

Going /k/ommando: Gun Culture in Fringe Online Communities

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Abstract

The increasing frequency of mass shootings in the United States has become alarmingly common, prompting discussions about gun control. While gun control in the US involves complex legal issues, cultural factors—particularly “gun culture”—play a significant but often overlooked role. Although the role of social media in shaping culture is well-documented, the intersection of gun culture and fringe online communities, like 4chan, remains unclear. This gap is particularly concerning given the rise in mass shootings and the online radicalization of some shooters. To address this gap, we explore gun culture on /k/, 4chan’s weapons board. More specifically, we employ various NLP techniques to analyze over 4M posts on /k/ and contextualize the discussion within the broader body of theoretical framework of gun culture. Our findings reveal that discussions on /k/ cover a wide array of topics, with a significant focus on law-related discussions—over 17% of gun-related conversations on /k/ revolve around legal matters. Additionally, our analysis uncovers the presence of extreme viewpoints surrounding firearms, often manifesting as gun fetishism. These insights can be valuable for a range of stakeholders including social media platform, in efforts to address content moderation and de-radicalization.

Introduction

The United States is relatively unique in the world when it comes to gun ownership. In 2018, it was estimated that civilians worldwide own around 857 million firearms, with over 390 millions in the US alone—exceeding the country’s population (Karp 2018). Gun ownership trends in the US vary across time, location, and demographics with the highest ownership among white and male population (Smith and Son 2015).

Many link the high rates of gun violence in the US to widespread gun ownership and easy access to firearms (Bangalore and Messerli 2013; Kellermann et al. 1992; Kalesan et al. 2016a; Hemenway, Miller et al. 2000; Wintemute et al. 2010). Critics argue that public health efforts to address gun violence have been hindered by insufficient attention to gun culture, which could inform more effective interventions (Abdalla, Keyes, and Galea 2021). To understand gun ownership and the apparent resistance to limiting access to firearms in the US, it is crucial to explore the

cultural and psychological significance that guns hold for many Americans. Gun culture—defined as the set of beliefs and activities oriented around the ownership and use of guns (Witkowski 2014)—has been at the heart of America since its founding (Yamane 2017). Gun culture in the US is entrenched in politics, religion, and all facets of society in between (Kohn 2004) to the point that it can turn into *fetishism*—a heightened, obsessive connection to guns that extends beyond practical use. (Butters 2022).

Social media plays a critical role in shaping and spreading cultural narratives, influencing everything from consumer behavior to the proliferation of hate and extremism (Tang and Chan 2020; Tsoy et al. 2021; Simeone and Scarpato 2020; Zannettou et al. 2020; Papisavva et al. 2020; Conway, Scrivens, and McNair 2019). The dangers of this cultural spread are seen by incidents like the 2022 Buffalo shooting. The shooter who purchased a Bushmaster XM-15 and murdered 10 people in a grocery store in a black neighborhood, was largely radicalized via social media, particularly 4chan (Collins and Kosnar 2022). His use of 4chan’s weapons board, /k/, to discuss, educate himself on, and even purchase firearms, highlights the board’s significant role in discussions around gun culture.

While 4chan’s influence on online and real-world extremism is relatively well-studied (Zannettou et al. 2020; Papisavva et al. 2020; Conway, Scrivens, and McNair 2019), its position in terms of gun culture remains murky. Particularly, how discussions on 4chan may normalize extreme views on firearms is not well understood. Given this gap, our study aims to explore how gun culture manifests within 4chan’s /k/ board, focusing on the intersection of gun culture and fetishism (extreme viewpoints on firearms). Specifically, we aim to answer the following research questions:

- RQ1. How does gun culture manifest itself in users’ discussions?
- RQ2. Are there any signs of gun attachment among users’ discussions?
- RQ3. Are there any indications of gun fetishism in users’ discussions?
- RQ4. Is it possible to identify whether a post reflects gun fetishism?

By addressing these questions, we aim to gain a deeper understanding of how users on 4chan’s /k/—predominantly

gun owners, enthusiasts, and users—perceive and relate to firearms. This understanding will shed light on the cultural and psychological factors that potentially drive gun ownership. Understanding these dynamics is crucial for informing future research on gun control, improving content moderation strategies, and enhancing de-radicalization efforts. Consequently, our study is especially relevant to the ongoing discussions surrounding gun violence.

To answer these research questions we collect over 4M posts from 4chan’s /k/ board and develop comprehensive analysis pipelines.

Our contributions are as follows:

- We implement a topic extraction pipeline that combines BERTopic for identifying high-level topics and Top2Vec for uncovering more specific, granular topics. This approach provides a map of the gun-related discourse on 4chan, contributing to a deeper understanding of the cultural narratives within this community.
- Through in-depth semantic similarity analysis, we explore various forms of gun attachments and their contexts, revealing insights into the language usage and emotional motivations behind gun ownership within /k/. These insights are crucial for understanding the emotional and psychological motives of gun ownership.
- We investigate potential signs of gun fetishism through semantic similarity search, providing examples of user posts that suggest the presence of such extreme viewpoints on firearms. This analysis contributes to a broader understanding of how extreme viewpoints on gun culture can be spread on online communities.

Background and Related Work

Gun Culture in America

Gun violence in the US is a severe concern, with death rates over 20 times higher than in other countries (Grinshteyn and Hemenway 2016). In 2019, the US had 3.96 shooting deaths per 100,000 people, a rate significantly higher than in Canada and the UK (Aizenman 2023). Gun ownership is widespread, with 42% of American households owning guns in 2018, and two-thirds of those owning multiple firearms (Enten 2018). The connection between gun violence and US gun culture is well-studied (Lemieux 2014; Mencken and Froese 2019), with gun culture being defined as the set of beliefs and practices around firearm ownership (Witkowski 2014). Gun “culture,” i.e., beliefs and practices around firearm ownership and use (Witkowski 2014), is quite diverse (Wamser-Nanney 2021) and shapes attitudes and actions towards firearms (Hofstadter 1970).

Gun culture in the US is predominantly male-centered, emphasizing traits like dominance, toughness, and aggression (King 2007). This orientation extends to sexualization of firearms, with slang terms equating guns to male anatomy (King 2007). Firearms also act as “social glue,” creating a collective identity among gun owners (Sarat and Obert 2019), and are integral to core identity in certain states, exemplified by phrases like “We are Texas because of guns (Butters 2022)”.

Gun culture is categorized into Gun Culture 1.0 and 2.0 (Yamane 2017; Butters 2022). Gun Culture 1.0 associates firearms with colonization, sports shooting, hunting, and masculinity, often intertwined with religious practices (Butters 2022; Kalesan et al. 2016b). In contrast, Gun Culture 2.0 shifts the focus to guns as essential for self-defense, closely linked to the Second Amendment and the perceived “God-Given” right to confront evil forces which symbolizes ideals like freedom, patriotism, and heroism, often intertwined with religious beliefs (Yamane 2017). This shift has contributed to the overall fetishization of firearms (Witkowski 2014), with fetishism manifesting as heightened urgency, belief in the magical powers of objects, or the redirection of sexual interest to firearms (Kaplan 2006).

Gun Culture on Social Media

To the best of our knowledge, no comprehensive study has examined gun culture and fetishism online at scale. However, existing research explores users views on various gun-related topics, particularly in the context of mass shootings and gun control debates.

Some studies investigate online attention towards mass shootings and how these events amplify gun control discussions. For example, Garimella et al. (Garimella et al. 2017) found that mass shootings significantly increase online discussions about gun control, particularly in the immediate aftermath. Similarly, Benton et al. (Benton et al. 2016) studied the gun control debate on Twitter, analyzing support and opposition across political lines. Lee et al. (Lee et al. 2022) expanded this by analyzing attention across multiple political subjects, including gun control, on YouTube and Twitter, highlighting the interconnections of these debates through video hyperlink analysis. Other work has focused on how mass shootings influence information-seeking behaviors and the spread of alternative narratives (Koutra, Bennett, and Horvitz 2015; Starbird 2017) while (Mejova et al. 2022) explored how demographic features correlate with participation in online gun debates and real-world marches.

There have also been small-scale analyses of gun related image sharing on social media. (Patton, Frey, and Gaskell 2019) analyzed 560 images posted by Black youth gangs in Chicago on Twitter to understand differences in how domain experts and social workers interpret gun culture. 2,680 images posted by major gun related publications to Instagram were also explored in the development of a so-called Gun Culture 3.0 (Stover 2022).

Another study focuses on examining the representation of girlhood in online gun communities (Gilpin and Thornton 2018). The authors selected five images of young girls from a collection of 20,000 images posted on Instagram with gun-related hashtags. However, the criteria for selecting these five images were not clearly outlined. Additionally, researchers have explored how “Gunfluencers” on Instagram promote the Second Amendment by glamorizing and demystifying gun ownership to engage a broad audience. The dataset contains posts from 25 influencers, totaling around 500 posts (Drenten et al. 2024). While the study addresses important phenomena such as social media influ-

Threads	Posts	Start Date	End Date
77,366	4,431,706	01/01/2022	12/31/2022

Table 1: Dataset details.

encers, it focuses on influencer-driven contents rather than the discussions among gun enthusiasts themselves.

Another study examined how gun manufacturers and influencers use social media platforms like Twitter and YouTube to promote firearms, highlighting themes such as self-defense, patriotism, and recreation to promote gun sales (Jordan et al. 2020).

In contrast, our study examines discussions on 4chan’s /k/ board, where users—primarily composed of gun owners, users, and enthusiasts—can anonymously express their opinions and beliefs on gun-related topics without constraints of content moderation. Understanding these unfiltered views is crucial for addressing gun control issues, as it highlights the significance of guns in the lives of gun enthusiasts on /k/, offering insights distinct from contents that are shaped by paid influencers or driven by specific events like mass shootings.

The most comparable work to our study is an investigation into gun-related discussions on Twitter by (Allem, Biyani, and Bushman 2024) who applied topic modeling on approximately 400,000 tweets. They identified key themes such as gun ownership and control, concerns about gun safety, and the Second Amendment. While their study provides valuable insights into these topics, addressing gun issues in the US requires a deeper exploration of the underlying beliefs and emotions that drive people’s attachment to guns. Our study contributes to this understanding by focusing on the organic, unfiltered discussions on 4chan’s /k/.

Dataset

This paper studies 4chan, a fringe social media platform and image board. Threads are created by an *original poster* (OP) with an image, and users reply in flat threads. 4chan supports anonymity, with users posting as “Anonymous,” with no account creation required. It is also ephemeral, as threads are deleted after several days at most (Hine et al. 2017). 4chan is broken up into *boards*, each focusing on specific topics. 4chan has a history of hosting toxic and extremist communities (Ribeiro et al. 2021), and some mass shooters claimed inspiration from the site (Collins and Kosnar 2022).

In 2022 we collected the data from all posts on 4chan’s weapons board, /k/, where discussions primarily revolve around firearms but also include military and other weapon-related topics. Frequent users of this board are colloquially known as “/k/ommandos¹.” Our dataset contains over 4.4M posts, detailed in Table 1.

Content Warning. The dataset we use in this paper is from a notoriously toxic community. We do not censor any of the content drawn directly from posts in our dataset, but we warn the reader that this paper contains content that is likely to be considered offensive and disturbing.

¹<https://knowyourmeme.com/memes/sites/k--4>

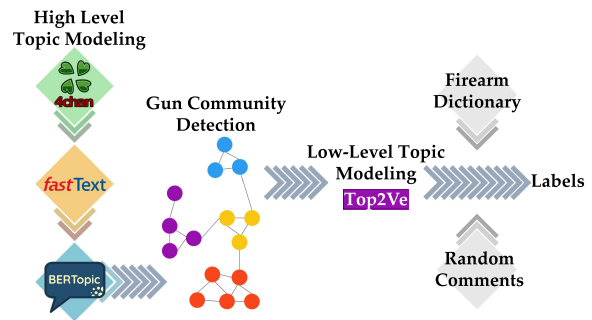


Figure 1: Our gun culture topic analysis pipeline.

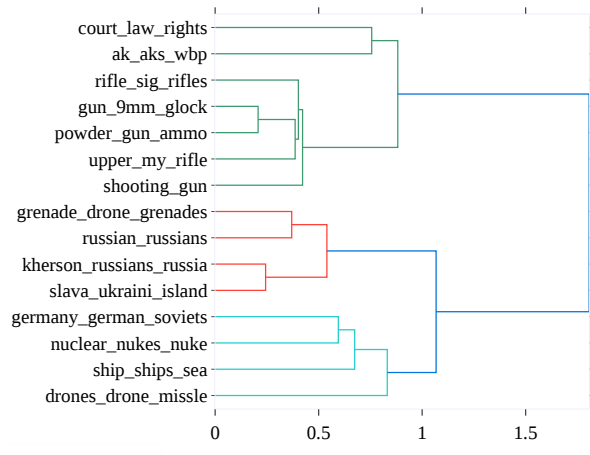


Figure 2: Hierarchical clustering of sample topics in three clusters: green represents gun-related topics, while red and blue denote discussions on the Russia-Ukraine War and general warfare, respectively.

Content Analysis

Topic Analysis

We begin by answering our first research question: *How does gun culture manifest itself in users’ discussion?* To do this, we build a topic analysis pipeline, a high-level overview of which can be seen in Figure 1. Our pipeline consists of four stages that allow us to measure and understand users’ discussions on /k/: 1) High Level Topic Modeling, 2) Gun Community Detection (Posts that are about guns), 3) Low Level Topic Modeling, and 4) Manual Annotation, each of which we describe in more detail below.

Stage 1: High Level Topic Modeling In the first stage, we apply BERTopic to the threads in our dataset. BERTopic leverages BERT model to cluster documents and generates topics for each cluster using the TF-IDF method (Groetendorst 2022). This process results in the identification of 377 topics. **Stage 2: Gun Community Detection.** In the second stage, we use a community detection algorithm to partition these topics into separate clusters by constructing

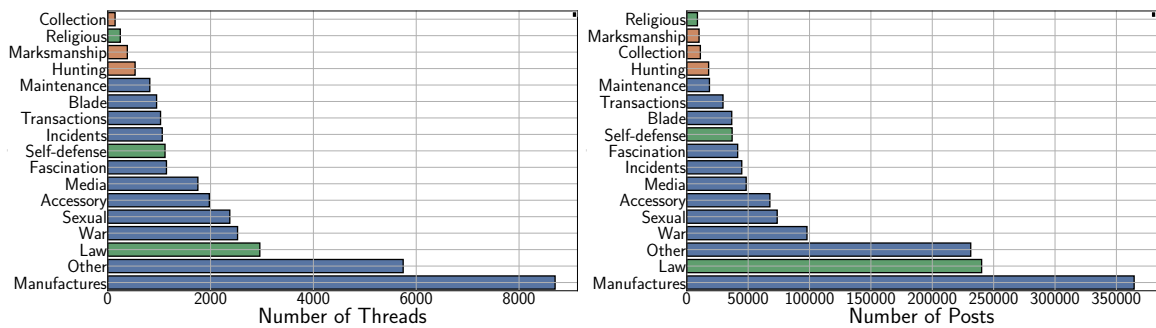


Figure 3: Number of threads and posts related to guns within each discussion labels. Labels directly aligned with Gun Culture 1.0 are highlighted in orange, those directly associated with Gun Culture 2.0 are green, and other labels are blue.

a weighted graph where topics are represented as nodes, and edge weights are determined by cosine similarity using BERTopic embeddings. The Louvain Community detection algorithm (Blondel et al. 2008) is subsequently applied to this graph, identifying three distinct clusters. Examples of the terms in each cluster are shown in Figure 2, where topics related to the Russia-Ukraine war and general warfare discussions merge into a larger cluster of warfare-related discussions, along with a separate cluster focused on gun-related discussions. See Appendix for BERTopic details and examples in Table 11.

Following manual inspection, we choose the cluster with topics primarily focused on guns for further analysis and retrieve all their threads in said topic.

Stage 3: Low Level Topic Modeling. In the third stage, we use Top2Vec to identify topics within the chosen gun-related threads from the second stage. We choose Top2Vec here for its capacity to generate more coherent and interpretable topic representations, as it takes into account all words near the cluster’s centroid, assuming that document and word embeddings share the same vector space (Grootendorst 2022; Angelov 2020). This results in more detailed and easily interpretable topic representations for our use case.

Stage 4: Manual Annotation. In the fourth and final stage of our pipeline we manually annotate the 198 quantitatively derived topics from the previous stage.

We build a gun topic dictionary to serve as a reference guide for understanding gun-related topics, phrases, and abbreviations, enabling more accurate labeling. Our gun topic dictionary combines an online firearm dictionary (Hallowell IV 2023) as well as manual inspection and discussion between authors of the paper to handle out-of-dictionary phrases and words (e.g., slang).

After developing the dictionary, three authors of the paper annotated the topics by reviewing the dictionary and analyzing 20 random comments related to each topic over three iterations, aiming to identify the central themes of the discussions. In the end, our annotators reach a Fleiss’ Kappa score of 0.75, suggesting *substantial inter-annotator agreement* (Fleiss et al. 1981).

Results. Below is the list of labels and their corresponding inspirations, drawn from relevant literature:

- **Law.** Discussions related to various laws and political parties’ approach towards guns and gun ownership (Butters 2022; Witkowski 2014; Yamane 2017).
- **Sexual.** Posts related to guns in a sexual context or sexual topics being discussed in gun-related threads (Butters 2022; Witkowski 2014; King 2007).
- **Hunting.** Discussions that are mostly about hunting (Yamane 2017).
- **Collection.** Posts that view guns as valuable objects, both sentimentally and financially, as well as the collection, gifting, and inheritance of guns (Yamane 2017).
- **Fascination.** Discussions related to people’s fascination with different gun features, like shooting power and the smell of bullets (Witkowski 2014). It can also be a form of fetishism towards guns (Witkowski 2014).
- **Manufacturers.** Discussions about different gun manufacturers. Gun culture symbolizes guns and weapons as sources of power and superiority, and gun manufacturers play a central role in perpetuating this culture (Luckham 1984).
- **Maintenance.** Discussions about different gun maintenance tools and skills (Butters 2022).
- **Transactions.** Discussions about purchasing guns and the processes involved in buying them (Witkowski 2014).
- **Marksmanship.** Discussions related to improving shooting skills (Yamane 2017).
- **Self-defense.** Discussions about using guns as a tool for self-defense to protect oneself, family, property, and one’s country and freedom (Yamane 2017).
- **Religious.** Discussions related to gun ownership being a God-given right or the introduction of religion into gun-related discussions, as discussed in (Butters 2022).
- **Media.** Discussions about gun-related topics in different types of media, including books, movies, and video games. Gun culture can manifest itself in these outlets by fetishizing guns through making heroes and heroism associated with guns, as seen in movies and comics (Posada 2019).

- **Accessories.** This label represents posts and discussions about different gun and shooting accessories (Su and Cheon 2017).
- **Incidents.** This label represents posts related to mass shooting incidents (GME and Brentwood 2023).

The remaining labels, though not directly derived from the theoretical literature, represent distinct topics discussed on /k/ and provide valuable insights into gun culture and fetishism:

- **Blades.** This label represents discussions about other weapons, like blades and swords.
- **War-related.** This label represents discussions about guns in a wartime context.
- **Other.** This label is applied to topics that did not fit into any of the previously mentioned categories. It is important to note that posts in this label may also reflect one or more of the aforementioned labels alongside other random discussions. Posts in these threads are not sufficiently cohesive to be assigned to other labels.

Figure 3 plots the number of threads and posts related to each label. Labels directly associated with Gun Culture 1.0 are shown with yellow and labels directly reflecting Gun Culture 2.0 are shown with green.

Takeaways. On /k/, users discuss elements from both Gun Culture 1.0 and 2.0, with “Manufacturers” being the most prevalent label. In these threads, users primarily delve into various gun types, their manufacturers, and quality. Gun Culture 1.0 labels like “Collection,” “Marksmanship,” and “Hunting” are less frequently discussed in comparison to Gun Culture 2.0 concepts like “Law,” “Self-defense,” and “Religion.” These findings reveal the priorities and concerns of gun enthusiasts on /k/, particularly the emphasis on firearms as symbols of personal protection and individual rights, which are central to understanding the motivations and attitudes towards guns among gun enthusiasts on /k/. It is notable that discussions around “Sexual” topics are highly prevalent, possibly indicative of sexual forms of gun fetishism.

Gun Attachment and Semantic Analysis

We conduct a detailed analysis of language usage on /k/ to explore gun culture, specifically focusing on aspects of gun attachment. We examine motivations rooted in emotions and significance associated with firearms, drawing from theoretical literature to explore the diverse perceptions of guns in Gun Culture 1.0 and Gun Culture 2.0. We consider expressions of gun fetishism (i.e., attachment or obsession) within the dimensions of gun culture, examining how these perceptions manifest in users’ posts. Drawing from Kaplan’s definition (Kaplan 2006), gun fetishism can be expressed as:

- Viewing guns as magical objects.
- Considering guns as religious objects.
- Replacing a higher power with guns.
- Perceiving gun possession as a necessity.
- Associating guns with sexual and erotic desires.

Key Word (gun+collect)	Cosine Sim.	Key Word (gun+friend_ famili)	Cosine Sim.
collector	0.69	commun	0.65
firearm	0.59	peopl	0.64
safe_queen	0.574	encourag	0.62
hobbi	0.56	gun_owner	0.62
antiqu	0.55	stranger	0.59
milsurp	0.52	gun_ownership	0.59
novelti	0.51	social_circl	0.58
sentiment_valu	0.50	relationship	0.58
handgun	0.50	hobbi	0.57
heirloom	0.49	motiv	0.55

Table 2: Top 10 similar words to the gun collection and social-related keywords resulting from from Word2Vec.

- Placing sentimental values on guns.
- Attributing social value and self-worth to guns.

To examine how gun attachment manifests in various forms within user discussions and comments, we use Word2Vec, a lightweight language model that captures semantic relationships between words (Church 2017). By training the model on cleaned and stemmed posts from our pipeline’s stage 2, we can gain insights into the context surrounding gun culture keywords. This approach, which has been used in the past to understand aspects of language of cryptic/niche online communities, including 4chan (Papasavva et al. 2021; Tahmasbi et al. 2021; Zannettou et al. 2020) not only reveals whether users discuss these concepts, but also helps us understand them in context of the overall discussion around any particular set of keywords. We focus on keywords inspired by existing works and those identified by the model, providing a nuanced exploration of different aspects of gun culture, attachment, and potential signs of fetishism among users. While creating a comprehensive keyword list is impractical, the model helps by suggesting similar words. See the Appendix for details on data cleaning and model parameters.

Sentimental Feelings and Group Identity Gun ownership is often motivated by the significant value that guns hold for individuals and groups, serving as markers of identity within families and social circles. They can also be treated as collectibles with sentimental value for their owners, and are often passed down through generations. (Butters 2022; Yamane 2017; Witkowski 2014). We next delve into these attachments by examining concepts related to gun collections and their social values.

Gun Collection We investigate via our model using the keywords “gun+collect,” resulting in similar words listed in Table 2, including “safe_queen,” “hobbi,” “antiqu,” “sentiment_valu,” and “heirloom.” The term “safe_queen” is slang for firearms prized solely for their collectibility rather than utility (i.e., they are kept locked up in a safe as opposed to being fired). Phrases like “sentiment_valu“ and “heirloom” suggest that firearms hold emotional significance and value beyond their practical or monetary worth, often passed down

Key Word (marksmanship)	Cosine Sim.	Key Word (hunt)	Cosine Sim.	Key Word (trophi_hunt)	Cosine Sim.
profici	0.76	hunter	0.82	nearli_extinct	0.80
disciplin	0.71	hunt_deer	0.81	bear_wolv	0.79
marksman	0.70	small_game	0.80	fox_coyot	0.77
becom_profici	0.66	varmint	0.74	hummingbird	0.77
competit_shooter	0.66	hunt_bird	0.72	safari_hunt	0.76
skill	0.64	danger_game	0.71	husbando	0.75
basic_marksmanship	0.64	whitetail	0.70	lead_gender	0.75
practic	0.64	pest_control	0.70	happi_trail	0.75
train	0.64	hunt_season	0.67	hunting	0.75
long_rang	0.61	medium_game	0.67	mah_nigga	0.75

Table 3: Top 10 similar words to the marksmanship keywords resulted from Word2Vec.

Key Word (gun+religion)	Cosine Sim.	Key Word (bear_arm)	Cosine Sim.
gun_ownership	0.61	infring	0.87
firearm	0.58	constitut	0.85
firearm_ownership	0.56	amend	0.83
religi	0.54	enshrin	0.81
ideolog	0.54	regul_militia	0.80
advoc	0.54	inalien	0.78
facet	0.53	free_speech	0.76
bear_arm	0.52	constitution	0.75
principl	0.51	ammend	0.75
belief	0.51	god-given	0.74

Table 4: Top 10 similar words to religious-related keywords resulted from Word2Vec.

Key Word (self_defense)	Cosine Sim.	Key Word (evil+firearm)	Cosine Sim.
lethal_forc	0.63	oppress	0.68
fear_life	0.62	disarm	0.66
deadli_forc	0.60	tyrant	0.65
innoc	0.58	populac	0.63
mortal	0.58	defend_themselv	0.62
merci	0.57	rebellion	0.62
divin	0.57	tyranni	0.61
evil	0.57	protect_themselv	0.60
prophet	0.57	polit_societi	0.60
justic	0.57	martyr	0.60

Table 5: Top 10 similar words to self-defense-related keywords resulted from Word2Vec.

through generations within families. The presence of terms like “milsurp” (Military surplus) and “handgun” among similar words indicate the types of goods and firearms collectors are primarily interested in acquiring.

Social Value Firearms can shape individual identities and social circles, to the extent that not owning one can lead to stigma (Kalesan et al. 2016b). Exploring similar words to “gun+friend+famili” yields terms like “commun,” “encourage,” “social_circle,” and “motiv,” (see Table 2). This is the indication of social value of firearms that promotes social bonds and a sense of community among users on 4chan’s /k/, highlighting the value of firearms beyond their mechanical worth for individuals and families.

Masculinity Firearms, often associated with power, symbolize masculinity, as observed in rituals like gifting boys firearms upon reaching puberty (Yamane 2017). This symbolism extends to hunting, providing avenues for men to express skills, dominance, and competition (Littlefield 2010). In exploring Gun Culture 1.0, we focus on marksmanship and hunting activities to understand how users on 4chan express power through masculinity and dominance. Here, we present “Marksmanship,” for explanation on “Hunting” please refer to appendix.

Marksmanship Our model’s top 10 most similar words to “marksmanship” include “proficiency,” “competitive_shooter,” and “long_range” as shown in Table 3. All of

these terms represent various expressions of masculinity, as discussed by Littlefield (Littlefield 2010).

Hunting In the list of top 10 similar words to “hunt” we see words like “small_game,” “medium_game,” and “danger_game,” which refer to the size of the targeted hunt. For example, animals in “danger_game” include lions, buffalos, large bears, etc. (NRA 2022). By examining similar words to “hunt,” we also find the term “trophi_hunt” within the top 50 with a cosine similarity of 0.52. Therefore, we investigate our model with “trophi_hunt” as well. This yields terms like “bear_wolv” examples of wild animals that are not submissive to human authorities representing power and dominance (Emel 1995).

Moral Empowerment Guns offer not only physical empowerment but also moral and emotional empowerment. Bearing arms is intertwined with religious beliefs; a “God-given” right enabling gun owners to face and defend against evil forces (Butters 2022). This includes the perceived need for armed patriots to defend freedom against a tyrannical government and evil forces as gun ownership is perceived a crucial aspect of being a “good and patriotic American (Mencken and Froese 2019).” In our investigation, we explore these keywords to understand /k/ users’ gun attachment from moral and religious perspectives.

Religion Drawing from (Butters 2022) and Gun Culture 2.0, we explore the intersection of gun culture and religion

Key Word (freedom)	Cosine Sim.	Key Word (patriot+gun)	Cosine Sim.
liberti	0.69	citizen	0.57
privileg	0.68	politician	0.57
bear_arm	0.67	freedom	0.57
freedom_speech	0.65	gun_owner	0.56
godgiven	0.63	american	0.55
tyrant	0.63	gun_ownership	0.54
inalien	0.62	govern	0.53
sovereignti	0.62	tyranni	0.52
oppress	0.61	countri	0.51
patriot	0.60	liberti	0.50

Table 6: Top 10 similar words to freedom and patriot keywords resulted from Word2Vec.

with the keyword “gun+religion” (Table 4). “Bear_arm,” central to Second Amendment interpretation, is linked to terms like “infring,” “amend,” “free_speech,” and “god-given,” highlighting the religious perspective of gun rights organizations discussed by /k/ users.

In Gun Culture 2.0, self-defense is viewed as a divine right against threats, reflected in the keyword “self_defense” (Table 5). Associated terms like “evil,” “disarm,” and “tyranny” reveal discussions about defending freedom from oppressive regimes and the perceived necessity of gun ownership for this purpose among /k/ users discussions.

Freedom and Patriotism Interpretations of the Second Amendment, focusing on self-defense (Butters 2022; Yamane 2017), intertwine gun ownership with patriotism, actively promoted by the NRA (Dawson 2019). This connection forms the basis for gun attachment, explored through terms similar to “freedom” and “patriot+gun” (Table 6). Terms like “bear_arm,” “godgiven,” and “tyrant,” align with the NRA’s portrayal of guns as symbols of freedom and patriotism. The term “godgiven” reveals religious undertones in these concepts.

We summarize different types of gun attachment and their association with discussion labels in Figure 4. To create this matrix, we calculate the cosine similarity score between the average of the most similar vectors to the discussion labels and the vectors corresponding to the keywords of each attachment. For instance, the “Physical Power” attachment is more prominent in discussions labeled “Self-defense” and “Marksmanship,” while Patriotism is more prevalent in discussions categorized under “Law” and “Religious” labels.

Takeaways. The analysis of /k/ discussions using the Word2Vec model reveals a complex landscape of gun attachment that is deeply intertwined with cultural narratives from both Gun Culture 1.0 and Gun Culture 2.0. Users express attachment to firearms through various cultural and psychological lenses, including masculinity, sentimentality, moral empowerment, and patriotism. These forms of attachment are not only reflections of individual beliefs but also reinforce collective identities within /k/. Additionally, our findings indicates that discussions around self-defense, religion, and moral empowerment often contain subtle undertones of gun fetishism, suggesting that the attachments of some users

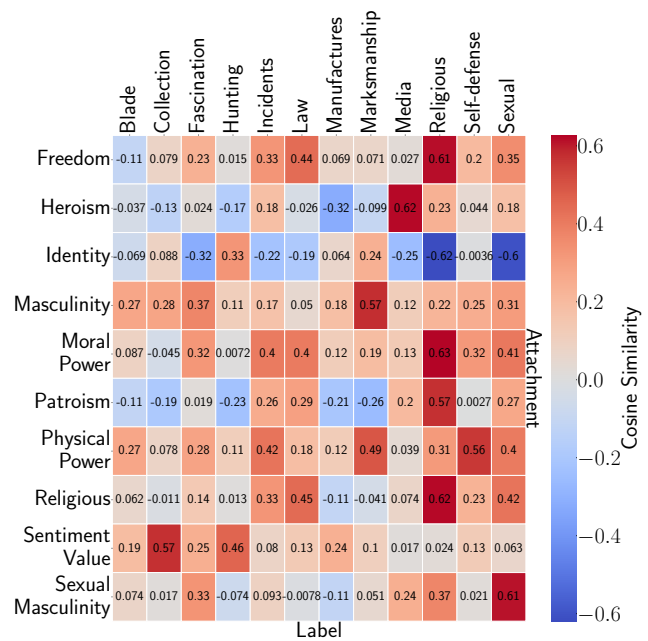


Figure 4: Similarity between different types of gun attachment and discussion labels.

to their firearms goes beyond practical use, evolving into a more symbolic or even obsessive relationship with guns.

Gun Fetishism

Building upon the concept of gun attachment, some connections to firearms may evolve into more extreme forms, manifesting as fetishism. In this section, we specifically analyze our dataset for signs of fetishism and explore methods to identify it in posts. This progression from attachment to fetishism illustrates how deeply entrenched and potentially obsessive gun culture can become within /k/.

Understanding the concept of fetishism is crucial for exploring gun fetishism. Kaplan defines it as a widely held false belief that can manifest directly or indirectly, with some individuals openly confessing their fetish for specific objects (Kaplan 2006).

Confession of Fetishism

To begin, we scan our dataset for terms derived from “fetish,” revealing 1,346 posts associating guns with fetishism or containing confessions. Examples of these confessions are shown in Table 8. Next, we explore the most similar words to “fetish” from our trained Word2Vec model, revealing terms with sexual connotations, as detailed in Table 7. When examining words similar to “fetishist+gun,” we find phrases like “gunfag,” “revolverfag,” and “glockfag,” typical 4chan terminology describing individuals with a particular affinity for specific items. E.g., a “glockfag” is someone who not only prefers Glock firearms but may also collect them, wear branded clothing, and exhibit other behaviors indicative of a deeper, almost ritualistic connection to the brand.

Key Word (fetish)	Cosine Sim.	Key Word (fetishist+gun)	Cosine Sim.
pervert	0.78	nongun	0.55
tomboy	0.75	feel_emascul	0.54
coomer	0.74	obsess	0.53
futa	0.74	nogun	0.52
fetishist	0.73	gunfag	0.51
bisexu	0.72	incel	0.50
arous	0.72	fetish	0.50
feminin	0.72	inanim_object	0.50
anim_girl	0.71	normalfag	0.50
bondag	0.71	revolverfag	0.49
femboy	0.71	enthusiast	0.49
deviant	0.71	swoon	0.48
lesbian	0.70	nofun	0.48
cute_girl	0.70	scary	0.47
short_hair	0.69	sexual_deviant	0.46
lust	0.68	glockfag	0.46

Table 7: Top 15 most similar words to fetishistic keywords resulted from Word2Vec model.

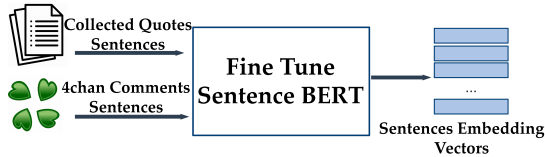


Figure 5: Sentence transformer model training process.

Discovering Fetishism

To further investigate the presence of fetishism in gun culture discussions, we create a semantic similarity pipeline to address our fourth research question: Is it possible to identify whether a post reflects fetishism?

Semantic Similarity Search

Our approach begins by collecting 50 quotes demonstrating gun fetishism/obsession from sociological literature, categorized under religious, patriotic, and freedom aspects of gun fetishism. Examples are in Table 9.

Encode: First, we fine-tune a pre-trained Sentence BERT (SBERT) model to identify posts closely resembling our baseline gun fetishism quotes. We use SBERT due to its superior performance in semantic search, compared to other BERT-based models (Reimers and Gurevych 2019). The technique discussed in (Wang, Reimers, and Gurevych 2021) is used to fine-tune our model. Once SBERT is fine-tuned, we obtained vector embeddings for each sentence from the model as shown in Figure 5

Decode: We construct embeddings for posts and quotes by averaging their corresponding sentence embeddings.

Semantic Similarity Search Results

Religious We collect quotes with religious messages supporting gun ownership from various sources (Butters 2022; Austin 2020; Dawson 2019; DiPippa 2014; Owen 2019;

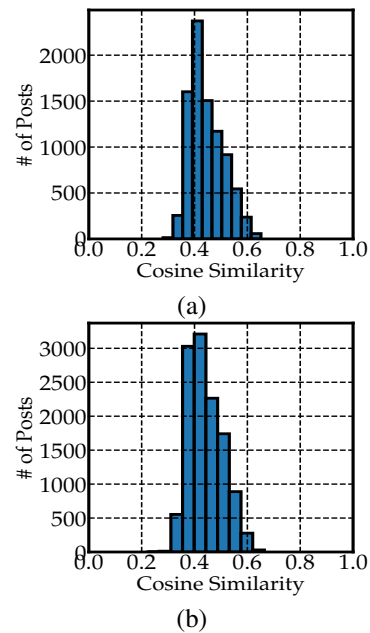


Figure 6: Histogram of average cosine similarity between collected quotes and posts labeled (a) Religious and (b) Law.

Springwood 2014). To identify semantically similar posts efficiently, we focus on those labeled as “Religious” in our dataset. Finally, we calculate the cosine similarity score between quotes and filtered posts. The histogram of the cosine similarity score is shown in Figure 6(a). We then manually examine the posts with the greatest similarity scores. One notable example from the semantic similarity search posits that Jesus would have been an advocate of gun ownership and enjoyed /k/’s culture:

“God is also a giant made of light sitting on a throne that surfs on a river of fire served by giant orbiting rings of eyes and wings. [...] Christ (if he ever existed, and if the description in the bible resembles him at all) was very definitely not a fan of rendering any more to Caesar than that which was Caesars, and he pretty explicitly advocated for personal ownership of weapons for everyone. Jesus was pretty /k/. [...]”

Another user self-identifies as a “Christ poster” and suggests that people should sprinkle holy water on their rifles to bless them, which clearly demonstrates religious fetishism in gun ownership:

“Hello I am the Christ poster. I would just like to say this thread OP is based and I’m full of joy seeing how you all agree that this is Christian territory.[...] You are strong in your Armour of God, the devil has no power over you! [...] Also buy a T81 and put some holy water on your finger and then made the sign of the cross on the stock, body, handguard. I saw a Slav orthodox priest soaking rifles in Holy Water, so I thought it was an excellent idea as a layman can ask God to bless anything for us, and the sacramental of Holy Water is a beautiful method of expelling

Label	Comment
Collection	“I’ve been struggling with this lately actually. I’m up to 20 guns and I feel like a fucking hoarder. I can’t shoot 20 guns routinely, I can barely keep up with 4 or 5. On the other hand, I’m genuinely really into all of my guns and would have a hard time selling them. I think I need to just get over my gun fetish and pare my hoard down to shit I actually shoot.”
Maintenance	“Greasy looking wood on old guns is my fetish. Whether its mid 20th century hunting guns or 90s police trade ins, that glossy used look is absolute kino”
Manufactures	“Yes, only because I have a fetish for failed AR-18 and other similar wierd guns. ACR, Faxon ARAK, Leader T2, etc.”, “spend 900 dollars on a handgun. LOOK, IM NOT POOR NOW PLS RESPECT ME! this new wave of HK fetishism is so tiring.” “small folding guns is my fetish.”
Fascination	“Wound cavity fetish aside the best thing about watching people shoot that round is how flat the gun stays.” “Firing a 12ga shotgun for the first time was like discovering a brand new fetish you never knew you always needed to have. Absolutely recommend for first gun.”
Hunting	“As long as the beast is cooked and eaten, then I am happy. I am relegated to killing minor pests. The rabbit. The wood pigeon. These creatures, although agricultural pests, and although delicious, provide little danger to the hunter. The thrill is still there, but it is fleeting, almost shameful. Like masturbating to a fetish you know is wrong, and seconds after release feeling disappointed in yourself.”
Marksman-ship	“I don’t know of a way other than practice. My impression is that I don’t get better from 200 rounds every few weekends. [...] I am considering getting some sort of pellet gun to practice, but controlling recoil is huge in competitions, and that’s obviously not something you get with an air/CO2 gun. [...] So if someone can recommend one. I have put more 9mm down range this summer than a lot of people here. I just don’t see it as a viable way to improve unless I plan to compete or it’s a fetish.”
Sexual	“favorite gun AK-47, sexual fetish, Skirts and stockings”

Table 8: Example of posts expressing gun fetishism.

all chink evil from the wood and metal. [...]”

Several posts underscore the idea of “God-given” rights to possess weapons for self-defense, further illustrating the deep intertwining of religious beliefs and gun ownership among some users. For instance:

“You need Christ. [...] The Jews have lost their chance at salvation. This is why they are a disgusting people who hate life. They hate natural law, they hate God, they hate weapons, self defense, and the continuation of life. God Given rights to them are nothing. [...]”

There are also posts which elevate gun fetishism by treating firearms as objects of worship. For example, there are several posts with users praising a sculpture of guns, which forms a massive cube. This sculpture is referred to as “Murder/k/ube,” and is worshipped by “/k/ommandos.”² Ironically, this art installation, which features 7,000 donated guns from around the world was created to challenge cultures of violence.³ The image of the gun sculpture originally appeared as a meme on /k/ as a joke.⁴ However, eventually some individuals took it a bit more seriously and even made pilgrimages to the art sculpture to pray to it, giving the meme a life of its own.

These examples highlight how some users elevate gun ownership to a near-religious level, while considering firearms as sacred objects. This merging of religious devotion with gun fetishism not only reflects the deep emotional

²<https://amagicalplace.fandom.com/wiki/Murder/k/ube>

³<http://www.gunsculpture.com/about>

⁴<https://knowyourmeme.com/memes/sites/k--4>

and ideological investment in firearms, but also illustrates how these extreme views can reinforce and normalize the broader gun culture on fringe platforms like 4chan. Understanding these dynamics is crucial because they may contribute to the spread of radical views that resist gun regulation. This poses challenges for policymakers and social media platforms working to mitigate the spread of extremist ideologies.

Patriotism We collect law-related quotes from various studies (Dawson 2019; Owen 2019; Springwood 2014), exemplified in Table 9. These quotes often intertwine patriotism with the Second Amendment. To find similar posts, we concentrate on those labeled as “Law” in our dataset. The histogram of the cosine similarity score is shown in Figure 6(b).

By manually examining the most similar law-related posts suggesting gun fetishism/obsession, we find notable examples. For example, one poster says:

“Guns are your inalienable right, and the deep state traitors of the NWO want to take it away. Biden is deep state. DeSantis is deep state. Zelensky/Ukraine is deep state. Do not support these entities, for they only seek our destruction. True American patriots are here, armed with guns to resist tyrannical takeovers.”

Another post emphasizes the belief that firearms are crucial for resisting government tyranny:

“And there’s always a tug of war between government and its citizens. Guns are powerful leverage against

Quote	Gun Fetishism
“As a Christian Pastor I believe that without a deep seated belief in God and firearms that this country would not be here. I am not ashamed of that fact. I am proud of it” (Springwood 2014)	religious
“God created man but Sam Colt made them all equal” (Butters 2022)	religious
“The Bible says that He who has no sword must sell his garments and buy one.” (Springwood 2014)	religious
“America was invented by Christian progressives who all carried guns and believed that the nation was born in the context of Gods relationship to man. Jesus and religious sentiment was muscular and manly. That Christ and the nation was founded on masculine tough love that could stand strong. The Bible says that He who has no sword must sell his garments and buy one. Today I guess that would mean an AR15” (Springwood 2014)	religious
“NRA will always defend that God given birthright from every enemy out there both foreign and domestic.” (Dawson 2019)	religious
“In John Chapter 2 we see that Jesus is an assault weapons manufacturer.” (Owen 2019)	religious
“God and guns keeps us strong, that is what this country was founded on. Well we might as well give up and run if we let them take our God and guns.” (Austin 2020)	religious
“you cant be christian if you don’t own a gun.” (Austin 2020)	religious
“For he is Gods servant for your good. But if you do wrong be afraid for he does not bear the sword in vain. For he is the servant of God an avenger who carries out Gods wrath on the wrong-doer.” (Butters 2022)	religious
“I feel more moral when I carry a gun” (Butters 2022)	religious
“I believe I am a better person because I carry guns.” (Butters 2022)	religious
“The majesty of the Second Amendment that our founders so divinely captured and crafted into your birthright guarantees that no government desperate no renegade faction of armed forces no roving gangs of criminals no breakdown of law and order no massive anarchy no force of evil or crime or oppression from within or from without can ever rob you of the liberties that define your Americanism.” (Dawson 2019)	patriotism
“second amendment is a cultural solidarity and commitment rooted in identity morality and patriotism of gun ownership.” (Dawson 2019)	patriotism
“I think the thing with the guns is more about freedom and rights.” (Owen 2019)	freedom
“stand for freedom, self reliance and the ability to control your own destiny. Gun rights are about living in a country where families are tough enough and responsible enough to stand up for themselves in a dangerous world.” (Austin 2020)	freedom, empowerment

Table 9: Examples of collected quotes linking firearms and ownership with notions of religion, patriotism, and freedom.

government tyranny. The more armed your civilians are the more secure they are against authoritarianism.”

As another example illustrating the close connection between gun ownership and the concept of freedom consider the following from what appears to be a Canadian user:

“realize there are gun owners and people who still love freedom in areas east of the Manitoba line, and I feel sorry for all of you [...].”

These posts demonstrate how firearm ownership is seen as an explicit display of patriotism and a crucial means of resisting perceived threats to personal freedom.

Conclusion

In this paper, we explore gun culture and fetishism on 4chan’s /k/ through various topic and language modeling techniques. Our analysis uncovers a diverse cultural and moral motivations for gun ownership among /k/ users, some of which border on gun fetishism. Notably, motivations related to Gun Culture 2.0, particularly self-defense, outweighed Gun Culture 1.0 in user discussions. Also, we ob-

serve clear indications of religiously influenced fetishization of guns.

Implications. Our study offers valuable insights that can be beneficial to a range of groups, including policymakers, educators, and social media platforms. By analyzing the intersection of gun culture and extremist ideologies within 4chan’s /k/, our research can inform policies that address both gun control and the cultural/ideological factors driving extremist views on firearms. This can lead to more effective strategies for tackling the complex issues of gun ownership and online extremism.

Our analysis emphasizes the critical role that legal concerns play in discussions on 4chan’s /k/ board, which can have important implications for policymakers. Understanding the deeply ingrained nature of gun culture and the specific legal arguments within communities like /k/ can enhance the communication and effectiveness of gun control policies. Additionally, our study highlights how gun fetishism intersects with broader issues of online extremism. While identifying potential patterns of radicalization is not the primary focus of this work, we provide examples

in the Appendix that illustrate the significance of this issue. These insights suggest that de-radicalization efforts and content moderation strategies could be improved by specifically addressing signs of gun fetishism.

Our research can assist in creating support programs to educate individuals at risk of adopting extreme views related to gun culture. These programs can address the psychological aspects of gun attachment, providing targeted interventions that encourage responsible gun ownership.

While our study focuses specifically on 4chan's /k/ board, the methodologies used could be adapted for future research on other platforms. This could help in understanding how extremist ideologies might propagate across different online spaces, offering a broader perspective for managing online discourse and shaping public attitudes toward gun culture.

Limitations and Future Work. Like any study, ours has limitations. Our focus on a single, fringe online community means that our findings may not generalize to other gun-oriented online spaces. Furthermore, the use of quantitative NLP techniques, while powerful, may overlook subtleties in the discussions, such as sarcasm or irony.

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Paper Checklist

1. For most authors...
 - (a) Would answering this research question advance science without violating social contracts, such as violating privacy norms, perpetuating unfair profiling, exacerbating the socio-economic divide, or implying disrespect to societies or cultures? **Yes. In particular, 4chan is public and anonymous, and we make no attempt to deanonymize its users.**
 - (b) Do your main claims in the abstract and introduction accurately reflect the paper's contributions and scope? **Yes.**
 - (c) Do you clarify how the proposed methodological approach is appropriate for the claims made? **Yes.**
 - (d) Do you clarify what are possible artifacts in the data used, given population-specific distributions? **Yes.**
 - (e) Did you describe the limitations of your work? **Yes. Please check the Conclusion.**
 - (f) Did you discuss any potential negative societal impacts of your work? **NA. We believe the research would not have any potential negative impact.**
 - (g) Did you discuss any potential misuse of your work? **Yes. Please check the Ethics Statement.**
 - (h) Did you describe steps taken to prevent or mitigate potential negative outcomes of the research, such as data and model documentation, data anonymization, responsible release, access control, and the reproducibility of findings? **Yes, Please check to Dataset and Ethical Statement sections.**
 - (i) Have you read the ethics review guidelines and ensured that your paper conforms to them? **Yes.**
2. Additionally, if your study involves hypotheses testing...
 - (a) Did you clearly state the assumptions underlying all theoretical results? **NA. There is no assumptions underlying the theoretical results**
 - (b) Have you provided justifications for all theoretical results? **Yes. Please check the results in Content and Semantic Analysis sections.**
 - (c) Did you discuss competing hypotheses or theories that might challenge or complement your theoretical results? **NA.**
 - (d) Have you considered alternative mechanisms or explanations that might account for the same outcomes observed in your study? **NA.**
 - (e) Did you address potential biases or limitations in your theoretical framework? **NA.**
 - (f) Have you related your theoretical results to the existing literature in social science? **Yes. Please check Content Analysis Section.**
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 - (b) Did you include complete proofs of all theoretical results? **NA.**
4. Additionally, if you ran machine learning experiments...
 - (a) Did you include the code, data, and instructions needed to reproduce the main experimental results (either in the supplemental material or as a URL)? **Yes. The parameters to all the train models and procedure are explained in the paper.**
 - (b) Did you specify all the training details (e.g., data splits, hyperparameters, how they were chosen)? **Yes. Please check Content Analysis section.**
 - (c) Did you report error bars (e.g., with respect to the random seed after running experiments multiple times)? **NA.**
 - (d) Did you include the total amount of compute and the type of resources used (e.g., type of GPUs, internal cluster, or cloud provider)? **NA.**
 - (e) Do you justify how the proposed evaluation is sufficient and appropriate to the claims made? **NA.**
 - (f) Do you discuss what is "the cost" of misclassification and fault (in)tolerance? **NA.**
5. Additionally, if you are using existing assets (e.g., code, data, models) or curating/releasing new assets, **without compromising anonymity...**
 - (a) If your work uses existing assets, did you cite the creators? **Yes.**
 - (b) Did you mention the license of the assets? **NA.**
 - (c) Did you include any new assets in the supplemental material or as a URL? **NA.**
 - (d) Did you discuss whether and how consent was obtained from people whose data you're using/curating? **Yes. Please see Ethics Statement**
 - (e) Did you discuss whether the data you are using/curating contains personally identifiable information or offensive content? **Yes. Please check the Dataset and Ethics Statement sections.**
 - (f) If you are curating or releasing new datasets, did you discuss how you intend to make your datasets FAIR (see ?)? **NA.**
 - (g) If you are curating or releasing new datasets, did you create a Datasheet for the Dataset (see ?)? **NA.**
6. Additionally, if you used crowdsourcing or conducted research with human subjects, **without compromising anonymity...**
 - (a) Did you include the full text of instructions given to participants and screenshots? **NA.**
 - (b) Did you describe any potential participant risks, with mentions of Institutional Review Board (IRB) approvals? **NA.**
 - (c) Did you include the estimated hourly wage paid to participants and the total amount spent on participant compensation? **NA.**
 - (d) Did you discuss how data is stored, shared, and deidentified? **Yes. Please check the Dataset and Ethics Statement sections.**

Ethical Statement

All results presented in this work are aggregate estimates and do not contain any information pertaining to individual participants. It is important to note that users posting on /k/ were fully aware of the public nature and free accessibility of the content they posted, as 4chan as a whole is a publicly accessible site. Furthermore, users on 4chan's sub-channels, including /k/, post anonymously, making it highly improbable to ascertain their true identities. As such, this work is not considered human subject research by our IRB. Finally, we note that scientific output, especially on topics with high societal impact, can often be misinterpreted (sometimes deliberately) on social media (Yudhoatmojo, De Cristofaro, and Blackburn 2023). With that in mind, we emphasize that the objective of this work is not to stigmatize or classify all gun owners as gun fetishists.

Label	Top2Vec topics
Manufactures	glock, longstroke, delton, mossberg, ...
Law	legislative, overturn, gunlaws, amendment,...
Sexual	women, horny, submissive, fetish,...
Accessory	holosun, reticles, dots, holster, waistband,...
Media	books, memoirs, movies, hollywood,...
Fascination	penetrate, fragment, hollowpoint, velocity,...
Self-defense	intruders, entrances, alarm, door, defense,...
Incidents	cops, uvalde, shooting, killing, radicalize,...
Transaction	gunbroker, payment, shortage, inflation,...
Blade	knives, blade, mora, sharpen, sword,...
Maintenance	solvents, ballistol, oil, lubricant,...
Hunting	deer, hunt, coyote, grizzly, bear, cougar,...
Marks-manship	fundamentals, practice, disciplines, competitions,...
Religious	kube, nex, alea, worship, bible, christ,...
Collection	collect, sentimental, vintage, heirloom,...

Table 10: Examples of Top2Vec topics within each annotated labels.

Appendix

Top2Vec Topics within Annotated Labels

Table 10 shows examples of topics within each discussion labels annotated in Topic Analysis section.

BERTopic Details

Prior to applying BERTopic, several preliminary steps are taken to enhance the quality of the results. We train a FastText model on threads and subsequently use it as the input embedding model for BERTopic. FastText is an extension of Word2Vec model that is efficient text classification and text learning tasks (Joulin et al. 2016). We use the FastText model because it can handle lengthy threads, provides word-level knowledge, and is not limited by token count constraints of transformers. We train with an embedding size of 300, a minimum word frequency of 50, a context window size of 7, and a skip-gram value of 1. Default values are used for the remaining model parameters. To minimize the impact of stop-words, we adopt BERTopic’s recommended CounterVectorizer technique.

BERTopic Examples Across Clusters

Table 11 shows examples of bert-topics within each detected community after the second stage in the topic analysis pipeline.

Word2Vec Modeling Details

Prior to starting our NLP analysis, it is essential to pre-process the collected comments and posts. This pre-processing involves multiple steps, such as removing Unicode characters (punctuation, emojis, and special symbols), removing links and URLs, eliminating excessive white spaces, normalizing text, removing stop words, and ultimately stemming all remaining words to break them down to their roots. We train our Word2Vec model on cleaned and stemmed posts of threads extracted from stage 2 of our topic analysis pipeline with an embedding size of 125, a window size of 7, and a minimum count of 30.

Cluster #	BERTopic topics	Topic
1	we_russian_russia_vdv, kher-son_russians_russian_ukraine, nuclear_nukes_nuke_russia, russia_ukraine_crimea_putin, etc.	Russia-Ukraine war
2	gun_9mm_glock_pistol, rifle_sig_rifles_m14, glock_trigger_slide_beretta, ak_aks_wbp_wasr, dot_optic_eotech_holosun, oil_grease_lube_rust, shot-gun_shotguns, etc.	Gun-related
3	artillery_rocket_guided, radar_missile_radars, subs_ships_navy_submarine, tank_tanks_turret_armor, etc.	Warfare-related

Table 11: BERTopic examples across different clusters.

Potential Signs of Radicalization

Fringe platforms like 4chan are well-known for radicalizing users and spreading extremism, which can have devastating real-world consequences. For example, Payton S. Gendron, the Buffalo shooter, confessed to being radicalized on 4chan, where he was influenced by white supremacy and replacement theory—the belief that white people are being displaced by other races such as Jews, Blacks, and Muslims (Collins and Kosnar 2022).

To further understand how such radicalization occurs, we analyze the language used on /k/, focusing on discussions around gun culture. We query our trained Word2Vec model with the keyword “progun” and generate a graph of similar words following the methodology in (Zannettou et al. 2020) as shown in Figure 10. Nodes represent words, and edges connect words with a cosine similarity above 0.65, limited to two hops from the keyword. We use the Louvain community detection method (Blondel et al. 2008) to group nodes into communities. As shown in Figure 10, reveals three main communities, each represented by a different color. Two of these communities contain political terms, while the third, shown in green, contains terms associated with white supremacy ideology. We observe terms like “white_supremacist” and “white_nationalist,” “antigun,” and “antiwhite” appearing together, suggesting that users on 4chan’s /k/ often use these terms in the same context. An example of such posts is:

“... everyone knows that the academic grifting to lobby the government for oppressively unnatural – anti-technological and anti-male and anti-white – gun control while also importing hundreds of thousands of camouflage races served only semitic interest. White wahmen were pawns in the whole media-parliamentary charade.”

This comment reflects extremist beliefs, suggesting that gun control is part of a broader conspiracy against white men.

This analysis shows how discussions on 4chan’s /k/ board link gun culture with extremist ideologies. The clustering of terms like “white_supremacist,” “antigun,” and “antiwhite” reveals a troubling overlap between gun advocacy and white nationalist rhetoric. The keyword “progun” connects political and ideological clusters, indicating that pro-gun discussions often intersect with extremist beliefs which can contribute to radicalization. Although discovering radicalization was beyond the scope of this study, these findings highlights the importance of further research in this area. These results also highlight the need for interventions that address both the

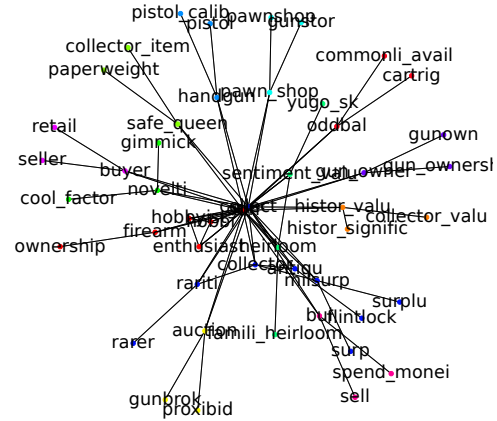
cultural obsession with firearms and the harmful ideologies that thrive in un-moderated online spaces.

Visualizing Gun Attachment Using Graph

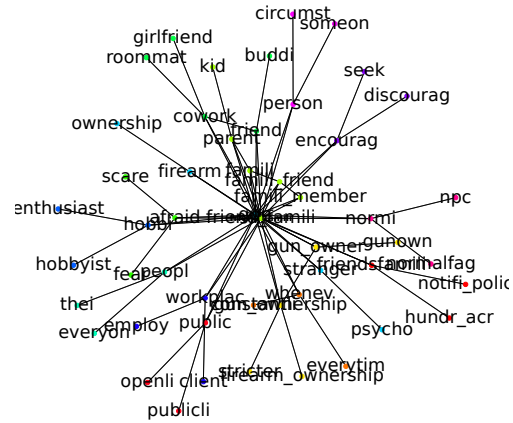
In this section we provide alternative way to show different types of gun attachments using graphs instead on tables. To construct the figures we use the trained Word2Vec model. Figure 7 (a) shows the most similar words to “gun+collect”. In the center of graph is the keyword “gun+collect” and the similar words are connected to the center keyword. Figure 7 (b) show similarity graph to keyword “gun+friend famili.”

We can visualize other types of gun attachments using similarity graphs as well. In Figure 8 (a) we can see how users show the concept of masculinity in the context of marksmanship (a) and hunting can show itself in /k/ users discussions.

Moral inspiration types of attachment to guns can also be visualize using similarity queries to trained Word2Vec models. In Figure 9 (a) we can see the language users use around concepts of “gun+religion” and “gun+patriot.”



(a)



(b)

Figure 7: Visualizing top 100 similar words to keywords reflecting the sentiment values of guns: (a) Gun collection and (b) Group identity.

