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The ‘tarrant effect’: what impact did far-right attacks have on the *8chan* forum?

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ABSTRACT

This paper analyses the impact of a series of mass shootings committed in 2018–2019 by right-wing extremists on *8chan/pol*, a prominent far-right online forum. Using computational methods, it offers a detailed examination of how attacks trigger shifts in both forum activity and content. We find that while each shooting is discussed by forum participants, their respective impact varies considerably. We highlight, in particular, a ‘Tarrant effect’: the considerable effect Brenton Tarrant’s attack of two mosques in Christchurch, New Zealand, had on the forum. Considering the rise in far-right terrorism and the growing and diversifying online far-right ecosystem, such interactive offline-online effects warrant the attention of scholars and security professionals.

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Introduction

This paper investigates the relationship between recent mass shootings committed by right-wing extremists and the growing underworld of far-right online forums. It more precisely focuses on the relationship between *8chan*, a ‘semi-dark web forum’ (Zamani et al., 2019) hosting far-right discussions, which was created in October 2013 and terminated in early August 2019, and a series of mass shootings committed between October 2018 and August 2019 by right-wing extremists. Specifically, we analyze the impact of the shootings on the forum’s interaction dynamics, offering a fine-grained examination of how attacks trigger shifts in both the pace of discussion and engagement with shootings-related content. This analysis suggests understanding attacks and forum behavior as a dynamic interlocking dyad. Understanding the impact of attacks on grey forums like *8chan* is essential given both the recurring pattern of online announcements of real-world attacks linked to far-right extremism and the gradual displacement of the most extreme far-right online activity from mainstream social media providers (e.g. YouTube, Twitter) to fringe platforms such as the ‘chans’, Slug, Discord, or BitChute (Conway et al., 2019, p. 9).¹

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As an anonymous ‘image-board’² with little (if any) moderation, *8chan/pol* was one of the key platforms where far-right discussions took place. The forum only truly attracted policymakers’ attention with the Christchurch shooting (15 March 2019) carried out by Brenton Tarrant, who used the board to announce his attack, provide links to his manifesto, and to distribute a Facebook livestream video of the massacre. Little more than a month later (27 April 2019), another right-wing extremist followed the same pattern of action, increasing public concern over the forum; the Poway synagogue shooter, John Earnest, used *8chan* to announce his attack and provide links to his ‘Open Letter’ and livestream video. The forum was terminated a couple of days after Patrick Crusius, the El Paso attacker (03 August 2019), similarly announced his intentions and posted a manifesto on the image-board. The year prior to Crusius’ attack, Robert Bowers’ attack on the Tree of Life synagogue in Pittsburgh (27 October 2018) already triggered discussions in *8chan/pol*, even though Bowers does not appear to have been a ‘Channer’ (he instead used another social media platform favored by right-wing extremists, Gab).³ In sum, as Conway et al. (2019, p. 13) put it, ‘*8chan* was directly implicated in three high profile [right-wing extremist] terrorist attacks’. Despite the fact that *8chan* is no longer accessible online, a spate of similar platforms have appeared since it was taken down. Indeed, the likes of *8kun* (*8chan*’s direct successor), *16chan*, and *Neinchan* have appeared or gained traction, hosting comparable far-right extremist discussions and attacks announcements. One such offshoot, *Endchan*, was used by Philip Manshaus to announce his attack in Bærum, Norway (10 August 2019), with a direct reference to Tarrant; Stephan Balliet posted links to a manifesto and the Twitch livestream of his attack of the Halle synagogue (9 October 2019) to another iteration called *Meguca*. More recently, *Kohlchan* users disseminated Tobias Rathjen’s video and his ‘Message to the German people’⁴ right after he killed five people and injured nine others in Hanau near Frankfurt (19 February 2020).

Given the persistence of these ‘chans’ as far-right online communities closely linked with terrorist attacks, we argue that *8chan* offers a unique case to gain a better understanding of the interconnection between far-right forums and violent attacks. Specifically, we use the case of *8chan* to shed light on what we believe is the least understood direction of this interconnection: the influence of the attacks on the forum dynamics (as opposed to the more widely studied impact of online content on shootings). We engage with two main, interlocking research questions. First, did the four attacks (in chronological order, Bowers’, Tarrant’s, Earnest’s, Crusius’) change the popularity of *8chan/pol*? If so, what was the nature of the changes (short-term or long-term, cumulative or not, etc.)? Second, did the four attacks change the content of these discussions? If so, in what way (towards more extreme content, with/without long-lasting consequences, etc.)?

By answering these questions, we hope to strengthen academics’ and security professionals’ understanding of the nature of the interaction linking fringe extremist far-right platforms and actual attacks, complementing the literature’s current emphasis of the media-to-attack direction of this interaction by a granular analysis of the attack-to-media direction. More broadly, the present paper builds on, and further reinforces, ongoing efforts⁵ to correct the field’s historically limited interest in far-right violent extremism⁶ – and, *a fortiori*, its online presence.⁷ Given the overall size of the *8chan/pol* corpus (i.e. 22,456 original posts and 435,697 total posts [original posts and replies] over the period from September 2017 to August 2019), we employ recent advances in computational text analysis methods to answer both questions, following the lead of recent

quantitative analyses of comparable extremist online spaces (e.g. Baele et al., 2019; Bernstein et al., 2011; Jaki et al., 2019). We understand such computer-assisted approaches as a complement to – not as a replacement for – in-depth qualitative work. It is important to note that our analysis, while providing important insights into forum behavior, cannot directly incorporate a range of exogenous factors that may be significant for influencing forum dynamics (e.g. opening of a rival forum, big political event which is not an attack). We nonetheless suggest, throughout the analysis, when these alternatives could have played a role.

We proceed in four main parts. First, we provide a brief overview of the history of the ‘chans’ and provide more information on *8chan/pol* and associated attacks; this contextual information is necessary to interpret our findings. In the second part, we specify our research questions and situate them within both the growing literature on the far-right online ecosystem and theories of online-offline extremist interactions. In the third part, we explain our computer-assisted method. Fourth and finally, we provide and discuss our results, organized in two interlocking sections corresponding to our two research questions. Overall, we show that there is no single, simple impact of attacks on forum dynamics and content; rather, each attack had different and in some instances opposite effects. This can only be understood by considering the general evolution of the discussion across time by attuning to the important and long-lasting ‘Tarrant effect’ of the Christchurch shooting.

Background

8chan’s content and dynamics are only understandable within the ever-growing constellation of sites colloquially referred to as ‘the Chans’ or the ‘Chanosphere’, which are all built on a similar structure and guaranteeing users’ anonymity.⁸ The ‘Chans’ initially started with two Japanese forums: ‘*2channel*’ (renamed ‘*5channel*’ in 2017, *5ch.net*) launched in 1999, and ‘*futaba channel*’ (*2chan.net*) launched in 2001. While originally dedicated to ‘anime’ and ‘random’ discussions, new iterations were quickly created that channeled nationalistic rants, pornography and hate speech, and triggering controversies. The creation of *4chan* (*4chan.org*) in 2003 marked both the spread of the Chans outside Japan towards a complex and rapidly evolving nebula constituted by a range of forums in different languages. The Chans have, from their inception, been the source of a range of controversies related to pornography, xenophobia, conspiratorial claims, misogyny, and violence. *4chan* was already suspended in 2004 due to concerns with child pornography on the site’s thematic board dedicated to ‘hentai’ (pornographic Japanese anime), and serious problems arose with other thematic boards, such as discussions on weaponry (‘/k’ board), xenophobic slurs (chiefly on the ‘/pol’ – for ‘politically incorrect’ – board), or the development of the misogynistic ‘InCel’ subculture (‘/r9k’ board).

8Chan (or *infinitechan*)⁹ was, immediately from its creation in 2013, a particularly problematic iteration of these sites. The image-board was directly intended to be a ‘no holds barred’ equivalent of *4chan*, as a result of a perceived increase in moderation from the *4chan* team and surveillance by intelligence and law-enforcement agencies. The forum indeed grew in popularity following the ‘#gamergate’ controversy, during which *4chan* moderators decided to ban conversations on the subject, triggering a migration of some *4chan* users to *8chan*. The lack of moderation and anonymity on *8chan* resulted

in its /pol board quickly becoming a hub for right-wing extremists (Conway et al., 2019) and a hotspot for shooters hoping to share their manifestos and videos (most notoriously the Christchurch shooter Brenton Tarrant). The focus of the analysis in the present paper is therefore on that particular board, where a community had gradually coalesced around a common ideology and subculture,¹⁰ the main components of which are discussed in the analysis below. *8chan* shut down in August 2019 following the El Paso shooting, accelerating the already growing expansion of the Chans nebula to forums like *8kun* (*8chan*'s direct successor), *Neinchan*, *Endchan*, *16chan*, *Shitchan*, *Spacechan*, *Finalchan*, *38chan*, *JulayWorld* and many others, all of which contain right-wing extremist forums (when they are not entirely dedicated to far-right discussions).

As noted in the introduction, three shootings are directly linked to *8chan/pol*, and an earlier one indirectly. Table 1 below provides key information about these attacks, which have been lethal (85 deaths and 82 injured overall). As far as can be ascertained, Bowers was not an active member of the Chan community, nor was his attack the first in the wave of right-wing extremist attacks that began in 2018. It was, however, arguably the first such attack that was majorly reported on and which gained attention on *8chan/pol*. Furthermore, this appears to have been the first instance of the *modus operandi* that would be adopted by the future attacks discussed here, namely that an announcement about an attack was made on social media by the perpetrator prior to it taking place. In contrast, Tarrant's attack of the two mosques in Christchurch was directly announced on the forum by the shooter, who was a board user. At 08:28 local time (19:30 UTC) on 15 March 2019, he made a post stating 'I will carry out and attack against the invaders'. As can be seen from Figure 1 below (which also gives unfamiliar readers an example of what the forum looks like), the poster goes on to talk about the *8chan* community in favorable terms as an in-group, and posts links to both his manifesto entitled 'The Great Replacement' (which contained numerous in-jokes demonstrating his familiarity with the forum's subculture) and a Facebook livestream video of his attack. The first response arrives less than 2 min later, and, in line with the Chan style, consists solely of a meme. Other replies include an image of Hitler drawn in anime style accompanied by the text 'Good luck shitposter. Rolling for many dead chinks and niggers' (posted at 00:49 UTC), or the statement 'holy Ifuck [Link removed] OP fucking delivered I just saw him kill so many fucking hajis' (posted at 00:51 UTC). Little more than a month after this mass

Table 1. Key information about the four shootings included in the analysis.

Shooter	Number of victims	Place of attack	Date of attack	Time of attack start	Use of <i>8chan</i> ^a
Robert Bowers	11 killed, 6 injured	Pittsburgh, Pennsylvania	27 October 2018	09:54 EDT	Predominately used Gab, but was the first in a wave of high-profile attacks using a specific MO that was discussed on <i>8chan</i> .
Brenton Tarrant	51 killed, 49 injured	Christchurch, New Zealand	15 March 2019	13:40 NZST	- announcement of attack. - Link to livestream video. - - link to manifesto.
John Earnest	1 killed, 3 injured	Poway, California, US	27 April 2019	10:39 MDTC	- announcement of attack. - Link to livestream video. - - link to manifesto.
Patrick Crusius	22 killed, 24 injured	El Paso, Texas, US	03 August 2019	10:39 MDT	- announcement of attack. - link to manifesto.

Note: time of attack is reported Zulu (local) time and UTC time.

^aDue to the anonymous nature of interactions on *8chan*, we cannot firmly establish if the shooters were active posters on the forum, and if so for how long. We only list here the uses of *8chan* that are clearly established.

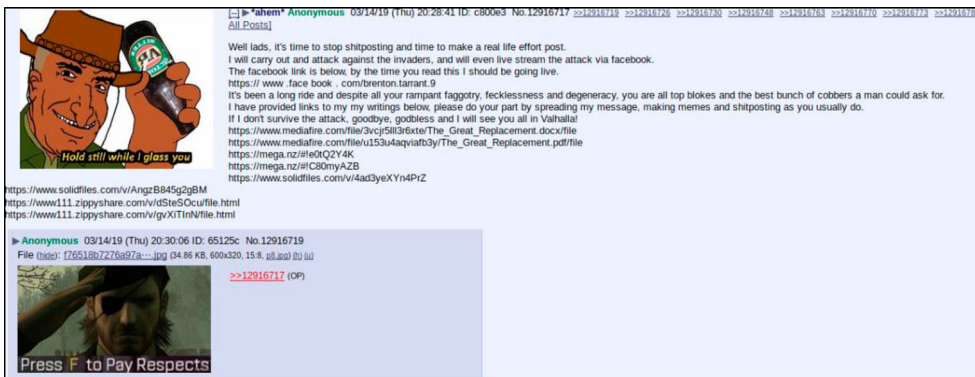


Figure 1. Screenshot of Tarrant's original post to 8chan/pol just prior to his attack, with the first reply post.

killing, on 27 April 2019, at 11:23 local time, Earnest committed the attack on Poway Synagogue in California.¹¹ Shortly beforehand, a post was made to 8chan's /pol board that contained a manifesto entitled 'Open Letter', accompanied by the following words: 'Keep up the infographic redpill threads. I've only been lurking for a year and a half, yet what I've learned here is priceless. It's been a honor'.¹² Finally, on 3 August 2019, Crusius committed a mass shooting at a Walmart in El Paso, Texas, following the same pattern of behavior as Tarrant and Earnest: he announced his intentions in an 8chan/pol post made at 10:15 local time, where he stated 'I can't wait any longer', adding 'I know the media is going to try to frame me incorrectly, but y'all will know the truth!'.¹³ The post also included a four page manifesto entitled 'The Inconvenient Truth', where he specifically singled out Hispanics as being his primary target and stated his wish for a confederacy of ethno-states.

This consistent pattern of behavior inevitably raises the question of the exact nature of the online-offline interactions at play between the shootings (and shooters) and the forum. The next section specifies our take on this question and situates our effort within existing work on similar phenomena.

Literature review and research questions

As evoked above, gaining a stronger understanding of the online-offline interactions when it comes to the far-right is crucial. As demonstrated by recent studies (e.g. Baele et al., 2020; Conway et al., 2019; Wahlström & Törnberg, 2019), the far-right online ecosystem is vast, multifaceted, and growing fast, yet – for these very reasons – it is still poorly mapped and insufficiently understood. Simultaneously, data shows an increase of attacks related to far-right ideology over the past years.¹⁴ In this double context, and with the shootings described above in mind, unpacking the relationship that connects this online environment to real-world violent incidents is a pressing question, both scientifically and in terms of counter-extremism/terrorism practice.

Efforts have been made to clarify the type of relationships that unite extremist online messaging and communities with real-world activism, in some cases violent action. Most of these efforts have, however, focused on the online-to-offline direction of the

relationship, generally arguing that higher exposure to, and participation in, online extremism raises the probability of actual violent behavior (e.g. Pauwels & Schils, 2016), a phenomenon observed in the cases of the far-right (e.g. Müller & Schwarz, 2018) and other extremist ideologies (for example Salafi-jihadism, see Rosenblatt et al., 2019; Zekulin, 2020). It is worth noting a series of reviews come to less assertive conclusions (e.g. Brown & Pearson, 2019). The present study focuses on the other, offline-to-online direction, in an effort to re-balance the analysis of the relationship as a dynamic and circular one whereby online developments influence offline behaviors which themselves shape further online developments. By doing so, we follow Boulianne and Theocharis (2020) heed that ‘while research generally assumes a causal flow from digital media to participation, the evidence for the alternative causal flow is strong and has very different implications on interventions’. With online and offline activities being highly interconnected in complex ways (Johansson & Scaramuzzino, 2019), we hypothesize, and empirically evaluate, two main processes when it comes to *8chan/pol* and the four attacks described above.

Hypothesis and research question 1: Our first hypothesis relates to the impact of shootings on *8chan/pol*'s popularity. We hypothesize that *the board's popularity would not be significantly affected by the shootings*, for two reasons. First, two opposite effects might happen simultaneously and cancel each other: on the one hand, attacks might have brought new, particularly extreme users endorsing violence to *8chan/pol*, yet on the other hand they could well have put off existing users who either fear surveillance or don't embrace the killing of civilians even though they share the kind of far-right ideological beliefs that dominate the forum. Second, none of these opposing user migrations is likely to be big, because *8chan/pol* occupied, from the onset, a very specific niche in the broader ‘chan’ ecosystem, hosting a much more extremist type of debate and content than *4chan/pol* (Baele et al., 2020). A very particular user base was rapidly cemented that was likely to support the shootings. Empirically, we therefore seek to evaluate whether over time the popularity of the board has increased or decreased, especially in the immediate aftermath of the shootings. Since *8chan/pol* was fully anonymous, it is impossible to distinguish posters and thereby identify new and old users; we therefore use, as a proxy measure, the amount of contributions posted to the board. While this is far from perfect, it should nonetheless allow us to spot clear changes in the forum's popularity, especially on the long run.

Hypothesis and research question 2: Our second hypothesis relates to the effect of shootings on *8chan/pol*'s content. We hypothesize that, after attacks, *the forum discussions would display a small yet noticeable shift towards more extreme content or exhibit slight ideological shifts*. On the one hand, different theories and past observations encourage us to expect an intensification of the level of extremism in the discussions, towards, for example, more explicit calls to violence or more regular racial slurs, for two reasons. First, it is likely that attackers who evidence their belonging to the board by announcing their attacks and posting manifestos/livestreams would subsequently become glorified by users, entering the subculture as martyrs for the cause. This ‘martyrology’ phenomenon is notoriously widespread in the Salafi-jihadi culture, but also in other extremist online communities akin to the ‘chans’ where the ‘sanctification’ of killers reinforced commitment to violence (read e.g. Baele et al., 2019, on incel forums; Raitanen & Oksanen, 2018; or Oksanen et al., 2014, on school shooters fan communities). Second, it is now established that the group

polarization phenomenon (Myers & Lamm, 1976), which refers to the tendency of like-minded individuals to embrace increasingly extreme politics the longer they deliberate, can lead groups to support violence (Thomas et al., 2014) and takes place in ideologically sealed online environments (e.g. Sunstein, 1999). Yet on the other hand, our previous argument that the *8chan/pol* user base was from the start a hardcore community with large support for violence means that group polarization cannot lead to support for much more extreme policies than the ones initially endorsed. So overall, while we don't expect to see an evolution of discussions towards significantly more extremism, the glorification of killer figures into 'role-models' (Langman, 2018) that ought to be emulated is likely to be noticeable, with the specific arguments made by the killers in their communications (manifestos, videos) having the potential to produce slight ideological shifts.

Data and methods

To answer these research questions, we conducted a two-step computer-assisted analysis of the forum. This approach was chosen for its demonstrated value in studying extremist forums (e.g. Baele et al., 2019; Jaki et al., 2019, on *Incels.me*), and should be situated within the broader research agenda using computational methods to study areas of the far-right online ecosystem (e.g. Baele et al., 2021; Törnberg & Wahlström, 2018; Wahlström et al., 2020). This quantitative approach should be understood as a complement to, rather than a replacement of, more interpretive qualitative work that could be developed on the basis of the present effort.

Data: harvesting the 8Chan/pol corpus

We developed a custom web-scraper¹⁵ to harvest both the visual and textual content of the *8ch.net/pol* board, and organized this content within a ready-to-use database which contains all of the board's linguistic content¹⁶ from 09 April 2017 through to the site's closure on 05 August 2019. Data was collected for all original posts and reply posts (for a total of 435,697 original and reply posts), and included all the corresponding metadata (for each post, key information such as its length, its date and time, and how many replies it received). Most of the analysis was carried out on a corpus comprising original posts only – the fact that replies were sometimes uploaded several months after the original post, made a judgement of the forum pace very difficult and a study of the content variation across time impossible.

Computational methods

We used this database to address our two core research questions. To answer research question 1 on the popularity of the forum, as explained we used the proxy measure of the pace of posting behavior, we used the posts' metadata harmonized in UTC time zone (as this is the time zone used by the forum itself). We plotted posting activity across time to show variation during the whole timespan covered by the website (zoom out) and then around the days the attacks took place (zoom in). This simple descriptive analysis provides sufficient information to assess general questions on posting dynamics.

Next, we employ two approaches to answer question 2 on changes in the forum's content. First, we use a topic model to identify and measure the main themes present in the *8chan* corpus, as well as to trace the evolution of these topics across time in our corpus in order to locate shifts in content before/after attacks. Generally speaking, topic models are 'an unsupervised machine learning method that learns the underlying themes in a large collection of otherwise unorganized documents' (Chaney & Blei, 2012, p. 1), and there have been a number of different approaches to estimating these models offered in the literature, from generative models such as Blei et al.'s (2003) well-known Latent Dirichlet Allocation (LDA) model to more recent approaches based on matrix factorization techniques (see Greene & Cross, 2017). In the analysis below, we utilize a non-negative matrix factorization approach (NMF) model, which our experiments suggest is particularly well-suited to short texts (such as posts on an online forum). Full details of our approach are provided in Section 1 of the Supplementary Material. The end result of this analysis is the identification of eight semantically coherent themes that reoccur across *8chan/pol* posts.

In addition to the topic modeling results, we provide additional nuance on the key features of *8chan*'s content by employing the popular Word2Vec model developed by Mikolov et al. (2013) and standard textual data summary statistics (such as relative term frequency counts and bi-grams).¹⁷ As described by Mikolov and colleagues, the Word2Vec model applies a simple, two layer neural network to a text corpus (here the text from every original post made to *8ch.net/pol*) in order to produce an N -dimensional vector space, whereby each unique word within the input text corpus is assigned a vector (or 'embedded') within the space. Why is this embedding useful? Mikolov et al. (2013) demonstrated how these word vectors can be used to understand the context surrounding a particular word and to find other words used in a similar context. That is, words that are used in similar contexts are closer together in this space than those that share different context of usage. We use this approach to identify and visualize the main dimensions of the forum's content, and how they relate to one another. For more information on our application of the Word2Vec model to the *8chan* corpus, see section 2 of the Supplementary Material (information on the specific versions of the packages used for the scraping and analysis is available in section 6).

Admittedly, these computational tools are not adequate to attribute direct, unambiguous causation between the shootings and the shifts noticed in the forum pace or/and content. As noted earlier, exogenous confounding effects may produce such effects. Our combination of various techniques and our consideration for such potential effects, together with our focus on several cases, nonetheless allows us to make measured claims on the shooting-to-posting connection.

Results and discussion

Research question 1: attacks and forum popularity.

In order to be able to identify any potential impact of attacks on forum popularity via an analysis of posting pace, it is first necessary to have a general overview of this measure over a long period of time. Table 2 below depicts summary statistics for the entirety of the *8chan/pol* corpus. We notice that the forum is very active: on average there are

over 570 posts (original and replies) per day.¹⁸ The average length for posts is similar to what one would expect in any other internet forum, with significant fluctuation (from very short posts with no text whatsoever and only containing images, to substantial arguments developed in several paragraphs), again not unlike any other internet forums. These measures also demonstrate the large amount of variation in the frequency of posts over time, which makes our analysis difficult.

Figure 2 below already suggests some attacks-related effects. It shows the evolution of the number of original posts made to *8ch.net/pol* across time, from the board's first archived post (09 April 2017) to the site's closure (0 August 2019). The figure shows that it took a couple of months for the board to develop a frequent user base over the summer 2017, after which the pace of the forum increased to around 30 new original posts per day (not counting replies). A significant surge in activity occurred on 27 May 2018, which carried on into June 2018, reflecting the first major discussion of the 'QAnon' conspiracy theory.¹⁹ Importantly for us, two other substantial increases in the frequency of original posts occurred, first on 15 March 2019, the day of Brenton Tarrant's attack in Christchurch, which cannot be a coincidence, and a more gradual increase from mid-June to mid-July 2019, followed by a new drop shortly before Crusius' attack.

With this general information in mind, we can zoom in on the periods of time directly preceding and following the four attacks. Figure 3 below displays the number of original posts per day for the four periods running from ten days before to ten days after each attack (the related summary statistics are provided in section 3 of the Supplementary Material).²⁰ One major observation can reasonably be made: Brenton Tarrant's attack had a strong and lasting impact on the forum's activity, while other attacks did not significantly boost posting rhythm. Bowers' attack coincides with an increase in traffic during the five days following his attack (which took place on a day of relatively little activity on *8ch.net/pol*), but on the slightly longer run the effect disappeared: the mean number of original posts per day during the 10 days preceding the attack was 29, and 32 for the 10 days following it. Tarrant's action was different in kind: his announcement of his attack resulted in an immediate, sharp increase in the number of original posts made to the forum (the number of original posts jumps to over 80),²¹ an increased pace that took time to dissipate: from an average 32 original posts per day over the 10 days preceding the shooting, the forum activity reaches an average of 74 posts for the same period after the attack.

Earnest's attack seems to have had a somewhat counter-intuitive effect: not only did posts not increase, their amount actually decreased (32 original posts on average over the 10 days beforehand, 23 for the same timeframe afterwards). Between the period of 17 April 2019 and 07 May 2019, there were actually only eight original posts mentioning Earnest (for a total of 19 mentions). As Figure 2 showed, his attack took place at a time posting activity was just back to its average as the impact of Tarrant's massacre eventually

Table 2. Summary statistics of all of original posts of the *8ch.net/pol* corpus between 09 April 2017 and 17 July 2019.

	Mean	Median	Mode	Standard deviation	Range
Original posts per day	33.67	34	32	16.98	152
Number of words per post	155.39	96	20	162.93	1564
Length of words (number of letters) in post	7.02	5.37	5	13.68	702.43

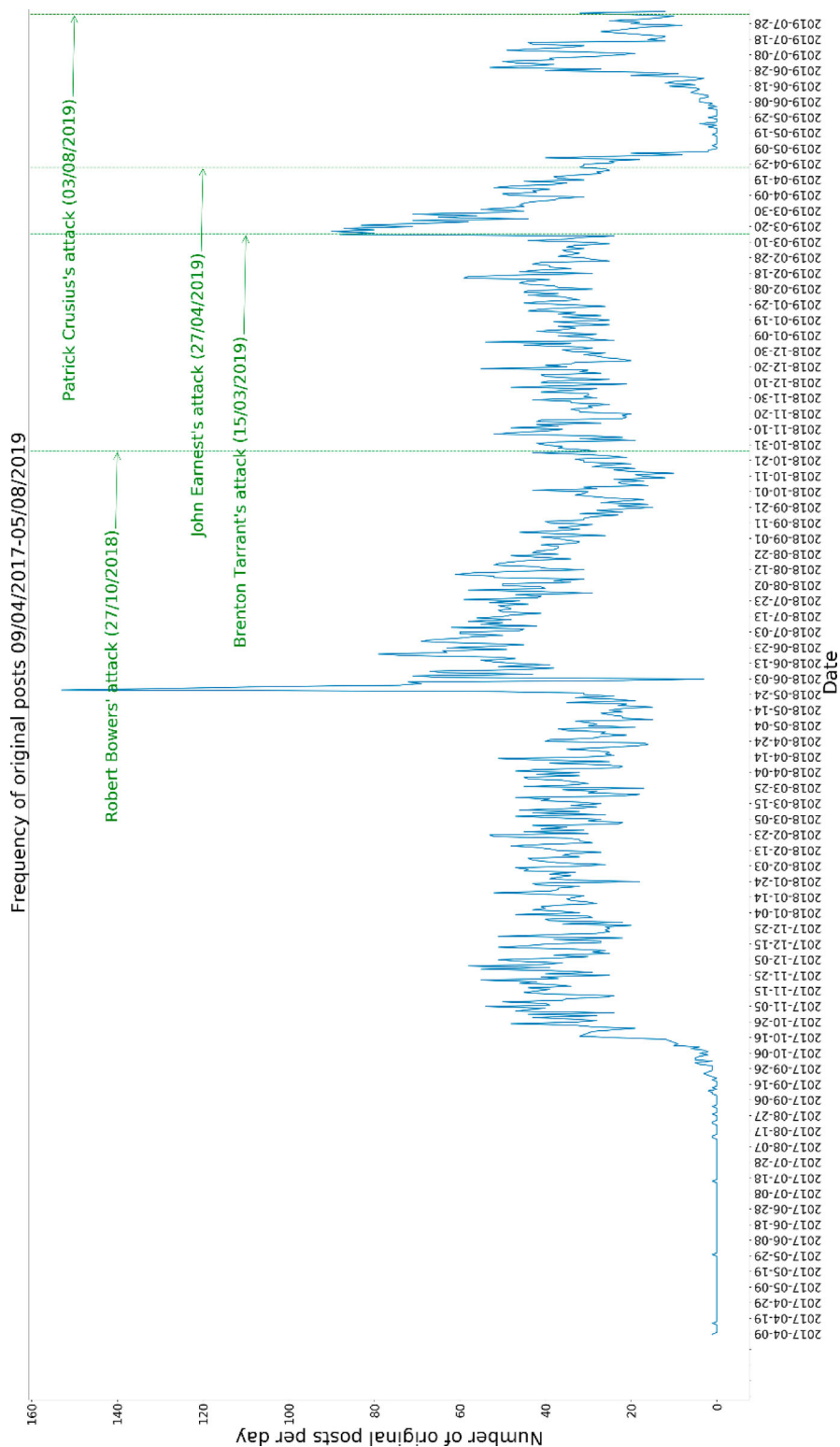


Figure 2. Daily number of original posts made on 8ch.net/pol between 09 April 2017 and 05 August 2019.

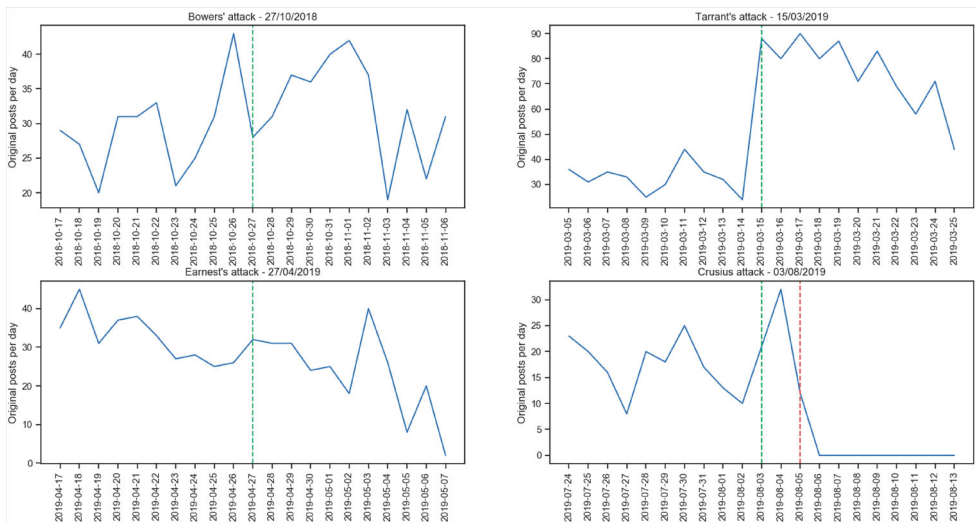


Figure 3. Number of original posts per day the 10 days prior to and following the four attacks, with the green dashed vertical lines signifying the day of the attack (Note that time zones should be taken into account. In (a) the difference between Zulu and Quebec time is -4 h; in (b) the difference between Zulu and Mike time is $+12$ h; in (c) the difference between Zulu and Tango time is -7 h; in (d)). The red dashed line on the graph for Crusius' attack indicates the date that 8ch.net/pol went offline.

waned, but instead of reinvigorating the forum the shooting seemed to have further depressed it to unprecedentedly low intensity. Our content analysis carried out in the next section partially explains this impact or lack thereof, which cannot be understood solely with the kind of metadata studied here. Interestingly, after more than a month of almost null posting activity on the board, intensity gradually increased again up to normal levels, and then plummeted once more before Crusius announced and committed his attack, which precipitated the closure of the platform within two days.

To sum up, we find that not all attacks have the same impact on forum dynamics. Indeed, only one – the Christchurch attack – had a clear effect on the online environment. Apart from Tarrant's attack, our data backs our hypothesis that the board's popularity is not significantly affected by the shootings; our use of posting pace as a proxy for the board's popularity further reinforces this argument, as part of the 'Tarrant effect' (yet most probably not all) could well be explained by old users intensifying their contribution rather than new members joining. The other attacks cannot be matched with clear, sharp changes in forum popularity: one did not change the posting activity (Bowers), one heralded an unprecedented decline that could be due to other factors (Earnest), and the final one, which provoked the closure of the website, occurred *following* an increase in posting intensity, potentially pointing to the kind of online-to-online dynamics more usually examined by the literature.

Research question 2: attacks and forum content.

Before assessing the impact of attacks on the forum content, it is necessary to offer a brief overview of that content over the whole corpus; that baseline will enable us to identify

potential shifts in this content before/after the attacks. To do so, we first ran a topic model for the whole corpus of original posts. Figure 4 below lists the 12 clusters of 10 words constituting each topic, with each topic being numbered, and the bars indicating their proportional contribution to the corpus, which allows us to confirm the far-right nature of the forum (topics 4, 5, 8) as well as its focus on political issues, with the first Trump campaign and presidency identified as a single important topic. Posters are also keen to talk about news stories – together with topic 10 (which we could label ‘government and economics’), this is the forum’s top discussion topic. Figure 5 visualizes the forum’s major themes in a different way, displaying the results of a Word2Vec model of the whole forum (fed with the majority of *8chan/pol*’s most frequent terms, which are available in Supplementary Material together with top bi-grams);²² thematic clusters clearly appear that reveal six major components of *8chan/pol*’s ideology, locating it with the broader ‘far right’ as defined in the introduction. *First*, an orange cluster on the right evidences the predominance of anti-Semitism (‘kike’, ‘judaism’, ‘shabbat’, ‘jew’, ‘rothschild’, ‘zionist’, etc.). This cluster is important: ‘jew’ is the third most frequent term of the whole corpus, and ‘jewish’ the eleventh. *Second*, a blue cluster right under the orange one confirms considerations about race (‘white’ [which is the second most frequent term in the whole forum], ‘brown’, ‘minority’, ‘color’, etc.). *Third*, the central, grey cluster reveals the importance of discussions revolving around race-oriented movements and action (‘identitarian’, ‘organization’, ‘militant’, ‘antifa’, ‘violent’, ‘atomwaffen’, etc.). Going left, a *fourth*, purple cluster confirms the board’s preoccupation with migration, understood as an invasion (‘foreigner’, ‘invasion’, ‘influx’, ‘migration’, ‘refugee’). Next to it, a *fifth* cluster in pink exposes the presence of discussions about government/finance collusion (‘government’, ‘lobbying’, ‘corrupt’, ‘finance’, ‘corporate’, etc.). *Finally sixth*, a green cluster on the left shows the salience of American politics and Trump in particular (‘trump’, ‘trumpist’, ‘kushner’, ‘presidency’, ‘dems’, etc.). Trump is a key figure in *8chan/pol*’s discussions – indeed ‘trump’ is the fifth most frequent term in the whole forum, and ‘donald, trump’ is the second most frequent bi-gram (with ‘president, donald’ and ‘white, house’ coming sixth and seventh respectively).

How did this content vary across time – and if it did, could changes be explained by attacks? We proceed in two steps. First, we evaluate if the attacks had a broad influence on the major themes and topics preferred by board members (the ones highlighted above). To detect such an effect, we plotted the relative salience of the 8 non-junk topics across time, in Figure 6 below. The figure clearly shows the overall prominence of topics 1 (‘news stories’) and 10 (‘Government and economy’). It also shows, importantly, no clear impact of attacks on the big topics of discussion. The forum content remained much of the same throughout its history, confirming our hypothesis that no major change in the ideology of the forum would be expected following the attacks. While there are drops and spikes in topics’ respective saliences, these cannot be clearly attributed to the attacks (for example, the June 2019 spike in topic 10 does not directly follow Earnest’s attack, and are more likely due to an exogenous factor: important steps in the China–US trade war and Trump’s announcement of his participation in the 2020 presidential election). Topics, however, do become much more unstable in the period following Tarrant’s attack. The aftermath of the Christchurch shooting is indeed followed by an increase (proportionally to other topics) in racial slurs, while discussions on government

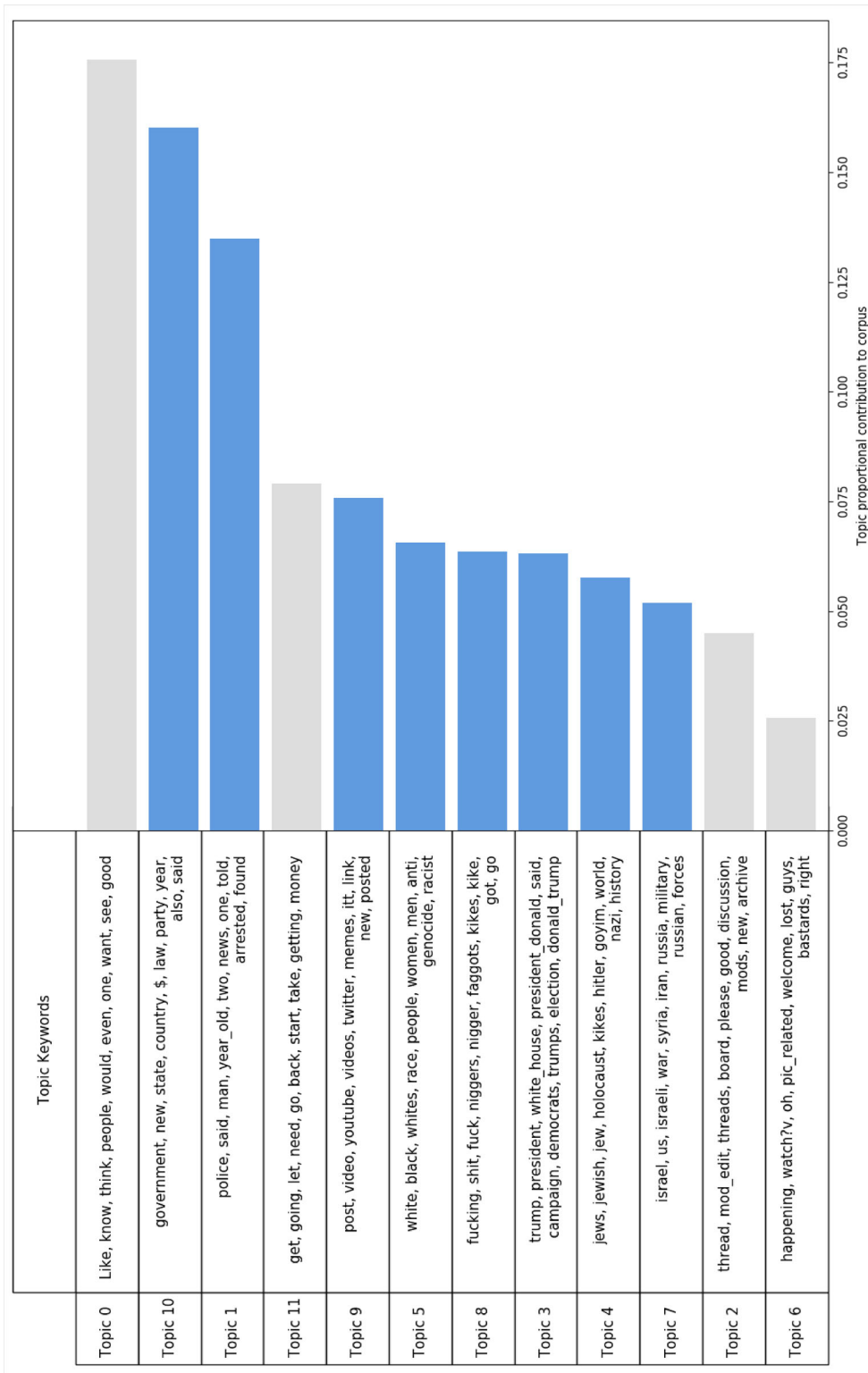


Figure 4. Topic model results for 8chan/pol's original posts (12 topics; the 4 'junk' topics are highlighted in grey).



Figure 5. Visualization of word vectors from the trained Word2Vec model for a selection of the most frequently occurring terms in the original posts in the corpus.

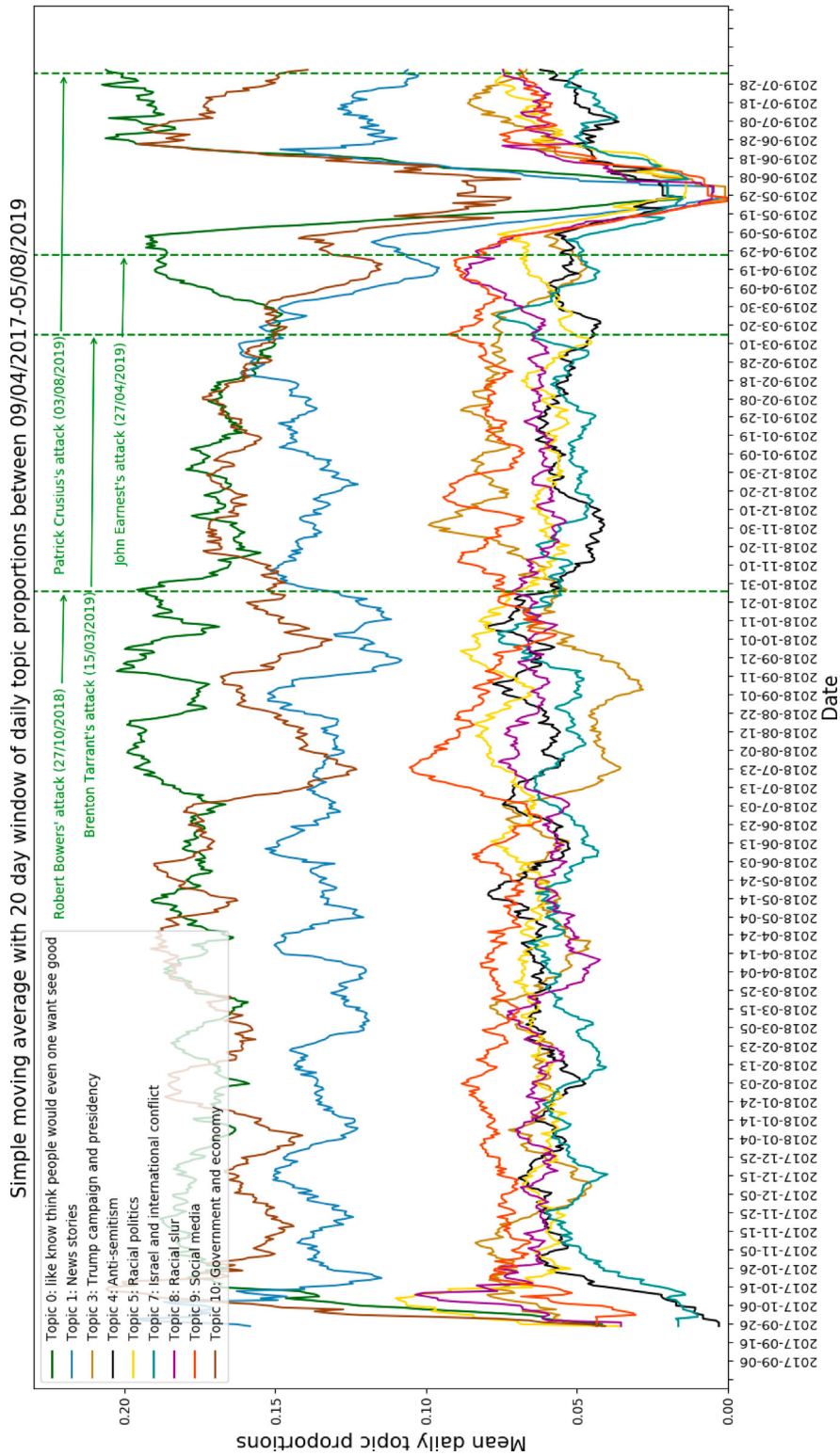


Figure 6. Evolution of 8chan/pol's topics across time.

and news stories fall. This might be part of the 'Tarrant effect' observed above in terms of forum pace/popularity.

Second, and as this analysis remains quite superficial and opens up the possibility of a 'Tarrant effect', we complemented it with a more focused verification of whether the four attacks were commented on by posters, and if so, why and for how long. As noted above, the glorification of 'role-models' is indeed a well-known amplifier of extremist worldviews that tends to reinforce commitments to violence. We observe that, as expected, forum members did in fact discuss the attacks in a direct way, with Tarrant's shooting having an unmistakable impact that further adds to our observation that a 'Tarrant effect' is at play on the board. Figure 7 below displays the frequency of the terms unambiguously characterizing each attack ('Bowers' OR 'Pittsburgh', 'Tarrant' OR 'Christchurch', 'Earnest' OR 'Poway', 'Crusius' OR 'El Paso') as well as the words 'shooting' and 'attack'. We see that after each attack the shooter/place is explicitly mentioned and the frequency of the words 'attack' and 'shooting' augments. In line with our findings on posting pace, and echoing the relative increase in racial slurs noted in the previous paragraph, we notice the undeniable impact of Tarrant's attack, as well as a small and short-lived effect of Earnest's shooting. Clearly, by the novelty of his *modus operandi* – an *8chan/pol* user directly announcing the attack on the board, posting a manifesto and livestreaming the massacre – Tarrant became an important and lasting influence on discussions. The tables listing the most frequent terms and bi-grams occurring in the forum for the periods running 10 days before to after each attack (available in Supplementary Material, section 4) confirm that while each attack is talked about, Tarrant's shooting truly colonizes the discussion (and Earnest's attack does not raise much interest). Some of the most frequent bi-grams in the Bowers' timeframe include 'life, synagogue', 'pittsburgh, synagogue', 'false, flag',²³ and 'robert, bowers'. A close, qualitative look at these terms in their context²⁴ shows that Bowers is, in line with our theoretical discussion, lauded as a 'saint' and 'fucking hero fighting the ZOG',²⁵ for having stopped 'sick kikes' and a 'faggot rabbi mutilating the penis of two infants and then sucking the blood from the wound'. In Tarrant's timeframe, some of the most frequent words are 'attack', 'video', and 'muslim', and a lot of the most frequent bi-grams unambiguously refer to the attack: 'Brenton, tarrant' (3rd most frequent bi-gram), 'false, flag' (6th), 'mass, shooting', 'terror, attack', 'christchurch, shooting' 'jacinda, ardern', or 'christchurch, mosque'. The most frequent bi-gram for the period is even 'noice, noice', a slang way of saying 'nice, nice' which posters kept on writing to directly comment on the shooting. A qualitative examination of the posts in context shows a large discussion on Tarrant's attack, where he is referred to as 'our soldier'. While strongly supported overall, the attack nonetheless sparked intense 'strategic' debates as to whether Tarrant was misleading in targeting Muslims (who 'are ruining their countries' and 'infesting their values and societies') and should have instead targeted Jews and 'inspire young white men to battle the ZOG' ('49 dead Muslims isn't going to hurt the System, and he could have killed nearly as many, along with robbing them, to help finance his own war against the ZOG along the way'). Earnest's and Cruisius' attacks did not have such an impact on the forum content – the latter in large part because of the forum's closure it accelerated. Together with factual information and links to his manifesto, the rare posts mentioning Earnest dismissed him as a failure ('Earnest: 1 Google Crane: 4.²⁶ Weaksauce. Will the ZOG bury their retaliatory [*sic*] crane slaying? They know they won this round. Smug mother fuckers').

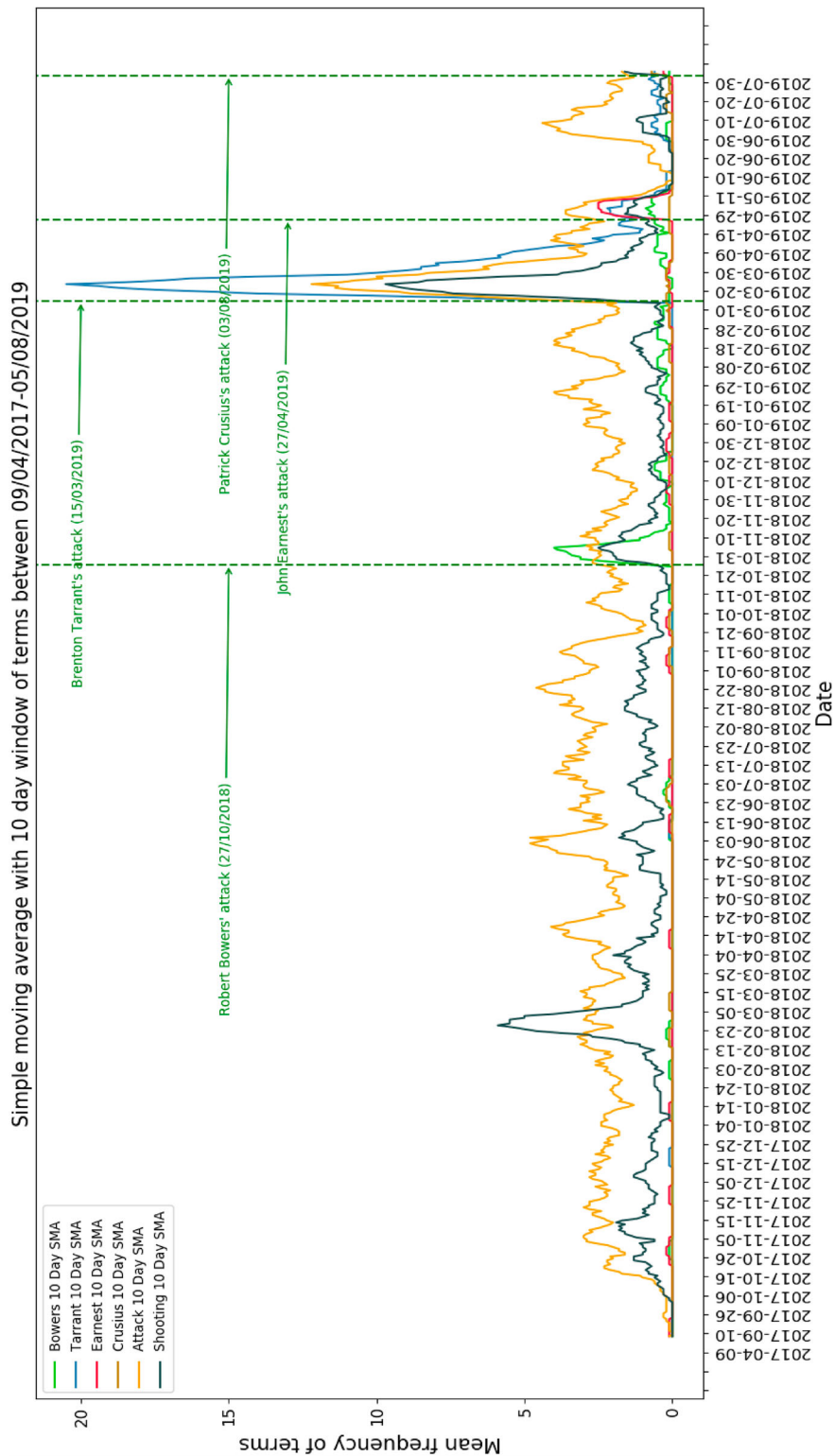


Figure 7. Frequency over time of words directly referring to attacks in 8chan/pol (Bowers ['Bowers' OR 'Pittsburgh'], Tarrant ['Tarrant' OR 'Christchurch'], Earnest ['Earnest' OR 'Poway'], and Crusius ['Crusius' OR 'El Paso']), plus 'attack' and 'shooting'.

Overall, our second hypothesis that attacks would prompt small yet noticeable shifts towards more extreme forum content, or trigger slight ideological shifts, is not strictly speaking verified. We do observe, however, changes following Tarrant's attack that contribute to the multidimensional 'Tarrant effect' exposed throughout the empirical section of this article.

Conclusions

Contributing to the ongoing debate on the offline-online interplay when it comes to extremism, the present paper aimed at determining the impact of a series of lethal shootings carried out by far-right terrorists on *8chan/pol*, a prominent online forum linked to these attackers. Examining the forum's metadata and textual content allowed us to find that overall, there is no single, clear type of offline-to-online impact. Each shooting had a different impact on the forum's popularity (approximated by posting activity measures) and content; in fact, in line with our hypotheses the forum's activity and ideology have remained relatively stable throughout its existence. There is one exception, however: the attack of the Christchurch mosques did have an undeniable and lasting impact on both the forum's activity and content. This 'Tarrant effect', which increased offensive racial slurs for over a month and created a 'saint' for the community, cannot reasonably be attributed to exogenous factors, even though our study does not involve causal analysis strictly speaking.

These results, while useful in clarifying the offline-to-online direction of the relationship between the far-right internet and real-life violence, raise a series of questions. First, it remains to be explained why this 'Tarrant effect' occurred, and why there was no 'Earnest effect' or 'Crusius effect'. We suggest that the novelty of Tarrant's attack *modus operandi*, its direct relationship to the forum, and its very high lethality, triggered the effect. In comparison, Earnest's and Crusius' attacks were far less lethal and not as 'new'. Second, and more importantly, highlighting a 'Tarrant effect' completes the picture of the cyclic interplay between the chans and far-right attacks, with the Christchurch attack prompting changes in the forum that most probably played a role in the occurrence of subsequent shootings. Indeed we are almost certain that both Earnest and Crusius were *8chan* posters, and we know that they discuss Tarrant in their manifesto which they disseminated on the image-board. Earnest directly cites both Bowers and Tarrant as his inspiration for his actions, the latter being mentioned ten times and described as 'a catalyst for me personally' ('I used a gun for the same reason that Brenton Tarrant used a gun'). Tarrant's influence is equally obvious in Crusius' manifesto: 'I support the Christchurch shooter and his manifesto', he writes, adding that 'the Hispanic community was not my target before I read The Great Replacement'. Our analysis, taken together with previous studies and intelligence on this case, therefore suggests the existence of a form of crime-media-crime contagion effect not dissimilar to the one found after the Columbine school shooting (read e.g. Helfgott, 2015; Surette, 2013).

These findings also call for further research – indeed we consider them as a first step in a broader research agenda necessitated by the current proliferation of similar 'chan' boards hosting right-wing extremist discussions, and by the continuing growth and increasingly multidimensional character of the far-right online ecosystem more generally. Further research should start by correcting the shortcomings of the present inquiry. Most

evidently, the investigation net ought to be broadened to other chan boards (e.g. *Neinchan*, *Endchan*) in order to detect inter-platforms migration, which could verify our use of forum posting activity as a proxy for popularity, elucidate some observations made here, and account more comprehensively for some under-explained variations (above all, the forum's first 'death' in May-June 2019). Future studies should also correct the present contribution's blindness to visual imagery, which constitutes a defining feature of the chan boards and an important piece of their extremist 'martyrology' (Tarrant, for example, became the source of some of the platform's most prominent memes). Careful qualitative work would also be needed to deepen the analysis, in order to better understand recurring posting practices and their role in establishing a common subculture that encourages violence. Finally, methods directly geared towards establishing causal pathways are necessitated to evaluate the validity of the findings we delivered through our descriptive methodology.

Notes

1. While the concepts of 'far-right' and 'extreme-right' are notoriously hard to define (see, e.g. Mudde, 1996), we understand them here as characterizing an 'illiberal opposition to equality' (see, e.g. Carter, 2018; Jupskås, 2020; Mudde, 2007).
2. A forum where the sharing of images is predominant.
3. Although not writing a manifesto, shortly before the attack, Bowers made a post to Gab stating: 'HIAS likes to bring invaders in that kill our people. I can't sit by and watch my people get slaughtered. Screw your optics, I'm going in'.
4. 'Botschaft an das gesamte deutsche Volk'.
5. To note only a few: (Caiani & Parenti, 2009; Caiani & Parenti, 2016; Davey & Ebner, 2017; Froio & Ganesh, 2019; Lee, 2015).
6. Schuurman (2019) recently showed that as little as 1.9% of the 3.442 articles published by the main journals in terrorism and political violence over the 2007-2016 timespan was dedicated to right-wing extremism.
7. Even though, as Conway et al. (2019) note, right-wing extremists were 'some of the very first users to engage in online politics and were the earliest adopters of internet technology for violent extremist purposes'.
8. Anonymity is an important feature of the Chans, and one that its users take seriously (Ludemann, 2018). Chans users thereby self-identify as 'anons'. Indeed, the Anonymous hacking collective originated from *4chan* as a result of users targeting the Church of Scientology in response to its attempts to censor the Internet. It is worth noting that this anonymity can be overcome through the use of a 'trip-code', a factor that proved to play a large role in discussions surrounding the 'QAnon' conspiracy discussed below.
9. The 8 on the site's logo is horizontal, like the infinity symbol.
10. We understand here the term culture broadly as a coherent ensemble of shared practices, references, lingo, moral code and assumptions (read Ramsay, 2013; or Hegghammer, 2017, on the culture of jihadi communities). For an analysis of the chans' /pol board subculture, read Baele et al. (2021).
11. Since his arrest, Earnest has been linked to an earlier arson attack on a mosque, due to his manifesto stating: 'I scorched a mosque in Escondido with gasoline a week after Brenton Tarrant's sacrifice and they never found shit on me'.
12. Reported by Evans (2019b).
13. Reported by Evans (2019c).
14. Read, among others (Anti-Defamation League Center On Extremism, 2020; Bjørgo & Ravndal, 2019; EUROPOL, 2020; UN Counter-Terrorism Committee Executive Directorate, 2020).

15. The scraper was developed in Python, using the request (<https://pypi.org/project/requests/>) and BeautifulSoup (<https://pypi.org/project/beautifulsoup4/>) packages. The Python script used is available at https://github.com/LewBrace/From_mass_shootings_to_shitposting_what_impact_did_far_right_attacks_have_on_the_8chan_forum.
16. *8ch.net/pol* archived all of the text data from April 2017 onwards, but it did not archive visual data, which could only be obtained through 'live scraping', i.e. continuous scraping of the board's currently active posts. Because the authors conducted live scraping from 04/07/2019 until the site's closure, the visual data in our database was insufficient to warrant inclusion in the present analysis (see conclusion).
17. Bi-grams (and N-grams more generally) capture the language structure of a body of text by calculating which word or letter is likely to follow any other given word or letter.
18. The amount of replies per original post varies a lot. Mean replies = 16.70; median replies = 4; STD = 32.20; range = 532.
19. The belief that the world is run world is controlled by a global cabal that is anti-Trump and operate an international child sex-trafficking ring. The theory states that Donald Trump is planning to dismantle the cabal through a series of simultaneous arrests that QAnon followers refer to as 'the storm'.
20. The graph for Crusius only contains 2 days after his attack as the forum shut down at that point.
21. The graph shows the increase in traffic beginning on 14/03/2019 due to the NZST time zone being twelve hours ahead of the UTC time zone and eleven hours ahead of UTC+1 time, which was the time zone of the authors at the time of scraping.
22. The terms 'people', 'time', 'year', 'jewish', 'president', and 'thing' were not fed into the model either because they strongly co-occurred with one of the other terms that were fed in or because they were so frequently used while having little analytical value that they would have constituted noise in the analysis to follow.
23. The notion of 'false flags' appears frequently in the *8chan* corpus and other Chans and right-wing extremist forums. It is a term used by both far-right and far-left groups to describe a violent act as being conducted by either an opposing group or the government in order to deflect blame onto the in-group in order to further a hidden agenda (the term is therefore intimately linked with the various conspiracy theories that are encountered on the Chans).
24. Quotes in this paragraph are taken from the 5 most popular original posts that mentioned the name of the killer within the 10-days timeframe around the attack day (ordered by the number of replies each original post had). These posts are available in Appendix, section 5.
25. The ZOG is an acronym commonly found on anti-Semitic platforms, standing for 'Zionist-Occupied Government'.
26. A crane accident occurred in Seattle on the same day.

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