATO, the CIA, and ISIS (#CNNisISIS). Through these actions, the crowd in the Blue cluster both reflected and supported a diminished trust in the "mainstream" media, which, over time, would leave the door open for the introduction of alternative narratives originating from other sources.

9. LIMITATIONS AND FUTURE WORK

This study of information operations online focused on the Twitter conversation of one specific case study. Although the data is from a larger collection, the case study presented here is just a snapshot of that, and specifically a period of time when the counter-narrative was ascendant (due to Omran's reappearance). We acknowledge that the network may have looked much different (for example, the red cluster might have been bigger and higher volume) if we had similar data from the weeks and months immediately following the initial photograph of Omran in August 2016. Future work is needed to apply this lens to other information operations online, including more case studies in different contexts, and using data from other platforms to build a better understanding of information operations. In particular, the development of methods and models that help us to differentiate between coordinated and organic, emergent information operations is a critical area for future research.

10. CONCLUSION

In this research we investigate information operations on social media by studying the conversation and narratives surrounding a specific episode of the Syrian conflict—the story of

Omran Daqneesh (the 'Aleppo Boy')—through a CSCW lens. We use an iterative mixed-methods approach to understand *who* was participating in these conversations, *what* they were doing, and *how* they were doing it. We uncover networks of clustered users that contribute to a contested and politicized information space surrounding Omran's story; the presence of undermining narratives that serve to disrupt the mainstream media's narrative and confuse the audience; and techniques such as *introducing uncertainty into the information space* and *challenging the credibility of information providers* as tactics for producing and propagating the undermining narratives. In addition to illustrating what information operations are and how they play out on social media, we contribute an improved understanding of online activism as a vehicle for information operations whereby groups of diverse users—including government agents, citizen journalists, and online activists—form emergent collaborations to engage in the cooperative work of conducting information operations. Future work is needed to examine why these online activist communities are functioning in this way, including whether they are specifically cultivated or coopted for the purpose of information operations.

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