

“The Government Spies Using Our Webcams:” The Language of Conspiracy Theories in Online Discussions

MATTIA SAMORY, Virginia Tech, USA

TANUSHREE MITRA, Virginia Tech, USA

Conspiracy theories are omnipresent in online discussions—whether to explain a late-breaking event that still lacks official report or to give voice to political dissent. Conspiracy theories evolve, multiply, and interconnect, further complicating efforts to limit their propagation. It is therefore crucial to develop scalable methods to examine the nature of conspiratorial discussions in online communities. What do users talk about when they discuss conspiracy theories online? What are the recurring elements in their discussions? What do these elements tell us about the way users think? This work answers these questions by analyzing over ten years of discussions in r/conspiracy—an online community on Reddit dedicated to conspiratorial discussions. We focus on the key elements of a conspiracy theory: the conspiratorial *agents*, the *actions* they perform, and their *targets*. By computationally detecting *agent-action-target* triplets in conspiratorial statements, and grouping them into semantically coherent clusters, we develop a notion of *narrative-motif* to detect recurring patterns of triplets. For example, a *narrative-motif* such as “*governmental agency-controls-communications*” appears in diverse conspiratorial statements alleging that governmental agencies control information to nefarious ends. Thus, *narrative-motifs* expose commonalities between multiple conspiracy theories even when they refer to different events or circumstances. In the process, these representations help us understand *how* users talk about conspiracy theories and offer us a means to interpret *what* they talk about. Our approach enables a population-scale study of conspiracy theories in alternative news and social media with implications for understanding their adoption and combating their spread.

CCS Concepts: • **Human-centered computing** → *Empirical studies in collaborative and social computing*;

Keywords: online communities; conspiracy; motif; topic

ACM Reference Format:

Mattia Samory and Tanushree Mitra. 2018. “The Government Spies Using Our Webcams:” The Language of Conspiracy Theories in Online Discussions. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 2, CSCW, Article 152 (November 2018). ACM, New York, NY. 24 pages. <https://doi.org/10.1145/3274421>

1 INTRODUCTION

Consider the following conspiratorial statements:

CIA provokes Conspiracy Theory FAKE NEWS that Russia Hacked Election

DEA orchestrates disinformation campaign to conceal surveillance powers

FBI fabricates hoax of ISIS gold and silver coin story

These statements share the same key elements: a governmental agency that controls information to manipulate public opinion. Yet, a number of details differ across these statements. For example, they differ in the conspiratorial agent identified (respectively the CIA, DEA, FBI) and in the setting

Authors’ addresses: Mattia Samory, Virginia Tech, 620 Drillfield Drive, Blacksburg, VA, 24060, USA, samory@vt.edu; Tanushree Mitra, Virginia Tech, 620 Drillfield Drive, Blacksburg, VA, 24060, USA, tmitra@vt.edu.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than the author(s) must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from permissions@acm.org.

© 2018 Copyright held by the owner/author(s). Publication rights licensed to ACM.

2573-0142/2018/11-ART152 \$15.00

<https://doi.org/10.1145/3274421>



Fig. 1. Although the details of who is behind an alleged conspiracy and what exactly is their plan vary wildly in conspiratorial statements, these often follow similar narratives. We extract agent-action-target triplets from submissions in r/conspiracy, and abstract them into semantically coherent narrative-motifs that recur in the corpus. Narrative-motifs highlight the entities that users refer to, and provide a frame to interpret the topics of conspiracy theory discussion.

of the conspiracy (governmental elections, mass surveillance, Islamic terror). In fact, although these statements share the same key elements, they do not have a single word in common. Online discussions host an unprecedented variety of conspiratorial statements like the ones above. In fact, conspiracy theories are often collages of many smaller scale theories [7, 42] that gradually become facets of an all-encompassing, conspiratorial worldview [62]. This overwhelming variety is the first challenge to studying conspiracy theories in online discussions comprehensively and at scale. This work offers methods to abstract from the linguistic details of conspiracy theory discussions and to expose their underlying commonalities.

To cut through the complexity of conspiratorial language, scholars have proposed different ways to categorize conspiratorial theories. These can be grouped into two classes. First is a set of *top-down* approaches, which focus on one principle to categorize conspiracy theories [42]—typically the characteristics of the conspiratorial agent or the scale of the conspiracy. Second, *bottom-up* approaches survey responses to conspiratorial statements to identify types of conspiratorial beliefs, e.g. [12]. Whereas top-down approaches carry the scholar’s bias in choosing the categorization principle, bottom-up techniques focus on a few well-known conspiracy theories [53]. Thus, existing approaches suffer from *selection bias* [64].

We develop a quantitative definition of *narrative-motifs*—recurring patterns of conspiratorial agents, actions, and targets—to infer a data-driven categorization of conspiracy theories in online discussion. We extract narrative-motifs from the complete corpus of discussions and use them to categorize conspiratorial topics. Because our approach works bottom-up from the entire discussion corpus, it does not need to assume a priori categories of conspiracy theories nor does it need to focus on paradigmatic examples. Therefore, our approach helps limiting selection bias. It surfaces relevant narrative patterns in the corpus, and it leverages human experts to interpret their meaning as conspiratorial constructs. We use narrative-motifs to analyze over ten years of discussions through 6 million comments in r/conspiracy, an online community on Reddit sporting over 500K subscribers dedicated to conspiracy theorizing. We start our study by addressing the question:

RQ1 Topics: What are the topics of discussion in r/conspiracy?

To answer this, we uncover conspiratorial topics in the corpus. We employ a modified version of character n-grams, also known as infinitygrams, to preserve complex periphrases as single entities (e.g., the “New World Order,” a secret elite group allegedly conspiring to rule the world). Then we find latent topics on the infinitygrams via the Meaning Extraction Method, a topic model that aims to expose the dimensions of thinking in natural language. We find 33 conspiratorial topics, including political elections, Islamic terror, and mass surveillance, in our examples.

However, multiple conspiracy theories are but facets of a single conspiratorial narrative. Therefore, it is crucial to understand not only *what* conspiracy theories users discuss, but also *how* users frame them. Consequentially, the next question motivates our following analyses:

RQ2 Narrative-motifs: What are the recurring narrative elements that users resort to for framing conspiracy theories in r/conspiracy?

To answer this question, we find recurring narrative-motifs in the discussion corpus. Most scholars define conspiracy theories as a composition of three narrative elements: the group of conspiratorial *agents*, their secret and malevolent *actions*, and the *targets* of the conspiratorial plot. The juxtaposition of agent, action, and target, therefore offers a minimal yet meaningful description of a conspiracy theory. We identify various incidences of **agent–action–target** triplets that contribute to a more universal narrative motif. For example, the conspiratorial statements opening the paper contain respectively the agent-action-target triplets (**CIA**, **provokes**, **FAKE NEWS**), (**DEA**, **orchestrates**, **disinformation campaign**), and (**FBI**, **fabricates**, **hoax**). We use dependency parsing to extract agent-action-target triplets from the discussions. Then, we identify narrative-motifs as semantically coherent groups of triplets using a combination of word embeddings and clustering. We find 12 distinct narrative-motifs, including the opening example **governmental agency–controls–communications**.

We conclude our analysis by bringing together what users discuss—the topics—and how users talk about them—the narrative-motifs. We ultimately use narrative-motifs as a lens to interpret conspiratorial topics. For example, the statements “**FBI fabricates hoax of ISIS gold and silver coin story**” and “**Russia: We have concluded that USA is defending ISIS**” both discuss Islamic terror (Figure 1). However, the statements feature distinct narrative-motifs—respectively, **governmental agency–controls–communications** and **country–threatens peace–through military**. Narrative-motifs clarify that the first statement is framed in terms of illicit disinformation campaigns, whereas the latter in terms of covert warfare strategies. Therefore, we ultimately address the question:

RQ3 Dominant narrative-motifs in topics: What framing do users typically adopt to discuss a conspiratorial topic, and in particular what topics share a similar framing in r/conspiracy?

We find narrative-motifs and topic proportions in the discussions and categorize topics according to the narrative-motif that users primarily use to discuss them.

Contribution. This work therefore offers two contributions:

- A data-driven method for categorizing statements in open-ended discussion through agent-action-target narrative-motifs.
- An analysis of the topics and narrative-motifs in r/conspiracy, an online community for conspiracy theory discussion.

Conspiracy theories influence a citizen’s ability to make decisions for both self-interest and social good [39]. Narrative-motifs give us a tool that can help understand the nature of conspiracism in online discussions and ultimately limit its spread. Narrative-motifs capture the shared symbols in conspiratorial language, which reflect the adopters’ values and preoccupations. On the one hand, narrative-motifs provide academics in psychology and social science with a toolbox for studying these symbols. On the other hand, our data-driven categorization of conspiracy theories affords identifying conspiracy theories in news and social media, as well as monitoring their adoption and diffusion, with broad implications for community managers and policymakers.

The rest of this paper is organized as follows. We start by situating our approach in related literature. After briefly describing the data, we detail our methods for extracting topics and narrative-motifs from the discussion corpus. We then present the extracted narrative-motifs, elaborate on their significance with respect to existing interpretations, and use them to expose the commonalities

between conspiratorial topics. Finally, we discuss our results, and we compare the proposed approach with existing categorizations of conspiracy theories, before concluding with remarks on the implications of this work.

2 RELATED WORK

We start by summarizing social computing literature on conspiracy theories in online discussions. Most related literature identifies agents, actions, and targets, as the defining constituents of conspiratorial narratives. Scholars in folkloristics categorize narratives using motifs—recurring elements such as characters. Similarly, scholars in psychology, social science, and epistemology leverage agents and targets to categorize conspiratorial narratives. These works inform our approach that uses agent-action-target narrative-motifs as a principle for categorizing conspiracy topics.

2.1 Conspiracy theories online

At least two factors make online communities a fertile ground for conspiracy theories. First, information can spread online without any editorial filter, making it difficult to assess its credibility [45]. Users that primarily rely on online media, such as blogs, as information sources are more likely to accept conspiracy theories [60]. Second, online echo chambers include only supporting points of view and exclude challenging opinions [59]. Restricted access to challenging opinions reinforces conspiratorial beliefs [17, 38].

Work in online misinformation details how alternative media intentionally fabricate conspiracy theories, spreading false allegations ranging from reptilian presidents to staged terrorist attacks [43, 59]. These conspiracy theories witness a renewed golden age as a political weapon [22]. Although intentional manipulation of public opinion is a momentous issue, surprisingly few studies focus on conspiracy theories in good-faith discussions.

Social media users that engage in conspiracist discussions show interest in a variety of conspiracy theories [9]. Engagement in online conspiracy theory discussion increases especially in the wake of dramatic events like mass shootings [4, 58]. In this light, conspiracy theories are a form of collective sensemaking—the process of giving meaning to collective experiences. In particular, groups attempt to make sense of these uncertain situations with the incomplete information available [3, 32]. Despite the prevalence of conspiracy theories in good-faith online discussions, most work in this space focuses on a limited number of conspiratorial topics like controversial public issues [37, 44] and the rejection of scientific evidence [41]. The present work instead proposes narrative-motifs as a general method for analyzing conspiracy theories in online discussions.

2.2 Recurring elements in conspiratorial narratives

Many conspiracy theories follow similar patterns and are best considered as variants of a common narrative [27]. In particular, conspiracy theories symbolize broader conflicts between social forces [61]. They portray outgroups as “collective enemies” set up to dominate ingroups through subversive activities [36]. In this light, many scholars define conspiracy theory in terms of three elements: the conspiratorial *agent*, the agent’s *action* or machination, and the action’s *target*—i.e., the goal, the outcome, or the victim of the alleged conspiracy [5]. We summarize in Table 1 some of the previous work that leverages these three elements to define conspiracy theory. For example, Pigden [52] define conspiracy as a secret plan on the part of a group to influence events by covert action. Similarly, Keeley [35] defines conspiracy theory as an explanation of some historical event in terms of the significant causal agency of a relatively small group of conspirators acting in secret. The juxtaposition of agent, action, and target, therefore offers a minimal yet meaningful description of a conspiracy theory. We draw inspiration from this body of work and leverage agent-action-target triplets as narrative-motifs to characterize the narrative of a conspiracy theory.

reference	definition of conspiracy theory or belief
[31, 54, 62]	a vast, insidious, preternaturally effective international conspiratorial network designed to perpetrate acts of the most fiendish character
[1, 19, 67, 70]	involve multiple actors working together in secret to achieve hidden goals that are perceived to be unlawful or malevolent.
[6]	causal narratives of an event as a covert plan orchestrated by a secret cabal of people (or organizations) instead of a random or natural happening
[7]	an organization made up of individuals or groups was or is acting covertly to achieve some malevolent end.
[8]	the intentional deception and manipulation of those involved in, affected by, or witnessing these events.
[13]	social and historical events occur as a consequence of a carefully worked out plan, plotted in secret by a small group of powerful individuals who aim for world domination.
[16, 52]	a secret plan on the part of a group to influence events partly by covert action.
[16, 35, 65]	a proposed explanation of some historical event (or events) in terms of the significant causal agency of a relatively small group of persons—the conspirators—acting in secret. multiple actors cooperate in order to orchestrate a malevolent plot.
[18, 63]	as attempts to explain the ultimate causes of events as secret plots by powerful forces rather than as overt activities or accidents
[33]	portray outgroups as “collective enemies” set up to dominate ingroups through subversive (hidden) activities.
[28, 36]	the attempt to explain a significant political or social event as a secret plot by powerful individuals or organizations
[41]	an omnipresent, malevolent, and highly coordinated group that wields secret influence for personal gain, and credit this group with the responsibility for many noteworthy events.
[47]	hidden, malevolent groups secretly perpetuating political plots and social calamities to further their own nefarious goals
[50]	powerful people have worked together in order to withhold the truth about some important practice or some terrible event.
[61]	a subset of false beliefs in which the ultimate cause of an event is believed to be due to a plot by multiple actors working together with a clear goal in mind, often unlawfully and in secret
[63]	some covert and powerful individual(s), organization(s) or group(s) are intentionally plotting to accomplish some sinister goal
[66]	The Conspirators Condition - There exists (or existed) some set of agents with a plan, The Secrecy Condition - Steps have been taken by the agents to minimize public awareness of what they are up to, and The Goal Condition - Some end is or was desired by the agents.
[20]	

Table 1. A majority of related literature resorts to agents, actions, and targets as the key elements defining conspiracy theory or conspiracy belief. We report a sample of these definitions, and highlight the three elements. For the sake of readability we group together works that refer to each other's definition. In the present work, we use agent-action-target triplets as the minimal yet meaningful recurring elements in online discussions that denote conspiratorial narrative-motifs.

2.3 Narrative-motifs as a principled categorization of conspiracy theories

Folktale scholars have longstanding practice in managing multiple variants of a single story. For example, there exist over a thousand variations on the story of Cinderella. We turn to their expertise to address the many variants of a conspiratorial narrative. A major advancement in organizing folktales has been the introduction of taxonomies. In particular, the Aarne-Thompson indexes are considered the most valuable tools in the professional folklorist's arsenal [21]. The Aarne-Thompson Motif index uses motifs, recognizable and consistently repeated story elements (e.g.,

common characters, objects, actions, and events) that are used in the traditional plot structures or tale types. More recently, computational linguists used subject-verb-object triplets to automatically classifying folktales according to the Aarne-Thompson-Uther index [48]. Motivated by these works, we categorize conspiratorial narratives using narrative-motifs. Narrative-motifs are motifs by the folkloristics definition, but focus on patterns of agents, actions, and targets which are the essential elements of conspiracy theories.

2.4 Existing approaches to categorizing conspiracy theories

We can sort existing approaches to categorizing conspiracy theories into two main types: breadth-based and focus-based [42]. Breadth-based categorizations divide conspiracy theories by how restricted the target of a conspiracy theory is—from a specific objective to world domination. Barkun [7], for example, identifies three types of theories of increasing breadth: conspiracies that target specific events, conspiracies that have broader goals such as control of the population, and even broader conspiracies that manipulate the agents of lesser conspiracies. Focus-based categorizations divide conspiracy theories by the type of the conspiratorial agent (e.g., religious groups instead of secret societies). Walker [68] proposes five categories according to the position of the agent—outside or within a community, belonging to elite or lower classes, or transcendental agents such as angelic forces. Breadth- and focus-based categorizations leverage the qualities of targets and agents to discern between conspiracy theories. However, they do so implicitly and separately from one another. The present work builds on this approach and considers agents, actions, and targets under one model: the narrative-motif.

A distinct, yet relevant, approach to categorizing conspiracy theories is proceeding bottom-up from data and inferring higher-level structure. Brotherton et al. [12] use factor analysis to identify five facets of conspiracist beliefs: government malfeasance, extraterrestrial cover-up, malevolent global conspiracies, personal wellbeing, and control of information. Brotherton et al. ultimately derive their factors from a manually curated seed set of items. Our data-driven approach is different in that it does not posit paradigmatic examples. Instead, we derive observations from the entire discussion history of a large conspiracy theory community.

3 DATA

We study discussions in r/conspiracy, a subreddit (i.e., Reddit community) which counts over 500K subscribers to date. The subreddit self-defines as “a forum for free thinking and discussing issues which have captured the public’s imagination.” Beyond free-form debate on a range of conspiracy theories, r/conspiracy hosts a wiki for conspiracy theories, features links to external resources on the topic, and entertains question and answer sessions with prominent conspiracy theorists.

Using the Reddit API, we collected all submissions and comments from the entire history of the subreddit r/conspiracy. The dataset spans from January 2008 to June 2017 and contains approximately 400,000 submissions and 6 million comments made by 200,000 active accounts.

4 METHODS

Our approach consists of three phases, summarized in Figure 2: 1) extracting key topics of discussion in the conspiracy subreddit; 2) finding groups of semantically coherent narrative-motifs that recur in the discussions; 3) using the narrative-motifs to categorize and interpret the conspiratorial topics. The next sections detail each phase respectively.

4.1 RQ1: topics in conspiracy discussion

After preprocessing the titles of all submissions, we use a modified version of Bag-of-Words to encode the titles. Instead of words, we employ variable-length character n-grams to preserve

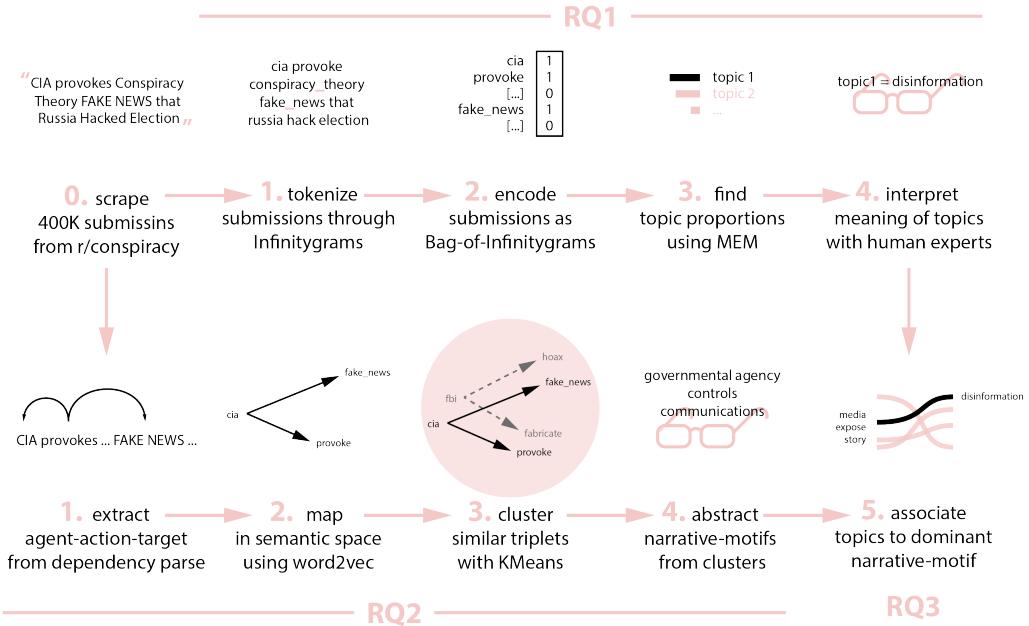


Fig. 2. Flowchart detailing how we analyze conspiratorial language in *r/conspiracy*. After gathering the submissions using the Reddit API (step 0, top row), in RQ1 we extract the topics of discussion using Infinitygrams and MEM (steps 1-4, top row); independently, in RQ2 we identify the narrative-motifs using a combination of word embeddings and clustering (steps 1-4, bottom row); finally, in RQ3 we find which narrative-motif users primarily use to discuss each topic (steps 5, bottom row).

complex entities such as “New World Order” as a single token. Then, we extract latent topics in the corpus using the Meaning Extraction Method [15]. Finally, we ask human experts to evaluate topics for interpretability and coherence. The next sections provide specific details on this procedure.

Text preprocessing. We employ a series of text preprocessing steps to reduce noise. We remove URLs, convert text to lowercase, and lemmatize text to deduplicate inflected forms of a word such as plurals for nouns and tenses for verbs. We retain only tokens longer than one character.

Tokenization and encoding using InfinityGrams. Many central concepts in conspiracy theories are multi-word memes or include punctuation and stopwords (e.g., “The five dancing Israelis of 9/11,” the figures allegedly celebrating and recording the terror attacks). Moreover, the number of words that make up conspiratorial memes varies greatly, which makes it difficult to assume an appropriate number of words for analyzing them through standard word n-grams techniques. We address this issue by partitioning sentences using repeated, variable length, character-level n-grams (also referred to as infinitygrams), inspired by [49]. For example, standard techniques would represent “9/11 is an inside job” as the unigrams “inside” and “job,” which individually carry little meaning, while infinitygrams represent the same phrase as “9_11_be_an_inside_job.” We retain infinitygrams that appear at least 20 times in the corpus, that are delimited by word boundary characters, and that contain at least one word that is not a stopword¹. We use infinitygrams to tokenize submissions: we read the text left-to-right, select the longest matching infinitygram, and iterate over the remaining

¹we use the list of English stopwords available in the python module nltk

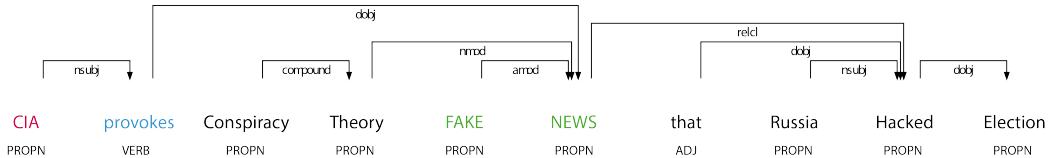


Fig. 3. Dependency parse of the phrase “CIA provokes Conspiracy Theory FAKE NEWS that Russia Hacked Election.” Highlighted are the three elements in the **agent-action-target** triplet, in order. We group together semantically similar agent-action-target triplets to abstract their similarities as narrative-motifs.

suffix of the string. We then compute a document-feature matrix following standard Bag-of-Words practices, but using infinitygrams instead of words. We call this approach Bag-of-Infinitygrams.

Topic modeling using the Meaning Extraction Method. We adopt topic modeling to extract overarching themes in conspiracy theory discussions. The Meaning Extraction Method, or MEM, aims to uncover the dimensions along which people reflect about themselves or particular issues [15]. We standardize the document-feature matrix and perform Principal Component Analysis (PCA). We select 50 components after inspecting the scree plot of the eigenvalues. Finally, we obtain topics by applying varimax rotation to PCA loadings. We invert the sign of loading vectors so that the maximum weight for all topics is positive, to ease interpretation. We then associate topics to submissions by computing topic proportions. Because some topics are more general and widespread, they may show higher proportions on average. To account for this, we standardize topic proportions for each topic. Finally, we select the main topic of a submission as the one having the highest standardized value. We also experimented with different models, i.e. Latent Dirichelet Allocation and Hierarchical Dirichelet Processes. We asked five graduate researchers to rank the models by how interpretable the topics appeared. MEM ranked consistently higher than the other models.

Evaluating topics for interpretability and coherence. Then, we evaluate the extracted topics. We ask four graduate researchers to independently 1) determine if the topic is interpretable and internally coherent, and 2) propose a name that summarizes the conspiracy theories that pertain to the topic. We retain topics that at least two raters agree upon. The final list contains 33 topics.

4.2 RQ2: narrative-motifs in conspiracy discussions

We extract agent-action-target triplets from submission titles using syntactic rules. Then, we map triplets in a word embedding space which allows to assess if two triplets are semantically similar. Finally, we group triplets into coherent clusters, each representing a narrative-motif. Human experts analyze the triplets in each narrative-motif and deduct their abstract common characteristics.

Extracting agent-action-target triplet candidates. First, we remove mixed quotations that would otherwise hinder parsing of sentence structure. Then, we identify each agent, action, and target that appear in each sentence in the corpus of submissions. In this work, we focus on **agent-action-target** triplets that take the form of subject-verb-object triplets (SVO in short). Figure 3 shows an example sentence with its corresponding dependency parse. We run the dependency parser in the natural language toolkit spacy to extract the main verb of each sentence. We augment the span of the verb joining it with adjacent auxiliary verbs and open clausal complement verbs. Then, we extract the subjects² and objects of the verb³, extending nouns to their compounds. We then remove triplets that are not useful for analyzing conspiracy theory propositions. We first eliminate triplets that

²taking the leftmost verb in the span and following edges of the types 'agent', 'csubj', 'csubjpass', 'expl', 'nsubj', 'nsubjpass'

³taking the rightmost verb in the span and following edges of the types 'attr', 'dobj', 'dative', 'oprd'

Query infinitygram	10 most similar infinitygrams in W2V space
the new world order	the nwo, one world government, new world order, new world order and, nwo and
shillary	hilary, hilary, hrc, hilary and, and hilary
big pharma	pharma, pharmaceutical company, drug company, big pharma and, the pharmaceutical
fly saucer	ufos, ufo s, spaceship, roswell
boston	orlando, san bernardino, san bernadino, aurora, of boston
sjw	sjws, feminist, leftist, alt right, liberal
bilderberger	the trilateral commission, trilateral, the cfr, trilateral commission, the council on foreign relation

Table 2. Word similarity through Word2Vector (W2V). W2V helps dealing with synonyms, inflections, typos, pet names, on top of providing a measure of semantic closeness.

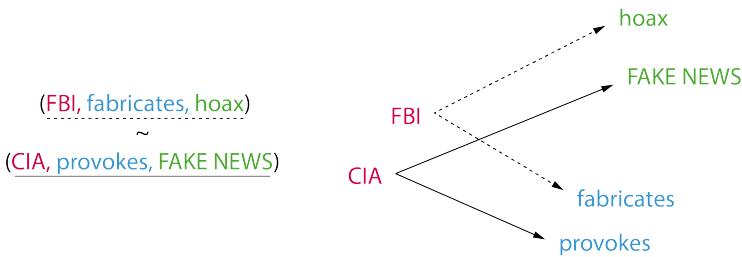


Fig. 4. Similarity between agent-action-target triplets in W2V space. We represent each triplet as a V, with the agent in the middle, and the V's arms pointing towards the action and the target. Two triplets are similar if their subjects are close together, and if they are oriented similarly.

have pronouns as sole agents or targets, since they are too generic. Then, we remove targets that end with a verb, because these targets typically correspond to subordinate clauses.

Building the semantic space of triplet components. We rely on Word2Vec embeddings (W2V for short) to compare agent-action-target triplets. W2V maps words to n-dimensional real vectors so that semantically related words are close in a geometric sense (see Table 2 for an example). We train a W2V model on the corpus of comments in r/conspiracy, preprocessed as infinitygrams as detailed in Section 4.1. A straightforward approach to measuring similarity between *triplets* of infinitygrams is to aggregate the similarities between corresponding triplet components in W2V space. However, this approach is problematic in practice for two reasons. First, some infinitygrams appear in more titles than others. Second, the W2V space has dense areas—especially for infinitygrams corresponding to actions and targets. Given the skewed distributions, most triplets result equally similar to some popular, central ones. In other words, it would be difficult to discern groups of triplets because all triplets would be close on average. Therefore, we devise a custom approach. We consider two triplets as similar if they have semantically similar agents, and similar agent-action and agent-target relationships (see Figure 4). To this end, we concatenate the W2V representation of the agent, the direction between the agent and the action (simply the difference between the agent and action vectors in W2V space [11]), and the direction between the agent and the target. We normalize each of the three resulting components separately before concatenating them, so that all three have equal weight when computing similarities.

Clustering triplets. We use KMeans to find clusters of triplets. We determine the optimal number of clusters as 12, at which point the silhouette score reaches a plateau. We repeat training using

different models, namely Gaussian mixtures and XMeans, to confirm that the optimal number of clusters remains stable under different assumptions on data distribution.

Extracting narrative-motifs from agent-action-target clusters. For each cluster, we find the most representative triplets by ranking them according to their closeness to the cluster centroid. Moreover, we find the most representative agents, actions, and targets by χ^2 score with their assigned cluster. Finally, we ask three raters to find the abstract concept that triplets in each cluster have in common. For example, the third cluster has as most representative agents “cia” and “fbi,” actions “collect” and “declassify,” and targets “communication” and “email”—the narrative-motif “**governmental agency–controls–communications**” is the final abstraction for the triplets in the cluster.

4.3 RQ3: Mapping topics to narrative-motifs

Submissions with a specific dominant topic may make use of different narrative-motifs, and vice versa. For each topic, we compute which narrative-motif its submissions rely on most frequently.

5 RESULTS

5.1 RQ1: Topics in r/conspiracy

Figure 5 summarizes the 33 extracted topics. Next, we layout the topics discussed in r/conspiracy, grouping them according to the overarching issues that they discuss. However, this grouping is purely qualitative, and often a single topic discusses several issues. For example, topics referring to the 9/11 attacks also allude to larger-scale conspiracy theories involving the US government, foreign intelligence, and religious groups. Section 5.3 shows how narrative-motifs clarify these differences and how they can systematically categorize topics.

Topics about health and environment. Concerns about health and environment are frequent in the discussions in r/conspiracy. Topics “big pharma,” “vaccines,” and “GMO,” for example, decry the corruption of health services while promoting the virtues of a “natural” lifestyle [23]. Similarly the topic “climate change” suspects that environmental phenomenon is a machination of lobbying academics and governments. Scholars have shown that believers in one of these health and environment related conspiracy theories often also discuss other conspiracy theories [10, 44, 59].

Topics about US domestic policy. US politics play a major role in the discussions in r/conspiracy. Topics “US elections” and “email scandal” focus especially on the 2016 elections and include allegations of voter fraud. Distrust in the government is evident in the topic “US Congress and bills”, which more broadly discusses policy changes that allegedly aim to harm the public. The nefarious consequences of law enforcement are brought to an extreme through the topic “police brutality,” which mainly portrays police officers in unwarranted outbursts of physical violence.

Topics about military intelligence and surveillance. Several discussions revolve around the issues of military intelligence and mass surveillance. Topics “NSA Whistleblowers” and “NSA tracking” criticize governmental agencies. We mostly find three types of allegations: privacy breach through mass surveillance, opinion manipulation through disinformation campaigns, and false flag military operations. The topic “Smedley Butler” similarly denounces economic interests as the primary motivations behind the US militaristic presence abroad.

Topics about global issues. We find that globalization applies not only to markets but also to conspiracy theories. Topic “banks and money” reflects the concern that multinational corporations may circumvent local regulations. Other geopolitical issues also appear frequently in r/conspiracy. For example, topics “Syria” and the “Israel-Palestine conflict” discuss diplomacy in the Middle

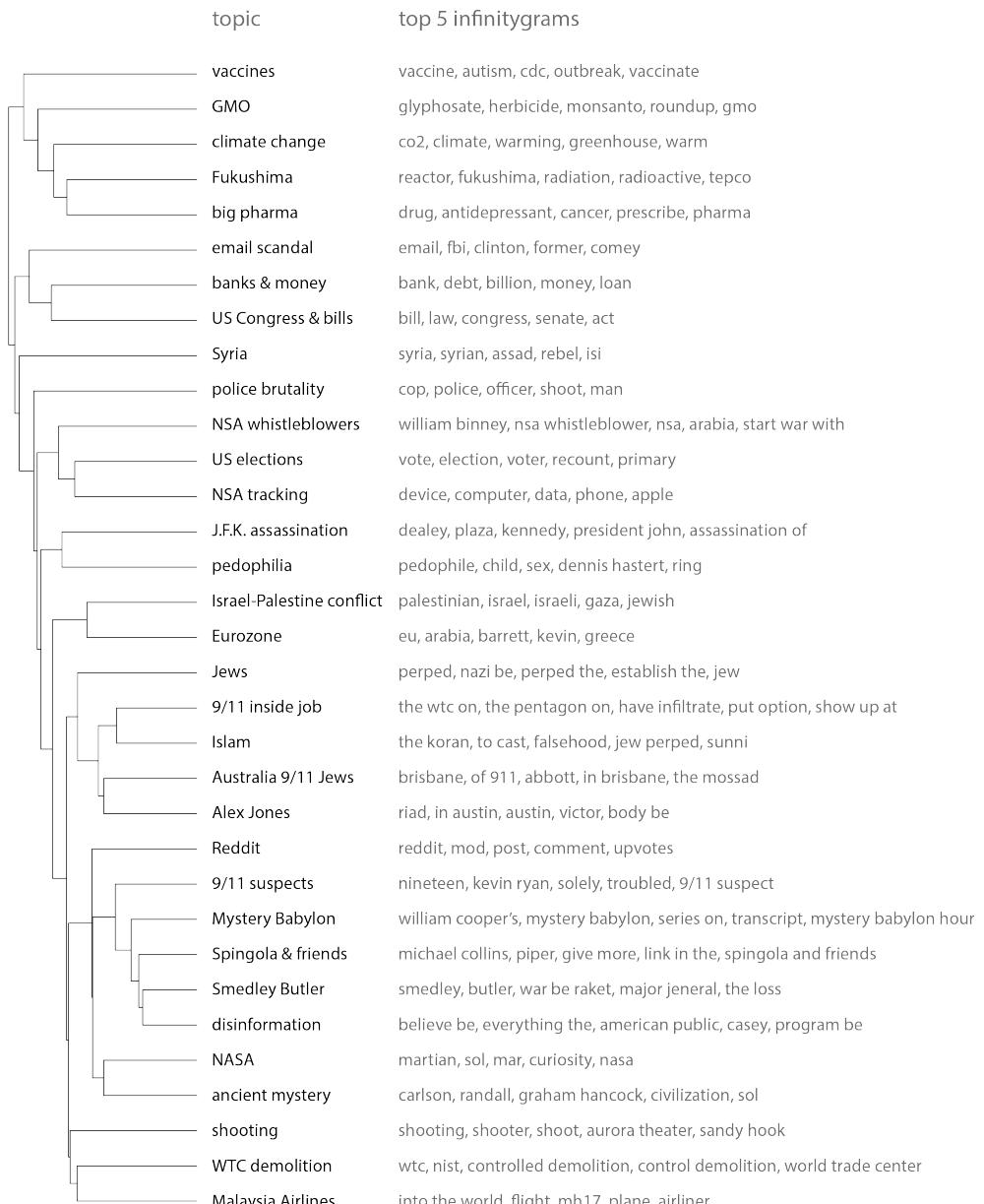


Fig. 5. Topics of discussion in r/conspiracy. The dendrogram shows topics clustered hierarchically according to their co-occurrence in the corpus. We compute co-occurrence as the cosine similarity of topic proportions in the submissions: two topics are close in the dendrogram if they appear in high proportions in the same submissions.

East, while topic “Eurozone” discusses how phenomena such as the immigration crisis, the Greek Depression, and Brexit, may destabilize European politics.

Topics about dramatic events. Reactions to dramatic events resonate in the discussions in r/conspiracy [58]. This is apparent in topics like “Fukushima”, “Malaysia Airlines”, and “shooting.” In particular, topics “9/11 inside job,” “WTC demolition,” “Australia 9/11 Jews,” “9/11 suspects,” attempt to frame the 9/11 events as a false flag operation run by Jews, an inside job by the US government, or the outcome of a corporate strategy for profit, among other claims. Conspiracy theories on dramatic events may remain relevant for decades, as topic “J.F.K. assassination” shows.

Topics about alternative media. Not only news, but also news media appear frequently. Topic “disinformation” criticizes the accuracy of mainstream media. Conversely, prominent figures of alternative media conspiracy theorists appear in topics “Spingola and friends” and “Alex Jones.” Reddit itself is not immune to criticism of censorship, as topic “Reddit” denounces unfair moderation.

Topics about religion, occult, and paranormal. Several topics show interest in mystical aspects. First, we find conspiracy theories implicating religious groups, such as “Jews” and “Islam.” Topic “NASA” discusses alleged contacts with alien lifeforms, whereas topics “ancient mystery” and “Mystery Babylon” speculate on esoteric aspects of ancient civilizations. Finally, topic “pedophilia” often depicts sexual ritual practices, especially attributed to satanism and secret elite groups.

5.2 RQ2: Narrative-motifs in r/conspiracy

The variety of topics—and of the different conspiracy theories that each topic discusses—makes it difficult to gain higher-level understanding of how users reason about conspiracy theories. To this end, we next present narrative-motifs which uncover entities and symbols that appear in the conspiratorial discussions. Table 3 summarizes the 12 extracted narrative-motifs.

Narrative-motifs denoting fear of the foreign. Conspiracy theories portray outgroups as “collective enemies” [36]. Narrative-motifs that focus on minority religions, immigration, war, and globalization all expose perceived threats from the point of view of the “Western world” ingroup. Scholars find that stereotypes and prejudice, such as antisemitism and xenophobia, support the adoption of these conspiratorial frames [5]. These sentiments are present in narrative-motifs **country–threatens peace–through military** and **religious group–attacks–population** which focus on national and religious outgroups as collective conspirators. These agents perform violent or militaristic actions to defeat a cultural opponent. Whereas the former narrative-motif depicts nations threatening from outside the target community, religious groups in the latter are not necessarily foreign. Yet, religious groups remain identifiable for their liaisons outside of the community. For example, this narrative-motif prefigures Jews as either the foreign nation of Israel, as a controlling force at top government and economic positions, or as a pervasive movement infiltrating all levels of society. Nativism, an “intense opposition to an internal minority on the ground of its foreign connections,” explains this trait of conspiracy theories [30]. Conversely, the narrative-motif **organization–pursues–profit** pictures globalization as a threat to the boundaries that identify a nation. Here, banks and corporations seek profit in a frame of global markets and values, to the detriment of their local counterpart. Alternative media spreading conspiracy theories appear to better align with anti- and pro-globalism than with left- and right-leaning political ideologies [59].

Narrative-motifs denoting blame on corrupt powers. Scholars have associated nonclinical paranoia with political conspiracy theories, especially in the context of the US [50, 55, 68]. Discussions employ the narrative-motif **political leader–usurps–power** to frame powerful political leaders as individuals in a quest for public influence and personal gain. Leaders have a role in representing public opinion, therefore public trust is a frequent issue in related conspiracy theories. Powerful individuals also appear as conspiratorial agents in the narrative-motif **official–discusses–peer or document**. Differently from the previous, the current narrative-motif focuses not the corruption of the individual but

Narrative-motif			
Agent	Action	Target	Example
country-threatens peace-through military			
america china iran	accuse ban behead	agreement arm currency	UN ordered depopulation of 3 billion people by food malnutrition has started
political leader-usurps-power			
clinton donald_trump hillary	appoint order pick	comey election executive_order	Over three million illegals voted. Trump won the popular vote
governmental agency-controls-communications			
cia fbi nsa	collect declassify interrogate	communication email foia_request	Did the CIA give the NSA documents to Ed Snowden?
inanimate object-disrupts-circumstance			
plane city death	baffle hit contain	beginning earth pentagon	MH17 prosecutor open to theory another plane shot down airliner: Der Spiegel
organization-manipulates-economy			
bank congress fed	manipulate be_buy inflate	interest_rate poor profit	Banks Launder Billions of Illegal Cartel Money While Snubbing Legal Marijuana Businesses
official-discusses-peer or document			
minister george_soros senator	answer call discuss	bill case clinton	Russian President Putin and Galactic Federation signed a treaty to end Zionists?
arbiter-moderates-controversy			
judge mod truth	affect bless delete	kick post thread	Judge Undermines Jury Nullification Law with Jury Instructions
religious group-attacks-population			
hamas israel jews	attack bomb demolish	america liberty gaza	How Khazarian Ashkenazi Jews Invented Modern Terrorism before 911
science-uncovers-health threat			
doctor monsanto nasa	confirm discover find	autism cancer disease	NASA Photographed Gigantic Cylindrical UFO In Front Of Moon
law officer-oppresses-people or with weapon			
cop court officer	arrest beat confiscate	gun man examination	Revealed: Chicago Police Detain Americans in Interrogation Black Sites
common people-face or pose-threat			
americans family friend	believe face sue	cannabis dead gun	Every conspiracy requires secrecy. Nothing in the Constitution allows our servants to keep secrets from us. The PEOPLE need to wake up.
media-expose-story			
alex_jones cnn facebook	release expose publish	crisis_actor code story	Reminder: Russian and Israeli propagandists promote wild conspiracy theories to "trash the information space."

Table 3. Narrative-motifs in r/conspiracy. We highlight the **agent**, **action**, and **target**, portion in each narrative-motif, and present three of the most representative words for each element, ranked by χ^2 with respect to the narrative-motif.

rather of the lawful system the agents embody—e.g. referring to Donald Trump not as an individual but as the president of the US. Narrative-motifs **arbiter–moderates–controversy** pictures agents in official positions with judicial—instead of legislative—power. This narrative-motif often frames statements dealing with issues of transparency, fairness, representation, and consensus. Finally, narrative-motif **law officer–oppresses–people or with weapon** frames corruption of executive power. Conspiratorial statements in this narrative-motif question the legitimacy of authority and individual empowerment. Lawmaker and law enforcers are in a position to hide *toxic truths*—scenarios that if true would be too costly for an institution to publicly acknowledge [20]. This causes uncertainty about the soundness of the agents' official accounts and fuels conspiracy theories.

Narrative-motifs denoting mistrust in official information. Conspiracy theories on toxic truths may undermine trust in public data [20]. In fact, high exposure to extremist ideas correlates with reduced trust in federal government reports [17]. Narrative-motif **governmental agency–controls–communications** implicates institutional groups, such as intelligence and administrative agencies, who take advantage of their position to hide, distort, or conversely expose sensitive information. Issues of privacy, freedom of expression, and mass surveillance drive conspiratorial statements using this narrative-motif. Moreover, narrative-motif **media–expose–story** shifts the focus of similar allegations from governmental agencies to media outlets either exposing or spreading misinformation. Disaffection with traditional news sources and the consequential reliance on alternative media is indeed a momentous phenomenon [59]. High consumption of alternative media—which play a significant role in spreading misinformation [10, 38]—correlates with conspiratorial belief [60].

Narrative-motifs denoting perceived threats to life and nature. Up to this point, we presented narrative-motifs that express ideological concerns. The following narrative-motifs, instead, frame perceived threats to the values and day-to-day lives of conspiracy theorists. For example, narrative-motif **common people–face or pose–threat** pictures common people facing or posing threats to the community around them. This everyday, mundane quality cast this narrative-motif in a relatable context. Urban legends share similarly relatable context [29], which intensifies emotional engagement and plays a significant role in making conspiracy theories appealing [61]. Emotional engagement helps to explain phenomena such as moral panics about deviant behavior [26, 61]. Environmental threats such as natural catastrophes are the focus of narrative-motif **inanimate object–disrupts–circumstance**. Conspiracy theorists often believe these items and events contain secret signs and symbols that would prove their theories if correctly interpreted [53]. Furthermore, narrative-motif **science–uncovers–health threat** pictures doctors, scientists, and technologists, as threats to the common wellbeing. In particular, their discoveries denounce threats to a way of life that is perceived as “natural.” This explains the frequent co-occurrence of health-, science-, and technology-related conspiracy theories [10, 44].

5.3 RQ3: Dominant narrative-motifs in conspiratorial topics

We adopt narrative-motifs as a categorization scheme for topics. First, we show how narrative-motifs bring together topics that share similar framing. To this end, we focus on the topics adopting the “governmental agency controls communications” narrative-motif. Then, we show how narrative-motifs disentangle the differences between related topics. In this case, we focus on topics discussing the 9/11 attacks. Figure 6 shows the associations between dominant narrative-motifs and topics.

5.3.1 Narrative-motifs to expose the similarities between topics: the case of governmental agencies as conspirators. We show how each narrative-motif uncovers similar framing in the topics that

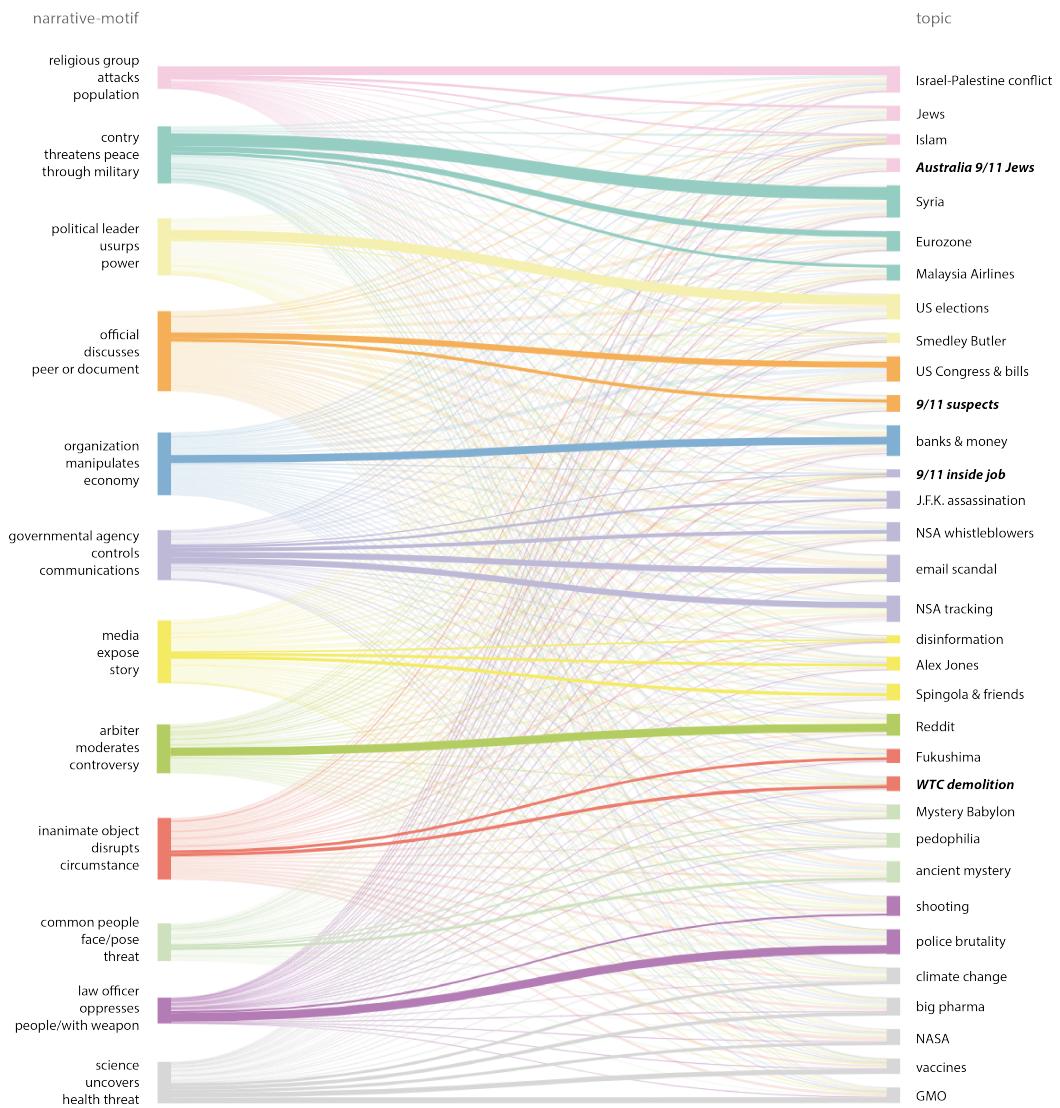


Fig. 6. Narrative-motifs highlight the entities that users refer to, and provide a frame to interpret the topics of conspiracy theory discussion. The figure shows narrative-motifs on the left and topics on the right. The height of the narrative-motifs and topics corresponds to the number of triplets in each. Similarly, the thickness of the edges corresponds to the number of submissions that belong to a given pair of narrative-motif and topic. Topics share the color of the dominant narrative-motif used to frame them. In bold are the four topics that discuss the 9/11 attacks: Section 5.3 discusses how narrative-motifs help interpret the differences between these topics.

primarily rely on it. Consider the case study narrative-motif **governmental agency-controls-communications**. The five topics that primarily use this narrative-motif share its characteristic preoccupation with *toxic truths*.

“NSA tracking” envisions agencies illicitly monitoring the population at large while hiding their actions. *Wikileaks* published classified documents demonstrating that some conspiracy theories concerning NSA mass surveillance are indeed warranted and true [20]. These leaks happened within the time frame of our dataset and related discussions appear under the “NSA tracking” topic. We have color coded the *agents*, *actions*, and *targets*, that our approach identifies and attributes to the current narrative-motif.

Why does the *FBI* need *video and images* from the public and why didn’t they use law enforcement surveillance?

FBI Quietly Removes *Recommendation* To Encrypt Your Phone... As *FBI* Director Warns How Encryption Will Lead To Tears

Agencies in the second topic “NSA whistleblowers” do not directly intervene to tamper with communications, but rather mediate disclosure. This topic includes reports of former NSA officers revealing toxic truths that the agency failed to acknowledge to the detriment of the population. Similarly, the following statements allegedly show the agency secretly coordinating with apparently unaffiliated whistleblowers.

Did the *CIA* give the *NSA documents* to Ed Snowden?

FBI is increasing *pressure* on whistleblowers in Stuxnet inquiry

Conspiracy theories in topic “J.F.K. assassination” disregard official records of the assassination of former President Kennedy, and instead accuse the US government as the orchestrator of the assassination. The current narrative-motif highlights how the focus of this topic is not the identity of the killer but the implication of State intelligence in the cover-up of toxic truths.

CIA used *mind control* to kill John F. Kennedy, and then again to cover it up. MK-Ultra exposed.

JFK’s Limo Stopped: *CIA* Faked *Zapruder Film*!

Similarly, topic “email scandal” speculates that investigative agencies proactively investigate scandals from the top—yet fail to disclose their findings. One recurring subject of this topic is the 2016 email controversy alleging Hillary Clinton interfered with the *res publica*.

Flashback: *FBI* found *fingerprints* of the First Lady, Hillary Rodham Clinton, on records discovered in the White House family quarters two years after they were first sought by investigators.

FBI recovered 30 potentially new *Clinton emails* related to 2012 Benghazi attacks

The topic “9/11 inside job” refers to conspiracy theories that suspect the top of the US chain of command—both political and military—had prior knowledge of the attacks as well as hide off-the-record details of how attacks were carried out. Supposedly governmental agencies released false official records either for hiding toxic truths or for the gain of alleged stakeholders.

The *FBI* just released 27 new *photos* of the Pentagon on 9/11

NSA was monitoring *calls* between OBL in Yemen and hijackers in the US before 9/11, but legally could not coordinate with CIA or FBI: PBS NOVA The Spy Factory

5.3.2 *Narrative-motifs to interpret differences between topics: the case of the 9/11 conspiracies.*

Users primarily frame conspiratorial statements in the topic “9/11 inside job” in terms of governmental intelligence failing to act on prior knowledge about the attacks. However, in our corpus we find several other topics that discuss the 9/11 attacks: “WTC demolition,” “9/11 suspects,” and “Australia 9/11 Jews.” How are these topics different? Narrative-motifs help uncover the differences between how r/conspiracy users frame this constellation of topics.

Similarly to topic “9/11 inside job”, “9/11 suspects” implicates the US government in the attacks. However, this topic mainly employs the *official-discusses-peer or document* narrative-motif for framing. In fact, conspiratorial statements in this topic mainly focus on individuals that advocate or hinder public inquiry about the attack.

April 2004: Clinton and Gore met with the 9/11 Commission (privately and separately). Bush/Cheney finally speak to Commission on April 29th...ALL the questions were pre-approved. Two commissioners (Lee Hamilton, Bob Kerrey) leave the session early for other engagements.

Did **Tenet** withhold information that might have prevented a 9/11 attack? In an Aug. 11th interview on PBS, counterterrorism czar Richard Clarke accused ex-CIA Director George Tenet of denying him and others access to intelligence that could have thwarted the attack on the Pentagon on 9/11.

The “WTC demolition” topic also refers to the 9/11 attacks. It focuses on the possibility that the World Trade Center may have been compromised before the attacks, and that explosives stored inside the buildings were the true cause of its collapse. The dominant narrative-motif of this topic, **inanimate object-disrupts-circumstance**, clarifies how the main focus of the topic is on the technical feasibility of the demolition scenario, on the structural properties of the buildings, and on the material qualities of the alleged evidence disproving official accounts.

Does anyone remember the bizarre melted cars found some distance from the WTC buildings after 9/11?

On 9/11, a paltry 10,000 gallons of kerosene (roughly the volume of an 11-foot cube) allegedly converted the following items into DUST – In under 10 seconds.

Finally, topic “Australia 9/11 Jews” primarily employs narrative-motif **religious group-attacks-populations**. This topic shows primarily anti-semitic, anti-Zionist, or anti-Israel traits. Conspiratorial statements frame people of Jewish faith as either covertly controlling governments around the world, or attacking them. One frequently cited conspiracy theory in this topic is that Australia is protecting “The Celebrating Jews of 9/11,” a group allegedly caught filming and celebrating the attacks to the Twin Towers and affiliated with Mossad, the Israeli intelligence. The topic contains a number of similar conspiratorial narratives, which replicate allegations of false flag military and terrorist operations in different geopolitical contexts.

Israeli Deceptions Go South: Ex-Australian Prime Minister Confirms Israel Attacked America

SNUFF PORN IN BRISBANE, The Mossad Link: Jews Eli Cara and Zev Barkan who are linked to Iraqi terrorism and similar crimes in Cambodia, filmed the murder of a young man on the grounds of Queensland University in 1972 - Evidence has been suppressed by successive legal & political dynasties ever since

Topic models offer a way to analyze semantics in the corpus of discussions in r/conspiracy. However, interpreting topics remain a challenge [14]. The topics above offer an example of why this is the case: the corpus contains several interrelated variants of conspiracy theories and their differences are not clear from the topics alone. Narrative-motifs help interpret topics by highlighting the key elements in conspiratorial framing.

6 DISCUSSION

We provided a data-driven approach to study conspiratorial discussions online. Using the entire history of r/conspiracy, we examined the language of conspiracy theory discussions in context of the community’s culture and conventions.

Our approach highlights the importance of considering both *what* conspiracy-theorizing users talk about and *how* they talk about, in examining the nature of conspiratorial thinking. We offer a few observations. In RQ1 we showed the topics of discussions in r/conspiracy. Our analysis yielded novel insight on their content. The topics contained a number of widespread conspiracy theories such as those about political elections, mass shootings, and religious groups. However, we also found a number of lesser-known conspiracy theories that were self-referential to alternative media. For example, the topics “Alex Jones” and “Reddit” not only referred to alternative media as information sources that supported conspiracy theories, but also implicated the outlets themselves as taking part in conspiracies. We found conspiratorial allegations of Alex Jones colluding in governmental cover-ups:

X POST SUBMISSION REMOVED: Joe Rogan Beats Alex Jones Drum, Jones led 911 Truth - Jews did it - until he dropped the ball, and took up with dual 911 traitors Ron and Rand Paul - Three generations of the Jones clan will be investigated for murder, the old boy for JFK, the other two for Riad Hamad

The author of this allegation remarks that the original submission had been removed. In fact, we also found conspiracy theories on Reddit itself accusing moderators of following a secret agenda:

Reddit accounts unmuted, then suddenly make a witchhunt, then /r/pizzagate gets banned. Admins playing with comments?

3,384 upvoted AskReddit post mentioning how /r/Politics is run by corrupt mods and blogs removed

This suggests that the separation between mainstream and alternative media is less neat than it appears. Alternative media are often pictured as competing with mainstream media for users' trust. Although there is evidence of the crisis of public trust toward mainstream media and of the rise in popularity of alternative media [59], our findings suggest that researchers should be cautious in assuming users are relocating their trust from one to the other. Yet, although topics presented us with interesting insight, they only offered a superficial view of the discussions. Multiple topics that employ different flavors of the same conspiracy theory are a common occurrence, as demonstrated in the case of the 9/11 attacks. Topics alone were unable to meaningfully explain their similarities and differences.

The word embedding approach in RQ2 allowed us to delve deeper and identify recurring elements in the conspiratorial narratives. We found that 12 narrative-motifs framed the many variants of conspiratorial statements in the corpus. Thus, we were able to categorize topics by their dominant narrative-motif, which offered a higher-level understanding of what motivated them. In RQ3, we showed how topics that employ the same narrative-motif also share similar framing. One such case is that of the single narrative-motif **science–uncovers–health threat** framing conspiracy theories on GMOs, vaccines, pharmaceutical corporations, climate change, and space exploration, all of which stem from the desire of preserving the values of “natural” life [7]:

Vaccines suppress your brain! Vaccine-Induced Brain Damage Syndrome (VIBDS) mirrors cognitive impairment caused by chemotherapy (Chemo Brain)

In 2012, a court found that Monsanto's **products** had chemically **poisoned** a French **farmer**.

NASA Announces Humanoid **Robot**

Geoengineering is Destroying the Ozone Layer

Why **Big Pharma** hates legalized **marijuana**; painkillers, chemotherapy and psych drugs could be made obsolete

Vaccines that cripple human intelligence, pesticides that harm workers, robots that substitute humans—all are alleged threats to the mind, body, and soul of humanity. Similarly, climate control technologies and synthetic drugs allegedly disrupt the relationship with nature, therefore threatening the environment that supports human life. Ultimately, conspiracy theory adopters are concerned with the values that the alleged conspiracies threaten, more so than with the practical implications of the conspiracies [23]. Deeply-rooted concerns about the sanctity of life and of reproduction may explain why a single alternative media domain may host conspiracy theories on vaccination, GMO, and climate science [59], or why users holding anti-vaccination opinions also discuss space, technology, and GMO [44]. Narrative-motifs may help uncover the values of conspiracy theory adopters by identifying recurrent symbols in their online expressions.

In sum, we argue that narrative-motifs offer a minimal, yet meaningful, description of a conspiracy theory, and their applicability to topics in large-scale discussion provides insights into conspiratorial thinking in online communities.

6.1 Implications for studying conspiracy theories online

Previous research relied on explicit formulations of conspiracy theories—for example, by studying publications detailing the thoughts of conspiracy theorists, or by surveying the beliefs of individuals in interviews and questionnaires. Online discussions, for the most part, do not make the users' beliefs explicit. Consider the statement "*Zionist Rita Katz released ISIS video before ISIS got a chance to release it themselves.*" The statement purports that Rita Katz—a terrorism analyst—had access to ISIS documents even before the terrorists themselves; therefore, it implicitly suggests that ISIS did not produce the documents in the first place; the unexpressed allegation is that ISIS are a false-flag operation directed by Zionists. This kind of implicit and suggestive language is typical of conspiratorial statements in online discussions⁴ and commands novel methods for at-scale analysis.

Because full conspiratorial statements are rare in online discussions, we focused instead on the minimal requirements that afford interpreting statements as conspiracy theories: agent-action-target triplets. By adopting data-driven notions of topics and narrative-motifs, our approach departs from existing methods in two significant ways. First, it analyzes conspiracy theories bottom-up instead of top-down, starting by analyzing each submission and finding recurrent patterns by aggregating the findings. Second, unlike prior bottom-up techniques, our approach does not make *a priori* distinctions between conspiratorial and non-conspiratorial statements, between extreme or innocuous allegations, and between unwarranted or genuine conspiracy theories.

This work opens up research directions toward more comprehensive understanding of conspiracy theory as part of community culture [7, 42]. A computational approach to categorizing conspiracy theories in their community of origin enables addressing important questions in social computing. For example, our approach can enable studying the processes of adoption and radicalization of conspiratorial beliefs, and conversely of their rejection and refutation. Moreover, it allows comparing conspiratorial beliefs in different communities, as well as tracking cross-contamination of conspiratorial memes between communities. Social computing scholars can build upon the proposed approach and enhance it with existing models of reputation, peer pressure, mass effects, as well as polarization and echo chambers—all phenomena that social psychology research suggests influence conspiracy theory beliefs [61]. Although we limited our analyses to r/conspiracy, we believe our approach can be useful in other online conspiracy theory communities like abovetopsecret.com and forum.prisonplanet.com that share a similar discussion-based structure.

6.2 Implications for understanding attitude and social cognition in conspiracy beliefs

In particular, our computational linguistic methods provide sociologists and psychologists with a toolbox for analyzing attitude and social cognition in conspiracy theory discussions. Through a process of clustering and abstraction, narrative-motifs identify the symbolic role of conspiratorial agents and targets from natural language expressions. For example, our narrative-motif notion was able to identify both powerful individuals (CEO of a company, Mark Zuckerberg or multi-billionaires, George Soros) as well as common everyday figures (family, neighbors, friends) in their role as *agents*. Computationally identifying these symbols is a step towards exposing the way people reason about conspiracy theories. For example, this allows studying what *type* of conspiratorial agents do users blame and what *type* of targets they empathize or identify with. Ultimately, this will lead to a better understanding of the states of anxiety, paranoia, and perceived powerlessness that motivate conspiracy theory adoption [28].

Psychology and sociology scholars have adopted various qualitative approaches similar to narrative-motifs to study individuals' attitudinal and social cognition. *Abelson and Rosenberg* [2] proposed to formalize experimental subjects' statements in interviews as *actor-means-end* triplets

⁴See for example <https://twitter.com/katestarbird/status/982733894876250112>

to understand attitudinal cognition. Similarly, [Gollob \[25\]](#) used interviewees' evaluations of *subject*, *verb*, *object* to determine the presence of cognitive biases and unravel whether interviewees had a tendency to attribute positive rather than negative characteristics to certain types of actors. Overall, this rich body of social-psychology work relied on triplet-based methods—analogous to the agent-action-target triplets informing our narrative-motifs—to study social inference, attitude change, and learning of social structures. This makes us confident that narrative-motifs are not only useful descriptors of conspiracy theories, but can also offer insight on the attitudinal and cognitive processes that generated them.

Moreover, because we are able to extract narrative-motifs systematically and in aggregate, narrative-motifs could allow expanding the application of these methods from small-scale experimental surveys to population-scale naturally-occurring discussions. Population-scale understanding of social cognition may inform strategies to counter misinformation. For example, if governments decided to refute one conspiracy theory, conspiracy theorists could interpret governments' special attention to that specific instance as an attempted cover-up. Refuting one conspiracy theory in isolation would paradoxically reinforce the theory [40]. Therefore, governments should refute *multiple* conspiracy theories at once [61]. To this end, refuting conspiracy theories within one *narrative-motif* may prove an efficient allocation of counter-misinformation efforts. Narrative-motifs identify groups of conspiracy theories that share common framing. Disproving allegations involving not one conspiratorial agent but a *category* of agents may help change the theorists' attitude and cognition toward them. For example, refuting conspiracy theories on both the assassination of J. F. Kennedy and the Clinton emails may prove effective, because mistrust in intelligence agencies is their common narrative-motif.

6.3 Implications for analyzing discussions beyond conspiracy theory

Our choice of methods is grounded in scholarly definitions of conspiracy theory. However, our approach is general and may prove useful in other domains. On the one hand, narrative-motifs can help analyze large-scale discussions because they identify recurring patterns in aggregate, thus mitigating the problems of volume, sparsity, and noisiness, typical of discussion data. On the other hand, agent-action-target triplets are a versatile construct. Recent approaches to knowledge base management adopt subject-verb-object triplets as the core data structure for representing relational information [34]. Moreover, subject-verb-object triplets appear among the first syntaxes that people use when they start speaking, which makes them conform to widespread mental models of language [24]. Therefore, this approach may be suitable for a variety of tasks in social computing. For example, it allows extracting relationships between named entities from text (e.g. [57]). This would yield crucial insights on how social media frame discussions surrounding public figures in the context of online misinformation, propaganda, and news.

7 LIMITATIONS AND FUTURE DIRECTIONS

Our approach is not without limitations. Our main assumption is that agent, action, and target, are necessary elements in a conspiracy theory. This assumption stems from the consensus of many academic definitions of conspiracy theory. Analyzing free-form text in online discussion, however, showed that whereas agents are typically clearly identifiable, actions and targets may be varied and nuanced. *Actions* may represent motives (e.g., Zionists, [want to destroy](#), Trump), intentions (Obama, [decides to starve](#), people), or actual committed activity (Zionists, [have infiltrated](#), system). Similarly *targets* may represent victims (Israelis, love, [Hitler](#)), tools (Russia, deploys, [carrier](#)), outcomes (FBI chief, approved, [scheme](#)), or events (Songbird McCain, makes, [secret trip](#)). On the one hand, this complexity asks for a less vague and more applicable definition of conspiracy theory. This is crucial for allowing the study of conspiracy theory to shift its focus from the academic discourse to

discussion data “in the wild.” On the other hand, the agent-action-target model can be improved to take into account these findings, and to identify the multiple meanings that action and target assume on a case-by-case basis. This may be a hard problem to solve: previous attempts in the literature detail the hurdles of tackling similar tasks such as semantic role identification with machine learning and NLP tools [46]. Agent-action-target triplets are admittedly a simplistic representation of conspiracy theories. However, more sophisticated approaches such as semantic frames [51], story grammars [56], and rhetorical structure theory [69], may help refine narrative-motif extraction and better attune it to open-ended discussion data. Finally, two important considerations stem from the fact that topics and narrative-motifs are aggregate constructs. First, topics and narrative-motifs are dependent on the discussion corpus under analysis. Although the method to extract them is general, the resulting observations are limited to the corpus and not representative of conspiracy theory overall. Second, individual statements may not share the same interpretation of their associated topics and narrative-motifs. Whereas the proposed method uncovers patterns that collectively recur in a corpus and that conform to conspiratorial language, careful examination by domain experts is essential to assess individual statements.

8 CONCLUSIONS

This paper presented a data-driven approach to categorizing conspiratorial statements in online discussion. We analyzed over ten years of discussions in r/conspiracy, a large online community on Reddit dedicated to conspiracy theorizing. We extracted the topics of discussion in the community, which show the typical elements of conspiratorial thinking. Human annotators evaluated the coherence of 33 topics ranging from GMO crops to Reddit moderation. Motivated by work in folkloristics we then categorized the topics through narrative-motifs, recurring elements present in their narratives. We chose linguistic patterns depicting the conspiratorial agent, their action, and their target, as narrative-motifs in conspiratorial narratives. This choice allowed for a minimal definition of a conspiracy theory, and fostered higher-level interpretation of the topics using the narrative-motifs. We adopted a combination of large-scale data analysis and human expertise for identifying 12 common narrative-motifs, which abstract the entities appearing in conspiratorial narratives. This work offers two contributions. First, it presents a general method for categorizing topics in free-form discussion through narrative-motifs. Second, it details the topics and narrative-motifs in r/conspiracy. Ultimately, folklorists’ interest in motifs lays in their usefulness for understanding the values, customs, and ways of life of unique cultures. Similarly, our approach aims to clarify the tangled narratives of conspiracy theory discussions and fosters insight on the values and motives of conspiracy theory adopters.

REFERENCES

- [1] Marina Abalakina-Paap, Walter G. Stephan, Traci Craig, and W. Larry Gregory. 1999. Beliefs in Conspiracies. *Political Psychology* 20, 3 (1999), 637–647. <https://doi.org/10.1111/0162-895X.00160>
- [2] Robert P Abelson and Milton J. Rosenberg. 1958. Symbolic psycho-logic: A model of attitudinal cognition. *Behavioral Science* 3, 1 (2 1958), 1–13. <https://doi.org/10.1002/bs.3830030102>
- [3] Cynthia A Andrews, Elodie S Fichet, Yuwei Ding, Emma S Spiro, and Kate Starbird. 2016. Keeping Up with the Tweet-dashians: The Impact of “Official” Accounts on Online Rumoring. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing - CSCW ’16*. ACM Press, New York, New York, USA, 451–464. <https://doi.org/10.1145/2818048.2819986>
- [4] Ahmer Arif, J. J. Robinson, S. A. Stanek, E. Fichet, P. Townsend, Z. Worku, and Kate Starbird. 2017. A Closer Look at the Self-Correcting Crowd: Examining Corrections in Online Rumors. *Proceedings of the 20th Conference on Computer Supported Cooperative Work & Social Computing - CSCW ’17* (2017), 155–168. <https://doi.org/10.1145/2998181.2998294>
- [5] Jeffrey M. Bale. 2007. Political paranoia v. political realism: On distinguishing between bogus conspiracy theories and genuine conspiratorial politics. *Patterns of Prejudice* 41, 1 (2007), 45–60. <https://doi.org/10.1080/00313220601118751>

- [6] John A. Banas and Gregory Miller. 2013. Inducing resistance to conspiracy theory propaganda: Testing inoculation and metainoculation strategies. *Human Communication Research* 39, 2 (2013), 184–207. <https://doi.org/10.1111/hcre.12000>
- [7] Michael Barkun. 2003. *A Culture of Conspiracy: Apocalyptic Visions in Contemporary America*. University of California Press. 1–134 pages. <https://doi.org/10.1111/j.1540-5931.2006.00238.x>
- [8] Lee Basham. 2001. Living with the Conspiracy. *The Philosophical Forum* 32, 3 (2001), 265–280. <https://doi.org/10.1111/0031-806X.00065>
- [9] Alessandro Bessi, Mauro Coletto, George Alexandru Davidescu, Antonio Scala, Guido Caldarelli, and Walter Quattrociocchi. 2015. Science vs Conspiracy: Collective Narratives in the Age of Misinformation. *PLOS ONE* 10, 2 (2 2015), e0118093. <https://doi.org/10.1371/journal.pone.0118093>
- [10] Alessandro Bessi, Fabiana Zollo, Michela Del Vicario, Antonio Scala, Guido Caldarelli, and Walter Quattrociocchi. 2015. Trend of narratives in the age of misinformation. *PLoS ONE* 10, 8 (2015), 1–16. <https://doi.org/10.1371/journal.pone.0134641>
- [11] Tolga Bolukbasi, Kai-Wei Chang, James Zou, Venkatesh Saligrama, and Adam Kalai. 2016. Man is to Computer Programmer as Woman is to Homemaker? Debiasing Word Embeddings. In *Proceedings of the 30th International Conference on Neural Information Processing Systems - NIPS '16*. 4356–4364. <http://arxiv.org/abs/1607.06520>
- [12] Robert Brotherton, Christopher C. French, and Alan D. Pickering. 2013. Measuring belief in conspiracy theories: The generic conspiracist beliefs scale. *Frontiers in Psychology* 4, MAY (2013), 1–15. <https://doi.org/10.3389/fpsyg.2013.00279>
- [13] Jovan Byford. 2002. Anchoring and objectifying ‘neocortical warfare’: re-presentation of a biological metaphor in Serbian conspiracy literature. *Papers on Social Representations* 11 (2002), 1–14. http://www.academia.edu/download/31054091/11_3byfor.pdf
- [14] Jonathan Chang, Jordan Boyd-Graber, Sean Gerrish, Chong Wang, and David M Blei. 2009. Reading Tea Leaves: How Humans Interpret Topic Models. In *Advances in Neural Information Processing Systems*. 288–296. <https://doi.org/10.1111/100.1089>
- [15] Cindy K. Chung and James W. Pennebaker. 2008. Revealing dimensions of thinking in open-ended self-descriptions: An automated meaning extraction method for natural language. *Journal of Research in Personality* 42, 1 (2 2008), 96–132. <https://doi.org/10.1016/j.jrp.2007.04.006>
- [16] S. Clarke. 2002. Conspiracy Theories and Conspiracy Theorizing. *Philosophy of the Social Sciences* 32, 2 (2002), 131–150. <https://doi.org/10.1177/004931032002001>
- [17] Matthew Costello, James Hawdon, Thomas Ratliff, and Tyler Grantham. 2016. Who views online extremism? Individual attributes leading to exposure. *Computers in Human Behavior* 63 (2016), 311–320. <https://doi.org/10.1016/j.chb.2016.05.033>
- [18] Neil Dagnall, Kenneth Drinkwater, Andrew Parker, Andrew Denovan, and Megan Parton. 2015. Conspiracy theory and cognitive style: A worldview. *Frontiers in Psychology* 6, FEB (2015), 1–9. <https://doi.org/10.3389/fpsyg.2015.00206>
- [19] Hannah Darwin, Nick Neave, and Joni Holmes. 2011. Belief in conspiracy theories: The role of paranormal belief, paranoid ideation and schizotypy. *Personality and Individual Differences* 50, 8 (2011), 1289–1293. <https://doi.org/10.1016/j.paid.2011.02.027>
- [20] Matthew R. X. Dentith. 2014. *The Philosophy of Conspiracy Theories*. Palgrave Macmillan UK, London. <https://doi.org/10.1057/9781137363169>
- [21] Alan Dundes. 1997. The Motif-Index and the Tale Type Index: A Critique. *Journal of Folklore Research* 34, 3 (1997).
- [22] Emilio Ferrara, Onur Varol, Clayton Davis, Filippo Menczer, and Alessandro Flammini. 2016. The rise of social bots. *Commun. ACM* 59, 7 (6 2016), 96–104. <https://doi.org/10.1145/2818717>
- [23] Bradley Franks, Adrian Bangerter, and Martin W. Bauer. 2013. Conspiracy theories as quasi-religious mentality: An integrated account from cognitive science, social representations theory, and frame theory. *Frontiers in Psychology* 4, JUL (2013), 1–12. <https://doi.org/10.3389/fpsyg.2013.00424>
- [24] Howard Goldstein. 1983. Training Generative Repertoires within Agent-Action-Object Miniature Linguistic Systems with Children. *Journal of Speech Language and Hearing Research* 26, 1 (3 1983), 76. <https://doi.org/10.1044/jshr.2601.76>
- [25] Harry F. Gollob. 1974. The subject-verb-object approach to social cognition. *Psychological Review* 81, 4 (1974), 286–321. <https://doi.org/10.1037/h0036591>
- [26] Erich Goode and Nachman Ben-Yehuda. 1994. Moral Panics: Culture, Politics, and Social Construction. *Annual Review of Sociology* 20, 1 (8 1994), 149–171. <https://doi.org/10.1146/annurev.so.20.080194.001053>
- [27] Carl F. Graumann and Serge Moscovici (Eds.). 1987. *Changing Conceptions of Conspiracy*. Springer New York, New York, NY. <https://doi.org/10.1007/978-1-4612-4618-3>
- [28] Monika Grzesiak-Feldman. 2013. The Effect of High-Anxiety Situations on Conspiracy Thinking. *Current Psychology* 32, 1 (2013), 100–118. <https://doi.org/10.1007/s12144-013-9165-6>
- [29] Chip Heath, Chris Bell, and Emily Sternberg. 2001. Emotional selection in memes: The case of urban legends. *Journal of Personality and Social Psychology* 81, 6 (2001), 1028–1041. <https://doi.org/10.1037/0022-3514.81.6.1028>
- [30] John Higham. 2002. *Strangers in the land: Patterns of American nativism, 1860–1925*. Rutgers University Press.

- [31] Richard Hofstader. 1965. The Paranoid Style in American Politics and Other Essays. *The American Historical Review* (1965), 330. <https://doi.org/10.2307/1848349>
- [32] Y Linlin Huang, Kate Starbird, Mania Orand, Stephanie A Stanek, and Heather T Pedersen. 2015. Connected Through Crisis. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing - CSCW '15*. ACM Press, New York, New York, USA, 969–980. <https://doi.org/10.1145/2675133.2675202>
- [33] Daniel Jolley and Karen M. Douglas. 2014. The social consequences of conspiracism: Exposure to conspiracy theories decreases intentions to engage in politics and to reduce one's carbon footprint. *British Journal of Psychology* 105, 1 (2014), 35–56. <https://doi.org/10.1111/bjop.12018>
- [34] Armand Joulin, Edouard Grave, Piotr Bojanowski, Maximilian Nickel, and Tomas Mikolov. 2017. Fast Linear Model for Knowledge Graph Embeddings. (2017), 1–8. <http://arxiv.org/abs/1710.10881>
- [35] Brian L. Keeley. 1999. Of Conspiracy Theories. *The Journal of Philosophy* 96, 3 (3 1999), 109. <https://doi.org/10.2307/2564659>
- [36] Miroslaw Kofta and Grzegorz Sedeć. 2005. Conspiracy Stereotypes of Jews During Systemic Transformation in Poland. *International Journal of Sociology* 35, 1 (2005), 40–64. <https://doi.org/10.1080/00207659.2005.11043142>
- [37] Yubo Kou, Xinning Gui, Yunan Chen, and Kathleen Pine. 2017. Conspiracy Talk on Social Media. *Proceedings of the ACM on Human-Computer Interaction* 1, CSCW (2017), 1–21. <https://doi.org/10.1145/3134696>
- [38] Danai Koutra, Paul Bennett, and Eric Horvitz. 2015. Events and Controversies: Influences of a Shocking News Event on Information Seeking. *TAIA workshop in SIGIR* (2015), 0–3. <https://doi.org/10.1145/2736277.2741099>
- [39] James H Kuklinski, Paul J Quirk, Jennifer Jerit, David Schwieder, and Robert F Rich. 2000. Misinformation and the Currency of Democratic Citizenship. *Journal of Politics* 62, 3 (2000), 790–816.
- [40] Stephan Lewandowsky, John Cook, Klaus Oberauer, and Michael Marriott. 2013. Recursive Fury: Conspiracist Ideation in the Blogosphere in Response to Research on Conspiracist Ideation. *Frontiers in Psychology* 4 (2013). <https://doi.org/10.3389/fpsyg.2013.00073>
- [41] Stephan Lewandowsky, Klaus Oberauer, and Gilles E. Gignac. 2013. NASA Faked the Moon Landing—Therefore, (Climate) Science Is a Hoax. *Psychological Science* 24, 5 (2013), 622–633. <https://doi.org/10.1177/0956797612457686>
- [42] Simon Locke. 2009. Conspiracy culture, blame culture, and rationalisation. *Sociological Review* 57, 4 (2009), 567–585. <https://doi.org/10.1111/j.1467-954X.2009.01862.x>
- [43] Jim Maddock, Kate Starbird, Haneen J. Al-Hassani, Daniel E Sandoval, Mania Orand, and Robert M Mason. 2015. Characterizing Online Rumoring Behavior Using Multi-Dimensional Signatures. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing - CSCW '15*. <https://doi.org/10.1145/2675133.2675280>
- [44] Tanushree Mitra, Scott Counts, and James W Pennebaker. 2016. Understanding Anti-Vaccination Attitudes in Social Media. In *Tenth International AAAI Conference on Web and Social Media - ICWSM '16*.
- [45] Tanushree Mitra, Graham Wright, and Eric Gilbert. 2017. Credibility and the Dynamics of Collective Attention. *Proceedings of the ACM on Human-Computer Interaction* 1, CSCW (12 2017), 1–17. <https://doi.org/10.1145/3134715>
- [46] Juan Pablo Mora Gutiérrez. 2001. Semantic Role Lists. In *Directed motion in English and Spanish*. Estudios de lingüística del español, Chapter 5.1.1.
- [47] Richard Moulding, Simon Nix-Carnell, Alexandra Schnabel, Maja Nedeljkovic, Emma E. Burnside, Aaron F. Lentini, and Nazia Mehzabin. 2016. Better the devil you know than a world you don't? Intolerance of uncertainty and worldview explanations for belief in conspiracy theories. *Personality and Individual Differences* 98 (2016), 345–354. <https://doi.org/10.1016/j.paid.2016.04.060>
- [48] Dong Nguyen, Dolf Trieschnigg, and Mariët Theune. 2013. Folktale Classification Using Learning to Rank. In *Lecture Notes in Computer Science*. Vol. 7814. 195–206. https://doi.org/10.1007/978-3-642-36973-5_{_}17
- [49] Daisuke Okanohara and Jun'ichi Tsujii. 2009. Text Categorization with All Substring Features. In *The SIAM International Conference on Data Mining - SDM '09*. 838–846. <http://pubs.siam.org/doi/pdf/10.1137/1.9781611972795.72>
- [50] J. Eric Oliver and Thomas J. Wood. 2014. Conspiracy theories and the paranoid style(s) of mass opinion. *American Journal of Political Science* 58, 4 (2014), 952–966. <https://doi.org/10.1111/ajps.12084>
- [51] Martha Palmer, Ivan Titov, and Shumin Wu. 2013. Semantic Role Labeling. *NAACL HLT 2013 Tutorial Abstracts* (2013), 10–12. <https://doi.org/10.3115/1667899.1667902>
- [52] Charles Pigden. 1995. Popper Revisited, or What Is Wrong With Conspiracy Theories? *Philosophy of the Social Sciences* 25, 1 (1995), 3–34. <https://doi.org/10.1177/004839319502500101>
- [53] Marius Hans Raab, Nikolas Auer, Stefan A. Ortlib, and Claus Christian Carbon. 2013. The sarrazin effect: The presence of absurd statements in conspiracy theories makes canonical information less plausible. *Frontiers in Psychology* 4, JUL (2013), 1–8. <https://doi.org/10.3389/fpsyg.2013.00453>
- [54] Marius Hans Raab, Stefan Andreas Ortlib, Nikolas Auer, Klara Guthmann, and Claus-Christian Carbon. 2013. Thirty shades of truth: Conspiracy theories as stories of individuation, not of pathological delusion. *Frontiers in Psychology* 4, JUL (2013), 1–9. <https://doi.org/10.3389/fpsyg.2013.00406>

[55] Robert S Robins and Jerrold M Post. 1997. *Political paranoia: The psychopolitics of hatred*. Yale University Press.

[56] David E. Rumelhart. 1980. On Evaluating Story Grammars. *Cognitive Science* 4, 3 (1980), 313–316. [https://doi.org/10.1016/S0364-0213\(80\)80007-3](https://doi.org/10.1016/S0364-0213(80)80007-3)

[57] Andrew Salway, Liadh Kelly, Inguna Skadiņa, and Gareth J F Jones. 2010. Portable Extraction of Partially Structured Facts from the Web. In *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*. Vol. 6233 LNAI. 345–356. https://doi.org/10.1007/978-3-642-14770-8_38

[58] Mattia Samory and Tanushree Mitra. 2018. Conspiracies Online: User Discussions in a Conspiracy Community Following Dramatic Events. In *Proceedings of the 12th International AAAI Conference on Web and Social Media - ICWSM '18*.

[59] Kate Starbird. 2017. Examining the Alternative Media Ecosystem through the Production of Alternative Narratives of Mass Shooting Events on Twitter. In *Proceedings of the 11th International AAAI Conference on Web and Social Media - ICWSM '17*.

[60] Carl Stempel, Thomas Hargrove, and Guido H Stempel. 2007. Media Use, Social Structure, and Belief in 9/11 Conspiracy Theories. *Journalism & Mass Communication Quarterly* 84, 2 (6 2007), 353–372. <https://doi.org/10.1177/107769900708400210>

[61] Cass R. Sunstein and Adrian Vermeule. 2009. Conspiracy Theories: Causes and Cures. *Journal of Political Philosophy* 17, 2 (2009), 202–227. <https://doi.org/10.1111/j.1467-9760.2008.00325.x>

[62] Viren Swami, Rebecca Coles, Stefan Stieger, Jakob Pietschnig, Adrian Furnham, Sherry Rehim, and Martin Voracek. 2011. Conspiracist ideation in Britain and Austria: Evidence of a monological belief system and associations between individual psychological differences and real-world and fictitious conspiracy theories. *British Journal of Psychology* 102, 3 (2011), 443–463. <https://doi.org/10.1111/j.2044-8295.2010.02004.x>

[63] Viren Swami, Martin Voracek, Stefan Stieger, Ulrich S. Tran, and Adrian Furnham. 2014. Analytic thinking reduces belief in conspiracy theories. *Cognition* 133, 3 (2014), 572–585. <https://doi.org/10.1016/j.cognition.2014.08.006>

[64] Zeynep Tufekci. 2014. Big Questions for Social Media Big Data: Representativeness, Validity and Other Methodological Pitfalls. *Proceedings of the 8th International AAAI Conference on Weblogs and Social Media - ICWSM '14* (2014), 10. <http://arxiv.org/abs/1403.7400>

[65] Joseph E. Uscinski, Casey Klofstad, and Matthew D. Atkinson. 2016. What Drives Conspiratorial Beliefs? The Role of Informational Cues and Predispositions. *Political Research Quarterly* 69, 1 (2016), 57–71. <https://doi.org/10.1177/1065912915621621>

[66] Sander Van der Linden. 2015. The conspiracy-effect: Exposure to conspiracy theories (about global warming) decreases pro-social behavior and science acceptance. *Personality and Individual Differences* 87 (2015), 171–173. <https://doi.org/10.1016/j.paid.2015.07.045>

[67] Jan Willem van Prooijen and Nils B. Jostmann. 2013. Belief in conspiracy theories: The influence of uncertainty and perceived morality. *European Journal of Social Psychology* 43, 1 (2013), 109–115. <https://doi.org/10.1002/ejsp.1922>

[68] Jesse Walker. 2014. *The United States of paranoia: A conspiracy*. Harper Collins.

[69] Amy X Zhang and Bryan Culbertson. 2017. Characterizing Online Discussion Using Coarse Discourse Sequences. In *Proceedings of the 11th International AAAI Conference on Web and Social Media - ICWSM '17*. 357–366.

[70] Marvin Zonis and Craig M Joseph. 1994. Conspiracy Thinking in the Middle East. *Political Psychology* 15, 3 (1994), 443–459. <https://doi.org/papers2://publication/uuid/15ECA456-C8E9-40E2-A96E-2773EF20B6B5>

Received April 2018; revised July 2018; accepted September 2018