

Network, Text, and Image Analysis of Anti-Muslim Groups on Facebook

Megan Squire [0000-0002-5335-8423]
Elon University, Elon NC, 27244, USA
msquire@elon.edu

Abstract. Islamophobic attitudes and overt acts of hostility toward Muslims in the United States are increasingly commonplace. The goal of this research is to begin to understand how anti-Muslim political groups use the Facebook social network to build their online communities and perpetuate their beliefs. We used the public Facebook Graph API to create a large dataset of 700,204 members of 1,870 Facebook groups spanning 10 different far-right ideologies during the time period June 2017 - March 2018. We first applied social network analysis techniques to discover which groups and ideologies shared members with anti-Muslim groups during this period. Our results show that the anti-Muslim Facebook network has unique characteristics when compared to other categories of far-right extremism. We then assessed 202 anti-Muslim Facebook group cover photos and descriptions for evidence of Islamophobic content. Results indicate that these anti-Muslim groups rely on a predictable collection of visual and linguistic cues to propagate negative stereotypes about Muslims, and that the vast majority of these groups rely heavily on symbols and language that portray Islam as a violent enemy which is deserving of violence and hostility in return. By understanding the important role Islamophobia plays in the hate ecosystem on Facebook, social media users and platform providers can be better prepared to confront and condemn anti-Muslim bias.

I. Introduction

Anti-Muslim hostility and Islamophobic attitudes are increasingly prevalent in the United States. A 2018 survey on anti-Muslim attitudes from The Institute for Social Policy & Understanding (IPSU) showed that 65% of Americans surveyed believed Muslims currently face discrimination in the United States, and 61% of Muslims surveyed reported experiencing some frequency of religious discrimination over the past year [1]. These results align with a Pew Research survey indicating that Islamophobia and anti-Muslim bias is commonplace, with 69% of US adults - and 75% of Muslims - reporting that there is "a lot" of discrimination against Muslims in America [2]. Unfortunately, data provided by the United States Federal Bureau of Investigation (FBI) also shows that

anti-Muslim hate crimes in 2016 increased 40% over the prior year, surpassing 2001 levels for the first time [3].

Riding this wave of perceived popular support for nativist ideas, businessman and television celebrity Donald J. Trump was elected in 2016 to the presidency on an explicitly anti-immigrant, anti-Muslim platform, and took action almost immediately after his inauguration to bring his nativist policies into effect. Within days of being elected, his administration issued a travel ban against Muslim-majority countries, and signed executive orders taking a hard line on immigration generally, and deportations of undocumented immigrants in particular [4]. In June of 2017, groups such as Act for America [5] and Proud Boys [6] began holding anti-Muslim rallies in cities across the United States. Billed as "anti-Sharia law" rallies, the organizers claimed that they were simply speaking out against a fear that Islamic religious law could possibly "creep" into the country and supplant the established American legal code [7]. By December 2017 anti-Muslim groups had introduced 23 new "creeping sharia" or "anti-Sharia law" bills into 18 state legislatures [8] and two of these laws were passed, in Arkansas and Texas.

Building on research that shows a direct causal link between stereotyping and dehumanization leading to discriminatory policies [9], the IPSU report also includes the first Islamophobia Index (II) for the United States. The II survey scores respondents according to how much they agree with various anti-Muslim stereotypes, such as that Muslims are prone to violence, and how much they agree with dehumanizing statements, such as that Muslims are less civilized than non-Muslims. Importantly, the II report also provides some insight into the origin of these beliefs: for example, recent research shows that Muslim terror attacks receive 357% more coverage by American media companies than other types of terror attacks [10], even though law enforcement agencies report incidents of ideologically motivated violence are much higher for right-wing anti-government ideologies than for Muslim extremists [11].

The goal of our research is to understand the way social media serves as a vehicle for encouraging anti-Muslim attitudes, and to investigate the overlap in

ideologies and group membership in the nativist far-right. To accomplish this, beginning in June 2017 we collected publicly-available Facebook membership rosters from 1,870 groups across 10 different far-right political ideologies. We then used network analysis techniques to understand crossover membership between these groups, and we applied three different rubrics for assessing the Islamophobic text and image content.

The main contributions of this work are two-fold: first, we analyze group membership data as a social network, showing the crossover between ideologies, and between groups within those ideologies, with particular attention to anti-Muslim groups. Second, we present a novel quantitative analysis of the anti-Muslim text and image artifacts, showing precisely which stereotypes, prejudiced viewpoints, and persistent myths are used most frequently in images and text to promote anti-Muslim bigotry on Facebook during this time period. Our results show that the overwhelming majority of anti-Muslim text and imagery on Facebook is used to construct a narrative of Islam as an inherently violent enemy that is separate from and hostile to American values and is thus deserving of retaliatory violence.

Section 2 provides a brief background of far-right extremist beliefs in the United States, with particular focus on Islamophobic and anti-Muslim groups. Section 3 introduces our Facebook data set, including the process used to collect and store it. Section 4 presents the method and results for social network analysis of group co-membership. In this section we also analyze text and images for Islamophobic and anti-Muslim content. Section 5 reviews some of the limitations of our approach and suggests avenues for future work with this data. Section 6 summarizes our findings and conclusions.

2. Background

This project is based on a large data set of far-right extremist groups using the Facebook social network during the period June 20, 2017 – March 31, 2018. Here we provide a brief background on far-right extremism, with a particular focus on anti-Muslim beliefs.

2.1 Ideologies

Table 1 shows ten far-right extremist ideologies and some basic statistics about the sizes of the groups on Facebook. Ideologies marked with * the ones we chose to focus on these for this study about anti-Muslim crossover. These ideologies were chosen because they

were some of the largest we collected, and because these five ideologies were most similar to one another in terms of nativist or xenophobic beliefs. The other five ideologies are discussed more thoroughly in prior work [12, 13].

Descriptions of each ideology came from two US-based not-for-profit extremist monitoring groups: The Southern Poverty Law Center (SPLC) [14] and The Anti-Defamation League (ADL) [15]. To give a sense of the differences between ideologies, a few example keywords and concepts are listed below, along with references to the SPLC and ADL descriptions of each ideology.

Table 1. Ideologies and counts

Ideology	#		Largest Mean	
	Groups	Members	Group	Group
* Neo-Confederate	453	182,621	19,447	662
* White Power	379	73,582	14,712	233
* Anti-Gov/Militia	273	101,211	11,509	473
* Anti-Muslim	136	128,467	17,824	1,270
* Anti-Immigrant	51	115,511	51,117	2,823
Alt-Right	246	99,996	36,666	587
Proud Boys	157	7,920	1,348	72
Male Supremacy	82	36,435	8,658	643
Neo-Nazi	48	6,218	1,251	139
Anti-Semitic	45	16,498	9,310	400

Anti-Muslim (AM) groups oppose the religion of Islam and are hostile to its adherents. Key groups and concepts include: ACT 4 America / ACT!, American Infidels, Bikers Against Radical Islam, creeping Sharia, Stop Islamization of America, Brigitte Gabriel. [16, 17]

Neo-Confederate (NC) groups advocate secession from the United States, the creation of a separate state based in the American South, reverence for and valorization of Southern historical revisionism and symbols from the Civil War era, i.e. the Confederate Flag. [18, 19]

Anti-Government "Patriot" Militia (AG) groups promote conspiracy theories involving perceived government overreach. Concepts include: New World Order, Agenda 21, FEMA concentration camps, The Turner Diaries, militias, extreme traditional constitutionalism. Examples of groups: Oath Keepers, militias, Three Percent, 3%, III%. [20, 21, 22]

Anti-immigrant (AI) groups oppose immigration into the United States as well as the immigrants themselves. Some believe there exists a government conspiracy to unify Mexico and the United States in a "North American Union". Key groups, concepts, and personalities include: Center for Immigration Studies, ALIPAC, Federation for American Immigration

Reform (FAIR), The Remembrance Project, nativism, border patrols, border guards, Plan de Aztlan, North American Union, David Horowitz, Glen Spencer. [23, 24]

White power (WP) groups promote white supremacist, white nationalist, or white separatist ideologies. Key concepts include white European ethno-nationalism, race realism, white pride, RaHoWa (racial holy war), racist Asatru/folkish beliefs, racist skinhead culture, racist prison gangs, Ku Klux Klan. [25, 26, 27]

2.2 Islamophobia and anti-Muslim bias

Islamophobia is the term for indiscriminate negative attitudes, hostility, or bias against Islam as a religion and against Muslims, the followers of that religion [28]. Erik Bleich's work on measuring Islamophobia [29] reminds us that the attitude in question must be indiscriminate (he also provides the terms *unnuanced* and *undifferentiated* to describe this point) in its condemnation of an entire religion or people. This criterion is important because it allows for nuanced disagreement or legitimate criticism of the religion of Islam without labeling those views Islamophobic. Islamophobia can include a variety of attitudes and emotional responses to Islam and the Muslim people, including fear, distrust, suspicion, jealousy, aversion, hostility, and so on. Islamophobic views do not always result in physical violence, hate crimes, or the enactment of discriminatory behaviors or policies, although as we cited earlier [2, 3], such unfortunate outcomes are often preceded by hostile attitudes.

Another important resource for defining and measuring Islamophobia was introduced in a 1997 report by the Runnymede Commission on British Muslims and Islamophobia [30] and updated in 2018 [31]. The "Runnymede Report" provides eight axes to measure viewpoints as either *Closed* and hostile to Islam, or *Open* to legitimate disagreement about Islam, appreciation for Islam, or respect for Islam. An example axis is Inferior/Equal: is Islam viewed as an inferior religion, or different but equal? Another axis is Enemy/Partner: is Islam viewed as an aggressive enemy, or as a cooperating partner?

To understand the language and imagery of Islamophobia, we will draw on the work of Gottschalk and Greenberg [32], who provide a comprehensive list of common caricatures and tropes used to describe Islam and Muslims in traditional popular print media, specifically in political cartoons. The caricatures used by cartoon artists depend on the viewer's ability to understand cultural and historical symbolic shortcuts. These caricatures eventually become stereotypes, which

ultimately fuel negative attitudes, bias, and discrimination. Visual symbols listed by Gottschalk and Greenberg to caricature Muslims and Islam include:

- Weapons such as the scimitar;
- Minarets and mosques as strange and foreign places where Muslims pray;
- Crescent moons as a symbol of nationalist Islam;
- Unkempt long beards and oversized turbans on men;
- Oppressive veils on women;
- Sultans, camels, deserts, and other "Arabic" symbols that conflate all Islam with Arab countries and promote the supposed duplicitous nature of Arabs (and, by extension, Muslims);
- Caves, goats, and other symbols of backwardness and cultural inferiority;
- Devils, genie lamps, harems, and other symbols of Muslims as evil or espousing beliefs incompatible with Christianity.

To understand how these visual symbols came to represent anti-Muslim bias, it is worth exploring persistent myths and stereotypes about Islam. Deepa Kumar [33] outlines a list of five myths about Islam that have existed since at least the 11th century and were revived during a period of "Orientalism" in the 18th century. For example, one common myth is that Islam is a homogenous, unified, monolithic belief system. Other myths include: that Islam is somehow more uniquely sexist than other religions, that Islam is irrational and anti-scientific, that Islam is inherently violent, and that Muslims are incapable of self-rule and Islam is anti-democratic. Kumar explains that these myths have persisted through history because they provide a convenient rationale for Imperialist policy positions that support a supposed imminent "clash of civilizations" between the civilized West and a monolithic, sexist, backward, violent, despotic Islam.

2.3 Prior Work

Our work on anti-Muslim bias on Facebook is part of a body of scholarship detailing how Islamophobia serves as unifying force for hate groups around the world. Farid Hafez's work explains that Islamophobia is a "common ground" for building unity among far-right groups in Europe, and that anti-Muslim bias and hostility has replaced anti-Semitism as a form of "accepted racism" found in the right-wing and increasingly in centrist politics [34, 35]. Deepa Kumar shows that there exists in the United States a network of anti-Muslim actors – including right-wing politicians,

media, think tanks, academics, and security apparatus – that profit from manufactured controversies around Islam [33]. Nathan Lean's work on charting the Islamophobia industry reflects on the role of online anti-Muslim activism bluntly: "The role of the Internet in fomenting hatred and prejudice cannot be overstated." [36] Our work contends that there is indeed a network of hate groups operating on social media, and anti-Muslim groups occupy an important place in its structure.

This should not be surprising, given past research on extremism in online spaces. Hale [37] reviewed research on extremist groups using online platforms and concluded that the number of groups using internet communities for recruitment and propaganda has increased over time. De Koster and Houtman [38] determined that extremist groups rely on online communities because stigmatization of their beliefs makes offline organizing difficult. Adams and Roscigno [39] studied how Ku Klux Klan and Neo-Nazi groups use online communities to promote and hone their ideologies, and to recruit new members. Regarding Facebook in particular, Marichal [40] studied politically-oriented Facebook groups and why users create them, concluding that Facebook groups can help users express "political performances that are a form of micro-activism."

Our decision to use social network analysis to understand ideological co-membership in these online spaces is also not without precedent. Kitts [41] described how to use social networks to study actors in offline political movements. His work suggests that co-membership analysis can predict whether participation by one person will positively influence another person towards a movement. Burris, Smith, and Strahm [42] applied social network analysis to a collection of links between white supremacist websites in order to reveal the latent ideological structure between Neo-Nazis, Holocaust revisionists, Skinheads, and other groups prevalent at the time. Their analysis shows that sharing of links is common between white supremacist websites from different ideologies, although their work does not attempt to examine shared memberships between these organizations. Similarly, Zhou, et al. [43] and Gerstenfeld, Grant, and Chang [44] use network analysis to study links between extremist websites to try to discern their ideological structure. Chau and Xu [45] also studied the relationship between 28 hate group blogs on Xanga, revealing a stratified community substructure.

Thus, our application of network, text, and image analysis to Facebook groups rests on a foundation of prior research on how political extremism persists in online communities. Our quantitative application to

anti-Muslim groups on Facebook is a unique contribution, and one that is particularly relevant in the current political climate.

3. Data Set

We used the public Facebook Graph API to create a large dataset of 700,204 members of 1,870 Facebook groups and events spanning 10 different far-right ideologies during the time period June 20, 2017 - March 31, 2018. Until June 2018, the membership rosters for both *Public* and *Closed* groups and *Public* events were publicly viewable in any browser or via the Facebook app, and until April 4, 2018 these were also available via the Facebook developer API to anyone with a valid authentication token [25]. We also collected metadata (name, cover photo, description) for these 1870 groups and events. After the API policy change, we were only able to collect metadata for an additional 66 anti-Muslim groups (for 202 anti-Muslim groups in all).

In constructing this data set, we followed Facebook's own data collection policy, including using the Developer API and otherwise abiding by its Terms of Service and Platform Policy for data use [27]. Additionally, our app did not request or receive any private information from users themselves; we only asked Facebook itself via its API for the membership rosters of groups and events for which those rosters were already publicly viewable.

Finding groups. To find the groups, we used a multi-part procedure. This procedure included: keyword searching using the browser-based Facebook "search box" feature, automated keyword searching using the Facebook Search API, using the "Suggested Groups" feature within Facebook, accessing the visible group lists attached to the timelines of heavy users within each ideology, and using the "Linked Groups" feature provided by some Facebook Pages. We only collected groups and events with English language names and descriptions. Groups that were clearly designed to represent users from non-US countries or regions were ignored.

Group visibility. On Facebook, groups can be set up as one of three types [23]: *Public*, where the content and membership lists are viewable by anyone, *Closed*, where the group descriptions and (at least until June 2018) the membership lists were viewable by anyone, but content (such as posts and photos) is viewable by group members only, and *Secret*, where the group information, content, and membership list are only viewable by members of the group. For this project, group names, descriptions, and membership lists were

collected from both Public and Closed groups. We followed a similar procedure for events: metadata and membership rosters were collected from *Public* events with visible guest lists, and we only tracked respondents who had proactively indicated they were either *Going* or *Interested* in the event (not *Invited*).

Ideological Division. The primary ideology (anti-Muslim, neo-Confederate, and so on) for each group or event was determined by visually inspecting its name, its description, its cover photo, and, for *Public* groups, its content. Two expert panels were convened to check both the validity of these ideological categories and the soundness of our classification of the groups and events into the 10 categories. One expert panel was comprised of subject matter experts from a non-profit extremist monitoring organization. The other panel was comprised of subject matter experts from a community-based watchdog group. Each panel independently reviewed the classification of the groups and events using the descriptions furnished by SPLC and ADL, portions of which were previously shown in Table 1. Agreement on a primary classification for each group was reached through consensus within and between the panels.

4. Network, text, and image analysis

4.1 Network analysis

In order to begin to understand ideological crossover between extremist groups, and how that relates specifically to an anti-Muslim context, we will first examine the degree to which members of the groups participate in other ideologies, then we will visualize this crossover using social network analysis. Table 2 shows the rate at which participants in a given ideology join groups in other ideologies. Table 3 shows the ideological crossover that occurs in this data set. For space reasons the abbreviations introduced in Section 2 were used to represent each ideology.

The "smaller" and "larger" designations in Table 3 are based on the total number of multi-issue users. For example, even though Neo-Confederate groups have more total members (182,621), only 34,404 (19%) of these participate in any group from another ideology. Anti-Muslim groups have only 128,467 members, but because 38,051 of those are multi-issue, this makes the anti-Muslim multi-issue users a larger set than the neo-Confederate multi-issue users. When considering membership crossover taken on a percentage basis, consider what percentage of the smaller ideology's multi-issue users is found in the larger ideology's multi-issue users. The range will be between a

minimum of 0% (no crossover) and a maximum of 100% (the smaller ideology is a subset of the larger ideology).

The largest percentage crossover occurs between anti-immigrant and anti-Muslim groups: 61% of the anti-immigrant multi-issue users will choose an anti-Muslim group in which to participate. In fact, three of the next five highest crossover percentages are for the anti-Muslim ideology.

Table 2. Counts and percentages of multi-issue and single-issue users, by ideology

Ideology	NC	WP	AG	AM	AI
# People	182,621	73,582	101,211	128,467	115,511
# of Multi-Issue	34,404	28,449	32,921	38,051	29,665
# of Single-Issue	148,217	45,133	68,290	90,416	85,846
% of Multi-Issue	19%	39%	33%	30%	26%
% of Single-Issue	81%	61%	67%	70%	74%

Table 3. Ideological crossover among multi-issue users, top five ideologies only

Smaller Ideology	Larger Ideology	Shared Member Count	Shared Members as % of Smaller Group
AI	AM	17,959	61%
AG	NC	17,002	52%
AG	AM	14,375	44%
NC	AM	12,139	35%
WP	NC	10,664	37%
WP	AM	10,600	37%
AI	AG	10,477	35%
AI	NC	10,168	34%
WP	AI	7,937	28%
WP	AG	7,521	26%

Normalizing for Group Size. Because the Facebook groups are of different sizes (see Table 1), before going further with the network analysis, we must normalize group size in order to account for the effect of chance on the likelihood of two groups having overlapping members. For example, the expected proportion of overlap will be naturally higher between two large groups than it will be for two smaller groups. To understand if the overlap we observe is genuine or an artifact of chance, we followed Bonacich's method for normalizing group size [49]. Each pair of groups is expressed as a matrix as follows:

Group A	# Members	Group B	
		# Members	# Non-Members
		n_{11}	n_{12}
	# Non-Members	n_{21}	n_{22}

For each group pair (A,B), we generate a new value r (0-1) to represent the normalized, shared proportion of shared members between the two groups as follows:

$$r = (n_{11}n_{22} - \sqrt{n_{11}n_{22}n_{12}n_{21}}) / (n_{11}n_{22} - n_{12}n_{21})$$

We now can prune low-scoring pairings from the data set, and going forward into the network analysis, we can use these normalized values to represent the strength of the tie between groups, rather than just the raw membership count.

Figure 1 shows a network graph built using the five target ideologies: anti-Muslim (green), anti-immigrant (black), white power (yellow), neo-Confederate (red), and anti-government (blue). In the figure, each Facebook group is shown as a node on the graph, and the edges between the nodes are the weighted, normalized overlap described earlier as r . Darker edges have a higher r , or a higher amount of normalized overlap. In order to be included in the network as a node, each group must share at least 10 members in common with at least one other node from those same five ideologies and must exceed .60 for the r normalization threshold.

Given these parameters, we were able to include 839 nodes and 19,532 edges in our social network. Nodes are scaled to reflect the membership size (larger circles mean more users are in the group). Groups are placed in proximity to one another based on how many shared members the groups have in common using the Gephi network analysis software [46] and its implementation [47] of the force-directed Fruchterman-Reingold algorithm [48].

The network diagram reveals a few interesting patterns. First, we observe a hollowed-out center of this diagram. There are very light edges in the center and only a few areas of the graph with relatively "busy" collections of darker colored edges. The darker edges correspond to groups that have a lot of non-chance crossover in memberships. In looking at the names of these groups, they fall into two main types: geographically related groups or chapters of a larger organization. For example, Figure 2 shows some circled areas of interest. Those three groups correspond to (from top to bottom): Confederate Freedom Fighters chapters, League of the South chapters, and Sons of Odin chapters.

This network graph confirms that there are certain ideologies that are more (or less) natural "fits" with each other. Anti-Muslim (green) and anti-immigrant (black) groups occupy much of the same space on the network graph, a visual confirmation of the 61% crossover rate shown earlier in Table 2. At the same

time, neo-Confederate groups are numerous but tightly clustered, whereas white power groups are diffused throughout the graph and are less tightly clustered. This reflects their 19% (neo-Confederate) and 39% (white power) crossover rates.

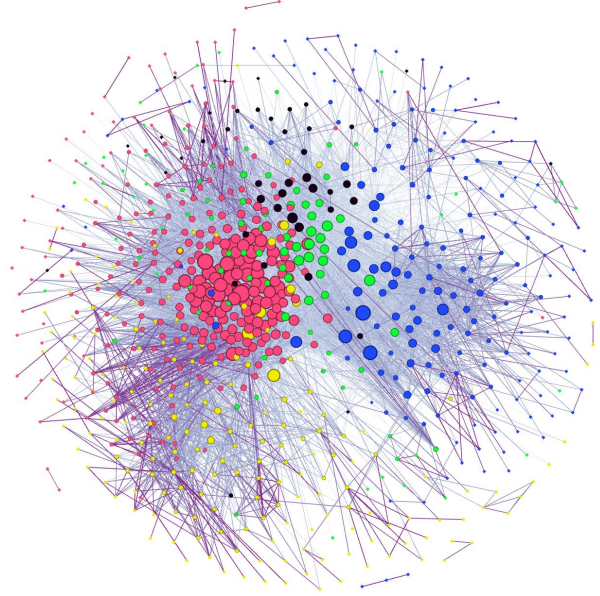


Fig. 1. Social network of Facebook groups with 10 or more members in common and $r \geq .60$, colored by ideology.

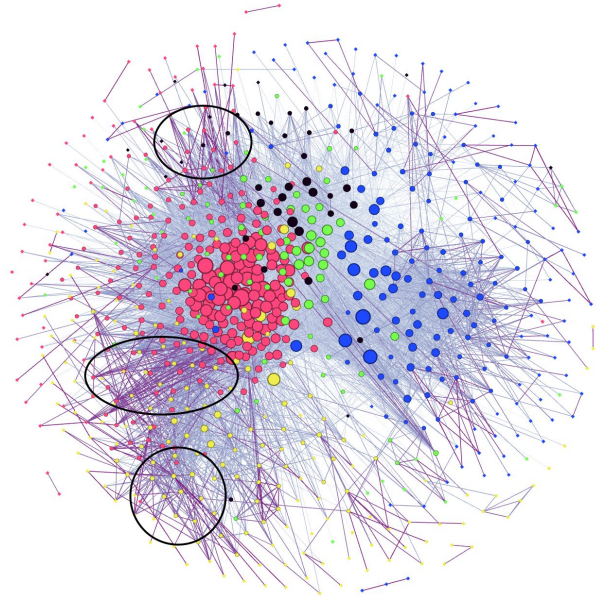


Fig. 2. Same social network, with areas of heavy normalized membership overlap circled.

Because the neo-Confederate groups are so numerous, and have the least amount of crossover with other ideologies (Table 2), we decided to re-draw the network without these nodes and edges. Figure 3 shows the same network with neo-Confederate groups removed.

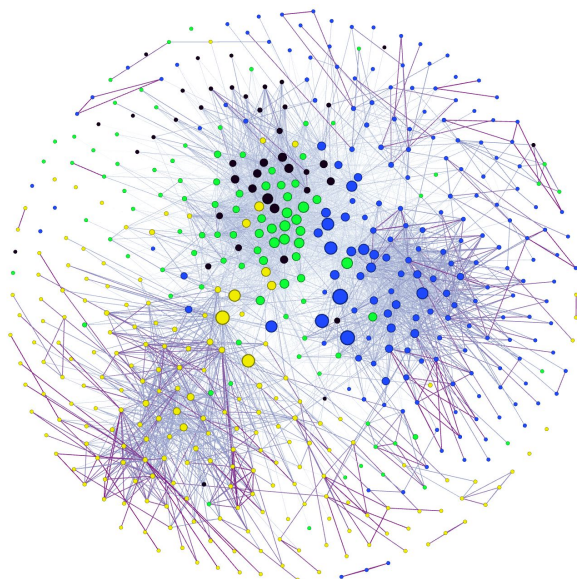


Fig. 3. Same social network, with neo-Confederate nodes and edges removed.

In Figure 3, three clusters are now visible: a blue anti-government cluster with fairly large nodes, a very diffused yellow white power cluster with much smaller but more well-connected nodes, and an anti-immigrant/anti-Muslim cluster with medium sized nodes and weak ties (faint lines) to both other clusters.

Closeness Centrality. The visual representation of the diagram is interesting but to put it in context and understand the influence of nodes (or groups of nodes), we will calculate a series of network metrics. First, the *closeness centrality* of each node measures each node's shortest path to all other nodes in the network. A shortest path is the smallest number of steps to get from node A to node B. Closeness centrality as an influence metric asserts that well-connected nodes are more important than remote nodes. The top 12 nodes for closeness centrality are all either anti-government or white power groups.

The top-scoring anti-Muslim group for closeness centrality is fairly far down on the list. Occupying the 13th spot, *Infidels United for Truth* has a cover photo reading "The final crusade against Islam has begun" superimposed over a figure of a kneeling medieval knight and broadsword. However, its description confirms its crossover appeal to anti-government groups, reading in part, "All true Patriots, 111%'s, Preppers, Militia, Constitutionlists, are welcome. Gun porn and 2nd Ammendment [sic] rights are encouraged." The ego-graph for this group also shows its position near the anti-government groups (Figure 4).

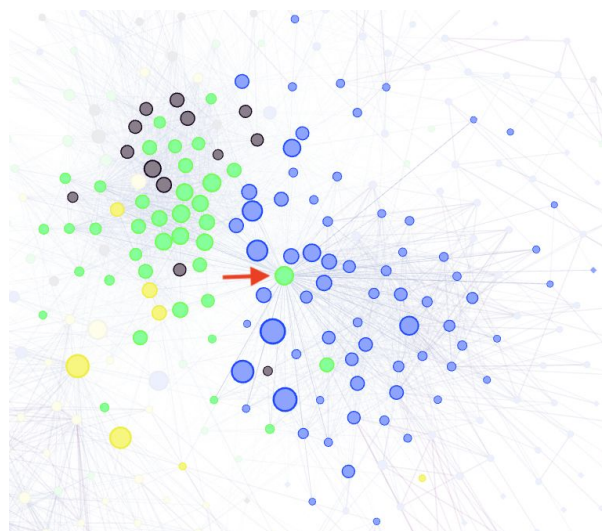


Fig 4. Ego graph for *Infidels United for Truth*, the anti-Muslim group with the highest closeness centrality score, showing its position near many anti-government groups.

Betweenness Centrality. Another way to measure the influence of a node is its betweenness centrality, or the number of the shortest network paths that pass through the node. In other words, how many shortest paths pass through Node A, and is that more or fewer paths than pass through Node B? The more shortest paths pass through Node A, the higher its betweenness measure is. Betweenness is a useful metric because it reveals not just the most popular or largest nodes, but which nodes may be able to tie together far-flung parts of the network.

Of the top five highest-scoring betweenness measures, three are classified as white power, and two are anti-Muslim. This stands to reason since the white power nodes are the most diffused in the graph, they will do the heavy lifting to bring far-flung nodes into the rest of the network.

The highest scoring is a standard white power group advertising itself as "THE LARGEST WHITE RACE GROUP IN THE WORLD ON SOCIAL MEDIA." (As of November 2017, this group is no longer on Facebook. It is unknown whether it was removed for a violation of Community Standards.)

The other is a *Sons of Odin* group, whose description refers to defending against "invasion of hostile foreign peoples to our lands." This node has relatively low closeness scores, but high betweenness scores, indicating that its nativist message serves as bridge between smaller, fringe white power groups and the anti-Muslim and anti-immigrant groups.

The anti-Muslim group *Infidel Brotherhood International* was the third-highest scoring group,

describing itself as "concerned with the islamification of Western countries and and the decline of their values, cultures and identities." The other high-scoring anti-Muslim group was again *Infidels United for Truth*.

Eigenvector Centrality. The importance of a node can also be framed in terms of how many other, popular nodes it is connected to. Eigenvector centrality will assign a higher score to a small, well-connected node than to a larger but poorly-connected node. Nodes are rewarded for having popular neighbors, rather than for connecting far-flung parts of the network.

In this Facebook group network, anti-Muslim nodes are mostly medium-sized, but when sorted by Eigenvector centrality, eight of the top 10 nodes - and 15 of the top 20 nodes - are anti-Muslim groups. Of the remaining nodes in the top 20, four are anti-immigrant, two are anti-government, and one is white power. Figure 5 shows the ego-graph for the highest-scoring (score of 1) anti-Muslim node, the *North American Defense League*. This group has ties to a range of other groups of similar size, from all the other ideologies.

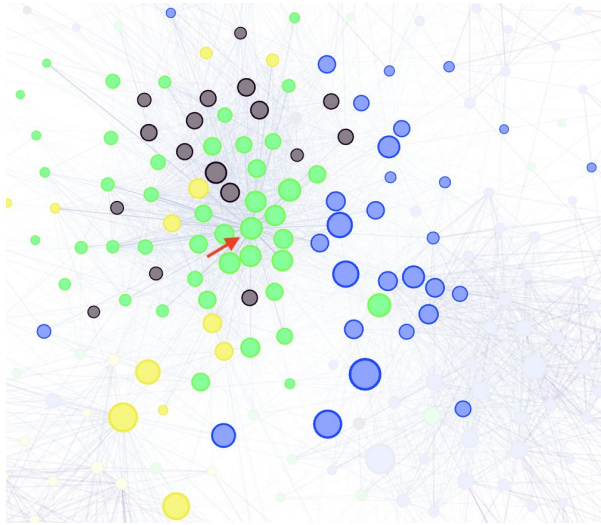


Fig 5. Ego-graph for North American Defense League, an anti-Muslim group with the highest Eigenvector centrality score

Depending on which centrality measure is used, different ideological categories - and different nodes within those categories - convey different levels of influence. The anti-Muslim groups are not the largest in the network, but they are very tightly connected to anti-immigrant groups, both in purpose and in membership (see Table 3). Interestingly, because of their high Eigenvector centrality, they may also serve to create an echo chamber, or "rabbit hole" of suggested groups within Facebook. It is unclear how the algorithms behind the Facebook "Suggested Groups"

feature work (see "Finding Groups" in Section 3), but because anti-Muslim groups tend to be mid-sized and well-connected - after all, they comprise 75% of the top-20 Eigen-connected groups in our sample - joining just one of these groups could end up prompting Facebook to suggest other, similar groups if such a style of suggestions is being used [50].

In the next two sections we explore more about these anti-Muslim groups and their artifacts, particularly the images and text they use to describe themselves.

4.2 Text analysis: themes

Of the 202 anti-Muslim group names and 170 descriptions provided, what themes emerge? To explore these questions, we generated frequency distributions for words in the group names and description text. Stop-words such as articles, pronouns, and most conjunctions were excluded. Given the list of several hundred results, our expert panel (described in Section 3) merged similar and thematically-related topics together and then sorted the themes by frequency of occurrence, retaining only the most commonly occurring and coherent 17 themes, described below.

1. **Islam** – The *Islam* theme includes words like: *Islam, Islamic, Islamization* (and spelling variants such as *Islamitization*).
2. **America** – The *America* theme includes words like *America/n, United States, and U.S.*
3. **Against/Vs** – The *Against* theme looks for two ideologies or concepts that have been put in conflict with one another using contrast words like *against* or *versus* (or the abbreviation *vs*). Examples include: *Freedom Against Islam, Infidels vs. Islam*.
4. **Violence** – The *Violence* theme includes words that describe Muslims or Islam as *violent, terrorists, criminals, dangerous, rapists*.
5. **Infidel** – Groups in this category use the term *Infidel* to reinforce a separate and distinct identity for non-Muslims. This theme includes variants such as *infidels* and *infidel's*. Examples include: *The Infidel Den - Anti Islam Coalition*, and *Patriots and Infidels Against Islam and Liberal Society Everywhere*.
6. **Purge Enemies** – This theme focuses on perpetrating violence on Muslims or exterminating them, using words like *purge, war, rage, enemy*. Example groups include: *Proud enemy of Islam, PROUD MOTHERFUCKERS AT WAR WITH ISLAM*,

Rage against the veil, and *PURGE WORLDWIDE (The Cure for the Islamic disease in your country)*.

7. **Patriot** – Groups in this category focus on distinguishing between Muslims and non-Muslims based on citizenry, immigration status, or perceived love of country. Words include *patriot*, *citizen*, *refugee*, *immigrant*, *immigration*, *resettlement*. Example groups include: *Patriots against Islam*, *CAIRJ-Citizens Against Islamic Rape Jihad*, and *Citizens of Florida Against Resettlement of Muslim Immigrants On Our Soil*.
8. **Exposing Truth** – This theme implies that the religion of Islam is insincere, false, or hiding something. These groups use words like *expose*, *unmask*, *unveil*, *reveal*, *lies*, *lying*, *fallacy*, *truth*. Examples include: *Islamic Lies and Quranic Fallacy Unveiled*, and *The truth about Islam*.
9. **Muslim** – This theme focuses on the use of the word *Muslim* to refer specifically to adherents of the religion of Islam. (We also included two groups who used the variant spelling *Moslem*.) Examples include: *Stop Islamization of the world - Infidels vs Muslims* and *Death to Murdering Islamic Muslim Cult Members*.
10. **Christian** – The Christian theme includes any terms specifically associated with Christianity, such as Bible quotes, mentions of Jesus or "Son of God," or the invocation of some other explicitly pro-Christian or anti-Muslim version of God. Group name examples include: *Islam Vs Christianity & Other Infidels*, and *Christians Unveiling Islam*, and *D.I.D.O.G. (Denounce Islam Defenders of God)*.
11. **Sharia** – This theme perpetuates the belief that Muslims want to replace the traditional system of American jurisprudence with Sharia law. Examples of groups in this category include: *Keep Sharia Law out of America* and *NO Islam In Schools or Sharia Law in USA*.
12. **Jihad** – This theme includes words which are variants of *jihad*, the Arabic word for a struggle or holy war. Example groups include: *Jihad Camp Watch USA*, *Patriots against jihad*, and *Broward /Dade Americans Against Jihad*.
13. **Radical** – The *radical* theme includes words that are related to the perception of Islam as unreasonable or outside the mainstream, for example *radical* or *extremist*.
14. **Devil** – This theme includes groups that conflate Islam or Muslims with *devils*, *evil*, or

Satan. Example groups include: *Unmask Islam and its Satanism*, and *Islam is of the Devil*.

15. **Trump/Obama** – Groups in this category refer to one or both recent United States presidents in terms of their perceived affiliation with or antipathy to Islam and Muslims. President Obama is uniformly referred to negatively, while President Trump is exclusively referred to positively. Example phrases include: *Obama is the primary cause to [Islam's] spread in America* and *we Support our President Donald Trump and Vice President. We hate Islam*.
16. **Crusades** – This theme includes terms and phrases referring to a campaign ("crusade") against Islam or Muslims. May use phrases related to the Crusades period of history where Christians from western Europe fought Muslims to retake the Holy Land, for example *Deus Vult*. Examples include: *Christians Against Islamic Repression - Deus Vult* and *Infidel Crusader - Proud enemy of Islam*.
17. **Dehumanization** – This theme includes words and phrases designed to dehumanize Muslims, including *filth*, *disease*, *dirty*, *cancer*, *horde* (and misspelled variant *hoard*). Examples include: *The Filth Of Islam*, and *Islam is a disease, that we must root out*.

Groups can exhibit language from multiple themes in a single name or description. For example, the group called *Infidels United for Truth* discussed in Section 4.1 represents three themes (#3, #5, and #8). Table 4 shows the counts of groups representing each theme in its name, its description, or both. (The themes are not calculated as percentages in Table 4 since a single group could be counted as representing a single theme in multiple ways within its name, description, or both.)

Table 4. Themes present in anti-Muslim Facebook group names and descriptions

Theme	# Names	# Descriptions	Total
Islam	121	112	233
America	61	68	129
Against/Vs	64	38	102
Violence	4	72	76
Infidel	46	23	69
Purge	15	51	66
Patriot	15	45	60
Truth/Lies	14	45	59
Muslim	6	45	51
Christian	6	39	45
Sharia	12	22	34
Jihad	14	16	30
Radical	11	16	27

Devil	5	22	27
Trump/Obama	1	14	15
Crusade	9	3	12
Dehumanization	4	8	12

Some themes are much more prevalent in the anti-Muslim group names than in the group descriptions, and vice versa. For example, the term *Infidel* is used much more frequently to name a group than to describe its beliefs. The word (or stem) *Islam* is used nearly equally in both names and descriptions, however, *Muslim* is used much more frequently in group descriptions and very rarely in names. The definition of Islamophobia given in Section 2 specified that *Islamophobia* can refer either to indiscriminate negative attitudes towards individual Muslims or the entire religion of Islam.

In short, the lexicon for group names is much shallower (*Islam, America, Against, Infidel*), but in the descriptions the groups begin to get much more specific about what precise aspects of Islam are being protested. One opposite case is the *Crusades* theme, which was nearly unanimously used to name a group, but is only rarely discussed within the group description. Another interesting case is the *Violence* theme. Groups used language implicating Muslims in violence very rarely in group names, but more than 70 times in the textual descriptions.

4.3 Image analysis: closed viewpoints

Next, our panel analyzed the cover photos in terms of their presentation of *Closed* views of Islam as described in the original Runnymede study described in Section 2. For each photo, the panel denoted which of the eight *Closed* views of Islam was being presented. Although most photos only conveyed one theme, a few photos did convey multiple closed views of Islam. Cover photos with irrelevant images or no direct representation of Islam were not included. For example, a cover photo consisting solely of an American flag was not included. In total, 85 (of 171) cover photos included visual expressions of at least one of the eight *Closed* views of Islam. Below we describe examples of each of the *Closed* views of Islam in the order they were originally presented in the Runnymede study.

1. **Monolithic** – In the *Monolithic* view of Islam, the religion is presented as static, and unchanging, while everyone in the religion has the same worldview. Examples of cover photos in this data set exhibiting a *Monolithic* view include one that shows a group of apparently Middle Eastern youths dancing in the street with the caption *Islam: Contributing*

not one damn thing to humanity for over 1400 years. Another photo in this category shows a man with a long beard and taqiyah holding his head in his hands while reading a "Dear Muslims" letter signed by "The Civilized World."

2. **Separate** – In the *Separate* view of Islam, the religion is presented as an "Other" which has different values from and nothing in common with the rest of the world. Cover photos in this data set demonstrating the *Separate* view of Islam include several photos denouncing "Teaching Islam in Schools," one showing a bald eagle (representing America) tearing its claws through a crescent moon (representing Islam), and one that includes the words *If you think Islam is compatible with our way of life you are an idiot.*
3. **Inferior** – In the *Inferior* view of Islam, the religion is presented as backwards, barbaric, irrational, sexist, or primitive. Examples of cover photos in this data set that exhibit the *Inferior* view of Islam include one that shows a group of bearded men in dark robes preparing to stone a woman buried up to her waist in sand with her hands tied behind her back. Another cover photo includes the caption *Not all religions are equal, some are barbaric*, and shows a line of prisoners about to be beheaded. One group cover photo shows the charred body of a human child, with the implication that this atrocity was committed by Muslims.
4. **The Enemy** – A viewpoint where Islam is the *Enemy* will portray the religion as inherently violent, aggressive, terrifying, and threatening. Examples of cover photos in this data set that portray Islam as an *Enemy* include photos showing bearded Middle Eastern men holding machine guns, images of scowling men in turbans wielding knives, a photo of an airplane dropping bombs with the caption *Islam is the cancer*, an image of a pistol-wielding American man captioned *Who wants to play cowboys & Muslims?*, an image of a nuclear mushroom cloud captioned *Mecca was here.*
5. **Manipulative** – The *Manipulative* view of Islam presents the religion as a scam, a lie, insincere, or with a hidden political agenda of world domination. Examples of cover photos in this data set that advance this view include one with a caption *Islam has an agenda: World Domination. Say no to Islam.* Another photo shows a closeup of a woman's face

behind prison bars. Her niqab covers her entire face except for her eyes, while the caption reads *We cannot wait for Islam to be unveiled. We must expose it for ourselves*. With its *veil/expose* double entendre, this photo also normalizes the idea that a Muslim woman's veil "must" be forcibly removed.

6. **Cannot critique the West** – The *Critique* viewpoint states that no negative opinions about the West held by Muslims can be valid. The panel did not find any examples of this viewpoint in the cover photos in our data set.
7. **Discrimination against Islam is natural** – The *Discrimination* view holds that exclusion of Muslims and Islam is normal, and there is nothing wrong with discriminating against Muslims. Examples of cover photos in this data set that advance a *Discrimination* view include one that shows the World Trade Center on fire during the 9/11 attack with a caption that says *How did we go from this [9/11 attack] to being afraid of offending Muslims?* Another image mocks the popular pro-equality COEXIST bumper sticker by stating that *You cannot coexist with people who want to kill you*.
8. **Hostility towards Muslims is normal** – The *Hostility* view portrays Islam and Muslims as being deserving of hostility and violence. This level of outright hostility exceeds the discrimination described in #7 above, extending to violent and aggressive behavior. Examples of this *Hostile* view in this data set include a cover photo with a rifle scope trained on a Muslim soldier and the caption: *72 virgins dating service...The relationship is up to you, we just arrange the meeting!* Multiple cover photos show middle fingers extended, sentiments such as *Fuck Islam*, burning Qu'rans, a severed pig's head with a Qu'ran in the mouth, nuclear explosions, soldiers firing rifles (one included the statement *Let the bodies hit the floor* written in a typeface that resembles blood drops), snarling dogs and animals tearing up a crescent moon, Crusades-era knights battling Muslims, and so on.

5. Islam is manipulative	11
2. Islam is separate	8
1. Islam is monolithic	3
7. Discrimination is normal	2

As Table 5 shows, of the 85 cover photos we reviewed, the vast majority (55) relied on symbols and visual rhetoric that portrayed Islam and Muslims as the *Enemy*. In light of the data from Table 4 showing the prevalence of themes of "Against" and "Violence," Islam is portrayed as a violent enemy. It is not surprising then that the second-highest viewpoint expressed in the cover photos is normalized *Hostility* toward Islam. Perpetuating this myth that Islam is inherently violent [33] scaffolds an environment of retaliation and revenge, in which "their" violence naturally begets "our" defensive violence. Facebook cover photos in this vein feature soldiers with ISIS flags and machine guns shooting rows of prisoners underneath a verse from the Qu'ran that reads *Killing unbelievers is a small matter to us*. Another image again co-opts the COEXIST bumper sticker, this time showing a crescent moon and sword slashing through the symbols of the other religions. Superimposed over the image are the words, *Foolish Infidels. Sura 4:89 "seize them and slay them wherever you find them"*.

It is important to reiterate that a number of images could not be assessed for explicitly *Closed* views of Islam because the images consisted solely of *Americana* (flags, bald eagles, and the like). While it is possible that these symbols could have been representative of the *Separate* viewpoint, for instance by the group administrator using American symbolism to define an anti-Muslim group as non-American or incompatible with American identity, making this logical leap seemed presumptuous. Instead, photos that were comprised solely of *Americana* were excluded.

5. Limitations and future work

The goal of this work is to understand Islamophobia on Facebook by using social network analysis, text analysis, and image analysis techniques. There are several limitations to the approach we took, and several ideas we have for future work and improvements.

One important limitation of this study is the potential for errors in the ideological classification of groups. Classification was straightforward for most of the groups, but we are very aware that groups may claim more than one ideology, or that the ideological focus of the group may change over time. Engaging closely with two expert panels helped with this issue a great deal, but it is true that a reclassification of groups

Table 5. "Closed" views of Islam present in Facebook group cover photos

"Closed" viewpoint	# Covers
4. Islam is the enemy	55
8. Hostility is normal	14
3. Islam is inferior	11

could affect our results, especially in the social network analysis portion of the work.

Another limitation of this work is in reproducibility and extension of the Facebook portion of the study. Facebook blocked researchers access to group or event membership rosters via the API as of April 4, 2018, and no longer allows access to Closed group membership rosters at all as of June 2018. Thus, this social network data set is now frozen in time, and cannot be expanded.

A limitation to the text and image analysis piece is that we identified only 202 English-language, US-centric Facebook groups with an explicitly anti-Muslim bias. It is possible that we may have overlooked some groups. We also did not include anti-Muslim Facebook "pages". There appear to be at least as many pages as groups on Facebook, so adding Islamophobic pages could have been a useful addition to this work.

At the same time, groups (and pages) are frequently being added to or deleted from the Facebook platform, so the anti-Muslim ecosystem there is constantly changing. We noticed during the course of this work that several groups had been deleted, and several other groups had their cover photos removed either by Facebook or by the administrators themselves. This, coupled with the platform changes and API restrictions we wrote about in Section 3 makes it difficult to imagine automating or growing this work significantly in the future.

Increasingly, Facebook is just one of many places where extremist content is found online, and US-based right-wing groups are not the only extremist movements worth studying. Membership crossover studies like this one can be broadly applied to other social media systems and other types of groups using those systems. Smaller, niche social media sites like Gab and Telegram also have a member/group structure and this type of analysis could apply to those sites.

And there are many avenues for future work on this data set. For instance, it might be fruitful to take a much closer look at the individual groups responsible for cross-ideological "bridging." Detailed analysis of this network data will uncover even more relationships between ideologies, and the groups responsible for unifying disparate corners of the graph. Additionally, since we now have a human-classified "gold standard" set of text descriptions and images, we wonder if it may be possible to design a bias detector using a machine learning approach. We look forward to pursuing this as an avenue for future work.

6. Conclusions

In reflecting on anti-Semitism in 1946 post-War France, Jean-Paul Sartre wrote that "The Jew only serves [the anti-Semite] as a pretext; elsewhere his counterpart will make use of the Negro or the man of yellow skin.... It is not the Jewish character that provokes anti-Semitism but, rather, that it is the anti-Semite who creates the Jew." [51] Right-wing extremists in the United States demonize Muslims for similar reasons today: Muslims are a scapegoat, and if the image of a violent, terrorist Muslim horde did not exist in the United States, a racist and xenophobic far-right would need to create one. And it has, apparently using Facebook.

To understand this phenomenon, and how it extends prior scholarship on far-right political activity on the Internet and social media, we have collected and visualized a large data set of online communities on Facebook. We classified these groups by right-wing extremist ideological subtype and used network analysis techniques to explain the interplay between groups with nativist bias, in particular anti-Muslim groups, on Facebook. Our analysis shows that anti-Muslim groups attract the same audiences as other extremist ideologies, including secessionist neo-Confederates, militant anti-government conspiracy theorists, and racist white nationalists. For some measures of centrality, anti-Muslim groups are far and away the best-connected groups in the hate network.

We then delved deeper into the anti-Muslim hate network through text and image analysis. Quantifying the presence of Islamophobic and anti-Muslim hostility on Facebook was unfortunately a straightforward task, given the quantity and intensity of its expression on the platform. We discovered 202 different Facebook groups that had been created to provoke hostility and discrimination towards a class of people based on myths and stereotypes about their religion. To quantify the different flavors of Islamophobic bias present on Facebook, we first performed text mining on the group names and descriptions to learn what themes were most frequently used to promote anti-Muslim ideas. We found 17 themes that were common in Islamophobic groups, the most important of which set up Islam as the cause of an us-versus-them environment of conflict and violence. We then applied standards from the literature on Islamophobia to understand the closed viewpoints, stereotypes, and myths present in the cover photo images used to promote these groups. We found that the vast majority of these groups rely heavily on symbols and language that portray Islam as a violent enemy which is deserving of violence and hostility in return. It

is our sincere hope that by quantifying the size of this problem on Facebook, users and platform providers will be able to recognize and confront Islamophobic language and imagery when they see it throughout the social media landscape.

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