

Fragmented Beliefs, United Threats: A Network Analysis of Ideologically Motivated Violent Extremism in Canada

Research Report
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EXECUTIVE SUMMARY

Ideologically Motivated Violent Extremism (IMVE) is an evolving and complex security concern in Canada. Unlike traditional extremist organizations, IMVE actors – particularly lone-actor extremists – often blend personal grievances with ideological narratives, constructing highly individualized belief systems that do not always align with formal extremist doctrines. This report examines the ideological structures within extremist manifestos using Natural Language Processing (NLP) and Social Network Analysis (SNA) to better understand the patterns of radicalization and their implications for counter-radicalization efforts. Using Named Entity Recognition (NER), this study extracted key entities, including ideological references, influential figures, organizations, and thematic concepts, from six Canadian lone-actor extremist cases. These cases were selected based on their representation of different IMVE categories, such as gender-driven violence, anti-authority extremism, xenophobic violence, and grievance-based attacks. Through network analysis, the report maps how ideological references interconnect within extremist narratives, revealing central themes, ideological influencers, and distinct clusters of extremist discourse.

Key Findings

- 1.** The network analysis of these cases reveals that IMVE narratives are highly decentralized, with loose ideological connections rather than a unified extremist doctrine. While religious or political ideological references appear frequently across cases, many entities remain case-specific, reinforcing the individualized nature of radicalization.
- 2.** Manifestos serve as both justifications for violence and tools for ideological reinforcement, often creating a copycat effect where new attackers reference past attackers. Figures like Elliot Rodger and Brenton Tarrant emerge in gender driven extremist discourse, illustrating their influence future lone actors.
- 3.** References to media, including movies and online subcultures, suggest that self-radicalization is driven more by digital environments than direct affiliations with extremist groups. Pop culture elements (e.g., Marilyn Manson, Rammstein, violent films, and video games) frequently appear in extremist discourse, highlighting how ideological narratives intertwine with identity formation.
- 4.** IMVE actors do not operate within centralized networks but instead engage with extremist ideologies in fragmented, self-directed ways. Many extremist manifestos blend ideological narratives with deeply personal grievances, making one-size-fits-all counter-radicalization strategies ineffective.

Policy Recommendations and Counter-Radicalization Strategies

These findings highlight the need for multi-layered, adaptive counter-radicalization policies that address both ideological narratives and personal grievances. Traditional counterterrorism strategies focused on group-based extremism are insufficient for IMVE, requiring a more nuanced, individualized approach.

1. Targeted Intervention Strategies for Lone-Actor Extremists

- Expand individualized risk assessments incorporating psychological, ideological, and social factors.
- Strengthen community-based programs addressing social isolation, mental health, and ideological grievances.

2. Distinguishing Between Ideological Influence and Operational Influence

- Use sentiment analysis to differentiate between passive ideological engagement and active radicalization.
- Prioritize intervention for those showing behavioral indicators of violence rather than ideological affiliation alone.

3. Addressing the Role of Media and Cultural Influences in Radicalization

- Research how extremist narratives integrate pop culture, media, and online communities.
- Implement media literacy programs to counter extremist manipulation of cultural references.

4. Strengthening Collaboration Between Researchers, Law Enforcement, and Community Organizations

- Establish a national IMVE research database to track extremist trends and inform policy.
- Expand training for law enforcement and mental health professionals to improve early detection. Ideologically Motivated Violent Extremism

Conclusion

This study contributes to CANSES Objective 1 by improving understanding of the evolving threat environment and informing policy priorities for countering radicalization to violence (CRV) at the individual, group, and social movement levels. The findings confirm that IMVE actors are not uniformly ideological, making traditional counterterrorism approaches insufficient in addressing this decentralized threat. Instead, a multi-layered counter-radicalization strategy combining digital monitoring, individualized interventions, and interdisciplinary collaboration is

necessary to detect, prevent, and disrupt radicalization pathways. By leveraging computational tools like NLP and network analysis, policymakers can anticipate emerging extremist narratives, assess ideological influences, and refine CRV programs. IMVE is a dynamic, evolving phenomenon, shaped by ideology, personal grievances, and digital radicalization. Future research should expand on these findings by integrating sentiment analysis, real-time monitoring, and longitudinal tracking to further enhance counter-radicalization strategies.

INTRODUCTION

The rise of Ideologically Motivated Violent Extremism (IMVE) has become an increasing concern in Canada and internationally. Since 2014, there has been a notable surge in attacks inspired by extremist narratives (Public Safety Canada, 2024), with lone-actor offenders carrying out high-profile incidents across North America and Europe. Unlike traditional terrorist organizations with structured hierarchies, IMVE actors often operate independently, driven by personal grievances, ideological beliefs, or a combination of both (Hamm & Spaaij, 2017; Hofmann, 2020; Miller, 2024). These individuals may not be formally affiliated with extremist groups, yet they consume and reproduce violent rhetoric that fuels their radicalization (CSIS, 2024; Government of Canada & Royal Canadian Mounted Police, 2015). This growing phenomenon underscores the urgent need for advanced analytical approaches to understand the ideological underpinnings of IMVE and to develop effective counter-radicalization policies.

Canada has not been immune to the rise of IMVE, with multiple high-profile lone-actor attacks occurring in recent years. Events such as the 2017 Quebec City mosque shooting perpetrated by Alexandre Bissonnette, the 2018 Toronto van attack perpetrated by Alek Minassian, and the 2021 London, Ontario vehicle attack perpetrated by Nathaniel Veltman

highlight the diverse ideological motivations behind IMVE, ranging from xenophobic and white supremacist beliefs to misogynist and grievance-driven extremism (Brunt & Taylor, 2020; Van de Velde, 2021; Vink, Abbas, Veilleux-Lepage & McNeil-Willson, 2024). Recognizing this threat, Canadian security agencies categorize IMVE into four broad categories: xenophobic violence, anti-authority violence, gender-driven violence, and grievance-driven violence (Carr, 2022; CSIS, 2024; Public Safety Canada, 2021). These categories reflect the varied and often overlapping motivations of lone-actor extremists, who frequently blend ideological beliefs with deeply personal grievances rather than adhering to a single, well-defined extremist doctrine.

A key feature of modern IMVE is the presence of extremist manifestos, texts written, spoken, or recorded by attackers that outline their ideological justifications, grievances, and motivations for violence. These documents offer critical insight into how lone-actor extremists frame their beliefs, reference ideological influences, and justify their actions. More than just declarations of intent, manifestos play a role in inspiring and reinforcing future attacks, with multiple cases showing perpetrators referencing earlier attackers' manifestos as ideological blueprints (Ebner, Kavanagh & Whitehouse, 2022; Ganor, 2002; Kaldor, 2021; Kupper &

Meloy, 2021). The study of these texts is essential in understanding how radical ideologies spread, how key figures and groups are referenced, and how violent justifications evolve over time.

Despite the importance of extremist manifestos in shaping and transmitting ideological narratives, they remain understudied through structured, data-driven methods. While qualitative discourse analysis has provided insights into extremist messaging, few studies have applied computational methods to systematically analyze their ideological structures. Natural Language Processing (NLP) offers the ability to extract and classify ideological content across multiple texts, while Social Network Analysis (SNA) enables the visualization of connections between references, revealing how seemingly isolated beliefs are part of broader, interlinked narratives. This report addresses that gap by using NLP and SNA to map ideological connections and identify the most frequently referenced entities in extremist manifestos. By applying Named Entity Recognition (NER), this study extracts key individuals, organizations, and ideologies from a dataset of extremist texts, providing a structured understanding of how lone actors construct their ideological worldviews. Network analysis is then used to visualize the relationships between these ideological references, offering insights into how violent extremist narratives are interconnected

and reinforced. This research contributes to counter-radicalization efforts by providing a data-driven approach to understanding extremist ideology and informing policy strategies aimed at disrupting radicalization pathways. By identifying key ideological nodes and frequently referenced extremist figures, this report helps law enforcement, policymakers, and researchers develop more targeted interventions to combat lone-actor radicalization.

Research Questions

To explore these issues, this research report addresses the following research questions:

[RQ1] What are the most frequently mentioned entities (individuals, organizations, ideologies) in extremist manifestos?

[RQ2] How are key figures, groups, or ideologies interconnected within extremist manifestos?

[RQ3] How can network analysis of extremist manifestos inform counter-radicalization policies, specifically in identifying key nodes (individuals or groups) that propagate violent ideologies?

Significance of the Research Report

The significance of this research report lies in its combination of computational analysis with real-world Canadian case studies, offering a data-driven approach

to understanding IMVE. By leveraging NLP and SNA, this study uncovers hidden ideological structures within extremist manifestos, providing a systematic method for identifying key ideological influences, tracking the evolution of extremist narratives, and assessing which ideas are most embedded within lone-actor extremist discourse. A key insight from this study is that IMVE is not always driven by a singular, well-defined ideology. Many lone-actor extremists blend personal grievances with broader ideological themes, constructing highly individualized belief systems rather than strictly adhering to formal extremist doctrines (Carr, 2022). Understanding this fragmentation is critical for counter-radicalization efforts, as traditional counterterrorism strategies that focus on dismantling structured groups may be less effective against decentralized lone actors. This research highlights the importance of adapting intervention strategies to address both widely shared extremist narratives and the more personalized, grievance-driven aspects of IMVE. By analyzing which ideological narratives are most prominent and how they are interconnected, this study provides insights that can inform law enforcement strategies, digital monitoring efforts, and intervention programs.

Structure of the Report

This report begins by providing an overview of IMVE and its manifestations in Canada, situating lone-actor extremism within the broader context of radicalization. It then explores the role of extremist manifestos in shaping ideological discourse, examining how past attackers influence future lone actors through textual narratives. Following this, the report details the methodologies employed, including NER for entity extraction and SNA for relationship mapping. The findings section presents the results of the network analysis, highlighting key ideological clusters and their significance in extremist discourse. Following this, the report discusses policy implications, emphasizing the need for adaptive counter-radicalization strategies that account for both ideological narratives and personalized grievance-based radicalization pathways. Finally, the report concludes with a summary of key insights and recommendations for future research, highlighting the importance of computational methodologies in IMVE research and the need for continued interdisciplinary collaboration.

BACKGROUND AND LITERATURE REVIEW

Ideologically Motivated Violent Extremism (IMVE) and Lone-Actor Extremism

Ideologically Motivated Violent Extremism (IMVE) refers to acts of violence committed by individuals or small groups driven by ideological beliefs, rather than by direct affiliation with a structured terrorist organization (CSIS, 2024). Unlike terrorism linked to specific religious, nationalist, or separatist movements, IMVE is often fueled by a mix of ideological, personal, and grievance-based motivations. The Canadian Security Intelligence Service (CSIS) categorizes IMVE into four broad types:

1. Xenophobic Violence – Motivated by racial or ethnic hatred, often targeting individuals perceived as foreign or different. This includes white supremacist attacks and anti-immigrant violence.

2. Anti-Authority Violence – Directed at state institutions, law enforcement, or government figures, often influenced by conspiracy theories, libertarian extremism, or sovereign citizen ideologies.

3. Gender-Driven Violence – Characterized by hatred toward specific genders or sexual orientations, often manifesting in misogynistic, anti-LGBTQ+, or incel-related violence.

4. Other Grievance-Driven Violence – Committed by individuals without clear ties to an organized movement, often driven by personal vendettas, ideological hybridization, or a mix of social, economic, and psychological grievances (Carr, 2022; CSIS, 2024; Public Safety Canada, 2021).

A key distinction of IMVE in Canada is its fragmented and highly individualized nature, where offenders frequently blend multiple ideological influences rather than adhering to a single extremist doctrine. This makes detection and prevention more complex, as ideological narratives often evolve based on personal grievances and exposure to extremist content rather than formal recruitment into a terrorist group.

Within the broader category of IMVE, lone-actor extremism has become an increasing concern. Lone-actor terrorists operate independently, planning and committing attacks without direct orders or operational support from an organization (Deloughery, King & Asal, 2013). This “solitary nature” makes their actions highly unpredictable and difficult to detect, as they leave fewer intelligence signals compared to group-based extremists (Gill, Horgan & Deckert, 2014). Unlike members of structured terrorist cells, lone actors lack co-conspirators, group communications, or a formal network, meaning law enforcement agencies have limited opportunities for

early intervention (Deloughery et al., 2013; Gill et al., 2014).

Research shows no single profile fits all lone extremists, but certain recurring factors often appear. For instance, McCauley, Moskalkenko & Van Son (2013) identified four common traits among lone-actor attackers:

- a perceived personal grievance or sense of injustice,
- symptoms of depression or mental distress,
- a recent personal crisis or “unfreezing” event disrupting their life, and
- a history of weapons use (outside any military context).

Many lone-actor extremists experience significant social alienation, tending to live reclusively and struggle with interpersonal relationships (Government of Canada & Royal Canadian Mounted Police, 2015). Some openly express extremist beliefs (e.g., anti-government, racist, or misogynist ideologies), which may be noticeable to acquaintances or online communities. Additionally, studies suggest that lone-actor terrorists exhibit higher rates of mental health issues compared to group-based extremists (McCauley et al., 2013). However, despite psychological factors, ideology remains a dominant driver behind lone-actor radicalization. Many offenders are deeply committed to extremist ideological grievances, such as far-right extremism,

incel ideology, anti-authority beliefs, or racial nationalism (Gill et al., 2014; Hofmann, 2020). Their radicalization process often occurs in isolation, but they consume and reinforce their beliefs through extremist propaganda, online networks, and past attack manifestos.

Manifestos and Their Role in Radicalization

Extremists frequently use manifestos or written statements to justify their actions, proclaim their ideology, and inspire others (Ebner et al., 2022). Publishing a manifesto or final statement has become almost a norm for modern lone attackers who want their message heard. These documents serve as both an explanation of motives and a propaganda tool to spread extremist ideology. Crucially, manifestos create a copycat effect: today’s lone attackers often explicitly cite and draw inspiration from past attackers’ writings (Dearden, 2019; Ebner et al., 2022; Ware, 2020). For example, the 2019 El Paso shooter began his own manifesto by praising the Christchurch Mosque shooter Brenton Tarrant and his manifesto, mirroring Tarrant’s rhetoric against immigrants (Peterka-Benton & Benton, 2023; Ware, 2020). Similarly, the perpetrator of the 2019 Poway synagogue shooting wrote that Tarrant “showed me that it could be done,” crediting his example as a catalyst (Dearden, 2019; Ebner et al., 2022).

This phenomenon of manifesto-driven radicalization is further illustrated by high-profile IMVE attackers whose writings have inspired subsequent generations of extremists. In 2011, Anders Behring Breivik emailed out a 1,518-page manifesto before murdering 77 people in Norway, outlining an Islamophobic, ultra-nationalist worldview (Berger, 2019b; Ebner et al., 2022; Ware, 2020). Years later, in 2019, Brenton Tarrant posted a document on 8chan just prior to killing 51 at New Zealand mosques, echoing white supremacist themes like the “Great Replacement” theory (Ebner et al., 2022; Ware, 2020). His manifesto in turn inspired multiple followers abroad. In 2018, Alek Minassian did not publish a traditional manifesto, but minutes before his van attack in Toronto, Canada, he posted a Facebook message declaring an “Incel Rebellion” and saluting Elliot Rodger – the U.S. shooter whose 141-page manifesto attacking women had made him a celebrated “saint” in incel extremist forums (Russo, 2022). These cases illustrate how manifestos justify violence by framing it as part of a larger ideological struggle, and how they cascade through extremist communities: one attacker’s manifesto can fuel the radicalization of the next lone actor. In this way, the manifesto is both a personal justification for violence and a strategic tool to amplify extremist ideology to a wider audience.

Social Media’s Role in IMVE

While lone-actor IMVE offenders operate independently, the internet and social media serve as key enablers of self-radicalization, providing access to extremist propaganda, ideological echo chambers, and violent manifestos (Binder & Kenyon, 2022). Unlike traditional group-based recruitment, online platforms allow individuals to adopt extremist beliefs without direct interpersonal contact. Digital forums such as 8chan, niche Telegram channels, and extremist chatrooms have facilitated multiple IMVE attacks by promoting extremist rhetoric and glorifying past attackers, fostering a copycat culture (Thomas, 2019). While this report does not focus specifically on digital radicalization, it is important to recognize that online environments facilitate the spread of extremist manifestos and reinforce ideological narratives across attacks. The rapid dissemination of manifestos on social media and encrypted platforms amplifies their reach, ensuring that lone actors can engage with extremist ideologies even in isolation. Recognizing this digital dimension helps contextualize how ideological content is shared and perpetuated beyond individual cases.

Canadian Security and Policy Response

Canadian security agencies have shifted substantial attention toward the lone-actor IMVE threat. The CSIS and RCMP now prioritize investigation of IMVE extremists, even when they are not tied to organized groups (Carr, 2022). In recent years, the federal government took the unusual step of designating several far-right extremist entities (such as Atomwaffen Division, The Base, and the Proud Boys) as terrorist organizations (FINTRAC, 2021) to empower law enforcement, though many lone actors are not official group members. Agencies are also enhancing community outreach and early intervention programs to prevent radicalization at the individual level. For example, Canada's Centre for Community Engagement and Prevention of Violence (established in 2017) funds research and local initiatives to identify at-risk individuals and counter extremist narratives. Law enforcement faces the challenge of identifying lone-wolf attackers before they strike, so there is emphasis on public tip reporting, monitoring of online hate communities, and "behavioral threat assessment" techniques to spot warning signs. Policy-wise, Canada has considered legislation to curb online extremist content (such as a proposed online harms bill) in order to limit the digital fuel for IMVE propaganda (Carr, 2022). In sum, Canadian authorities recognize that lone-actor extremists,

particularly from the far-right and incel milieus, pose a significant domestic threat. They have responded with a mix of intelligence focus, new terrorism designations, community-based prevention, and efforts to address the online ecosystems that enable these actors, all aimed at preventing the next "lone wolf" before he can act.

METHODOLOGY

This study applied Named Entity Recognition (NER) and Social Network Analysis (SNA) to examine the ideological landscape in six Canadian case studies of IMVE. While the original research plan aimed to analyze over 90 extremist manifestos, resource limitations led to a more focused approach, allowing for a detailed exploration of only Canadian cases. NER was used to extract key ideological references from each manifesto. This included identifying names of influential individuals (e.g., historical extremists, political figures), ideological groups (e.g., Nazis, feminists, government agencies), and terms or concepts central to the attacker's worldview (e.g., "white genocide," "the Matrix," "incel"). These references formed the core building blocks of the ideological networks.

Initially, multiple NER models were tested, including BERT (Bidirectional Encoder Representations from Transformers), a widely used language model. However, BERT struggled with structured, entity-based classification, producing fragmented or inaccurate results unsuitable for network analysis. Given these limitations, OpenAI's GPT models were selected for their stronger contextual understanding. GPT-3.5 was used to extract ideological references at scale, while GPT-4 was applied for more

precise classification and validation of extracted entities. This two-step process balanced computational efficiency with interpretive accuracy.

Following extraction, the data underwent a detailed manual cleaning process. This involved correcting incorrect labels and merging overly specific terms into broader categories to improve interpretability. This hands-on work was essential to ensure that the dataset accurately reflected the narratives within each manifesto. The cleaned entity data was then used to build a network model using NetworkX, a Python-based tool for visualizing and analyzing relationships. In this model, each unique ideological reference became a node, and edges (connections) were drawn between entities that appeared in close textual proximity, typically within the same sentence or paragraph. This allowed the study to map how ideological concepts clustered together and how often certain references co-occurred across different manifestos. To assess the structure and influence of different ideological elements, several centrality metrics were used. Degree centrality measured how many connections a node had, indicating how often an ideology was referenced alongside others. Betweenness centrality showed how frequently a node served as a bridge between different clusters, highlighting ideologies that link otherwise separate parts of the narrative. Closeness centrality assessed how close a node was

to all others in the network, revealing which ideologies were thematically central across the manifesto (McLevey, 2021). Colour-coding by source document helped visualize which references were unique to a specific attacker and which appeared across multiple cases. This provided a comparative lens for examining ideological overlap and divergence across different types of IMVE.

While sentence-based network construction provided a valuable structural view of ideological co-occurrences, a key limitation was that it did not distinguish between ideological alignment and opposition. Future research could improve upon this by incorporating sentiment analysis or stance detection techniques to assess whether ideological references in manifestos were supportive, neutral, or critical. Despite these limitations, this methodology provides a structured and scalable approach to analyzing extremist ideology in IMVE manifestos, offering valuable insights into the ideological networks that shape radicalization narratives in Canada.

CASE STUDIES

This section provides an overview of six Canadian IMVE cases selected for deeper analysis based on their ideological motivations, personal grievances, or a combination of both. Their manifestos, online writings, and attack justifications reflect broader trends in IMVE radicalization, where perpetrators often merge various grievances, personal beliefs, and fragmented ideologies rather than adhering to a single extremist doctrine (Carr, 2022). Overall, these individuals acted alone without ties to organized extremist groups, and their attacks align with gender-driven violence, anti-authority extremism, xenophobic violence, and grievance-based attacks. Table 1 categorizes analyzed cases based on how they framed their acts in their manifestos.

Marc Lépine’s 1989 attack on female engineering students at Montreal’s École Polytechnique remains one of Canada’s most infamous acts of gender-based violence. His suicide note explicitly stated

his hatred for feminists, whom he blamed for his failures, demonstrating a clear ideological motivation (Mansour & Kidd, 2024). Lépine’s massacre is often cited in discussions of gender-driven terrorism, where misogyny functions as an extremist belief system similar to white supremacy or jihadism (Vink et al., 2024).

Similarly, Alek Minassian, a self-identified member of the incel (involuntary celibate) community, carried out one of Canada’s deadliest lone-actor attacks on April 23, 2018, killing 11 people and injuring 15 (Brunt & Taylor, 2020). His online statements and police interrogation revealed his intent to spark an “Incel Rebellion”, blaming women and society for his perceived failures. Minassian idolized Elliot Rodger, the 2014 Isla Vista shooter, whose 141-page misogynistic manifesto has inspired multiple copycat attacks (Mansour & Kidd, 2024; Van Brunt & Lewis, 2014). Minassian’s attack aligns with gender-driven IMVE, as misogynistic extremism increasingly overlaps with other forms of hate-based radicalization (Woloshyn, 2024). Reports indicate that he faced bullying and social rejection

Table 1 Mapping Canadian Lone-Actor Extremists to IMVE Categories

Name	Primary IMVE Category	Secondary IMVE Category
Alek Minassian	Gender-Driven	Other Grievance-Driven
Kimveer Gill	Other Grievance-Driven	Xenophobic
Marc Lépine	Gender-Driven	N/A
Michael Slobodian	Other Grievance-Driven	N/A
Michael Zehaf-Bibeau	Anti-Authority	N/A
Valery Fabrikant	Other Grievance-Driven	N/A

during his school years, leading to deep-seated personal grievances that compounded his incel-related beliefs. This combination of social alienation, resentment, and ideological reinforcement is a common pattern among grievance-driven IMVE actors, highlighting how personal struggles can intertwine with extremist narratives to justify violence (Brunt & Taylor, 2020; CBC, 2020).

In 2014, Michael Zehaf-Bibeau shot and killed a Canadian soldier at the National War Memorial before storming Parliament, where he was fatally shot by security forces. His recorded manifesto indicated an anti-government motivation, blending jihadist rhetoric with personal grievances against state institutions (Perry & Scrivens, 2018). While media coverage framed the attack as Islamist terrorism, scholars debate whether his anti-authority stance and personal instability were stronger influences. His history of criminal activity, substance abuse, and mental distress suggests a complex mix of ideological and psychological radicalization, complicating strict classification (Perry & Scrivens, 2018).

Kimveer Gill's 2006 attack at Dawson College in Montreal killed one person and injured 19 before he died by suicide. His online writings on the website VampireFreaks revealed an obsession with violence, anti-social grievances, and

some xenophobic tendencies (CBC News, 2018; News Staff, 2006). However, unlike Minassian or Lépine, his ideological commitment was less explicit, blending personal struggles, music, and resentment toward societal norms. Gill's case complicates the traditional IMVE framework, as he did not fit neatly into white supremacist, incel, or anti-government extremism, yet exhibited multiple IMVE traits, highlighting how grievance-driven lone actors often defy rigid categorization.

Valery Fabrikant, a former Concordia University professor, killed four faculty members over perceived academic injustices in 1992. Unlike ideological extremists, his manifesto focused on revenge, positioning him under grievance-driven IMVE (Cherry, 2020). His case raises questions about workplace violence and lone-wolf radicalization, showing that not all IMVE perpetrators fit traditional terrorist molds. Instead, personal vendettas can escalate into mass violence, echoing patterns seen in workplace and school shootings.

Michael Slobodian, a 16-year-old student, killed two teachers and wounded 13 others in Canada's first modern school shooting in 1975. Like Fabrikant, his attack was rooted in personal grievances rather than broader ideological goals (Andrew, 2015). While not traditionally classified as an extremist, Slobodian's revenge-motivated violence shares

characteristics with modern lone-actor IMVE attacks, where personal hatred manifests in large-scale violence. His case predates contemporary online radicalization, illustrating that IMVE existed before digital extremism but has since evolved.

The implications of these case studies extend beyond individual attacks, shaping Canada's policy responses. Lépine's massacre led to stricter gun control laws, while Minassian's attack highlighted the growing threat of misogynist extremism (Mansour & Kidd, 2024; Van Brunt & Lewis, 2014; Vink et al., 2024; Woloshyn, 2024). Zehaf-Bibeau's actions influenced counterterrorism legislation (Bill C-51) (Forcese & Roach, 2015), emphasizing national security risks. Across all cases, a common thread is the role of ideology, whether political, religious, or personal grievance-based, in justifying violence. These findings reinforce the importance of network analysis, online extremism prevention, and ideological deconstruction in countering IMVE.

ANALYSIS

This section examines the most frequently mentioned entities in extremist manifestos, addressing Research Question 1: What are the most frequently mentioned entities (individuals, organizations, ideologies) in extremist manifestos? By analyzing the distribution of named entity types extracted through NER, we can identify key figures, organizations, and ideological references that structure extremist narratives.

The distribution of named entity types in extremist manifestos, as visualized in the bar chart (Figure 1, below), reveals a strong emphasis on individuals, locations, and organizations, suggesting that extremist narratives are structured primarily around personal grievances and specific institutions rather than broad ideological frameworks. The overwhelming frequency of “PERSON” entities indicates that manifestos center heavily on specific figures, whether as perceived enemies, ideological inspirations, or key actors within the author’s worldview. This aligns with previous research showing that lone-actor extremists often anchor their beliefs in admiration for past attackers or hatred toward particular public figures (Perry & Scrivens, 2018). Similarly, “LOCATION” and “DATE” entities appear frequently, reinforcing how manifestos contextualize grievances within specific places and

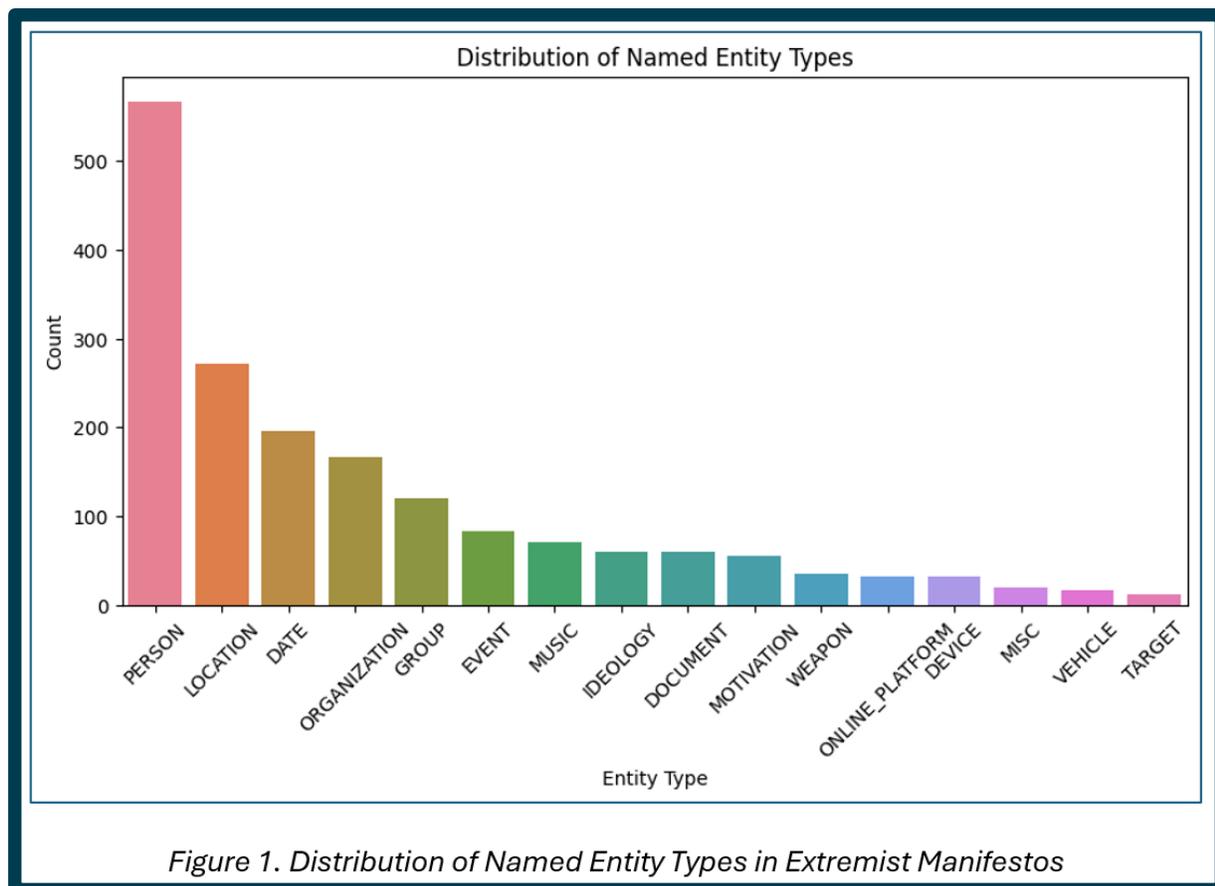
historical timelines. This pattern suggests that extremist writings often draw legitimacy from real-world events, citing historical incidents, locations of attacks, or geopolitical conflicts to justify their beliefs and call for action. The strong presence of “ORGANIZATION” and “GROUP” entities further highlights how extremists discuss institutions, whether as oppressive forces (e.g., governments, media, law enforcement) or ideological allies (e.g., online communities, extremist groups, or historical movements). This confirms that lone actors, despite acting independently, often perceive themselves as part of a broader ideological struggle (Hoffman, 2017; Hoffman, Ware & Shapiro, 2020).

However, the relatively low frequency of “IDEOLOGY” and “MOTIVATION” mentions highlights a critical limitation of NER models in extracting abstract ideological themes. Unlike concrete entities like “PERSON” or “LOCATION,” ideological concepts are often expressed in nuanced, implicit ways, making them harder for standard NER systems to detect. For instance, an extremist manifesto may reference concepts like “Western decadence,” “corrupt elites,” or “moral decay” without explicitly labeling them as an ideology, leading to underrepresentation in structured entity analysis. This aligns with previous research showing that extremist discourse often relies on coded language and implicit references rather than direct

ideological declarations (Berger, 2018, 2019a). A similar issue arises with “MOTIVATION” entities, which appear infrequently despite being central to extremist narratives. Many extremist beliefs are embedded within narrative structures, rhetorical framing, and emotional appeals, rather than in direct statements about motivation. These findings suggest that while NER is effective at identifying key actors and locations, it is less suited for extracting complex ideological structures, which would require more sophisticated semantic analysis, topic modeling, or sentiment analysis to provide a fuller understanding of extremist discourse.

Observations from the Named Entity Network

A balanced and interpretable network analysis requires a fair distribution of entities across all case files. However, the initial, unnormalized social network revealed significant imbalances, where certain cases overwhelmingly dominated the visualization due to variations in document length. As some manifestos contained thousands of words while others were notably shorter, the longer texts produced a disproportionately high number of extracted entities, skewing the overall representation. To illustrate this discrepancy, Table 2 presents the word



count and extracted named entities for each case. Valery Fabrikant’s (1992) manifesto, for instance, is over 17,000 words long, leading to 984 extracted entities, while shorter texts, such as those of Michael Zehaf-Bibeau (2014) and Michael Slobodian (1975), contain fewer than 600 words, resulting in far fewer named entities.

To correct for these imbalances, the dataset was normalized by adjusting entity frequency according to document length, essentially weighting entities relative to the number of words in each manifesto. This made it possible to compare documents of different lengths on more equal footing. The revised network (Figure 2, below) ensured that each case contributed a proportional number of key entities, preventing longer texts from dominating the analysis. However, it is important to note that three of the shorter manifestos – those of Marc Lépine, Michael Slobodian, and Michael Zehaf-Bibeau – do not appear in the normalized network visualization, as they contained either no extractable named entities or too few to meet the inclusion

threshold. This absence further underscores the limitations of shorter texts in entity-based network analysis.

Normalization improved interpretability in several ways. First, it allowed key figures to emerge from all cases, not just from the longest ones. Second, it reduced visual clutter, making patterns easier to observe. The colour-coded classification of cases remained intact, but the reduced density of connections enhanced readability and made it possible to observe distinct ideological clusters and personal grievance patterns. Unlike the chaotic web of the raw network, the normalized version provided clearer insights into how specific individuals and themes are referenced both within and across manifestos. This allowed for a more structured and interpretable analysis of lone-actor extremist narratives.

Another major improvement was the accuracy of entity influence rankings. In the unnormalized network, the most “important” nodes (those with the most connections) tended to come from the

Table 2. Word Count and Extracted Named Entities Across Lone-Actor IMVE Case Files

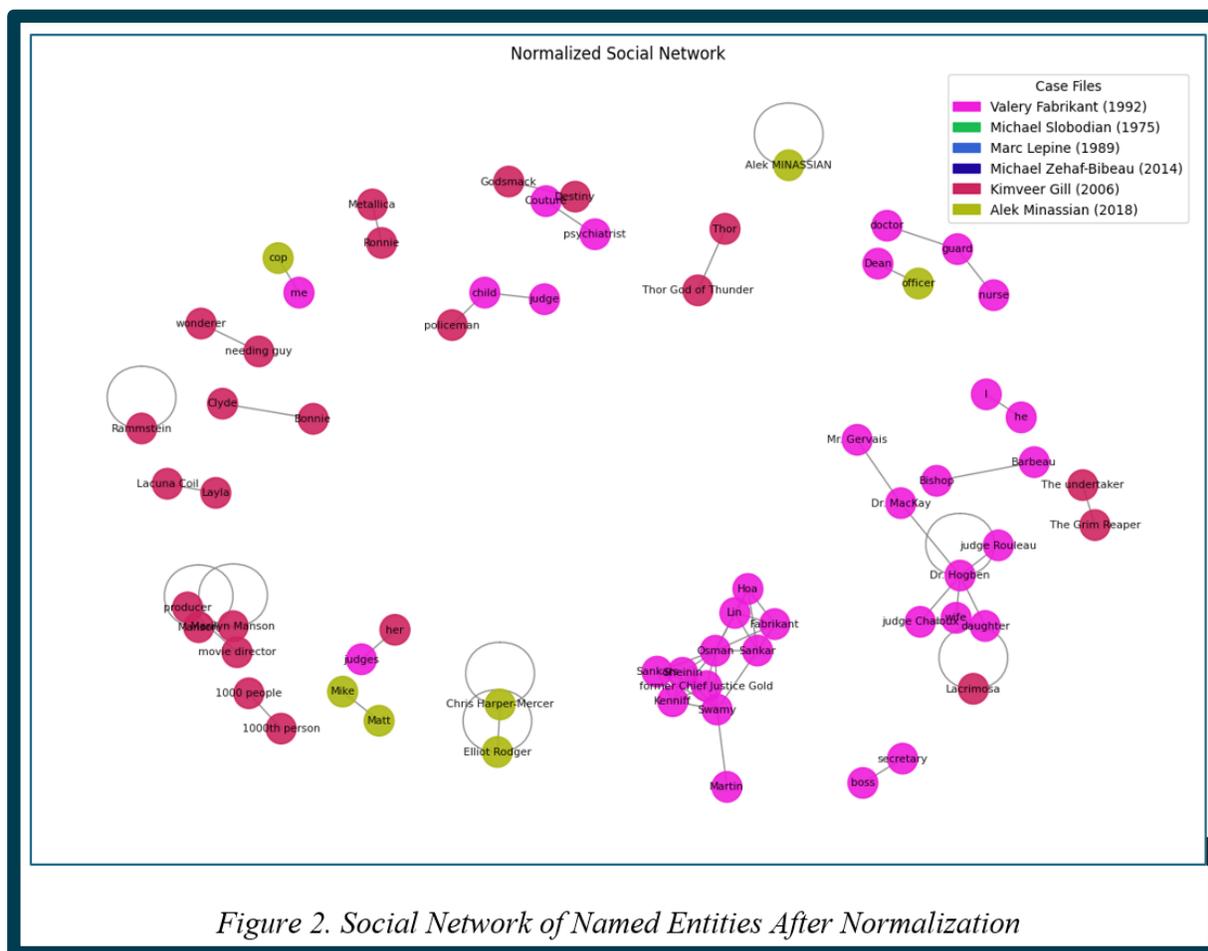
File	Word Count	Entities
Valery Fabrikant (1992)	17947	984
Kimveer Gill (2006)	3901	392
Alek Minassian (2018)	3704	357
Michael Zehaf-Bibeau (2014)	569	15
Marc Lepine (1989)	520	39
Michael Slobodian (1975)	118	9

longest documents, not because they were ideologically central, but because they were mentioned more often. Normalization corrected this distortion, so centrality metrics – such as degree centrality (number of connections), betweenness centrality (bridge between clusters), and eigenvector centrality (influence based on network position) – could more accurately reflect which entities played central roles across all cases (McLevey, 2021). This produced a more reliable ranking of the most influential individuals, allowing for a deeper understanding of who or what actually shaped the broader ideological structure.

The normalized social network (Figure 2) reveals several important trends in entity relationships across lone-actor IMVE cases. One of the most striking patterns is the fragmentation of the network into smaller, loosely connected clusters. This suggests that most named entities, people, groups, places, are specific to each case and not widely shared across manifestos. In other words, we see fewer common entities that appear in all manifestos, and more individualized networks centered on the attacker’s personal references.

At the same time, we also observe connections among manifestos through shared references to figures like Elliot Rodger or ideological themes such as anti-feminism. These patterns support

the idea of “manifesto-driven radicalization,” where newer attackers are influenced by the content and figures in previous manifestos, rather than all manifestos being caused by the same underlying ideology. The presence of these shared references creates indirect links across cases, forming a kind of decentralized ideological ecosystem. Another notable trend is the presence of self-referential entities, such as “I,” “me,” or references to personal history and suffering. This reflects how many lone-actor extremists narrate their actions as intensely personal and justified responses to perceived wrongs. This aligns with previous research showing that lone actors often construct their justifications around personal struggles, perceived injustices, and revenge motives, rather than explicit ideological affiliations (Perry & Scrivens, 2018). A third pattern is the centrality of cultural references, including musicians (e.g., Marilyn Manson, Rammstein) and fictional characters (e.g., Thor, The Grim Reaper). These references suggest that some lone actors draw on pop culture as part of their ideological identity, either as symbolic figures, aesthetic influences, or emotional anchors. The presence of these entities supports research on cultural radicalization and the blending of entertainment and extremism. Finally, the decentralized and fragmented structure of the network confirms that lone actors do not operate within formal hierarchies



or coordinated groups. Instead, they engage with ideology in highly individualized ways, drawing from a mix of online content, prior manifestos, and personal grievances. This explains why manifesto-driven radicalization can occur without direct coordination, because the ideological influence travels through indirect references, digital traces, and cultural mimicry.

Network Analysis of Ideologies

The network analysis of ideological themes across different case studies reveals a fragmented and loosely connected structure, rather than a singular, tightly unified framework (Figure 3). Certain ideological terms, such as “Allah,” “Mujahedin,” “Lord,” and

The presence of disconnected ideological terms reflects the nature of IMVE as a decentralized and individualized phenomenon, where lone actors often combine broad ideological references with deeply personal narratives (Gill, 2020; Gill et al., 2014; Perry & Scrivens, 2018). Instead of adhering to a clear or consistent doctrine, lone actors create their own ideological frameworks, sometimes borrowing from known extremist ideologies, and sometimes mixing in unrelated or fringe ideas (Carr, 2022). This helps clarify the distinction between common elements across manifestos and connections among them. While a few shared references suggest some common ideological ground (e.g., anti-feminism, religious justification, admiration for past attackers), the network more clearly points to indirect ideological connections, that is, one manifesto influencing another, rather than all drawing from the same source. This pattern is a key feature of what we might call manifesto-driven radicalization: newer lone actors are not necessarily joining a movement but are absorbing and repurposing ideas from earlier manifestos that resonate with their personal grievances.

The network also shows how media consumption shapes these narratives, with ideological references often linked to music, films, video games, and other cultural content. This supports prior

research suggesting that self-radicalization is increasingly shaped by digital and cultural environments, rather than traditional recruitment by organized extremist groups.

POLICY RECOMMENDATIONS AND COUNTER- RADICALIZATION STRATEGIES

The findings of this study underscore the need for a more nuanced and adaptive approach to counter-radicalization policies in Canada. Unlike traditional terrorist organizations with hierarchical structures, IMVE actors radicalize in fragmented and highly individualized ways, often blending personal grievances with extremist narratives. **Because these actors are not part of formal groups, but instead construct their own ideological justifications, their radicalization is harder to detect and disrupt.** This decentralized nature of IMVE presents challenges for policymakers and law enforcement, requiring strategies that address both ideological influences and individual pathways to radicalization.

One key insight from the network analysis of these extremist manifestos is that IMVE actors rarely adhere to a single, coherent ideology. Instead, they integrate multiple extremist narratives with their personal motivations, creating unique ideological justifications for violence. While certain ideological themes, such as religious fundamentalism, political extremism, or gender-driven violence, appear across multiple cases, many references remain

highly case-specific and weakly connected. For example, Valery Fabrikant repeatedly referenced intellectual property rights and academic conspiracies, topics not found in other cases. These findings suggest that traditional counterterrorism approaches focused on group-based recruitment and radicalization processes may be insufficient for tackling IMVE. Instead, individualized risk assessments, early intervention, and digital monitoring of ideological shifts must take priority.

1. Targeted Intervention Strategies for Lone-Actor Extremism

Traditional counterterrorism strategies often focus on organized extremist groups, targeting recruitment networks and leadership structures. However, this study confirms that lone-actor extremists radicalize in highly individualized ways, blending ideological influences with personal grievances. As a result, intervention programs must be tailored to address the unique motivations of IMVE actors.

Key recommendations include:

- Expand individualized risk assessments for radicalized individuals, incorporating psychological, ideological, and social factors into intervention planning.

- Enhance community-based intervention programs that address both ideological grievances and personal struggles, such as social isolation or mental health issues.

By shifting toward personalized intervention models, counter-radicalization efforts can become more effective at disrupting IMVE trajectories before individuals resort to violence.

2. Differentiating Between Ideological Influence and Operational Influence

A critical limitation in counter-radicalization policies is the assumption that ideological exposure directly translates into violent action (Borum, 2011; Schumann et al., 2024). This study demonstrates that while certain ideologies are central in extremist discourse, not all references indicate direct support for violent extremism. Some terms may be mentioned to critique or oppose certain ideologies rather than endorse them.

Key recommendations include:

- Differentiate between ideological exposure and intent to act, integrating sentiment analysis and stance detection techniques to assess whether ideological references are positive, neutral, or negative.
- Prioritize intervention efforts for individuals who show behavioral indicators of radicalization, rather than solely focusing on ideological affiliation.
- Develop indicators for distinguishing between passive consumption of extremist content and active preparation for violence, using network analysis to map progression patterns in radical discourse.

By refining how ideological influence is assessed, policymakers can ensure that counter-radicalization efforts focus on individuals who pose genuine threats, rather than over-policing ideological expressions that may not lead to violent action.

3. Addressing the Role of Media and Cultural Influences in Radicalization

This study highlights that some lone-actor extremists integrate elements of media, entertainment, and pop culture into their radicalization narratives. References to violent movies, video games, and cultural symbols suggest that radical ideologies are sometimes blended with broader cultural influences, making it difficult to distinguish extremist content from mainstream media consumption.

Key recommendations include:

- Expand research on the intersection between media, culture, and radicalization, identifying how certain media references contribute to ideological reinforcement in extremist discourse.
- Develop media literacy programs that help individuals critically engage with online content and recognize how extremist narratives manipulate cultural references to legitimize violence.

4. Strengthening Collaboration Between Researchers, Law Enforcement, and Community Organizations

IMVE is an evolving and highly individualized threat, requiring an integrated, multi-disciplinary approach to counter-radicalization. No single entity, whether government, academia, or law enforcement, can address this issue alone. Effective counter-radicalization must involve collaboration across sectors to ensure real-time data sharing, ethical monitoring, and targeted interventions.

Key recommendations include:

- Establish a national research and monitoring infrastructure to track IMVE trends in real time. This could be hosted by a university-led institute

that conducts ongoing meta-analysis of manifestos, online discourse, and emerging ideological patterns.

- Enhance public-private partnerships to monitor online radicalization patterns while ensuring ethical considerations and privacy protections.
- Expand interdisciplinary training programs that equip law enforcement, mental health professionals, and social workers with the skills needed to identify and intervene in radicalization processes.

By building institutional capacity and improving coordination, Canada can more effectively respond to the fragmented but persistent threat posed by IMVE actors.

LIMITATIONS AND FUTURE DIRECTIONS

While this study provides valuable insights into the ideological structures of IMVE, several limitations must be acknowledged.

One of the key challenges was the lack of existing Named Entity Recognition (NER) models specifically trained on extremist manifestos or IMVE-related data. Most pretrained language models, including those based on BERT or transformer architectures, are developed using general-purpose corpora and are not fine-tuned for the coded language, ideological references, and unique terminology present in extremist texts. As a result, entity extraction accuracy was limited, leading to misclassification of certain ideological terms and the overlooking of nuanced extremist references. OpenAI's GPT-based NER demonstrated greater contextual accuracy and adaptability compared to traditional transformer models, but its use comes with substantial computational costs, making large-scale analysis financially prohibitive. Future research could address this limitation by fine-tuning transformer models on domain-specific extremist corpora, allowing for improved detection and classification of ideological entities.

Another limitation concerns the network analysis methodology. The study

constructed networks based on sentence-level co-occurrence, which does not distinguish between alignment and opposition. For example, an extremist manifesto may mention a political ideology to reject or condemn it, rather than endorse it. This limitation means that network connections do not necessarily imply ideological agreement, only that terms appeared together in the text. Future research could integrate sentiment analysis or stance detection techniques to differentiate whether ideological entities are referenced positively, negatively, or neutrally, providing a more precise understanding of how lone-actor extremists construct their narratives.

Lastly, the dataset itself presents limitations. Although this study focused on six Canadian lone-actor IMVE cases, it was drawn from a larger global dataset of 107 cases. However, the dataset remains limited in scope and time frame, meaning that the findings cannot be generalized to all forms of IMVE. Future research should expand the dataset by including more diverse IMVE actors and cases from broader geopolitical contexts. Additionally, incorporating longitudinal analysis could help track how ideological narratives evolve over time, identifying shifts in discourse, targets, and radicalization pathways.

Despite these limitations, this study demonstrates how computational

methods can be leveraged to analyze extremist discourse in a structured, scalable way. By refining NER classification, expanding datasets, incorporating sentiment analysis, and tracking ideological shifts over time, future research can provide even more actionable insights for counter-radicalization efforts. Thus, this study lays the groundwork for future applications of NLP and network analysis in terrorism research, offering a new methodological framework for identifying ideological structures in extremist narratives. By expanding upon these findings, researchers and policymakers can develop more effective strategies for detecting, disrupting, and preventing IMVE in Canada and beyond.

CONCLUSION

This study applies Natural Language Processing (NLP) and Social Network Analysis (SNA) to extremist manifestos, providing a data-driven examination of Ideologically Motivated Violent Extremism (IMVE). The findings reveal that IMVE actors do not adhere to a singular ideological framework but instead construct highly individualized worldviews, blending personal grievances with extremist narratives. Network analysis shows that while a few themes frequently appear across cases, many references remain case-specific and weakly connected, reinforcing the fragmented nature of IMVE. The study also underscores the role of online ecosystems in reinforcing extremist worldviews. The presence of references to past attackers, ideological influencers, and media-related themes suggests that digital spaces serve as echo chambers where lone actors validate and refine their extremist beliefs. This highlights the challenges of traditional counterterrorism approaches, which often focus on structured groups rather than self-radicalized individuals.

From a counter-radicalization perspective, the findings emphasize the need for multi-layered interventions that account for both shared extremist narratives and personal grievances. Policymakers should enhance digital

monitoring efforts, develop targeted interventions for lone actors, and apply sentiment analysis to differentiate ideological endorsement from rejection. Additionally, integrating counter-narratives within online spaces could disrupt the digital pathways that facilitate radicalization. By incorporating computational methodologies into extremism research, this study offers a scalable, systematic approach to identifying patterns in IMVE discourse. Future counter-radicalization efforts must adapt to the decentralized, evolving nature of IMVE, ensuring interventions address both the ideological and psychological factors driving lone-actor extremism.

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