2024

BROADCASTING BOMBS: CLASSIFYING ANTECEDENT BEHAVIORS AND STRATEGIZING PREVENTATIVE TACTICS IN LONE-ACTOR TERRORISTS AND MASS-MURDERERS

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BROADCASTING BOMBS: CLASSIFYING ANTECEDENT BEHAVIORS AND STRATEGIZING PREVENTATIVE TACTICS IN LONE-ACTOR TERRORISTS AND MASS-MURDERERS

A dissertation submitted in partial fulfillment
of the requirements for the degree of

DOCTOR OF PROFESSIONAL STUDIES

to the faculty of the

DIVISION OF CRIMINAL JUSTICE AND HOMELAND SECURITY

of

THE LESLEY H. AND WILLIAM L. COLLINS

COLLEGE OF PROFESSIONAL STUDIES

at

ST. JOHN'S UNIVERSITY
New York
by
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Date Submitted 10/7/2023 Date Approved 11/20/2023

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ABSTRACT

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Julia Varvaro

The modern notion of a socially isolated lone-wolf terrorist and public mass-murderer is challenged by analyzing those individuals' pre-attack behaviors. Many of these behaviors can be explained with theories such as Social Identity, Social Network, and Social Movement Theory, which examine the changes in human behavior to understand motivations. Properly classifying certain behaviors in a radicalized individual could help identify potential risk factors indicating an impending attack, prompting better responses, and solutions to strategize tactics and policies in preventing terrorism. Using existing literature and theory as the basis, this dissertation will examine common broadcasting behaviors of individuals who have perpetrated or attempted to perpetrate physical acts of terrorism to identify pre-attack warning actions, thus classifying them into distinct sects. This quantitative study uses data collected through a previous study which used open-source text materials from a sample of 186 case studies of United States based lone-wolf terrorists and mass-murderers between 1990-2013. The results show a clear division in broadcasting behaviors between classified types of offenders. These research findings are expected to contribute to the larger body of literature rejecting the moniker of an isolated lone-actor and mass-murderer to one that broadcasts their collective convictions to a larger group. Practical implications on how to better inform and prepare intelligence agencies, law enforcement, and the public in assessing vulnerable individuals and implementing preventative practices will be discussed.

ACKNOWLEDGEMENTS

To my dissertation chair Dr. Marina Sorochinski – from allowing me the opportunity to work with her in research on cyber violence and co-author a published article, which originally inspired my topic, to guiding me throughout this challenging process - she has shaped my doctoral journey and taught me in more ways than I could describe. I am forever grateful for her endless support.

My dissertation committee – Dr. Keith Cozine, Dr. Chris Cleary, and Dr. Brian Nussbaum – their intelligence, expertise, and confidence in me has encouraged and shaped my work. I greatly appreciate their guidance.

To Dr. Cozine – for pushing me to apply to this program in the first place, and his support throughout my assistantship and fellowship, trainings in the lab, and conference experiences, I am tremendously thankful for his mentorship.

To my cohort – staying 11 forever, I would not have made it through this program without their friendship and support. The countless zoom sessions and residency on campus truly made us friends for life. Their passions and professional endeavors constantly impress and encourage me.

To Mom, Dad, Gina, and my dog Rosie – I am eternally grateful for their support and love. Throughout my almost decade at St. John's for three degrees, they have constantly pushed me towards being the best person and academic I could possibly be. Their convictions and our faith in God have given me hope and devotion in pursuing my beliefs, values, and morals. In joking about being a lifelong student – this might actually be the last time I am in school.

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CHAPTER 1: INTRODUCTION

Detecting and disrupting acts of terrorism is a complicated yet central necessity for global intelligence agencies. While there are many iterations of the definition of terrorism, the Department of Homeland Security Lexicon defines it as "any act of unlawful violence that is dangerous to human life or potentially destructive of critical infrastructure or key resources committed by a group or person" (2018, p. 183). For the purpose of this research, this will be used in conjunction with the definition of lone-actor terrorists as "individuals who operate independently of a group who may have become radicalized to violence on their own, and conceive, develop, and carry out activities without direct input from a wider network", all of which intends to intimidate the public or influence the government through acts of violence (Gill et al., 2014, p. 426). Mass-murderers are defined as the killing of four or more people (not including the offender) at one (or multiple but geographically close) location(s) over a relatively short period of time (Gill et al., 2014). Together, these forms of terrorism are shaped by radicalization, which refers to a "change in beliefs and behaviors that increasingly justify intergroup violence" (McCauley & Moskalenko, 2008, p. 416). This form of radicalized lone-wolf terrorism has become extremely volatile and destructive. These individuals are not working directly with or under a terrorist group, they are communicating through virtual channels, and attacking targets with relatively unsophisticated weaponry, making their detection exponentially more challenging.

A common prevalence in instances of self-radicalization is their consumption of radical propaganda through various social media channels and internet messaging forums (Hollewell & Longpre, 2021; Awan, 2017). These virtual communities connect the pre-

radicalized individuals and lure them into their network, later encouraging and enticing them to commit violent acts in their own geographic location to further the group's cause (Hollewell & Longpre, 2021). This form of recruitment is extremely attractive to terrorist groups as it requires minimal investment, produces large returns, and extends a global reach (Hollewell & Longpre, 2021). This adds to the difficulties law enforcement agencies face while working to identify those radicals. The range of different actors involved in the dissemination of terrorist propaganda along with the internet's widespread reach, makes initial detection exponentially more difficult. As the vulnerable individuals sympathize with the grievances of these online radical groups, they feel motivated and inclined to perpetrate acts of terrorism on behalf of that group (Schuurman et al., 2018; Clemmow et al., 2019). While they are not directly or physically tied to terror groups, research (Hamm & Spaaj, 2015; Schuurman et al., 2018) has revealed links in a lone-actor's social network to outside contacts, challenging the notion of a lone-wolf truly acting alone. Studying these linkages and associated behaviors becomes critical for the detection and cessation of these masked networks.

From 2005-2015 social media factored into the radicalization of 50.15% of lone-actors, and in 2016 alone that statistic jumped to 88.23% (Jensen et al., 2018). This caliber of results was facilitated by the Islamic State of Iraq and Syria (ISIS) unprecedented 24/7 social media recruiting drive that disseminated propaganda such as videos, memes, tweets, and manuals in over 21 languages (McDowell et al., 2017). ISIS previously went from producing 1,000 events per year in 2007 to over 10,000 events per month by 2015 (McDowell et al., 2017). This attracted more than 30,000 foreign fighters who were virtually connected to the group at any given time (McDowell et al., 2017).

This has caused an instability in global security through its vast reach that enables a continuous line of communication to otherwise unreachable individuals, allowing them access to potential members and the ability to virtually plan attacks which are then perpetrated in the offenders' geographic area.

Currently, large gaps exist in scholarly and empirical literature when delving into the explicit study of the "structure, nature, and implications of the ideological, communicative, and support ties formed by lone-actors" (Hofmann, 2020, p. 659). Thus, potentially vital insights into the behavioral traits and networking ties of these lone-actors are overlooked and could be analyzed to better understand the type of individual most vulnerable and inclined to join these sorts of radical groups. The classification of those individuals could lend law enforcement and intelligence practitioners more effective strategies in implementing preventative tactics based on those predisposed characteristics and behaviors.

Social Movement, Social Identity, & Social Network Theory

Theories provide reasoning and logic in the presumption of a perceived truth and may attempt to explain observed patterns in behavior (Ramsay, Cozine, Comiskey, 2021). A well-evidenced theory may be modified or corroborated by findings gained through the development of new techniques, encouraging critical analysis and leading to greater understandings of the subject matter at hand (Ramsay, Cozine, Comiskey, 2021). Solving contemporary homeland security issues relies on evidence-based research gained through sound theoretical framework. In terrorism studies, theory provides a basis on which researchers can expand through various other disciplines to explain observable phenomena to make recommendations based on collected data.

While scholarly research has identified a diverse set of potential internal drivers of extremism (e.g., Borum, 2004; Gartenstein-Ross & Grossman, 2009; McCauley & Moskalenko, 2014), few articles have focused on the immediate psychological and social actions that could be predictive behaviors of imminent physical violence (Hamm & Spaaj, 2015; Schuurman et al., 2018; Hofmann, 2020; Gill et al., 2021). Given theory's utility in attempting to explain observable phenomena, social theories such as Social Movement, Social Identity, and Social Network theory could be used to better illuminate a vulnerable individual's transition from radical ideas to physical acts of violence. The use of these social theories is therefore critical to the understanding of the psychological background of individuals who perpetrate physical acts of terrorism. In this section, I will review several key theories that could be of particular use to the understanding and identification of vulnerabilities of an individual's antecedent behaviors and characteristics.

In understanding the foundations of radicalization in relation to Social Movement Theory, it is important to recognize that terrorist groups are organizations first and foremost (Beck, 2008). Given the groups' structure and membership, they are subject to similar dilemmas and dynamics of other social movement organizations (Beck, 2008). This foundational work on social movements emphasizes the view that terrorism acts as a method for creating and maintaining a collective identity similar to a larger intellectual movement (Beck, 2008). Terror organizations can be categorized as a social movement as they call attention to issues that empower oppressed populations and unite people with similar mindsets. Without the need to be physically present to partake in that movement, they communicate through social media applications as channels. Those applications then

act as a direct outlet which plays upon individual grievances and dissatisfaction that makes those who are vulnerable feel as though they are significant and part of the greater movement (Awan, 2017). Radicalized individuals then feel encouraged by the motivations of the movement and are more willing to act on behalf of them, regardless of the potentially dangerous outcome towards oneself.

Social Identity Theory focuses on an individual's background to characterize their motives or future potential actions (Al Raffie, 2013). This theory represents the "socio-cognitive processes underlying group dynamics and how they shape identity", where the standards of the group often become the blueprint for the individual's identity and subsequent behavior (Al Raffie, 2013, p. 68). These vulnerable individuals are influenced by radical propaganda through both media channels and interpersonal relationships. Once those radical ideas are adopted, they are then internalized as an extension of their identity. That self-ascribed importance they deem is necessary for their cause becomes a shaping factor in their future actions and could be predictive of their behavior.

Social Network Theory studies the linkages in relationships between individuals and can be used to map potential connections (Hofmann, 2020). Social networks are comprised of large quantities of interconnected nodes, where the connections between the nodes are useful for predicting, understanding, and accounting for that small group's behavior (McDonnell & Cozine, 2021). Rather than focusing exclusively on attributes or qualitative data from written documents and interviews, social network analysis studies "the relations or ties between actors that make up their larger interpersonal networks" (Hofmann, 2020, p. 660). Here, kinship provides a link into a network where that individual socializes with other nodes of like-minded radicals. This creates a sense of

bonding and belonging to a sect of the population that generally feels overlooked and draws upon their capacity for acceptance from the collective group, thereby treating one another as family (McCauley & Moskalenko, 2008). Close relationships with members of that network provide a feeling of safety and acceptance for those individuals to discuss ideological concepts and their interest or intent to commit an act of terrorist violence (Hofmann, 2020). These relationships further the notion of a lone-wolf being more interconnected and social than previously considered.

A theory-driven approach examining lone-actor terrorists and public mass-murderers can inform investigations on the vulnerable factors that drive individuals to radicalize, indicate specific behaviors such as one's signaling of intent, and further the discipline of counterterrorism. The conclusions drawn from this approach may offer counterterrorism practitioners insight for terrorism prevention and reduction. Additional analyses of those specific behaviors and their significance will be reviewed in greater detail throughout this research.

Broadcasting Intent

One major concept critical to this work is the socialization factor of the radicalized individuals with their peers, specifically, if the individual vocally expressed their desire to physically perpetrate an attack. This is defined through one's broadcasting intent which explicitly refers to the individual having "broadcasted their intent or communicated with others of their causes through spoken statements and threats, manifestos, e-mail messages, texting and videotaped proclamations" (Hamm & Spaaj, 2015, p. 9). In a study among post-9/11 lone-wolf terrorists, Hamm & Spaaj found that 76% broadcasted their intent, often more than once (2015). In Schuurman et al. (2018)

"86% of lone-actors communicated their radical or extremist convictions to others"; "58% gave others the idea that they were involved in suspicious and potentially violent activities"; and "30% communicated a desire to commit an unspecified attack" (p. 1196). Additionally, 26% divulged specific intentions of their targets and attack plans (Schuurman et al., 2018, p. 1196). These findings suggest that broadcasting behaviors are a critical aspect that could be indicative of an upcoming or imminent attack, and reinforces the concept of lone-actors engaging in signaling behaviors with a wide network. While these behaviors may only be part of the broader activities of a lone-actor, they could assist with the early classification of an individual moving from radical beliefs to radical behaviors. The organization of these behaviors represents a significant need to fill gaps in previous literature that focused exclusively on a demographic profile rather than considering one that is more dynamic and concentrated on antecedent actions instead of characteristics alone.

A Social Network's Aggregate Actions

As an individual becomes involved in a close community or network such as a religious or extreme ideological group, they are more likely to exhibit behaviors similar to others in the group, even if those actions oppose a typical moral compass (Gill et al., 2014). In terms of violent actions, this phenomenon could likely be explained by the intent of perpetrating an act of terrorism in itself. Without the presence of an ideological driver, "the act cannot be an act of terrorism because it is 'message-less' for all intents and purposes" (Horgan et al., 2016, p. 27). If signaling or leakage behaviors are absent prior to or during the incident, the lone-actor's attack could potentially be disregarded as the work of a "mad-man" rather than the planned act of a rational terrorist (Horgan et al.,

2016, p. 27). This underscores the importance of the lone-actor's willingness or need to interact with others before and after the attack (Horgan et al., 2016). Argued by Gill et al. (2014) these behaviors within a wider network were statistically prevalent, with 16.8% seeking "legitimization from religious, political, social, or civic leaders prior to the event they planned (p. 430). This continues to contradict the moniker of the lone-actor and emphasizes the necessity in further examining the offenders' relation and similar behavior to others within the same network.

Behavioral Typing

Foundational work in behavioral psychology (Hagan & Palloni, 1988, as cited in Salfati, 2000) suggests the need to examine the generality of behaviors in an offender's background in order to thoroughly understand behaviors that may have originally been overlooked. Those specific behaviors can then be linked to general themes within a subgroup. In this manner, links between an offender's antecedent behaviors and characteristics can be established and used as an investigative profiling tool by law enforcement (Hagan & Palloni, 1988, as cited in Salfati, 2000). In order to meaningfully construct de-radicalization and prevention strategies, the offenders' antecedent behaviors and characteristics must be classified. Thus, the type of prevention strategy could be based upon the behavioral classification of the offender.

As a framework for the integration of psychology and criminal justice, investigative psychology is concerned with the psychological input to the full range of issues related to management, investigation, and prosecution of crime (Youngs & Canter, 2006). In policing, investigative psychology can provide answers to operational questions by providing a framework for understanding procedures (Youngs & Canter, 2006). Some

of these aspects include salience of the crime, suspect elicitation, suspect prioritization, offender location, linking crimes, prediction, investigative decision-making, information retrieval, evaluation of information, and preparing a case (Youngs & Canter, 2006). These facets allow investigative psychologists to provide substantive knowledge based on empirical studies to provide more direct answers to complex issues involving a range of actors and criminal behaviors. The conceptualization and classification of the above terms into familiar subtypes additionally allows psychologists to suggest improvements or implement new policies (Youngs & Canter, 2006).

The classification of criminal behaviors is thus a central part of the process in examining the significant components of offences. In order to be operationally used, generating empirically based models of investigative inference must have some form of indication of the themes that are focal to the actions of offenders, as this allows them to be distinguished from one another (Youngs & Canter, 2006). These models, most commonly including visual charts and graphics, are one of the key features investigative psychology uses to effectively organize and convey information to law enforcement. Given the challenge in disseminating meaningful research on such an extensive subject such as similarities between offenses, a visual summary offers a simpler avenue for seeing and understanding patterns and associations within activities (Youngs & Canter, 2006). While simple charts are effective to distribute to the public and law enforcement, researchers can benefit from a greater detailed examination of the data. Modern technology offers this solution whereby advanced software can produce more sophisticated output to allow for a deeper investigation. The present study will build upon

this methodology and offer a unique approach in classifying themes between lone-actor terrorists and public mass-murderers.

Summary

The theories and methods mentioned above will provide a greater understanding into the behaviors and engagement dynamics of the self-radicalized actor: understanding the individual's social identity helps explain their vulnerability and attachment to extremist propaganda; social network and movement theory further map their relationship to others within a larger network and movement given their range of contacts. Those relationships will be analyzed to explain their broadcasting and signaling behaviors, and antecedent actions that could be indicative of their aim to physically commit an act of violence. Finally, those behaviors become indicators of the actor's imminent desire and potential threat to perpetrate an act of terrorism. The identification and discussion of those behaviors and characteristics allows for the typing of offenders in thematic sub-groups, specifically into instrumental and expressive themes of aggression, of which may warrant different prevention and de-escalation tactics. These forms of aggression, commonly used in investigative psychology, will be discussed in greater detail throughout this work. Furthermore, an understanding of the complexity of these sub-groups supports law enforcement and intelligence agencies' efforts in performing accurate threat assessments of the legitimate risks broadcasted by those individuals and their further dissemination to the public in hopes of recognizing and preventing these violent acts.

Research Questions

Previous research (e.g., Gill et al., 2014; Hamm & Spaaj, 2015; Gill et al., 2021) emphasizes the vital need for the cessation of the lone-actor and mass-murderer label to one that is better representative of the wide network, social features, antecedent behaviors, and characteristics that sect possesses. Rather than creating static profiles on vulnerable individuals, a dynamic understanding of the radical's group, network, behavior, and subsequent category of aggression is more conducive to accurate data and conclusions. The current study will explore pre-event behaviors and predisposing characteristics of lone-actors and public mass-murderers to configure a theme specific to each form of offender. This will be achieved by analyzing prevalent broadcasting behaviors and characteristics of those offenders, categorizing each behavior, identifying any prevalent themes from the analysis, classifying the type of individual perpetrating this act of terrorism, and finally determining if the offenders' attack methodology is correlated to their classification. Thus, their classification could identify unique patterns useful for terrorism prevention and de-radicalization strategies.

R_1: Can the antecedent behaviors of lone-actors and mass-murderers be meaningfully classified into distinct thematic types?

H_1: Offenders' pre-attack behaviors could be classified into separate thematic types of Expressive and Instrumental aggression.

R_2: Can a behavioral classification predict offenders' attack methodology?

H_1: Pre-offense behaviors and characteristics will be meaningfully associated with distinct offending patterns as evidenced in the choice of target location.

The independent variables in the first research question from the later provided dataset will be the suspected individual's pre-attack behaviors (e.g., offender's age; if the offender was single; if the offender lived alone; history of violence; previous criminal convictions; arrest history; history of mental illness; if the offender expressed anger; expressed a desire to hurt others; made verbal statements to family or friends about their intent or belief; produced public letters or statements; claimed to be part of a wider group or movement; at least one other person knew of the individual's grievance prior to the attack; individual stockpiled weapons; individual was socially isolated). The dependent variable will be the classification of the individual into either subgroup of an expressive or instrumental offender.

The independent variable in the second research question will be the individual's classification (e.g., expressive or instrumental). The dependent variable will be their methodology (e.g., if the individual had a personal history with the location of their attack).

CHAPTER 2: LITERATURE REVIEW

Self-Radicalization

Insight into the process of self-radicalization is critical to understanding the psychological background of individuals who perpetrate physical acts of terrorism. According to McCauley & Moskalenko (2008), radicalization promotes intergroup behaviors and violence for the sake of the ingroup's survival. In self-radicalization, this refers to the individualistic process where one embraces radical beliefs that are in-line with the ideology of a terrorist organization without physically or directly working with the group (Bradbury et al., 2017). This draws a distinct line between one's radical opinions and their physical actions. Radicalization to extremist beliefs is "psychologically a different phenomenon from radicalization to extremist action" (McCauley & Moskalenko, 2017, p. 211). As Borum (2012) argued, the process of developing extremist ideologies must be distinguished from action pathways, which is the actual engagement in violent extremist actions. Illustrated in Figure 1, this is visually represented by McCauley & Moskalenko (2017) Two-Pyramids model. This model theorizes the separation between radicalization of opinion and radicalization of action. In ascending the pyramid, the base of the Opinion Radicalization Pyramid consists of those who do not care about a particular cause and are neutral; one step higher includes sympathizers who believe in the cause but do not justify violence; followed by justifiers who justify violence for the cause; and the apex consisting of those who feel a personal moral obligation to perpetrate violence in defense of the cause (McCauley & Moskalenko, 2017). It is emphasized that this is not a stairway model, as individuals may skip levels in ascending or descending the pyramid (McCauley & Moskalenko, 2017).

This is separate from the Action Radicalization Pyramid. Here, the base represents those inert and not participating in a particular cause; then activists who are engaged in a specific action for the cause; radicals engaged in illegal action for the cause; followed by terrorists who are engaged in illegal actions that target civilians (McCauley & Moskalenko, 2017). The Two-Pyramid model is relevant as researchers may "track changes in radicalization of opinion in a particular group over time or in reaction to a political event" (McCauley & Moskalenko, 2017, p. 212). Plotting these changes allows researchers to then focus on different behavioral trajectories responsible for the escalation and transition from idea to action (McCauley & Moskalenko, 2017). Furthermore, "research might aim to test the possibility that the psychologies associated with these trajectories are different; it is even possible that there are different personality and demographic profiles associated with these trajectories" (McCauley & Moskalenko, 2017, p. 214). This development from ideas to actions can be further analyzed in terms of behavioral drivers and one's social network. Both may be predictive of the individual's pathway to radicalization. In addition, the trajectory to radical actions can be further shaped by grievances through mass media or the testimony of others.

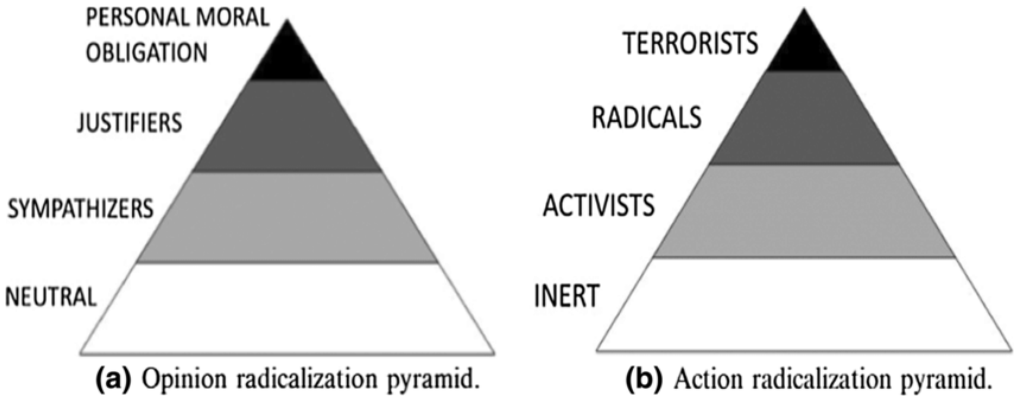


Figure 1 - The Two-Pyramid Model

Reprinted with permission from McCauley & Moskalenko (2017)

Propaganda Through Social-Media

The process of developing extremist ideologies and beliefs has been perpetuated by the use of the media and interpersonal relations from small groups and radicalized terrorist networks. The increased use and accessibility of social media applications and networking platforms has played a considerable role in the progression of one's self-radicalization (Awan, 2017; Von Behr et al., 2013; Jensen et al., 2018; Hollewell & Longpre, 2021). Although this process has been assumed to be individualistic, it is not without the exposure and influence of propaganda disseminated by terrorist groups. Those radical groups are utilizing the open communication through networking sites and social media messaging applications to spread their ideology to sympathizers who they would otherwise not have access to (Awan, 2017). Given the internet's encompassing geographical range, ISIS and other radical groups have consistently exploited sites like Twitter, Facebook, YouTube, and Reddit to share images and stream violent videos targeting young and impressionable teenagers (Awan, 2017; Bodine-Baron et al., 2016; Berger & Morgan, 2015).

Particularly, ISIS has repeatedly portrayed a glamorized and "cool" image of ISIS fighters becoming the "new rockstars of global cyber jihad" (Awan, 2017, p. 138). These social media applications and platforms are filled with hundreds of pages of goals and strategies of their operations and proposed tactics (Awan, 2017). They have essentially created promotional videos and images showcasing a member's glorious life; designing an ideological view of the benefits of joining the group (Awan, 2017). Instructional material such as those outlined in the 'Open-Source Jihad' (OSJ) section of Al-Qaeda in the Arabian Peninsula's (AQAP) Inspire Magazine and the 'Just Terror' (JT) section of

ISIS' Rumiyah Magazine provided 'how-to' guides in "provoking violence by providing would-be terrorists with the practical knowledge to carry out such attacks" (Reed & Ingram, 2017, p. 2). Characterized by a "streamlined and seamless fusion of ideologically driven material with pragmatic instructional and skill-building content", these magazines intended to simultaneously "increase motivation and lower the barriers of entry to terrorism, with the aim of fostering a do-it-yourself ethos resulting in terrorist behaviors" (Reed & Ingram, 2017, p. 5). By incorporating unsophisticated weaponry and homemade items, terrorist groups are these making entry and acceptance into these radical networks easier than ever. Accordingly, they are disseminating harmful and violent propaganda encouraging vulnerable individuals to join or associate with that radical identity and partake in attacks to further the groups' ideology. The embedded instructional material promoted and disseminated by these violent extremists within a broader sea of narratives are designed to legitimize, justify, and inspire engagement in violence.

Figure 2 below represents the wide variety of technical advice and instructions covered in these radical magazines which ranges from highly sophisticated methods to lower-level vehicular and arson attacks (Reed & Ingram, 2017).

Inspire Magazine	Open Source Jihad (Instructional Material)
Issue 1	"Make a bomb in the kitchen of your mom", The AQ Chef "How to use Asrar al-Mujahideen: Sending & Receiving Encrypted Messages", Terr0r1st
Issue 2	"The ultimate mowing machine", Yahya Ibrahim "Asrar Al-Mujahideen 2.0 extras", Terr0r1st
Issue 3	(Special Issue)
Issue 4	"Destroying Buildings", AQ Chef "Training with the AK", Abu Salih "Advice for those who want to help Al-Malahem Media", Terr0r1st
Issue 5	"Training with the AK 2", Abu Salih
Issue 6	"Training with the AK", Abu Saleh "Making acetone peroxide", Dr Khateer
Issue 7	(Special Issue)
Issue 8	"Training with the handgun", Abu Saleh "Remote control detonation", Dr. Khateer
Issue 9	"The convoy of martyrs: Rise up and board with us" "It is your freedom to ignite a firebomb", The AQ Chef "Qualities of an urban assassin", Uthman Ibn Al-Ightiyal
Issue 10	"Torching parked vehicles", Ibnul Irhab "Causing road accidents", AQ Chef "You ask, we answer", AQ Consultant
Issue 11	(Special Issue)
Issue 12	"Car bombs inside America", AQ Chef "Car bomb: Field data", AQ Chef
Issue 13	"The hidden bomb" "Breaching security barriers", The AQ Chef "Making the hidden bomb", The AQ Chef "Field Tactics" External Operations Reconnaissance Team
Issue 14	"Assassination Operations" "Designing a timed hand grenade", The AQ Chef "Assassinations Field Tactics" Reconnaissance Team

Figure 2 - Inspire's Open-Source Jihad Section

Reprinted with permission from Reed & Ingram (2017)

The technical advice outlined above in the OSJ section is designed to inspire a 'copycat' effect, which has proven efficient as being cited by law enforcement in many successful and foiled terrorist attacks, most notably the 2013 Boston Bombing (Reed & Ingram, 2017).

This strategy of online recruitment and radicalization has proven effective as these websites and publications receive significant traffic and have been discovered and referenced by numerous lone-actor terrorists who have perpetrated acts of violence (Awan, 2017; Metwally, 2022; Sonmez, 2017). From September through December

2014, Berger & Morgan (2015) use of social network analysis and manual selection observed at least 46,000 – 70,000 Twitter accounts utilized by ISIS supporters. The classification of a supporter was defined as someone who was followed by at least one other ISIS supporter and produced tweet content consistent with ISIS-related values and ideology (Berger & Morgan, 2015). These accounts were significantly more active than the average Twitter user, with 35% of users tweeting every 24 hours and 16% having tweeted at least once within the preceding week (Berger & Morgan, 2015). Additionally, these accounts had a mean number of followers of around 1,004 compared to 208 for the average user (Berger & Morgan, 2015). These data are consistent with Bodine-Baron et al. (2016) mixed-methods analysis which used lexical, geospatial, and network analysis to identity and characterize different communities within the Twitter ISIS conversation. Through community detection algorithms, 23 million tweets from 771,321 users were separated into 36 distinct communities and finally into four metacommunities which characterized the identities and prominent themes of the metacommunities (Bodine-Baron et al., 2016). ISIS supporters on Twitter were significantly dominant over their opponents, with 75,946 active Twitter accounts all tweeting an average of 60 times per day, outnumbering opponents who averaged 40 tweets per day (Bodine-Baron et al., 2016). Through open-source means, Berger & Morgan (2015) tracked the location of ISIS supporters on twitter by using geo-locating services of the user's tweets enabled through the location feature on his or her smartphone. To support a better inferred location, the user's time zone, biography, and "location" field in their Twitter profile was compiled (Berger & Morgan, 2015). Figure 3 below demonstrates the inferred locations

of the sample of ISIS supporters, showing the group's global support networks, encouraging users to radicalize in their own geographic location.

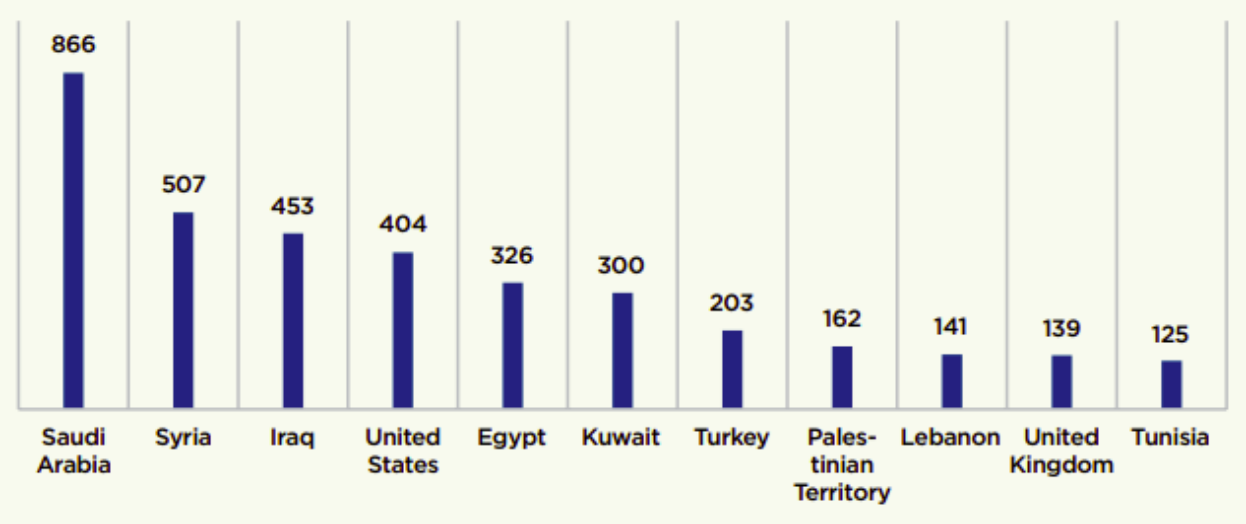


Figure 3 - Inferred Locations of ISIS Supporters on Twitter

Reprinted with permission from Berger & Morgan (2015)

Extremist groups are leveraging social media channels to broadcast their message, inspire followers, and recruit new fighters (Bodine-Baron et al., 2016). Regardless of the individual's location, they are being exposed to foreign terrorist groups' propaganda. Furthermore, the magnitude of their social media reach and development of communities emphasizes the growing network these radicals are exposed to and interact with, challenging the concept of "loneness".

These volatile forums allow extremists to collaborate with like-minded individuals without having to physically interact with one another. They have become a gateway for radical ideas to be normalized as individuals with similar beliefs exchange ideas in the absence of diverging opinions (Hollewell & Longpre, 2021). This creates an echo chamber that provides a greater opportunity to confirm existing beliefs (Hollewell &

Longpre, 2021; Von Behr et al., 2013). Once a recruiter can bring a potential recruit to a favorable (radicalized) website, the potential recruit is surrounded by people with similar ideas and viewpoints which reinforce the terrorist group's perspective and ideology as spread by the propaganda. These echo chambers provide safe-spaces where terrorist groups can reinforce the ideological and radical thoughts and ideas of their violent group. These forums and echo chambers are rampant in messaging applications such as Telegram which offers "peer-to-peer service where users must be invited to join chats in order to gain access to the content" (Bloom et al., 2017, p. 1). The forums on these types of secondary applications can usually only be accessed through an invitation link, which may be temporarily available on other social media platforms, but is most often disseminated within existing ISIS channels by trusted administrators (Bloom et al., 2017). This platform (Telegram) is considered superior compared to other messaging applications through its strict security and encryption features (Bloom et al., 2017). Users can create secret chats that "self-destruct" after a set amount of time or once it is viewed by the intended recipient (Bloom et al., 2017, p. 2). This platform received extensive media coverage and investigation following the use of its official Arabic-language channel which claimed influence for the November 2015 Paris attacks (Berger & Perez, 2016). This prompted the formation of those aforementioned secret channels where further radical ideas are spread. In Bloom et al., (2017) exploratory study, researchers accessed the ISIS Telegram network using four undercover accounts to monitor chat rooms. The activities observed ranged from members interacting and debating with one another, sharing recruitment and violent videos, and reporting "enemy" channels and spies (Berger & Perez, 2016, p. 7). Figure 4 below depicts the range of documents and

activity shared on one these secret channels as well as the steady influx of members who joined the channel over a three-day period.

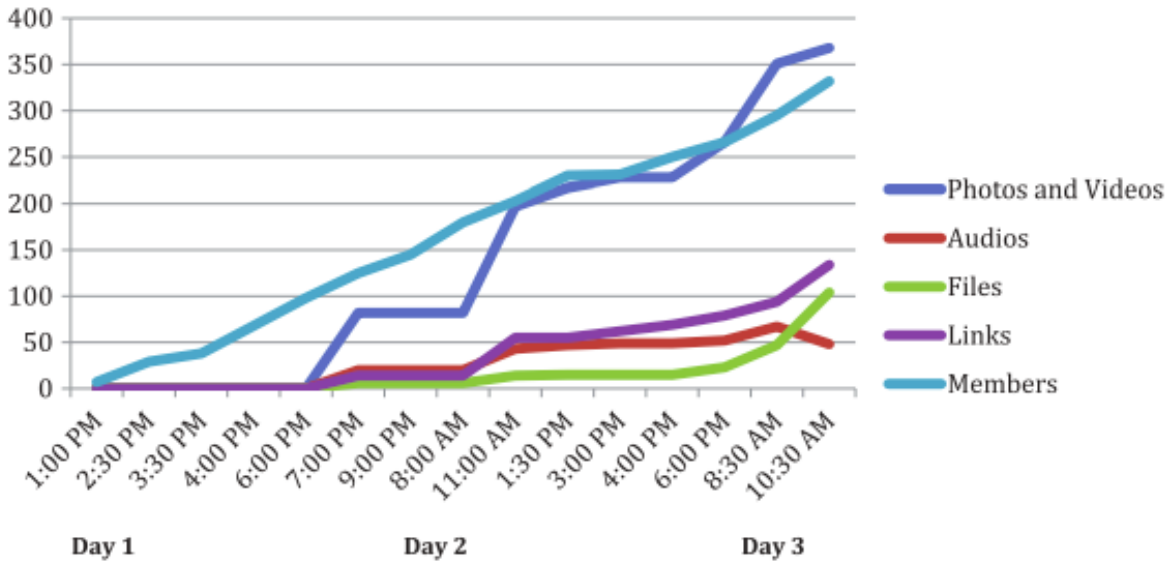


Figure 4 - Three-day Flow of Chat Room Membership and Content

Reprinted with permission from Bloom et al. (2017)

The content and community of these chat rooms can be extremely appealing to those seeking to interact with other like-minded individuals (Bloom et al., 2017). Reaffirming behaviors present in these settings from sympathizers encourage the radicalized individual to perpetrate similar acts. Once they gain the support from their peers, they are more likely to engage in that act or potential call to violence (Hollewell & Longpre, 2021). While Von Behr et al., (2013) findings do not suggest the internet alone contributed to the radicalization, it instead acts as a facilitator by connecting groups of like-minded individuals. Further research on these messaging forums and the content of their propaganda could offer observations into specific patterns of behavior of the participants (Bloom et al., 2017). This expands the need for continuing research

connecting lone-actors to a broader network in terms of radicalization via social media and their pre-event planning behaviors.

Social Theories in Practice

Theories include a set of assumptions, propositions, or accepted facts that attempt to provide a plausible or rational explanation of causal relationships among a group of observed phenomena (Ramsay, Cozine, Comiskey, 2021). They allow for predictions of expected behavior to test the theory's validity. Theories are useful in bridging the gap from awareness to action, and help "develop useful generalizations that assist understanding" (Gill, 2010, p. 54 as cited in Dahl, 2021). A greater understanding of the areas of interest allows agencies to shift resources from lesser priority areas to those containing the utmost threats (Marrin, 2007, as cited in Dahl, 2021). Without formal theoretical frameworks, it becomes difficult to examine efficacy in research paradigms or to develop rigorous policy standards (Wright, 2015).

Addressing and solving contemporary homeland security issues relies on research based on sound theoretical framework, and provokes the need to examine the basis of those theories and difficulties the discipline faces in defining it. As the present sector itself is constantly changing, it is necessary to consider a variety of approaches. In developing steps from observation to understanding, one method used to begin building theories in homeland security is to "adapt and blend applicable theories from a number of academic disciplines that have relevance to homeland security" (Kiltz & Ramsay, 2012, p. 3). This relates to the use of theory in homeland security, as it is better understood by acknowledging its counterparts. Essentially, homeland security is comprised of various other disciplines including criminal justice, emergency management, cybersecurity, risk

management, preparedness, resilience, communication, strategy and decision-making, intelligence, and terrorism (Ramsay, Cozine, Comiskey, 2021). From this perspective, the complex nature of homeland security acts as a meta-discipline (Ramsay, Cozine, Comiskey, 2021). It is this unique nature of a multidimensional analysis that sets homeland security apart from its more singular counterparts. Therefore, the integration of theories from various disciplines is valuable to furthering the scope and understanding of compound issues in homeland security.

Given the different fundamental stories, outcomes, and meanings of terrorism, a single explanation for this phenomenon can be problematic (Nussbaum, 2009). Thus, the complexity of terrorism and specifically lone-wolf terrorism has not allowed the effective use of a single theory (Wright, 2015). The extensive range of psychological elements, behavioral nuances, personal grievances, and social categories has unequivocally impeded the efforts of researchers (Wright, 2015). With these diverse driving factors, the use of a single theory would be restrictive and too narrow in scope to fully address the issue. Furthermore, asymmetric violent extremism is a paramount example of a wicked problem – one that challenges the assumptions of traditional perspectives and is not easily solved. This is defined as in Ramsay, Cozine, Comiskey (2021) by the following characteristics:

> The solution depends on how to problem is framed; the problem can change in response to an attempted solution; stakeholders vary considerably in how they define and understand the problem or what a solution would be; suspended judgement and iteration are key in resolving the problem; the constraints and

> resources available to address the problem change over time; and the problem may never be totally solved (p. 7).

It is with these complex factors that lone-actor terrorism requires a range of different actors, approaches, preventative measures, and policy alterations.

In sum, terrorism studies require an array of theories from various disciplines to aid in its overall understanding. In the present study, the relationship between theory and practice allows for the extraction of theories from the social sciences to investigate the changing features and behaviors of violent offenders. These theories can help practitioners formulate methodologies and frameworks that could identify patterns found throughout lone-actor terrorists and mass-murderers. Applying these social theories to terrorism can contribute to the growing body of research focused on developing practical solutions and concepts to countering terrorism.

Social Movement Theory

Whether virtually or physically, human beings seek and crave the connectivity from others (McDonnell & Cozine, 2021). Jackson (2006) refers to social movements as groups of people who share a common ideology in hopes of achieving a certain goal. Internal and external strains on society that erode established institutions create instability and "lead to the coalescence of an already marginalized group to coalesce around a social movement that gives both a sense of stability and purpose to a fractious and oppressive existence (McDonnell & Cozine, 2021, p. 81). The shared experiences or beliefs between that group of people form inextricable bonds that give those members a sense of purpose and belonging (McDonnell & Cozine, 2021; Borum, 2012). When those bonds are threatened, those individuals tend to react to restore the balance that was lost (McDonnell

& Cozine, 2021). In recruiting new members, those individuals specifically seek those who are most likely to act on behalf of the group, effectively furthering the cause (Borum, 2012). Consequently, terrorist groups can be categorized as a social movement as they connect like-minded individuals who share a common set of grievances and are willing to defend the group (Beck, 2008).

The relationships formed under the premise of trust between one another and their shared ties unite the individuals under a common purpose, essentially a social movement. However, interests may vary from those who share the same ideas but do not take action, and those considered extremists who are willing to take radical action (McCauley & Moskalenko, 2008). This point in the overall movement is significant in that it is the collective of those groups of people, where participants may not completely share interests but espouse partially shared interests (Bayat, 2006). Even these partial interests encourage the individuals to further explore the topic, leading them onto different paths, some of which are more radicalized than others (McCauley & Moskalenko, 2008). As these values are dispersed across the globe due to the interconnectivity of modern technologies, it is unlikely that every participant shares the same degree of motivation to form a consistent group. However, those partially shared interests ensure a certain degree of collectivity to the movement (Bayat, 2006). This ties a social movement and network perspective together, where their network is crucial for its commitment and recruitment, to a group's shared beliefs, creating a cohesive band of individuals spanning a global reach. It further links a social identity perspective by analyzing the types of people in those groups willing to act on behalf of the movement and possibly even sacrifice their own life for the cause.

Social Identity Theory

Studies on self-radicalization find identity to stand at the forefront of the process (Al Raffie, 2013; Schwartz et al., 2009). Social Identity Theory posits the relationship between the socio-cognitive impact of groups and social categories on the development of an individual's personal identity (Al Raffie, 2013). Social identity represents specific values that a person incorporates throughout their life as guiding principles for behavior, ascribing specific importance to the social groups which one belongs to. Al Raffie (2013) argues that these identities are direct reflections of the social categories, groups, and networks of which the individual belongs to. Wright (2015) concurs and goes a step further as to suggest that behavior is precisely guided by factors of social identity such as those from a group membership, rather than interpersonal factors. This constructivist approach is useful as it shapes the perception of how individuals can be mobilized to serve the purpose of a specific ideology.

Furthermore, this holds the assumption that one's own "ingroup" may be threatened when "outgroups" are perceived to be encroaching on the ingroup's physical or psychological territory (Schwartz et al., 2009). The members of that ingroup share common grievances against that outgroup, which reinforce the adoption of whatever tactics are deemed necessary for removing the threat or redressing the grievance with that outgroup (Schwartz et al., 2009). This is an important element as individuals begin to "act on behalf of the group according to the norms they internalize as a result of belonging to the group" (Al Raffie, 2013, p. 77). They do not need continuous interaction with the group in a closed setting in order to feel connected to them, but rather adopt that mentality and follow their own interpretation (Al Raffie, 2013). These self-serving

feelings against the opposing party strengthen the individual's sentiment with their own group.

Radical groups have exploited these vulnerabilities and preyed on young individuals who are seen as the "black sheep" and who are easy to influence (Schwartz et al, 2009). These individuals develop such a strong identity and loyalty to the movement that they feel fused with the group they represent. Because they rely on these groups to give them a sense of purpose or identity, they are particularly vulnerable to manipulation (Schwartz et al., 2009). It is this absence of actual self-clarity that encourages the individual to latch onto a strong group leader rather than their own independent beliefs or thoughtful reflections (Schwartz et al., 2009). Thus, these vulnerable persons are likely to be pushed into the direction that leader is advocating for, as the leader is an agent of influence who is responsible for ensuring the continuation and success of their cause (Schwartz et al., 2009). These enablers provide inspiration for terrorism either through direct means of communicating with the radicalized individual, or through indirect means such as through their own acts of violence (Hamm & Spaaj, 2015). These leaders understand the type of recruits they are looking for, and create propaganda based around those social needs (Guadagno et al., 2010). One particular tactic utilized by both ISIS and Al Qaeda is their framing of exclusivity (Guadagno et al., 2010). They create and disseminate propaganda that makes the viewer feel special, as if they are a "chosen one" with special access to rare opportunities (Guadagno et al., 2010; Borum, 2004). This feeling of exclusivity most likely entices the individual to cooperate with the group's ideology and goals (Guadagno et al., 2010). As they develop empathy for that group, they begin to identify with it (Guadagno et al., 2010). By viewing propaganda that is produced

and circulated by those top leaders of influence, they are likely to assume that similar identify and embrace the actions that leader is calling upon. This distinguishing identity could be observed in analyzing the social identity of numerous self-radicalized terrorists. A deeper understanding of the theory can better inform investigations into the pathways of radicalization and provide insight to avenues for terrorism reduction strategies.

Radical Self-Identity Case Examples

The 2009 Fort Hood shooting perpetrated by Major Nidal Hasan is an instance that could be examined to better recognize the signs of self-radicalization and its destructive implications. Using social identity theory, predictions of Hasan's actions could be made by studying some distinct behaviors that he embodied. The shooting which killed 13 people and wounded 32 others was preceded by many warning signs, as in the following investigations the FBI and Defense Department were criticized for failing to prevent the attack after missing a number of those signs (Farrell & Littlefield, 2012). Hasan had an extremely troubling upbringing and antisocial demeanor, with former colleagues recalling his inability to connect with people and constant argumentative behavior (Farrell & Littlefield, 2012). He exhibited behaviors consistent with feelings of personal grievance with his Muslim identity and saw the war on terror as a war on his beliefs in Islam as a political grievance (McCauley & Moskalenko, 2014). In the months prior to the shooting, Hasan was frequently emailing Anwar al-Awlaki, a radical cleric who often uploaded speeches and texts on the internet supporting violent jihad (Farrell & Littlefield, 2012; Metwally, 2022). Al-Awlaki was regarded as a strong and esteemed leader in the Islamic community known for his lengthy YouTube sermons and open communication with supporters (Metwally, 2022). Hasan had sent at least 18

emails to Al-Awlaki between December 2008 and June 2009 "asking various questions concerning the legitimacy of killing innocents and when engaging in jihad is appropriate" (Gill et al., 2014, p. 430). As Al-Awlaki was a figurehead for that community, it is anticipated that someone with Hasan's social issues and distant personality would attach to the teachings of that dominant figure. Hasan was essentially looking for a sense of validation from a prominent individual who shared similar intent and belief to spread a specific message to the masses. It was determined that Al-Awlaki's sermons combined with Hasan's research of radical propaganda and personal feelings of aversion to the American military created a complete state of tension that ignited his motivation to carry out the shooting (Farrell & Littlefield, 2012). Through the lens of social identity theory, Hasan would have met the criteria as a vulnerable individual at risk for radicalization as he was attaching his identity to the beliefs of that radical group and Al-Awlaki, making him susceptible to manipulation and willing to perpetrate an act of terrorism.

The 2017 truck attack in New York City proves as another example of the increasingly dangerous consequences of radicalized lone-wolves. In October 2017, Uzbek immigrant Sayfullo Saipov drove a large pick-up truck into pedestrians and cyclists on a bicycle path near the World Trade Center in lower Manhattan, killing eight people (Sonmez, 2017). Saipov was reportedly not a violent or aggressive man and had strong family ties and good relationships with his neighbors (Sonmez, 2017). It was not until after the attack that authorities found over 90 graphic and violent propaganda videos on his phone of ISIS leader Abu Bakr al-Baghdadi, who was encouraging Muslims around the world to avenge their peoples' deaths (Sonmez, 2017). With the attack's clear similarities to overseas terror organizations, especially those mentioned on open-jihad

terrorist forums, federal investigators believe that he was radicalized after immigrating to the United States (Sonmez, 2017). As he had access to these forums on social media, he identically followed the instructions on vehicular attacks that were published in the Islamic State's Rumiyah magazine the previous year (Sonmez, 2017). Additionally, given his Uzbekistani background, he was also influenced by the media presence of the Islamic Movement of Uzbekistan's leader Usmon Ghazi, who announced the group's allegiance to ISIS a few years earlier (Sonmez, 2017). Recruitment online following this declaration began increasing, with a number of Uzbek websites created targeting the young, vulnerable, and religious Middle Eastern and Central Asian men (Sonmez, 2017). The social media propaganda along with the outspoken radical leaders undoubtedly affected this impressionable individual. As Saipov became increasingly connected to that group of radicals online, he began to identify with those same grievances and was willing to further their movement and message in the United States through a physical attack of terrorism. Later discussion on social networks and social movements lends further consideration for the need for intelligence agencies to better recognize these risk factors and behaviors.

Social Network Theory

The network of a radical refers to ties to other extremists, groups, or wider movements, and has mainly challenged the loneness sought of in lone-actor violence (Clemmow et al., 2019; Gill et al., 2021; Hofmann, 2020). Social Network Theory analyzes connections and nodes that are useful for understanding and accounting for group behavior (McDonnell & Cozine, 2021). It centers on the premise that radicalization and its succeeding political actions are related to interpersonal relationships and

connections to others who have been radicalized (Belanger et al., 2019). The structure of that network determines its reach, having a direct impact on the recruitment efforts of a terrorist network (McDonnell & Cozine, 2021). Once the structure and density of the nodes are identified, the inner workings and connections of a terrorist organization can be distinguished (Belanger et al., 2019). In Hofmann (2020), social network analysis is concerned with relationships between actors that form larger networks, rather than focusing on one's attributes to build a profile. These patterns of relations help connect pre-radicalized individuals with one another and contributes to the dissemination of terrorist propaganda as they are socializing with like-minded people.

This theory posits the relationship between an individual's network and their actions. Individuals are more likely to adhere to radical beliefs if they establish a link into that network who could either be a family member or friend (Sageman, 2004). In nearly 66% of cases, Sageman (2004) found those individuals joined the jihad collectively as part of a small group or had a friend who already had joined. In other instances, a group leader or recruiter may use new recruits to identify other prospects or leverage a relationship (Sageman, 2004). This is especially significant in terms of commitment and recruitment. People are more likely to engage with others that are recommended or have previous relations with their family or friends (Bayat, 2006). These relationships attract those who want to become part of that elusive group, and will therefore partake in the actions of that particular group for entrance. Since they want access to that group, the radical ideas seem more realistic and practical (Bayat, 2006; Sageman, 2004). Thus, a mindset is formed around the perception of acceptance; since their friends and family are followers, it must be a worthy cause (Borum, 2004; Hofmann, 2020). This continues the

cycle of recruitment. As the group is constantly expanding to offset its losses, it continues to lure new recruits from its vast reach (Borum, 2004). It additionally accounts for the loyalty and dedication to the group (McDonnell & Cozine, 2021). If one individual in a network is radicalized, they are more likely to spread those ideas to others in that network (Hofmann, 2020). This becomes particularly concerning as social media allows those radicals to reach a large pool of potential recruits across the globe and spread that radical propaganda through virtual means. Analyzing specific networks allows researchers to better understand the interpersonal relationships members of that network share, along with specific behavioral actions that group exhibits. If those actions could be identified, intelligence practitioners can be more prepared to link those specific networks to sets of signaling behaviors.

Collective Convictions

As modern lone-actors are more socially connected than predicted, examining their social network is more critical than ever before, and addresses wide gaps in previous research that lacked this aspect (Gill et al., 2014). Pre-radicalized individuals are sympathizing with one another through technological means and bonding over shared commonalities, whether it is dissatisfaction with their situation, mutual sentiments against a particular group, or even religious ideologies (Gill et al., 2014; Egger & Magni-Berton, 2019; Gartenstein-Ross & Grossman, 2009). These sympathizing behaviors are consistent with foundational research (Sageman, 2004; Awan, 2017) on social movements and networks. Clusters or nodes within a network suggest a shared trajectory of radicalization and thus its members often exhibit similar behaviors (Gartenstein-Ross & Grossman, 2009). These behaviors can likely be correlated to similar incidents when compared

against other attacks from the same network (Gartenstein-Ross & Grossman, 2009). This becomes relevant for practitioners looking to identify vulnerable individuals and their prospective warning behaviors. If linkages between an individual's network and their signaling behaviors are identified, law enforcement could better detect and deter those individuals from perpetrating an act of violence.

A Religious Network

The changing nature and frequency of lone-wolf attacks has prompted a discussion over the factors that push one to self-radicalize and perpetrate acts of terrorism. A variety of these factors have been studied as contributing elements, specifically religious and ideological beliefs. Those religious beliefs and their intensification likely play a critical role in the development of networks and similar behaviors between an individual and their religious community (Gartenstein-Ross & Grossman, 2009). As an individual becomes more involved in a close community such as a religious group, they are more likely to disseminate their dissatisfaction or feelings to that group due to the social theories involved in group dynamics (Gill et al., 2014). Specifically in terms of counterterrorism, the influence of Islamist ideology over the attitudes of ordinary Muslims toward political violence has been attested to as a consequential factor in radical terrorist groups (Gill et al., 2014). These close groups have mobilized Islamic rhetoric to define their goals and shape their political agenda (Egger & Magni-Berton, 2019). A growing body of research (Gill et al., 2014; Egger & Magni-Berton, 2019; Gartenstein-Ross & Grossman, 2009; Horgan & Gill, 2020) examines the relationship between intensifying religious beliefs and group socialization. This prior research suggests a linkage between an individual's intensifying religious beliefs and the

likelihood that others knew of the individual's research and planning prior to the radicalized attack. In Gill et al. (2014) religiously inspired lone actors constitute the largest set of actors at 43%, with 37.7% of those individuals noted as recent religious converts. This is supported by Gartenstein-Ross & Grossman (2009) case study on 117 Islamic terrorists who perpetrated or attempted to perpetrate an attack, which suggests an "individuals' theological understanding is a relatively strong factor in their radicalization" (p. 14). Their data found 20% of the homegrown terrorists examined had a spiritual mentor; "25.6% had a spiritual sanctioner (an individual with perceived religious authority who provided specific theological approval for the violent activity), while just under 40% of the sample explicitly claimed a religious motivation for their violent actions" (Gartenstein-Ross & Grossman, 2009, p. 14). Regardless of the singular notion of the lone-wolf terrorist, these individuals have proven to participate in social networking activities, specifically, broadcasting and signaling behaviors to their friends or family. They have become increasingly more religious and have used that religiosity to relate to other members of that ideology, creating a familiar network. As they gain the kinship and sympathy of those individuals, they are more likely to divulge their grievances with that group and partake in its collective activities (Gartenstein-Ross & Grossman, 2009; Gill et al., 2014). Therefore, intensifying religiosity and its role as a network influence the radical individual's communication and broadcasting intent with other members of that religious group. These specific signaling behaviors can be used as an additional warning sign when an individual is known to participate in a large religious network or has recently exhibited intensified ideological beliefs. Together, these elements

better prepare intelligence agencies and law enforcement in categorizing the tangible risk that individual poses.

Signaling and Broadcasting Behaviors

One major concept critical to this research is the socialization factor of the radicalized individual with their peers, specifically, if the individual vocally expressed their desire to physically perpetrate an attack. This is defined through one's "broadcasting intent" which refers to the individual having "communicated with others of their causes through spoken statements and threats, manifestos, e-mail messages, texting and videotaped proclamations" (Hamm & Spaaj, 2015, p. 9). This is used in conjunction with the term leakage which refers to the "communication to a third party of an intent to do harm to a target" and "infers a preoccupation with the target and may signal the research, planning and/or implementation of an attack" (Cohen, Kaati, & Shrestha, 2016, p.1).

In a theory-based case study, Hamm & Spaaj (2015) complied a database of lone-wolf terrorists in America through an extensive review of open-source materials such as biographies and memoirs, court documents, government reports, and journals. Between 2001-2013 83 "authentic" lone-wolves were included that met that definition: having perpetrated an act of violence alone; does not belong to an organized terrorist group; who acts without the direct influence of a leader; whose tactics and methods are conceived without direct command of a hierarchy (Hamm & Spaaj, 2015, p. 3). A comparative analysis of those lone-wolves distinguished key characteristics and trends specific to their behaviors, identifying patterns of underlying causes and risk factors to influence control strategies for law enforcement (Hamm & Spaaj, 2015). In the sample, 76% broadcasted their intent, or communicated with others of their future grievances or causes, often more

than once (Hamm & Spaaj, 2015). Signaling behaviors to outside ideological leaders were also present. Approximately 67% researched or consumed the propaganda an indirect enabler had disseminated (Hamm & Spaaj, 2015). This is consistent with a data-driven study by Schuurman et al. (2018) focused on attack preparation which found a striking 86% of lone-actors communicated their radical convictions to others, 58% gave others the idea they were involved in suspicious and potentially violent activities, and 33% communicated a desire to commit a violent attack. Additionally, 26% even divulged their specific intentions (Schuurman et al., 2018). This strongly suggests the close relationship between broadcasting intent and an individual's planning of an impending attack.

In Rose & Morrison (2021) exploratory multiple-case study on U.S. based lone-actor terrorists, 83.9% of offenders demonstrated leakage warning behaviors; 80.8% leaked to other sympathizers, 65.4% to members of the public, and 38.5% leaked to family or friends (p. 187). Instances of leakage included written statements posted on Twitter, Facebook posts and messages, and other social media applications. In 88.5% of cases, lone-actors leaked support to radical groups. One such case included an individual pledging support to ISIS and its leader in a Facebook post that stated "I support the brother Abu al-baghdadi" (Rose & Morrison (2021, p. 189). Of those who demonstrated leakage warning behaviors, 96.2% leaked intent. A specific instance included an individual pledging "I will kill people this month", accompanied by a profile picture of the ISIS flag and the following statement: "Allah is my Lord, Islam is my life, Quaran is my guide, Sunnah is my practice, Jihad is my spirit, righteous is my character, paradise is my goal…I will die to establish Islam" (Rose & Morrison, 2021, p. 187). "While intent

and specifics were leaked most often through verbal communication, support was leaked more regularly through written text" (p. 194). This elevated prevalence of written support seems fitting given that 78.3% of those leaking support did so online (Rose & Morrison, 2021). Figure 5 shows the forms in which offenders demonstrated this leakage.

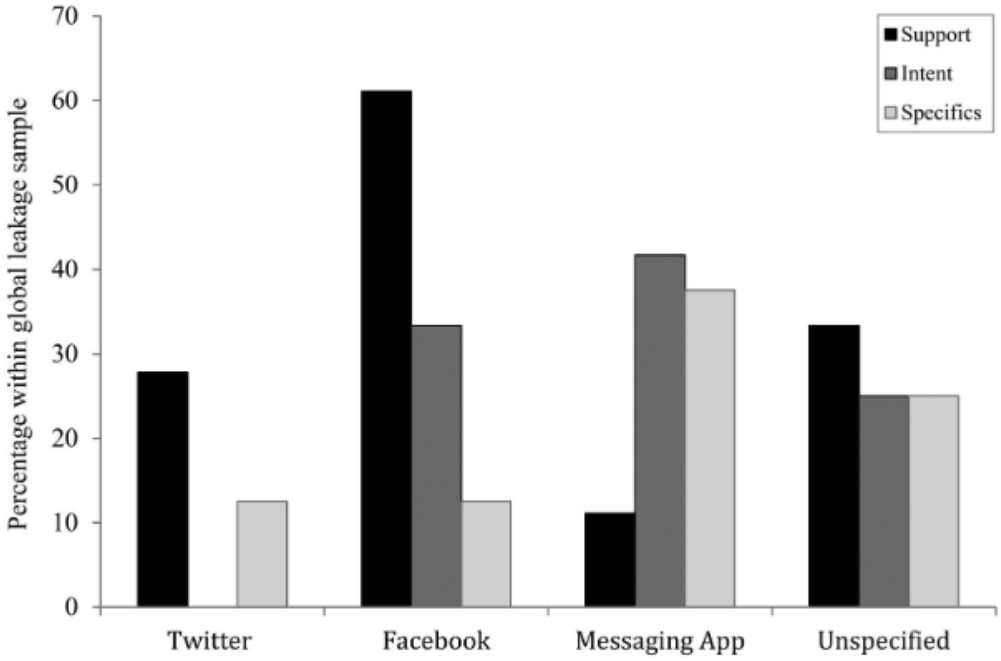


Figure 5 - Percentage of those who demonstrated leakage on the four specified online platforms

Reprinted with permission from Rose & Morrison (2021)

When leakage did occur, support was most frequently leaked on Facebook, whilst intentions and specifics were most frequently leaked through social media messaging applications. As shown, intentions were not leaked on Twitter, possibly due to the platform's public forum layout. These findings reiterate that there is a considerable prevalence of leakage warning behaviors in lone-actors.

The Federal Bureau of Investigation's Behavioral Threat Assessment Center released similar statistics in their 2019 Lone-Offender Terrorism Report and subsequently in 2021 for their collaboration with the National Counterterrorism Center (NCTC) in the U.S. Violent Extremist Mobilization Indicators Booklet. Figure 6 below visually graphs bystanders' awareness of the lone-offender's ideologies by category of individual the message was broadcasted to. This aspect of awareness ranges between spouse/partner, family, mentor, peer, and stranger. The listed categories all show statistically significant positive results. The significant figures of over 50% show the degree of awareness others have of the potentially violent individual and their grievances or ideology (FBI, 2019). While fewer people are exposed to the offender's specific attack plan or research prior to the event (2% - 23%), a substantial amount (up to 83%) of the given social categories have some knowledge of the individual's ideology, whether violent or non-violent. This sentiment is reiterated in the 2021 NCTC Mobilization Booklet that lists an individual's pre-attack manifesto, final statement, last-will video, or dissemination of their own martyrdom as significant indicators of a potential mobilization to violence (NCTC, 2021). Both sources produced by the FBI present significant results highlighting the extensive network these "isolated" individuals actually interact with and convey their grievances to.

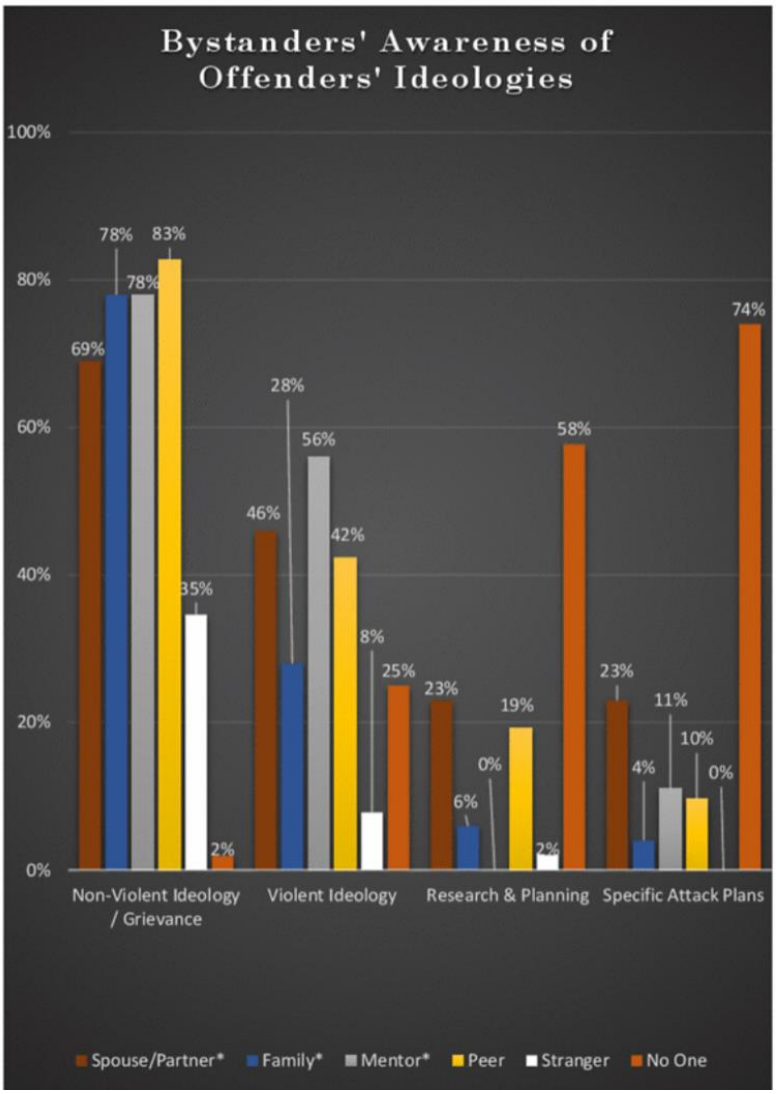


Figure 6 - Bystanders' Awareness of Offenders' Ideologies

FBI. (2019). Lone offender terrorism report.

Moreover, broadcasting intent may be the most important commonality from the standpoint of prevention: "if lone-wolves announce their violent intentions beforehand, then presumably steps can be taken to stop them" (Hamm & Spaaj, 2015, p. 9). Therefore, the assumption that lone-wolf terrorists do not communicate or interact with others is challenged as the individuals studied sought recognition and affirmation for their

causes through outside venues (Hamm & Spaaj, 2015; Schuurman et al., 2018). These results clearly indicate that many lone-actor terrorists regularly interact with wider groups and movements.

Scholarly research on the relational dynamics of social networks of lone-actors is likely to provide valuable information for detecting, identifying, and preventing acts of terrorism (Hofmann, 2020). The results of Hofmann's (2020) social network analysis strongly indicate that the radicalization, planning, and operational actions of lone-actors are influenced by multiple group and individual social interactions (Hofmann, 2020). In these networks, the lone-actors display signaling behaviors which are characterized as the dissemination of "specific information about the lone actor's research, planning, and/or preparation prior to the event itself" to outside individuals (Hofmann, 2020, p. 658). In the studied cases, the communicative networks of each of the lone-actors had either some knowledge of the individual's radical intent or played a role contributing to the lone-actors' radicalization towards violence (Hofmann, 2020). This finding reinforces the suggestion that lone-actors engage in widespread signaling and broadcasting behaviors (Hofmann, 2020; Hamm & Spaaj, 2015).

A dynamic, dimensional approach away from the static profile of the lone-wolf is necessary to progress in the identification of behavioral actions rather than singular profiles of psychological traits. While the data in Gill et al. (2014) imply that there is no uniform demographic profile of lone-actor terrorists, it shows clear commonalities related to their dissemination of intent. In Clemmow et al. (2019) the lone-actor terrorist expressed a desired to physically harm others in 80% of cases, demonstrated high frequencies of signaling and leakage behaviors, and more than half had previously

committed acts of violence. Therefore, it is likely that their social network such as their friends, family, co-workers, and other acquaintances had knowledge of their dangerous behaviors or intent to harm themselves or others (Clemmow et al., 2019). Those indications coupled with the network's knowledge of the individual's normal behaviors, leave specific opportunities for that network to properly identify and report those high-risk individuals. Thus, the lone-actor's social network plays a critical role in the possible prevention and disruption of terroristic or violent plots. This suggests further research is needed for the creation of a set of behavioral indicators of which the public could use to identify and properly respond to a troubled family member or friend displaying those behaviors. This may create positive implications for the development of operational investigations and preventative strategies.

Social Media Signaling Case Example

Broadcasting and signaling behaviors were evident in the case of the 2015 San Bernardino Attack. Following the investigation, FBI Director James Comey determined that Syed Farook and Tasfeen Malik, the married couple that perpetrated the attack, were homegrown violent extremists who were inspired by foreign terrorist organizations (Mueller, 2016). The attack that took place during Farook's work training event that killed 14 and seriously injured 22 others marked a significant point that highlighted the risk of these types of lone-wolf attacks (Mueller, 2016). Farook and Malik had met a few years earlier and married, with Malik moving from Saudi Arabia to the United States as a citizen through marriage (Mueller, 2016). After moving to the United States, it is theorized that Farook became increasingly more religious and unhappy with living in the United States (Mueller, 2016). This dissatisfaction was further expressed by Malik when

she posted in Facebook groups asserting her allegiance to ISIS just a few days prior to the attack (Mueller, 2016). Her messages and posts specifically stated she was a supporter of Islamic Jihad and had "hoped to join the fight one day" (Mueller, 2016, p. 11). Through online social media channels like Facebook, Malik communicated her strong feelings of disdain with her friends from her hometown. A more thorough investigation of their internet activity and social media postings would have revealed the signs and broadcasting behaviors that the couple had become radicalized.

3N Model: Need, Narrative, Network

As previously discussed, a radical's dynamic profile and distinctive behaviors are extremely telling of their intent or potential desire to commit an act of terrorism. The identification of these signs could be best utilized when developed into a succinct framework. The 3N model is one such approach that integrates the various identities vulnerable to radicalization by combining psychological theories that address the role of individual needs, the ideological narratives of a network, and the ultimate means those members will adopt to address a specific goal (Belanger et al., 2019). It essentially fuses together the foundations of social identity, social movement, and social network theory. The 3N model stands for need, network, and narrative, all of which are concluded to be vital components of the radicalization process (Belanger et al., 2019). This model will be further explored to narrow the theoretical approach to a functional mechanism.

In this model of radicalization, needs are classified as the "quest for significance," namely, the desire to be a prominent and respected figure (Belanger et al., 2019). This psychological state stems from one's personal dissatisfaction with certain structural elements of society and their feelings of being ostracized (Belanger et al., 2019). Social

alienation pushes the pre-radicalized individual to internalize their feelings of grief and restore that desired feeling of significance (Belanger et al., 2019). This could be achieved by retaliating against the source of the threat or by seeking out others that can provide camaraderie and a sense of purpose (Belanger et al., 2019). The need for this personal significance increases the likelihood of extreme behavior (Jasko et al., 2016). Belanger et al. (2019) visually represented this phenomenon in Figure 7 below. Social alienation was positively related to support for political violence, which in turn was positively related to wanting to join a radical group (Belanger et al., 2019). This is extremely similar to the basis of social identity theory. Those internal feelings push the individual to cooperate with a wider network of similar individuals for that reassurance or to rectify the perceived grievance.

Figure 7 - Escalation Behaviors from Social Alienation

Reprinted with permission from Belanger et al. (2019)

A narrative offers the pre-radical actor an "ideological framework that provides moral justifications for its use against a specific group of people" (Belanger et al., 2019). These justifications render violence acceptable and even desirable against outgroup members in order to fulfill the goal (Kruglanski et al., 2014; Belanger et al., 2019). This narrative motivates the individual to seek out others that confirm their beliefs and justify the means to achieve that goal. It furthers the process of radicalization as the individual continues to move from idea to action.

After an individual establishes a personal need and narrative, they are likely to seek the presence of others that share similar beliefs. Their universal motivation to attain mutual understanding and a shared sense of reality influences the type of network they pursue (Belanger et al., 2019). This type of network validates their relations between violence and significance, joining them together with like-minded people (Jasko et al., 2016; Kruglanski et al., 2014). Similar to the echo chambers prevalent throughout social network theory, this model emphasizes the collectively extreme behaviors of that network. When exhibited by respected members of the group, those behaviors are perceived as less extreme and more normative, "which can decrease objections against violence and make it easier to deviate from broad societal norms" (Jasko et al., 2016, p. 4). The findings in Jasko et al. (2016) highlight the role of social networks in legitimizing this violence; the presence of radicalized individuals increases their likelihood of connecting and radicalizing others to perpetrate acts of violence (Jasko et al., 2016).

The 3N model connects the three theoretical social approaches. The personal need acts as the initial motivational element that defines a goal for that individual. An ideological narrative identifies the means necessary to achieve that goal. The network validates those means and needs, connecting an individual to a group of others who share similar grievances. The positive correlation between these steps (Belanger et al., 2016; Kruglanski et al., 2014; Jasko et al., 2016) affirms the relevance of social theories that explain the drivers behind each of these actions. Theory-driven findings provide the basis for these claims. The individual motivations coupled with an ideological narrative produce the willingness to seek others with similar beliefs. Acts of violence are normalized, permitting the emergence of unusual behaviors such as signaling to others in

that niche group, all returning to that need for self-significance and admiration. Knowledge on this psychology of radicalization and its unique behaviors provides additional information and potential warning signs of vulnerable individuals for law enforcement and intelligence agencies.

A Similar Genesis: Mass-Murderers and Lone-Actors

The study of public mass-murderers and lone-actor terrorists has historically and independently emerged as distinct fields, varying in terms of motivation, attack type and target. However, research (Gill et al., 2021; Capellan, 2015; McCauley & Moskalenko, 2017) suggests that these offenders are more similar than previously believed and share considerable overlap. The initial and most prominent distinction centers around offender motivation in shaping inclusion criteria (Gill et al., 2021). McCauley & Moskalenko (2017) found that mass-murderers are more likely to share personal grievances with their prospective target and mostly act out of that grievance rather than for material self-interest as opposed to lone-actor terrorists. While some motivations varied, their pre and event-level behaviors were remarkably similar; the profiles of lone-actors and public mass-murderers share and converge more often than not (McCauley & Moskalenko, 2017; Capellan, 2015). Moreover, McCauley & Moskalenko (2017) findings suggest that these seemingly different types of offenders are part of a larger phenomenon of lone-actor grievance-fueled violence.

Capellan (2015) reiterates this sentiment in a comparative study between ideological active shooters, non-ideological active shooters, and lone-actor terrorists. This analysis highlights the extremely close similarities of pre and event-level behaviors

between the three groups rather than the focusing on their personal characteristics and specific motivations.

> Most ideological active shooter attacks could be considered lone-wolf terrorism, as 70 percent of events were motivated by ideological extremism. Seventy-seven percent of ideological shooters had no formal ties to extremist organizations, which means they self-radicalized through Internet forums and other forms of media, such as music, book, and magazines (Capellan, 2015).

These behaviors are reinforced by Gill et al. (2021), which concluded "they are similar people, while similar mobilization pathways, committing similar forms of violence, with slightly dissimilar motivational structures" (p. 1801).

Ultimately, the distinctions between lone-actor terrorism, mass-murderers, and other forms of grievance-fueled violence continue to blur. The nature of these threats will continue to evolve, taking advantage of developments in global technology and communication. Understanding and embracing the distinctions and commonalities in terms of pre-attack warning behaviors between the various subsets of grievance-fueled violence can aid in the development of effective preventative measures to reduce this form of violence.

Investigative Psychology Approach to Behavioral Classification

Investigative psychology is a "framework for the integration of a diverse range of aspects of psychology into all areas of criminal and civil investigation" (Youngs & Canter, 2006, p. 322). It extends to all forms of criminality that require investigation which may not always be conventionally within the domain of law enforcement services (Youngs & Canter, 2006). It examines criminal activities and its methods to better detect

crime and recommend proper legal proceedings (Youngs & Canter, 2006). Thus, investigative psychology is centered on the psychological input to the "full range of issues that relate to the management, investigation, and prosecution of crime" (Youngs & Canter, 2006, p. 322). Numerous potential processes are hypothesized based off of social and psychological theories, specifically, frameworks drawing on interpersonal narratives (Youngs & Canter, 2006). By forming a basis on the individual offender, a general trend can elucidate consistencies between criminal acts perpetrated by that same offender or other offenders with a similar background. In policing, this commonly equates to offender profiling where common characteristics are useful to the investigation and provide a valid basis for variations in criminal behavior (Canter, 2011). This has been instrumental in providing law enforcement agencies with a foundation for resolving and explaining profiling equations and preventative solutions to complex issues.

In investigative psychology, the application of a classification of behaviors and characteristics to better understand an offender's pathway to violence and potential future plots is fundamental and predominant in classic criminological studies (Canter, 1994; Fesbach, 1964; Toch, 1969; Salfati, 2000). As an observable unit of analysis, behaviors should be a primary focus of law enforcement during investigations, as that objective data can produce a more readily applicable model to replicate for future study (Salfati, 2000). In Fesbach (1964), the influence of the interpersonal relationship between the offender and victim was distinguished by their goals or the reward to the perpetrator, and could be indicative of their attack methodology (as cited in Salfati, 2000). The form of aggression is the basic ingredient in violent crime (Fesbach, 1964, as cited in Salfati, 2000). Toch (1969) echoed these ideas; "violent episodes can be traced to well-learned, systematic

strategies of violence that some people have found effective in dealing with conflictual interpersonal relationships" (p. 267). In this case, violence not only becomes an impulse, but a learned habitual response (Salfati, 2000). Therefore, examining the psychological history and previous behaviors of violent individuals has exposed unique consistencies in the offender's approaches to interpersonal relationships and normative actions (Toch, 1969, as cited in Salfati, 2000).

Salfati and Canter (1999) expanded on this theory using multidimensional scaling analyses on crime scenes and offender characteristics from single-offender, single-victim stranger homicides. Their study proposed that different styles of homicide will reflect differences in the characteristics of the offender; the studied crime scenes will reveal stylistic distinctions in the role of aggression in the offense (Salfati & Canter, 1999). As hypothesized, different forms of interpersonal transactions such as variations in murders, are reflected in the murder crime scene itself through the offender's choice of victim of their method of engagement with that victim (Salfati & Canter, 1999).

If patterns or themes in crime scene behaviors can be established and in turn be used to identify the characteristics of the offender, "then the science of psychological profiling can be said to be a valid and reliable technique for the identification of offenders from their crime scene themes" (Salfati, 2000, p. 269). Through the analysis of the co-occurrences of the offender's crime scene behaviors, components that form different themes of homicide suggest that interpreting the actual meaning of those behaviors in relation to other behaviors with which they coincide can procure a more subtle definition than previously suggested (Salfati, 2000). The ultimate goal is not to produce a checklist to profile groups or communities, but rather to assist intelligence

agencies within the context of an active investigation (Schuurman & Eijkman, 2015). This helps build a conceptual framework to aid investigators in assessing whether the identified potential offender is involved in attack preparations or if the suspected vulnerable individual is in communications with outside groups.

Classifying Expressive and Instrumental Themes of Aggression

As the classification of separate thematic groups has proven to be effective in offender profiling and policing (Salfati & Canter, 1999; Salfati, 2000; Sorochinski & Salfati, 2010; Salfati & Bateman, 2005), investigative psychology research has commonly utilized the terms Expressive and Instrumental aggression. These forms of aggression are concepts or themes in which the offender is classified into a specific group based on their actions compared to other offenders in the study. In Fesbach (1964) and Toch (1969), expressive aggression was distinguished as to make the victim suffer (as cited in Salfati, 2000). The expressive theme of aggression is "often provoked through an emotional, interpersonal confrontation and is most likely to occur against someone the victim knows intimately" (Salfati & Bateman, 2005, p. 124). This theme represents offenders who deal with individuals and situations that have a direct emotional impact on themselves (Salfati, 2000). They typically do not have a criminal history and are perceived as more isolated. This contrasts to the instrumental aggressor who is centered on attaining an ulterior goal such as making a bold statement or a material gain (Fesbach, 1964; Toch, 1969, as cited in Salfati, 2000). Instrumental aggression focuses on the victim not as a person, but rather as a vehicle through which the offender can gratify some need or gain a reward (Salfati & Bateman, 2005). That need or personal gain could

be expressed in terms of disseminating a specific goal or message that is significant to that individual or the group to which the individual identifies with.

In Salfati (2000), consistencies were hypothesized to be found in the manner in which offenders behave prior to and during a homicide, evidenced in the following classification of crime scenes into separate thematic types reflecting different styles of the offenders' interactions with the victim. A sample of 247 British single-offender homicide cases were analyzed and classified into these thematic groups. A visual examination of the data showed a distinct division, which was differentiated in terms of expressive and instrumental acts and behaviors. Expressive acts included extreme physical attacks against the victim, the offender's access to a weapon indicating their anticipation of a conflict with the victim, and their transportation of the victim's body away from the crime scene (Salfati, 2000). These actions are indicative of the offender's need to separate themselves from the victim and the crime scene, suggesting a prior or existing relationship between the two parties (Salfati, 2000). Actions taken by offenders categorized by the instrumental theme were not directed at the victim as a person (Salfati, 2000). Rather, they contributed to the offender's larger goal of using the victim to further attain an ulterior purpose (Salfati, 2000). In the studied homicide cases, these acts were more centered on the offender's target of gaining financial or personal property; offenders had stolen property, or attacked the victim with objects from the crime scene, indicating their focus on the overall goal rather than personal harm to the victim (Salfati, 2000). The instrumental aggressor was also found to include individuals who had previous criminal convictions such as theft, burglary and previous imprisonment,

suggesting the offender is more likely to be a seasoned criminal with a substantial history (Salfati, 2000).

Santilla et al. (2003) study of 502 Finnish homicides similarly classified offender characteristics and behaviors into expressive and instrumental themes of aggression, noting core background characteristics and crime scene actions. As previously sustained, the expressive offenders were found to be individuals without a criminal record who had not previously used aggression to obtain some goal not directly related to the aggression itself (Santilla et al., 2003). Rather, their homicidal aggression and violence was a reaction against perceived frustrations and threats to self-esteem (Santilla et al., 2003). They are more likely to present mental health issues and showed close proximity to the variable "single", indicating some of the offenders had issues creating or maintaining relationships, which corresponds well with the psychiatric problems of these offenders (Santilla et al., 2003). Additionally, the expressive aggressor was more likely to admit their involvement in the violence and speak with the police, highlighting their inexperience with the criminal justice system and willingness to justify their actions based on their choosing of victim (Santilla et al., 2003). Conversely, the instrumental aggressor was one who used violence as a means to habitually solve their problems and exhibited an extensive background of criminal convictions or allegations (Santilla et al., 2003). These offenders most often were unemployed or lived in unstable conditions, presented substance abuse issues, and had volatile relationships with their friends and family (Santilla et al., 2003). Their prior criminal convictions made it difficult if not impossible to legally obtain weapons, referencing their choice in attack methodology; their use of a firearm was one that was obtained illegally or their tactic called for the use

of unconventional weaponry (Santilla et al., 2003). These expressive and instrumental themes of aggression in offender profiling corroborated the findings in earlier studies (Fesbach, 1964; Toch 1969; Salfati & Canter, 1999; Salfati, 2000) affirming their utility in conducting and furthering homicide investigations.

Having been validated internationally and by numerous studies in investigative and criminal psychology, this model of expressivity and instrumentality presents an appropriate method of classification. The present study emphasizes the components (antecedent behaviors and characteristics) that contribute to each theme, creating distinct thematic types in which offenders can be classified. By interpreting the meaning of these behaviors and characteristics in relation to others classified within the same type, the two subgroups produce a more intricate analysis than previously offered in singular offender profiling of lone-actor terrorists and public mass-murderers in counterterrorism studies. This approach could be utilized to strategize preventative measures and de-escalation tactics based on the offender's sub-type and target.

Prevention and De-radicalization

Given the nature of this form of violence, no singular preventative strategy or de-radicalization method is sufficient; a multi-faced approach is critical. In a broad sense, prevention may be understood as "efforts to reduce both the future occurrence of crime as well as the harmful consequences of crime to victims and society" (Bjørgo & Smit, 2020, p. 2). De-radicalization refers to the process of "detaching a person, voluntarily or otherwise, from their extreme views", while disengagement refers to the process of "moving a person away from their extreme group's activities, without necessarily de-radicalizing that person" (Hearne & Laiq, 2010, p. 2). Modern de-radicalization programs

that aim to convince the individual that their beliefs are mistaken is a flawed system; forcing an individual to abandon their beliefs is extremely difficult and will lead to resistance (Silke, 2011). Given the initial radicalization process where a target's "characteristics are identified to determine their suitability for terrorism", de-radicalization or preventative programs would benefit from appealing to the individual rather than attempting to broadly implement change (Hearne & Laiq, 2010, p. 2). This form of de-radicalization introduces a more personalized approach that takes into account the situational factors prevalent in the given case.

In their holistic model of violence and terrorism prevention, Bjørgo & Smit (2020) propose nine preventative mechanisms:

1. Establishing and maintaining normative barriers
2. Reducing recruitment
3. Deterrence
4. Disruption
5. Incapacitation
6. Protecting vulnerable targets
7. Reducing harm
8. Reducing rewards
9. Desistance and rehabilitation

This model distinguishes between preventive measures (what we do to prevent crime) and preventive mechanisms (how the measures work to prevent crime) (Bjørgo & Smit, 2020). It additionally encourages the strong coordination among many relevant actors, such as families, civil society organizations, public services, the private sector, psychological and religious counselling, employment assistance, and law enforcement (Bjørgo & Smit, 2020). These actors all play a part in identifying, preventing, and mitigating the vulnerable and potentially violent individual. Their close proximity to the vulnerable individuals puts them at the forefront of detection and reporting; their

suspicions and awareness of the aforementioned warning factors offer the potential for them to alert social services or law enforcement of the vulnerable individual and possible violence.

Nonetheless, certain measures or interventions could possibly reinforce extremist narratives or harden convictions, which can be an unintentional side effect of excessive suspicions directed at a certain group of people (Bjørgo & Smit, 2020). A well-trained and maintained police force and clear legal framework can limit some of these unintended side effects (Bjørgo & Smit, 2020). In sum, de-radicalization and disengagement is just one portion of a holistic counterterrorism approach; a variety of preventative measures taken by multiple actors must be considered.

Chapter Summary

Overall, both mass-murderers and lone-actor terrorists share a variety of characteristics and behaviors that could provide a useful dynamic profile indicative of potential acts of violence (McCauley & Moskalenko, 2014; Gill et al., 2014; Hamm & Spaaj, 2015;). Rather than solely focusing on motives or characteristics, more attention should be dedicated to situational factors and pre-attack indicators (McCauley & Moskalenko, 2014). This illustrates the key role one's individual psychology and emotional needs plays in moving from idea to action in violent extremism (McCauley & Moskalenko, 2014). A thorough consideration and analysis in behavioral and investigative psychology offers a unique approach to this complex issue. Efforts to address the discussed warning signs must be led by those who are cognizant of the vulnerabilities that exposure to extremist narratives creates (Jensen et al., 2018). This could be religious leaders, social group organizers, and educational staff at the

community level, as well as family, friends, and peers at the individual level (Jensen et al., 2018). These community members have the ability and proximity to recognize concerning changes in the beliefs and behaviors of those known vulnerable individuals (Jensen et al., 2018). Thus, research concerning the psychology and pre-attack behaviors of those individuals is critical to be further investigated and then disseminated to the public. Violence prevention programs and counterterrorism organizations should empower those closest to at-risk individuals through education and support programs to identify and prevent those acts of radical lone-actor terrorism and mass-murder attacks. Law enforcement and intelligence agencies can gather various lessons from a complex view of radicalization that may otherwise go unnoticed when using a singular form, such as only viewing prevention from a counterterrorism and homeland security lens. Rather, the incorporation of theories and practices from other disciplines extends a unique approach that is necessary to address this complex form of violence.

CHAPTER 3: RESEARCH QUESTIONS & HYPOTHESES

This study contributes to research surrounding lone-actor terrorism and mass-murder attacks in the importance of behavioral studies; these offenders exhibit critical warning signs and provide unique characteristics that could guide researchers and experts on de-escalation and preventative procedures. These behaviors can be used to detect individuals most vulnerable to radicalization and those who have become radicalized and intend to perpetrate an act of violence. Furthermore, the classification of behaviors and characteristics of those vulnerable individuals can help investigative psychologists and intelligence agencies understand the most useful form of preventative strategy based on the needs and actions of the offender's classified type of aggression. Thus, the dissemination of these warning behaviors to community programs and the public could better inform those closest to the individuals, which may lead to more referrals to counterterrorism agencies and local law enforcement departments who can take quicker preventative actions.

The research questions and hypotheses for this study are as follows:

R_1: Can the antecedent behaviors of lone-actors and mass-murderers be meaningfully classified into distinct thematic types?

H_1: Offenders' pre-attack behaviors could be classified into separate thematic types of Expressive and Instrumental aggression.

R_2: Can a behavioral classification predict offenders' attack methodology?

H_1: Pre-offense behaviors and characteristics will be meaningfully associated with distinct offending patterns as evidenced in the choice of target location.

This complex multidimensional analysis considers multiple variables simultaneously to identify common patterns. In order to answer the first research question, 'characteristics' and 'pre-offense behaviors' were selected. To best support the hypothesis and create a meaningful classification, it is expected that each classification type will contain variables from both groups. The following variables for 'characteristics' are as listed: offender's age; if the offender was single; if the offender lived alone; offender's history of mental illness; if the offender expressed anger; if the individual was socially isolated. The following variables listed are 'pre-offense behaviors': history of violence; previous criminal convictions; arrest history; made verbal statements to family or friends about their intent or belief; produced public letters or statements; claimed to be part of a wider group or movement; at least one other person knew of the individual's grievance prior to the attack; individual stockpiled weapons; offender expressed a desire to hurt others.

The dependent variable will then be the classification of the individual into either subgroup of expressive or instrumental aggression.

The independent variable in the second research question will be the individual's classification (e.g., expressive or instrumental aggression). The dependent variable will be their planning behaviors (e.g., if the individual had a personal history with the location of their attack;).

Tables (1) and (2) below outline the study's classification distribution and database definition for the expressive and instrumental themes in this sample.

Table 1 - Operational Definitions of Research Question 1 Variables

Variables	Variable Type	Operational Definition
Age	Expressive	If the offender is under the age of 30
Single	Expressive	The offender's marital status at the time of the event
Live alone	Expressive	If the offender lived alone
Mental illness	Expressive	If the offender had a history of mental illness
Angry	Expressive	If the offender was angry leading up to the event
SocIsolated	Expressive	If the offender was socially isolated
Stockpile	Expressive	If the offender stockpiled weapons
Harm	Expressive	If the offender expressed a desire to hurt others
Violence	Instrumental	If the offender had a history of violent behavior
CrimCon	Instrumental	If the offender had any previous criminal convictions
Arrest	Instrumental	If the offender was ever arrested

VerbFam	Instrumental	If the offender made verbal statements to family/friends of their intent or belief prior to the event
Written Message	Instrumental	If the offender produced letters/public statements prior to the event
Group	Instrumental	If the offender claimed to be part of a wider group/movement or characterized the actions as a group/movement
AwareGriev	Instrumental	If at least one other person knew of the offender's grievance prior to the event

Table 2 - Operational Definitions of Research Question 2 Variables

Variables	**Variable Type**	**Operational Definition**
Classification	Independent	Expressive or instrumental aggression
Planning behaviors	Dependent	If the individual had a personal history with the location of their attack

CHAPTER 4: METHODOLOGY

Facet Theory Approach

Facet theory is a "comprehensive approach to the design of observations and the analysis of empirical data in behavioral research", specifically concerning the integration of data in complex systems in the behavioral sciences to enable theory-based measurements (Shye, Elizur, & Hoffman, 1994, p. 1). Its unique methodology addresses behavioral scientists' chief concern being the conceptual complexity of the individual aspects that encompass human behavior. Shye, Elizur, & Hoffman (1994) wrote:

> Concepts such as attitude, intelligence, anxiety, adaptability are complex in that each is composed of a number of interrelated components. Moreover, typically the number of the components and the nature of their interrelationships are unknown. Intelligence, for instance, is composed of many different abilities…Facet theory proposes procedures for identifying concept components and for depicting their interrelationships. (p. 1).

The most distinguishing aspect of Facet theory is its scientific imagery displayed on a three-dimensional plane. Whereas conventional models perceive variables as discrete passive entities affected by outside forces, the imagery offered by Facet theory conceives variables closely related to other variables within the same domain (Shye, Elizur, & Hoffman, 1994). That domain reflects the fact that "concepts are likened to continuous rather than discrete physical bodies" (Shye, Elizur, & Hoffman, 1994, p. 2). Every observed variable is a point in the physical space occupied by the investigated concept; "the concept may be studied in terms of the conceptual components that make it up, in much of the same way as a continent can be explored in terms of its geographical

regions" (Shye, Elizur, & Hoffman,1994, p. 3). This research methodology integrates content design with data analysis; it explores new possibilities in the substantive domains of research (Shye, Elizur, & Hoffman,1994). Thus, given the complexity of behavioral research, this form of design allows for a sophisticated, multidimensional analysis of intricate data.

Data Collection

This research study is entirely quantitative in nature and uses data previously collected by Horgan & Gill (2020). Relying completely on an open-source methodology, Horgan & Gill (2020) utilized academic articles, LexisNexis, the Global Terrorism Database, FBI Uniform Crime Reports, public record depositories, news reports, biographies of lone actors, and lists of convictions of terrorism-related offenses. As defined by Horgan & Gill (2020), terrorism is the "use or threat of action where the use or threat is designed to influence the government or to intimidate the public or a section of the public, and/or the use or threat is made for the purpose of advancing a political, religious, or ideological cause; can involve violence against a person, damage to property, endangering a person's life other than that of the person committing the action, creating a serious risk to the health or safety of the public or a section of the public, or facilitating any of the above actions". A lone-actor terrorist is then an individual who "engages in ideologically-inspired violence in support of a broader group but absent of ties to or material support from that group" (Horgan & Gill, 2020). Mass-murderers are defined as the killing of four or more people (not including the offender) at one (or multiple but geographically close) location(s) over a relatively short period of time (Gill et al., 2014).

As their study analyzed lone-actors and mass-murderers, their final sample was focused on all United States-based individuals who a) fit the study definition of lone-actor terrorist or solo mass-murderer, b) were identifiable through publicly available records and sources, c) operated between 1990 and 2013 (2020). The final sample contains 71 lone-actors and 115 mass murderers (n=186). Since the sample only included individuals who were convicted or charged for their perpetration and attempted plans, the entire data set could be used.

Using open-source data, Horgan & Gill (2020) developed a codebook which included variables spanning sociodemographic information (age, gender, occupation, family, relationship status, occupation, employment, etc.), characteristics (angry towards others, socially isolated, mental illness, substance abuse) antecedent event behaviors (broadcasting their intent to friends and family, ideological orientation intensified, stockpiled weapons), event-specific behaviors (attack methods, targets), and post-event behaviors and experiences (claims of responsibility, arrest/conviction details) (Horgan & Gill, 2020). This study will focus exclusively on antecedent event behaviors and characteristics.

Validity

Validity is a central feature to any research study and must be ensured to increase confidence in conclusions by lessening the influence of biases in any one source (Pyrczak & Tcherni-Buzzeo, 2019). Horgan & Gill (2020) offered the following discussion on validity:

> To ensure consistency and validity, each observation was coded by three independent coders. The results were then reconciled in two stages (coder A with

coder B, and then coders AB with C). If the three coders could not agree on particular variables, the project's postdoctoral research fellow resolved differences based on an examination of the original sources that the coders relied upon to make their assessments. Such decisions factored in the comparative reliability and quality of the sources (e.g., reports that cover trial proceedings vs. reports issued in the immediate aftermath of the event) and the sources cited in the report. Due to time constraints, no efforts were made to check the veracity of reporting against primary sources unless they were readily available online.

Ethical Issues

Ethical issues in the use of secondary data analysis research primarily revolve around potential harm to individual subjects and the issue of return for consent (Tripathy, 2013). Material that is freely available on the internet, books, or other public forums is considered open source where the permission for use and analysis is implied, given acknowledgement of the original ownership (Tripathy, 2013). All information contained within the Horgan & Gill (2020) database came from public source materials such as news reports, academic journals, and police reports. The compiled data did not contain any confidential information. Once the data was collected and imported by the original researchers into IBM SPSS, it was entirely void of any identifying information and only contained "present or not present" responses to the coded variables.

Additionally, the researcher of the present study has no relationship to any of the parties involved nor any of the database researchers. As such, there is minimal risk of conducting any breeches of ethical conduct.

Demographics

There are 71 (38.2%) lone-actor offenders and 115 (61.8%) mass casualty offenders included in the data set. Nearly all of the offenders were male (97.8%), and their age ranged from 14 years old to 69 years old. Of those whose citizenship was known, 161 (86.6%) were United States citizens, and 19 (10.2%) were foreigners. Approximately 138 (74.2%) of offenders were born in the United States, 30 (20.4%) were born outside of the United States, and place of birth is unknown for 10 (5.4%) offenders. Almost a third (61; 32.8%) of the offenders were unemployed, 46 (24.7%) worked in the service industry, 17 (9.1%) were students, 12 (6.5%) had professional careers, 10 (5.4%) were laborers, 7 (3.8%) were administrators, 19 (10.2%) had other occupations, and the occupation was unknown for 14 (7.5%) offenders.

Analytical Approach

As one of the aims of this study is to examine consistency and patterns of behavioral change within subgroups of lone-actors and mass-murderers, data were analyzed using the statistical software IBM SPSS 24 to generate descriptive statistics and the partitioning of regions within the Smallest Space Analysis (discussed below) were produced through statistical software HUDAP. The statistics presented in this dissertation resulted from the output of those programs.

Smallest Space Analysis

In order to identify whether behaviors and characteristics of offenders were classified into meaningful themes, Smallest Space Analysis can be used. Smallest Space Analysis (SSA) is a nonmetric multidimensional scaling procedure based on the assumption that underlying structures or common themes in behavior can be analyzed by

examining the relationship each variable has with the other variables (Salfati, 2000). Variables are computed and rank ordered, creating a three-dimensional matrix in which the variables are able to be visually associated with or against one another, forming a spatial representation of those variables in the smallest possible dimensionality (Santtila et al., 2003). This method of analysis is effective at reliably analyzing real world data, allowing for the researcher to visually identify distinctions where classes of behaviors are most likely to co-occur. The results of SSA form a "visual representation of the data where each variable is represented as a dot in a three-dimensional geometrical space with behaviors that often co-occurred in the data set, appearing closer to each other, and behaviors that do not co-occur often, appearing farther from each other" (Sorochinski & Salfati, 2010, p. 122). Compared to a two-dimensional representation where variables may appear far apart, the inclusion of a third dimension that is usually overlooked could include a more precise visual showing their true distance (Sorochinski & Salfati, 2010). In the present study, this form of analysis was ideal as it best visually identified thematic divisions that co-occurred.

The Jaccard coefficient in SSA is used to compute the correlations between variables and is responsible for determining the placement of those variables on the geometric plot. The procedure (performed using HUDAP) then ranks and represents the correlations "in a space of a specified dimensionality where the distances between the variables in the space reflect their actual ranked correlations, so that the shorter the distance between two points, the higher is their intercorrelation" (Santtila et al., 2003, p. 11). This coefficient is appropriate to use in the current study as it does not take into

account the non-occurrences; the strength of the associations is not dependent on the mutual non-occurrences as they are not counted.

Correspondingly, the coefficient of alienation "gives the proportion of co-occurrences of all occurrences between two dichotomous variables", with its value deeming how well the spatial representation fits the data (Santtila et al., 2003, p. 11). This degree of a goodness of fit is represented by Guttman's scale where the coefficient of alienation ranges from 0 (indicating a perfect fit) to 1 (Santtila et al., 2003). A coefficient of 0.2 or less is considered a reasonably good degree of fit (Shye, Elizur & Hoffman, 1994). Thus, the lower the coefficient, the better the fit. (i.e., the better the representation of the behaviors in the geometric space is to the actual relationships in the data) (Salfati & Bateman, 2005).

SSA Classification of Behaviors

To determine if offenders shared consistent antecedent behaviors and characteristics, it is first necessary to classify a dominant theme in each behavioral subgroup. In Salfati and Bateman (2005), the most appropriate criterion found for identifying the dominant theme was if the proportion (%) of behaviors from one theme was one and a half times greater than the proportion from the second theme. Sorochinski and Salfati (2010) used the same criterion; for an event to be classified into one of the themes there needed to be at least 1.5 times the proportion of variables from one theme compared to the other. "The cases that did not meet the cut-off criterion (e.g., when half of the behaviors present were from one theme and the other half from the second theme) were classified as hybrids" (Sorochinski & Salfati, 2010, p. 125). The present study uses the same cut-off criterion in a dominance analysis.

SSA in Present Study

The use of SSA in the present study is significant as it is a proven method of analysis in examining the co-occurrences of variables. The expected patterns found in the SSA plot accordingly show themes present in the overall data. This has been used in determining the distinct themes of expressivity and instrumentality in previous studies (Salfati, 2000; Santtila et al., 2003; Salfati & Bateman, 2005; Sorochinski & Salfati, 2010; Trojan & Salfati, 2010). The aforementioned studies have demonstrated that SSA is effective at reliably analyzing real-world data, illustrating existing themes within that data, and presenting a clear reflection of the relationships between those themes (variables). It thus facilitates the examination of each variable, such as behaviors in the present case, to all other behaviors under scrutiny. Thus, if themes are present within the current study's variables, they should be visually identifiable upon review of the SSA plot.

Furthermore, it is emphasized that the current model is not a typology but rather a thematic behavioral classification model. In this method, each offense is not expected to fit solely into one category; the cases may contain aspects of both themes but should predominantly fall within one theme.

CHAPTER 5: RESULTS

The aim of the present study is to determine if lone-actor terrorists and mass-murderers could be meaningfully classified into distinct thematic types, and if those classified types are indictive of their attack methodology. This behavioral classification aims to better address prevention and de-escalation measures. These thematic types will be explored as both expressive and instrumental aggression.

Research Question 1

The first aim of this study is to identify if the antecedent behaviors and characteristics of lone-actors and mass-murderers can be meaningfully classified into distinct thematic types; expressive or instrumental forms of aggression. In order to develop a meaningful classification system, the frequencies of common characteristics and pre-offending behaviors were analyzed in reference to foundational research on the subject. A frequency analysis was conducted on 15 variables from the existing Horgan and Gill (2020) database to analyze for meaningful conclusions. The frequencies of occurrence of these behavioral elements and characteristics are presented below in tables 3 and 4.

Table 3 - Frequencies of Offender Characteristics

(N = 186)

Characteristics	Frequency (%)
Offender expressed anger	120 (64.5)
History of mental illness	82 (44.1)
Offender under the age of 30	75 (40.3)
Offender single	66 (35.5)
Socially isolated	66 (35.3)
Offender lived alone	59 (31.7)

Table 4 - Frequencies of Offender Pre-offense Behaviors

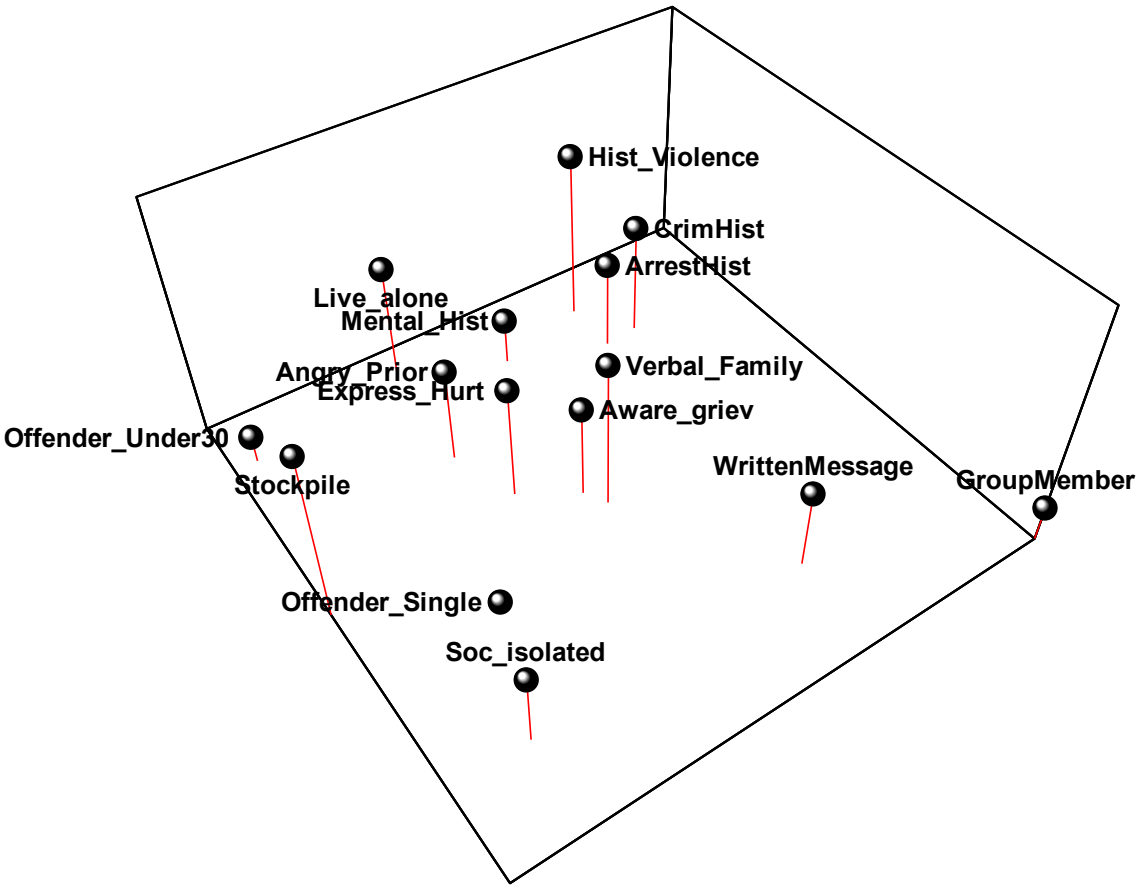
(N = 186)

Pre-Offense Behaviors	Frequency (%)
At least one other person knew of offender's grievance	110 (59.1)
If the individual was ever arrested	106 (57.0)
Expressed a desire to hurt others	104 (55.9)
Previous criminal convictions	90 (48.4)
Verbal statements to friends/family of intent	78 (41.9)
Stockpiled weapons	74 (39.8)
History of violence	69 (37.1)
Produced public letters	56 (30.1)
Claimed to be part of a wider group	33 (17.7)

The hypotheses of this study were formed on the basis that actions with similar underlying themes will be more likely to co-occur than those that imply divergent themes. The variables that co-occur most frequently will be found closer together. In the present study, those similar antecedent behaviors and characteristics should coincide in the same region as one another on the SSA plot. This aim previously (Salfati, 2000; Santtila et al., 2003; Salfati & Bateman, 2005; Sorochinski & Salfati, 2010; Trojan & Salfati, 2010) has been justified as an appropriate way of interpreting co-occurrences of behaviors in offender profiling, and has successfully been used to psychologically interpret specific thematic types to further hypothesize preventative tactics or recognize patterns.

A Small Space Analysis was performed on the above 15 variables in order to detect potential themes from the co-occurrences of variables based on their spacial representation on the plot. This could then be used to classify themes of expressive or instrumental forms of aggression. Figure 8 shows the three-dimensional SSA plot of 15 pre-event behaviors selected for this study. The coefficient of alienation of this SSA

analysis was .10953, showing a good fit of the spacial representation of the co-occurrences of antecedent behaviors and characteristics.



Coefficient of Alienation ..... .10953

Figure 8 - SSA plot of antecedent behaviors and characteristics

Thematic Analysis

To resolve the first aim of this study, behaviors and characteristics that share a common theme should be visibly found in the same region of the SSA plot. This plot should chart co-occurrences in expected patterns, thus allowing for the distinction of themes present in the overall data.

It is then necessary to examine the SSA configuration to establish whether different themes of offender behavior could be visually identified and separated within the plot. As hypothesized, variables that co-occurred were able to be identified on the SSA plot. This created a partition into two separate areas on the plot. On the SSA plot pictured below, a distinct split could be seen dividing the left side of the plot from those on the right side. Figure 9 demonstrates this degree of separation and represents a progression from the previous figure. The plot shows two themes with the co-occurring variables that are associated with the same theme as sharing the same color. The pink triangle in the middle represents a high frequency variable that is part of both themes, as it did not distinctly belong to either group. The themes are evident in each as they cluster in the same spot on the plot, confirming their co-occurrences.

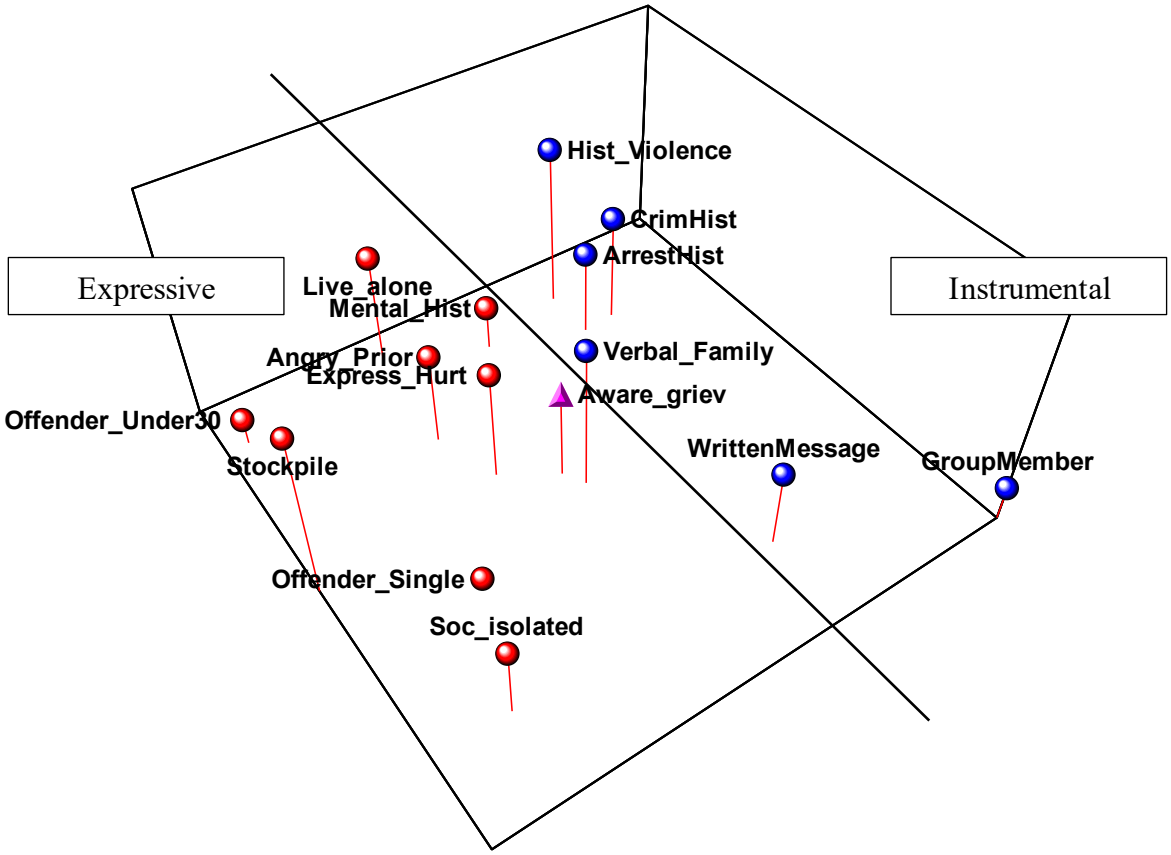


Figure 9 - SSA with regional interpretations

The SSA plot was reasonably split as to reflect the results of the previous analysis. A clear partition into two separate halves was possible; the left side of the SSA represents the expressive theme which contains 8 variables, while the right side represents the instrumental theme containing 6 variables. The SSA confirmed that the expressive and instrumental classification model is applicable for the present data and the variables meaningfully co-occur within the thematic framework.

Offender Classification

In order to properly sort a case into a subgroup, a thematic dominance analysis determines the number of variables in each of the cases and their classification. In the thematic dominance analysis, the overall proportion of the cases that could be classified into a dominant cognitive strategy theme within each behavioral subgroup was high, confirming that the chosen subgroups may be a promising way of classifying and differentiating between offending behaviors. SPSS was used to calculate the proportion of cases present within each variable to determine a classification of expressive or instrumental. The criteria of 1.5 times the proportion from each case was utilized to find a dominant classification. Based on the medium stringency criterion of 1.5 times the proportion of the variables of one theme to the other, 100 cases were classified as expressive, 77 predominantly instrumental, and 9 were classified as hybrid. All of the 186 cases were thus successfully classified.

These themes differ in the left side presenting an expressive theme: offender lives alone; has a history of mental illness; is angry at the time of the incident; expresses hurt prior to the event; is under the age of 30; has stockpiled weapons; is single; is socially isolated. This is contrasted to the right side which includes the following antecedent

behaviors of an instrumental offender: has a history of violence; has a criminal history; been previously arrested; verbally expresses grievances to family or friends; made others aware of their grievances; produced letters or public statements prior to the attack; individual claimed to be part of a wider group.

Expressive Aggression

The left side of the SSA plot represents an expressive offender. The expressive offender is more likely to be young, single, socially isolated, have a history of mental illness, live alone, have expressed a desire to hurt others, be angry prior to the attack, and have stockpiled weapons. This type of offender is looking to perpetrate a violent attack simply for the desire to harm others or for a particular personal grievance they share, not specifically to spread a sort of message or further an outside group's agenda. In Santtila et al. (2003), offenders in the expressive region of the SSA plot were individuals who had not previously used aggression in order to obtain a goal not directly related to the aggression. Rather, their homicidal aggression was more likely to be expressive in nature: they had reacted against perceived frustrations and threats to self-esteem (Santtila et al., 2003).

Instrumental Aggression

The instrumental aggressors are represented by the right side of the SSA plot. These offenders have a history of violence whether it is having a criminal history and/or an arrest history, have verbally expressed their intent or beliefs to their friends or family prior to the attack, have produced written letters detailing their intent, and have characterized their terroristic actions as part of a group/movement. The type of offender presenting these antecedent behaviors suggests their habitual use of violence to solve

problems they encounter (Santtila et al., 2003). Consistent with literature mentioned in chapter 2, the instrumental offenders are mostly the seasoned criminals with a lengthy history of convictions or some form of documented aggression. They use violence as a means to further their agenda or beliefs which is likely supported by or dedicated to a wider group or movement with which they identify. These individuals are more connected to others who share similar ideas and are more likely to have expressed their violent plan with others, as opposed to the expressive aggressor who is more introverted and socially isolated. The instrumental aggressors have a history of violence and physically lash out to their opponent or perceived injustice. Their space in the SSA plot includes broadcasting behaviors, showcasing their desire to express their plans and messages to others. They are extremely articulate. These individuals have an explicit message or grievance, and the violent offense is their way of spreading that message.

Summary of Aim 1

Aim 1 of the current study was to determine if a thematic framework of instrumentality and expressivity could be meaningfully applied to lone-actor terrorists and public mass-murderers. Using SSA and SPSS, this first aim was successfully achieved as the visual split between two types of offenders was present. Moreover, the themes of instrumental and expressive aggression were found to be effective in understanding the antecedent behaviors and characteristics of offenders. Furthermore, these themes are distinct from one another indicating that they may be utilized to classify those actions of the given offenders.

Research Question 2

The second aim of the current study is to determine if a specific behavioral classification is related to offenders' attack methodology. This hypothesizes that pre-offense behaviors and characteristics will be meaningfully associated with distinct offending patterns as evidenced in the offenders' choice of targeted location.

This aim hypothesizes that the offenders' classification of either expressive or instrumental will determine if they had a personal history with the location of the planned attack. Table 5 below shows the frequency analysis of this variable.

Table 5 - Frequency (%) of Offender's Personal History with Target
(N = 125)

Classification	**N (%)**
Expressive	65 (91.5)
Instrumental	43 (87.8)
Hybrid	4 (80.0)
Total	112 (90.0)

As shown, 112 offenders had a personal history with the targeted location while 13 did not. This personal history includes 65 expressive offenders, 43 instrumental offenders, and 4 hybrids. A chi-square analysis was subsequently conducted to identify a statistically significant relationship between the variables. The Chi-square analysis did not reveal any significant differences ($X(2) = .963$, ns). Therefore, it cannot be concluded that the variables are related. The offender's classified aggression as expressive or instrumental does not relate to whether or not they had a personal history with the targeted location.

Summary of Aim 2

The second aim of this study was to determine if offender classification can be associated with their chosen attack methodology. As demonstrated in the statistical output, this hypothesis was rejected. The correlation was not statistically significant. Thus, the offender's personal history with their chosen target is not related to their classification of expressive or instrumental.

CHAPTER 6: AD-HOC ANALYSIS OF OFFENDER TYPE

Overview

The majority of previous research that highlights the expressive and instrumental forms of aggression has additionally been able to classify consistencies or relationships between offender types. In Salfati (2000), the hypothesis sought to test the supposition that "offenders exhibiting a specific theme at the crime scene would exhibit that same theme in their background characteristics" (p. 283). Offenders were able to be classified and then categorized based on the established behaviors and characteristics prevalent in previous research. As chapter 4 demonstrated that the antecedent behaviors and characteristics of lone-actor terrorists and mass-murderers can be meaningfully classified into distinct thematic types, the present ad-hoc analysis aimed to determine whether lone-actor and mass-murderer types of offenders have a significant association with the expressive/instrumental classification of their behaviors.

Method

Each case used in the original database was previously coded as lone-actor terrorist or mass-murderer. SPSS was used to include that variable, with the crosstab and chi-square analysis reported below. (Table 6)

Results

Aim 1: Determine which behavioral theme each type of offender (lone-actor terrorists and mass-murderers) can be categorized into (expressive and instrumental aggressors).

The study revealed that mass-murderers shared significantly more traits of the expressive aggressor (71) than those of an instrumental aggressor (41). Comparatively, lone-actor terrorists were somewhat more often instrumental (36) than expressive (29).

Additionally, 6 lone-actors and 3 mass-murderers shared traits of both classifications to be deemed hybrids. This is consistent with previous criminal psychology research (Salfati & Bateman, 2005; Sorochinski & Salfati, 2010; Trojan & Salfati, 2010) asserting the shared nature of cases where offenders are expected to present aspects from both themes while still predominantly representing one theme greater than the other.

Table 6 - Frequency (%) of Classified Offender Type
(N = 186)

		Lone-Actor (N%)	Mass-Murderer (N%)
Classification	**Expressive**	29 (29.0)	71 (71.0)
	Instrumental	36 (46.7)	41 (53.2)
	Hybrid	6 (66.7)	3 (33.3)
Total		71 (38.2)	115 (61.8)

A Chi-square analysis revealed that the differences in classification were statistically significant ($X (2) = 9.063$, $p=.011$). This suggests that there are differences in the behavioral classification of lone-actors and mass-murderers into expressive and instrumental themes.

Discussion

The present ad-hoc analysis aimed to determine if lone-actors and mass-murderers could be further classified into the expressive and instrumental aggressors. The results of the current study affirmed their classification. The statistically significant association between variables demonstrates this relationship. Lone-actor terrorists are more likely to be classified as instrumental aggressors and mass-murderers are more often classified as expressive offenders.

This is in line with research that suggests lone-actor terrorists interact with wide networks, produce public letters, and have a criminal or violent history, (Horgan et al., 2016) similar to the instrumental theme of aggression that emphasizes group motivations and violence as a means to further an ideology or group's ulterior goal (Salfati, 2000; Santtilla et al., 2003; Salfati & Bateman, 2005). Serial homicide offenders in the instrumental subgroup (Sorochinski & Salfati, 2010) are often less emotional and more calculated – their ulterior motive drives them to perpetrate the attack. Conversely, the results from the present study suggest mass-murderers are more isolated, personally angered, and have a desire to harm others - corresponding with the expressive aggressor who has an interpersonal connection to a specific grievance and perpetrates a violent act because of that personal feeling (Salfati, 2000; Salfati & Bateman, 2005). Expressive offenders perpetrating domestic homicide exhibit similar characteristics – their aim is to hurt a specific person and their consistencies in attack methodology mirror this sentiment (Sorochinski & Salfati, 2010). Hence, the present findings are in line with other types of violent crime classifications.

CHAPTER 7: DISCUSSION

The present study aimed to investigate the antecedent behaviors and characteristics of lone-actor terrorists and public mass-murderers to meaningfully classify them into distinct thematic types based on expressive or instrumental forms of aggression. It further went to question if that classification could be associated with the offender's chosen target location. That determination lays the basis for exploring different forms of prevention and de-radicalization strategies based on the characteristics of that specific type of aggression.

In investigative psychology, the application of a classification of behaviors and characteristics to better understand an offender's pathway to violence and potential future plots is extremely prevalent in numerous classical works. Research studies in investigative psychology (Salfati & Canter, 1999; Salfati, 2000; Sorochinski & Salfati, 2010) have explored the utility of better understanding the personal background and antecedent behaviors of violent aggressors to most effectively relate to and convey prevention tactics and recognize patterns in behaviors. Those researchers have identified key components in an individual's actions that demonstrate consistencies throughout that offender's crimes. While this method of classification has been well established as useful and applicable for a wide variety of crime types, it has not previously been applied to the present one.

As the importance of reliable behavioral models has been stressed (Fesbach, 1964; Toch, 1969, as cited in Salfati, 2000), this work contributes to the growing need of behavioral linkages and valid methodologies best fit for offenders in the field of counterterrorism and violent extremism by lone-actors. Given this sector's diverse actors,

no single theory or tactic has been or could be irrefutably used. Thus, the necessity of a wide array of preventative measures, de-escalation procedures, community outreach plans, and policy initiatives, is imperative to address this changing issue. To foster the changing needs of this sector of security, the present study's classification of form of aggression, theoretical implications, and practical applications are vital to the diversification of preventative efforts.

Summary of Results

Initial Classification

The first part of this study addressed if lone-actors and mass-murderers could be meaningfully classified into distinct forms of aggression. As previously highlighted in the literature review, investigative psychology research that examines violent crimes commonly distinguished between offenses using the categories of expressive and instrumental aggression. The results of the first aim of the present study supported these hypothesized differentiating forms of aggression, confirming that the selected antecedent behaviors and characteristics could be meaningfully classified.

The expressive theme of aggression relates to the emotional, interpersonal confrontation, and represents offenders who often share a history or intimate anger with the target (Salfati & Bateman, 2005). In the present study, this represented offenders who were mostly young, socially isolated, and had a personal grievance with their end target. They used violence in reaction to a perceived injustice against themselves or the ideology they closely identified with. This type of offender was personally hurt – they were angered by a specific incident and expressed a desire to physically harm others because of that treatment. They do not have a violent or criminal history and perpetrated this act

based upon their individual grievance that was a triggering point. Given their typically non-violent past, they are more likely to easily and legally obtain heavy weaponry. This is evidenced by their ability to stockpile weapons. Family or friends may not typically assume this individual is radicalized or willing to perpetrate an attack due to their perceived isolation and relatively normal or quiet history. Given their suggested title, they essentially express and resolve their personal anger or specific perceived injustice through violence itself. As later discussed, these personal characteristics should be taken into account when accompanied by a change in behaviors which may indicate this type of individual is progressing from radical ideas to action.

The instrumental offender has an ulterior motive or bold statement to communicate through the act of aggression. The act furthers the agenda of their cause, or more commonly the cause of the group to which they attribute their commitment. As supported by the literature, the instrumental aggressor is more likely to have used violence in the past, given their arrest and criminal history. Their social network such as their family and friends are aware of this individual's grievance, whether it is against a group or opposing ideology. They have previously used violence as a method to obtain personal gain or disseminate a specific message. That need or personal gain could be expressed in terms of disseminating a specific goal or message that is significant to that individual or the group to which the individual identifies with. Similarly, as the name suggests, their violent act is merely an instrument through which they use to achieve an end goal. Overall, these findings are consistent with many aspects of previous literature and theory, whilst also providing an alternative form of classification than commonly used in terrorism and radicalization studies.

Offending Patterns

The second aim of the current study hypothesized that the offenders' classification of either expressive or instrumental would determine if they had a personal history with the location of the planned attack. For instance, the expressive offender would be expected to have a significantly greater personal history with their target than the instrumental offender, due to the expressive offender's emotional nature and connection to their act. While this hypothesis was not statistically significant enough to be supported, there was still a trend toward the expected results with a slightly greater number (65) of expressive offenders who had a history with the target than instrumental offenders (43). However, this could be inconclusive in the present study due to the sample size, as limitations later discussed will address this issue.

Ad-Hoc Analysis Findings

One especially important conclusion that followed the classification was whether or not lone-actors and mass-murderers could be placed in the respective categories of expressive and instrumental typologies. Previous research supported the conclusive behaviors and characteristics that were able to link both types of offenders to a specific theme of aggression. Mass-murderers were most closely related to expressive aggressors and lone-actor terrorists were predominantly instrumental. That classification represents a step to further diversify the theories and methods used in radicalization and counterterrorism studies to that from other disciplines such as those in classical criminal justice and investigative psychology.

Theoretical Implications

Homeland security and social science theories have driven the present study and provide the basis for the above-mentioned findings. The successful classification of offenders affirms this study's original emphasis on social theories of radicalization. The expressive offender who feels internalized grievances, personal hurt, and close proximity to the specific target is consistent with the application of social identity theory. The very nature of the theory lies in the individual's personal interpretation of events that a supposed out-group perpetrates on their in-group (Al Raffie, 2013). The offender internalizes that perceived injustice, where they feel a personal attack, hatred, and anger towards that target. It is not just an attack on the group or ideology, but an attack on themselves. It could be viewed as a significant threat to their own life and possibly towards their relationships with others who share similar views. This aligns with the expressive behaviors and characteristics concluded from the present study. The expressive offender is one who is most personally connected to their target; they are angry and express a desire to harm those who they feel pose a threat. Consistent with literature on expressive offenders (Santilla et al., 2003; Salfati & Bateman, 2005), they are likely to present mental health issues, be socially isolated, and express anger towards a specific issue. In the current study, expressive offenders were also more likely to be single and live alone, indicating it may be difficult for them to maintain relationships or connect to others. This heightens their personal connection to the perceived threat and their objective to eliminate that threat by any means necessary as it could jeopardize their normal way of life. Under the lens of social identity theory, the expressive offender represents one who claims a self-ascribed significance to a specific community or

ideology and is willing and able to perpetrate violent acts to protect their personal connection or ideology from a perceived threat. Furthermore, their dedication to destroy that target is further complemented by their weaponry stockpiling that is possible to acquire and accumulate through their non-violent history.

The instrumental offender focuses on personal gain and utilizes the victim or target as a vehicle through which they can obtain their desired objective; the benefit is intangible and intended to make a statement rather than be personally motivated (Salfati & Bateman, 2005; Trojan & Salfati, 2010). Social movement and social network theory represent the relations or ties between actors that make up larger interpersonal networks, where kinship provides a link into a group where that individual socializes with other nodes of like-minded radicals (Hofmann, 2020). Here, the group mentality is emphasized where individuals are encouraged and expected to contribute to the larger goals of the overall group. The health and continuity of the network is prioritized over the individual. The perceived shared experiences from a specific group or culture form inextricable bonds between individuals, offering a sense of duty or purpose that can often be marred by chaos and uncertainity (McDonnell & Cozine, 2021). A potential threat to those bonds impels those to act to restore the balance that could be lost (McDonnell & Cozine, 2021). In the present research, the instrumental offender exhibited more group-focused behaviors and characteristics. They had a history of violence and previous arrests, indicating their inclusion in some form of ideology or larger community. In one sense or another, they felt belonging to a group, potentially through their violent incarcerated past or interactions with other criminals. Similar to social network theory, these offenders most often shared relationships (e.g. criminal ties through incarceration, membership in

online radical chat room) that acted as nodes or linkages which provide access to the rest of the network.

Additionally, the predicted goal of an instrumental offender – where violence is a means to an end – is supported by their antecedent actions. They broadcasted intent to their social groups and disseminated written messages proclaiming their main purpose. This is intentional as to not be disregarded as mentally ill or simply a "mad-man" and as having a personal grievance with the target, but rather to be viewed as part of a larger movement with an intended goal. Their self-radicalization and entrance into a social group accompanies their feelings of self-worth that is determined by the acceptance of others from that larger group. They are more inclined to perpetrate a violent attack in name of that group. Whether for personal gain of notoriety, or to further the group movement, they put the aims of the group at the forefront of their purpose. This form of aggression is representative of the group-think ideology and reiteraterates the dangers of echo chambers.

The theoretical implications of this study reveal the utility in exploring unconventional avenues when attempting to solve complex issues. Given the nature of this type of violence and range of actors in the field of counterterrorism and homeland security, more specifically when analyzing lone-actors and mass-murderers, a large gap and opportunity exists for other disciplines to lend theory and practice. Disciplines with these established theories can fill those gaps in knowledge and understanding in this developing field. The present study's use of investigative psychology and behavioral classifications (e.g., the division of expressive and instrumental aggressors) has not previously been applied to the analysis of lone-actor terrorists and public mass-

murderers. This method, that has been effectively used to analyze a range of other violent crimes, has proven to be a meaningful approach of classifying these groups of violent offenders. These findings reaffirm the utility of the expressive and instrumental model in yet another type of violence, supporting its applicability.

Investigative psychology in particular emphasizes its use for all forms of criminality which may or may not always be conventionally within the domain of law enforcement services. Hence, the scope of actors previously mentioned (e.g., family, friends, social services, psychological and religious counsellors, employers and coworkers) play a critical role through its diverse range. Applying alternative theories and methods extends the reach of practitioners and academics looking to expand and contribute to the discipline. The application of social theories of radicalization with established investigative justice psychology extends the discipline's knowledge base by exploring alternative explanations to wicked problems that are not easily solved by narrow solutions. The present project confirms the utility of a multi-disciplinary approach to this form of radical violence. In sum, the continued development and experimentation of the aforementioned theories from diverse backgrounds furthers the advancement and understanding of this form of violence.

Practical Implications

While the theoretical understanding of behaviors in the social context of lone-actors and mass-murderers is relevant for future progress, the work's ideal function is its application for law enforcement, intelligence agencies, and the public in identifying, preventing, and addressing these forms of physical violence. It is therefore essential to explore the various avenues in which this theoretical understanding can achieve its

ultimate goal. As research has demonstrated there is no singular form of this type of violence, there is similarly not an explicit solution. However, studies such as the present one aim to construct evidence-based dynamic risk assessment tools to further the spectrum of available methodologies to prevention and de-escalation. The inclusion of antecedent behaviors, as shown in the current study, can represent warning signals indicating the desire or preparation of an imminent attack. Dynamic indicators, in this form, could identify patterns of behavior that indicate stages in a process of radicalization from formation to fruition. The behaviors described in the methodology (e.g., disseminating written messages of intent or grievance, expressing anger and a desire to hurt others, arrest/criminal history, history of violence) could be used to complement other personal characteristics as a potential sign of a vulnerable individual whether to radicalization or in the pre-planning stage. Offenders have communicated many of these warning signs through social media applications or internet messaging forums. This lends law enforcement and intelligence agencies the specific opportunity to identify these early actions. Machine learning techniques and artificial intelligence is one process to identify the psychological warning behaviors in such written communications. For example, Linguistic Inquiry and Word Count (LIWC) sorts words in psychologically meaningful categories by counting the relative frequencies of words in a text and dividing words into different categories to create a profile of the person who wrote it (Cohen, Kaati, & Shrestha, 2016). Those categories can be used to assess the emotionality in a text and how it compares to baseline neutral blogs (Cohen, Kaati, & Shrestha, 2016). The analyzed texts of lone-actor terrorists in Cohen et al. (2016) had "significantly lower frequencies of positive emotion and friends and significantly higher frequencies of

negative emotion, anger, power, certainty, third person plural" (p.5). This supports the notion that a sense of persistent grievance is being disseminated by lone-actors to the public or other supporters on social media channels. Computerized text analysis is not a conclusive method alone, nor should it be used without the close attention of a human analyst. Instead, it is a step towards a more comprehensive method to use in conjunction with other risk assessment tools.

In light of the results in the classification from the current study through its analysis of the co-occurrences of the actual behaviors of offenders, attention should be bought to the behavioral components that make up each theme and how they could be used to relate to individuals that fall into that classification. As discussed, the expressive offender is younger, more socially isolated, directly angered, has stockpiled weapons, and is most likely perpetrating a violent act due to a personal connection or grievance. This challenges the practitioner on tactics to best reach and relate to that type of offender. Even though they are more likely to be isolated and not affiliated with a group, there are still points in society where that individual interacts with friends or family, where those closest to that individual have the ability to notice changes in their demeanor or behaviors. When this type of socially isolated individual begins expressing anger towards a group or situation, coupled with them becoming more secretive with their personal space (e.g., signaling weaponry they may have stockpiled) these behaviors and characteristics could be indicators that the individual has taken on a radical mindset and is in the process of moving from idea to action. In one aspect, they are more likely to stockpile weapons, and as they do not share a criminal background or arrest history, the acquisition of legally obtaining a weapon would most likely be their approach. This could

mean strengthening the barriers and controls to purchase a weapon and instituting more mental health qualifications and routine checks. Since this type of individual is more isolated rather than one who has a criminal background with extensive connections, they may be less likely to attempt the violent act if they are unable to immediately locate and source the exact weapon of their choice. Their personal connection to the act may make them more driven to use that chosen weapon, and the inability to find or purchase that it could potentially be a deterrent in them perpetrating the violent act.

Regardless of their degree of isolation, research suggests that they are far less isolated than expected (Von Behr et al., 2013; Hamm & Spaaj, 2015; Schuurman et al., 2018). They interact with society in some form, whether it is online with sympathizers in a chat room or social media site, or to family and friends who may disregard that individual as being anti-social. Their social circle is still aware of a grievance that individual shares with others from an out group, demonstrated in the current study's analysis. Reaching this type of individual should be explored by a multi-faceted approach. This accentuates the importance of the social identity and network of the individual. Their friends and family may be the first line of identification and prevention as they could physically observe changes in behavior (e.g., individual going out of their way to visit weaponry stores; closing themselves in their bedroom more than usual; becoming more isolated or interested in obscure topics) that could indicate this individual is serious about perpetrating a violent act. Those close contacts should not feel intimated to reach out to social services or law enforcement if they feel that individual poses a threat. Instead, they should be encouraged to seek the help that person needs, whether it is mental health therapy or early intervention to prevent further radicalization. This

community-wide effort is one step in further identifying and thus possibly preventing acts of violence before they could be attempted.

The classification of the instrumental offender contrasts to the expressive offender in terms of their group dynamics and the form of outreach intelligence agencies may need to present. As instrumental offenders have more experience with law enforcement given their criminal history and are broader in their purpose as to further the message of a larger group or movement, strategies for interception of radical ideas or plans can be instituted through a variety of internet-wide and social media tools. An automated approach to detecting threatening online communication for the messages of the instrumental offender can be one component. As previously mentioned, using Linguistic Inquiry and Word Count (Cohen, Kaati, & Shrestha, 2016) and other artificial intelligence tools can probe open-source data exponentially quicker than a human analyst. However, this is not sufficient in itself and must be complemented by the analyst rather than act as a replacement. Additionally, social media companies must better monitor and remove harmful and violent content when detected and reported. As discussed in the literature, (Awan, 2017; Bodine-Baron et al., 2016; Berger & Morgan, 2015 Reed & Ingram, 2017) terrorist propaganda inundates the internet between postings on social media of terrorist sympathizers to the circulation of entire instructional manuals. Widespread and accessible content enables those self-radicalized individuals. The swift removal of violent content could sever the communication channels between these individuals with foreign terrorist groups. Some degree of accountability must be placed on these websites that allow the production and dissemination of violent material. Additional security measures such as the flagging or banning of individual accounts should be taken into consideration.

If the social forums and thus the group dynamics of these instrumental offenders could be disrupted, they may become discouraged and uninterested in continuing to attempt connecting with those online groups. As a result, more rigorous policies and standards should be imposed and assumed by these private companies.

Another aspect that must continue to be addressed is the public's role in identifying and reporting manifestos of violence that are posted on social media sites and messaging forums. Violent and threatening messages should not be disregarded. They should be taken seriously and seen as an imminent call to action. In the discussed signaling cases (Mueller, 2016; Rose & Morrison, 2021) these offenders posted clear messages on social media declaring their grievance and allegiance to a specific ideology prior to physically perpetrating their violent act. The escalating degree to which these individuals were posting prior to their offense shows their social network's knowledge of their grievance and blatant disregard for it. Furthermore, this type of offender's group mentality should be referenced. As they are likely carrying out the attack based on the ideology or goals of an outside organization (one they do not need specific ties to, sympathizing on social media is sufficient), the infiltration and cessation of those thought-leaders could impact the rest of the group. This sort of top-down strategy aims to address the root causes of radicalization and resolve issues diplomatically as to not have the followers retaliate.

Limitations and Future Research

Despite the contributions of this study in expanding the perception of lone-actors and mass-murderers, there are some clear limitations that should be noted. First, findings may be hampered by a common deficiency in terrorism studies which is the reliance on

secondary source data (Hofmann, 2020). Primary source data, specifically manifestos or interviews with the perpetrators, are difficult to access and usually not released to the public. This presents significant barriers in obtaining those direct statements such as redacted internet postings or direct messages, which may provide substantial value to the study. Access to personal journals, biographies, video statements, or correspondence written by lone-actors could aid this research and as such, efforts should be made to obtain quality primary data in future research focused on the networks and behaviors of lone-actors (Hofmann, 2020). Additionally, the data in the present study did not include specific forms of broadcasting or the exact year the studied act of violence occurred. This information could present a unique progression useful for future research.

Specific to this research's database, the sample only includes information on individuals who planned or perpetrated incidents reported in the media (Gill et al., 2014). It is possible some incidents were missed that "either (i) led to convictions but did not register any national media interest but may have been reported in local level sources not covered in the LexisNexis archives or (ii) were intercepted or disrupted by security forces without a conviction being made (Gill et al., 2014, p. 426). While this could be a limitation, it also represents the most readily available information accessible to researchers. Attacks that are heavily reported and investigated in the media are likely to have more information and greater details than attacks that are not publicized.

The accuracy of a statistical analysis of acts of terrorism in general also raises concern (Nussbaum, 2009). Given the wide variety of attacks at an incident level in terms of their scale such as injuries and fatalities, the motivation of the offender, and the symbolic meaning behind the attack, their comparison to one another may not be useful

for probabilistic mathematical study (Nussbaum, 2009). The outliers in a database may even skew the results; some events may be underemphasized where their scale could not be accurately captured while others may be overstated to fit the category's definition. This emphasizes the limitations of a database of this magnitude. The rarity and scale of this type of event may affect generalizability. However, the frequency and availability of events that fit this study's criteria can be justified by the nature of this type of terrorist attack. As there are a limited number of attacks that provide sufficient detail to fulfil the conditions of this study in terms of the offender's background data, the sample size of 186 cases was deemed appropriate.

Finally, it is important to consider the timeframe of the database. The present study included cases from 1990 – 2013, spanning a large time period where motivations, personal characteristics, antecedent behaviors, ideologies, and methodologies could have varied. Given the changing nature of this sort of violence, it is plausible that some discrepancies could arise from such a large time span. Subsequent studies should examine this issue and whether or not it is feasible to include cases with such a large difference in time, or if it is reasonable given the nature of this type of violence. Managing a practical and effective number of cases should be further considered as to obtain the most accurate results.

Additional contributions to this research could include a database that incorporates those who broadcasted specific behaviors and perpetrated an act and those who similarly broadcasted warning behaviors but did not perpetrate an attack. While this may prove difficult in obtaining protected data and predicting whether or not that

individual will actually enact those plans, it could help extend practitioners to a deeper understanding of imminent warming signs in vulnerable individuals.

Furthermore, in terms of data collection, it would be useful for future studies to include qualitative examples of the offenders' specific broadcasting actions. Manifestos or direct social media postings could be useful for researchers looking to further classify and categorize different forms of offenders. Information regarding their specific target or postings made online prior to their attack could aid investigators or social media companies in identify potentially vulnerable and violent individuals.

The classification of these violent offenders into distinct thematic types represents a primary stepping stone for future research to further explore these avenues. As previous research (Fesbach, 1964, Toch, 1969, as cited in Salfati, 2000; Salfati & Canter, 1999) hypothesized and concluded that crime scenes and attack methodologies could reveal stylistic distinctions in the role of aggression in the offense, future studies on lone-actors should continue to test and challenge these theories. This influence of interpersonal relationships between the offender and the victim or target should continue to be investigated in terrorism studies. Continued research on the present topic could more closely focus on this relationship and how it relates to offenders' attack methodology, potentially being indicative of potential attacks.

Conclusion

In sum, there is an urgent need for reliable risk assessment procedures and preventative tools for use within a terroristic and violent population. Viewing this form of terror perpetrated by a singular profile of individual is problematic. Homeland security practitioners risk impeding their ability to effectively detect and address this danger if the

scope of actors and range of their social interactions are overlooked. The prevalence and role of social ties in the formation of these self-radicalized and violent offenders' motivation, leakage behaviors, and methodology must be addressed. Accounting for their vast social network and hidden reach through social media is a critical first step in discontinuing the discrete category given to these individuals. It is precisely this degree of social interaction between these types of violent offenders and broader radical environments which open avenues for detection and interdiction that may previously have been thought closed. Embracing the distinctions and commonalities of these grievance-fueled actors can aid in the development of effective preventative measures to reduce these violent offenses. The findings in the current study demonstrate the utility in a comprehensive risk assessment methodology that includes professionals from law enforcement, psychology, criminology, investigative psychology, and other social sciences. Overall, the present study represents one step in furthering the use of an interdisciplinary approach in addressing these forms of radicalized violent offenders to include theories from other disciplines that may offer unique perspectives, allowing for actionable insights useful for threat assessment procedures best fit to address this complex form of violence.

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