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Radicalization patterns and modes of attack planning and preparation among lone-actor terrorists: an exploratory analysis

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ABSTRACT

This article explores the link between radicalization patterns and modes of attack planning and preparation among lone-actor terrorists. Building on theorized patterns of lone-actor radicalization, we discuss and compare their modes of pre-attack behavior, including target and weapon choice, observance of operational security measures, likeliness of engaging in leakage behavior, and the overall amount of time devoted to these activities. This exploratory study builds upon a dataset of thirty-three lone-actor terrorist cases in North-America and Europe between 1986 and 2015. The analysis suggests that specific patterns of radicalization are linked to systematic differences in modes of attack planning and preparation. The results provide insights into the heterogeneity of terrorist involvement and tentatively suggest the potential importance for law-enforcement agencies in using case-specific knowledge on radicalization patterns to inform forecasts of likely pre-attack behaviors.

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Introduction

Recent years have seen an increase in the volume of lone-actor terrorism in the Western world that is matched in at least some cases by an upward trend in lethality (Hamm & Spaaij, 2017; Phillips, 2017). Although not as deadly as group-based terrorism (Spaaij, 2012), lone-actor violence, such as vehicle-borne or firearms attacks on soft targets, represents a serious threat against Western societies (Perry, Hasisi, & Perry, 2017).

In this paper, lone-actor terrorists are defined according to three criteria: firstly, a lone actor must operate as a single perpetrator in the execution of an attack; secondly, a lone actor must not have a direct affiliation with a terrorist group or organization; and thirdly, a lone actor terrorist must not follow the direct commands or be under the direct influence of a leader or group (Malthaner, Lindekilde, O'Connor, & Bouhana, 2017). This definition, thus, does not preclude individuals who radicalize in a group-context, but, for various reasons, move on to commit terrorist violence alone.

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Recent advances in the study of lone-actor terrorism have shown that the radicalization of these individuals is best understood as a variation of group-based radicalization, rather than as a different phenomenon altogether. Though it may appear counterintuitive, social relations in both the offline and online domains also exert a considerable influence on the radicalization pathways of lone actors (Malthaner & Lindekilde, 2017). Lone-actor terrorists are more often than not in contact with radicalized individuals, groups or larger 'radical milieus' (Malthaner & Waldmann, 2014), but for various reasons either do not fully integrate into these or become detached from them before engaging in violent projects alone (Lindekilde, Malthaner, & O'Connor, forthcoming). Moreover, as this article will show, lone-actor radicalization is rarely a singular process but takes different forms according to differing configurations of social ties and relationships with the individuals' immediate social environment.

New research has also shed light on the particularities of lone-actor attack planning and preparation. Work by Schuurman, Bakker, Gill, and Bouhana (2017) found that most individuals commonly seen as 'lone wolves' do not fit that moniker's connotations of highly-capable terrorist operatives who work alone and are able to strike out of nowhere. In fact, a majority of lone-actor terrorists display poor operational security and 'leak' their violent convictions and intentions in a way that leaves them vulnerable to detection and interdiction at various stages in the pre-attack process. These individuals differ markedly from one another in terms of the professionalism and duration of their pre-attack behaviors. The question that the present article explores, is whether the heterogeneity found within patterns of lone-actor radicalization can be matched to particular modes of attack planning and preparation.

The processes that can bring people to adopt a mind-set in which the commission of terrorist acts is evaluated positively are distinct from those that can lead to the actual planning, preparation and execution of terrorist violence (Taylor, 2010; Taylor & Horgan, 2006). Although it has been recognized that lone actors do not form a homogeneous group, research has so far not systematically investigated the potential links between specific patterns of lone-actor radicalization and subsequent forms of pre-attack behavior (Simon, 2013). The core argument of the present paper is that the way radicalization unfolds, translates into systematic differences in individual capacities for attack planning and preparation and specific preferences for pre-attack behavioral choices. Particular radicalization patterns might influence target and weapon choice, observance of operational security measures, likeliness of engaging in leakage behavior, and the overall amount of time devoted to planning and preparatory work.

Investigating this link is important for counterterrorism practitioners as well as academics, because understanding how patterns of lone-actor terrorist radicalization may map onto pre-attack behaviors provides potential new avenues for both prevention and interdiction. Such information can potentially be put to use for risk assessment purposes, help practitioners and policy makers prioritize the allocation of scarce resources, and provide guidance on the timing of potential interventions. Mapping lone-actor terrorist events from radicalization to attack planning and preparation can provide better grounds for assessing what may come next, in a context that is usually governed by limited information of frequently uncertain accuracy.

We engage with the following research question: to what degree do different patterns of lone-actor radicalization lead to variations in subsequent phases of attack planning and

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preparation? To address it, we take as a starting point previous research on lone-actor radicalization, which has identified and theorized a number of recurrent radicalization pathways (Malthaner et al., 2017). We chose the two most frequently encountered radicalization pathways – which have been referred to as Volatile and Autonomous lone-actor terrorist radicalization – and study whether they lead to particular forms of pre-attack behavior.

To guide our inquiry, we formulate several expected differences between Volatile and Autonomous lone actors with regard to their choice of targets and weapons, the degree to which they try to maintain operational security, their likeliness of engaging in leakage behaviors and the temporal length of their planning and preparatory activities. We use these expectations to guide our exploratory comparison of attack planning and preparation using a dataset of 33 lone-actor terrorists, of which 23 are categorized as Autonomous and 10 as Volatiles. The dataset's temporal delineation is 1986–2015, and includes individuals driven by Islamist, right-wing, anti-abortion and animal-rights based convictions drawn from Europe and North-America (Schuurman et al., 2017) (See Appendix 1).

To be clear, the thirty-three cases of 'Volatile' and 'Autonomous' attack planning and preparation are too few to reach broadly generalizable insights. Yet, they offer an empirically-grounded starting point for exploring the degree to which differences in the ways in which individuals come to adopt the motivation to commit acts of terrorist violence systematically shape pre-attack behavioral choices. The findings also underline the potential importance of case-specific knowledge on radicalization pathways for law-enforcement agencies to forecast pre-attack behaviors and, not least, the duration of the attack and preparation phase. Concretely, as we will show, knowing that a case at hand resembles that of a Volatile radicalization pattern might mean that swift intervention should be a priority, while further evidence gathering prior to intervention may be more appropriate in the case of an Autonomous radicalization pattern.

In the following section, we present the theoretical foundation of the paper, which briefly outlines a typology of lone-actor radicalization pathways and then details the patterns and causal mechanisms of two distinct pathways – Volatile and Autonomous. We also shortly review extant knowledge of lone-actor terrorist attack planning and preparation. We then describe several expectations about how Volatile and Autonomous patterns of lone-actor terrorist radicalization may map onto particular pre-attack behaviors, which serve as analytical lines of inquiry for the subsequent exploratory comparison. Before presenting the results, we outline our methodological considerations and the data used in the paper. We conclude by discussing the results and their potential implications for prevention and interdiction.

Theory: lone-actor terrorist radicalization & pre-attack behavior

In theorizing the radicalization of lone-actor terrorists, we move beyond the identification of risk factors – an approach which has unearthed a wealth of micro-level empirical insights (Borum, Fein, & Vossekuil, 2012; Danzell & Montañez, 2016; Gill, Horgan, & Deckert, 2014; Pantucci, 2011) – by focusing on the mechanisms that can link individual actor characteristics to specific settings and configurations of social relations in fostering the propensity to consider terrorism as a viable action alternative (Wikström & Bouhana, 2017). It has been convincingly demonstrated that most lone-actor terrorists are not the isolated

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loners of popular imagination (Berntzen & Sandberg, 2014; Gill et al., 2014; Nesser, 2012). Accordingly, rather than seeing 'aloneness' as a static characteristic of these individuals, we consider it a relative phenomenon which varies among cases and over time.

Previous research traced the creation and rupture of lone-actor terrorists' social relations over time and across different settings as key to understanding their radicalization (Malthaner et al., 2017). In this earlier research, the phenomenon of lone-actor terrorism was disaggregated to identify recurrent radicalization patterns comprised of sets of causal mechanisms through a two-step approach. First, the authors conducted within-case analyses on 25 individuals drawn from the Gill et al. (2014) dataset, utilizing theory-building process tracing (George & Bennett, 2005). This entailed moving backwards from the event under investigation, here the motivation to carry out a terrorist act alone, and tracing the causal mechanisms which together can account for the observed outcome. Second, the authors engaged in cross-case analysis, condensing data and categorizing cases in a way that recurrent empirical observations are put in relation to each other, and the causal mechanisms connecting them specified.

The 25 cases studied by Malthaner et al. (2017) were selected foremost on the basis of the depth of the available material regarding the process of radicalization, especially configurations of social ties and their development over time. The employed techniques of data analysis necessitated detailed information on the sequential ordering of events. This inductive analysis uncovered two broad recurrent patterns of radicalization: Peripheral and Embedded, which can be further subdivided into two sets of three sub-types (Lindekilde et al., forthcoming; Malthaner et al., 2017).

Peripheral lone-actor terrorists are individuals who adopt certain political or religious beliefs, commonly found in broader radical milieus, but fail to integrate comprehensively with collective initiatives or networks. They form a range of loose and affiliative ties with radical actors and milieus but never succeed in substantiating them. They remain on the periphery of these milieus, sufficiently engaged to incorporate some of the ideologies and beliefs which prevail in them, along with justifications for violence for their specific cause, but never fully progressing to active membership or engagement (Malthaner et al., 2017).

The Peripheral-Withdrawn subtype tend to lack the self-confidence to propose themselves as potential militants to others within the radical milieus they frequent (e.g. the youth who shot US soldiers in Germany in 2011). Those within the Peripheral-Anti-social subcategory tend to be rejected after repeated efforts to engage because of objectionable personality traits such as narcissism or domineering behavior (e.g. Anders Breivik), while the Peripheral-Volatile subgroup are kept at a remove because of well-founded beliefs of their fundamental unreliability and erratic behaviors (e.g. Omar Hussein, the Copenhagen shooter in 2015) (Malthaner et al., 2017).

In contrast to the Peripheral pattern of radicalization, Embedded lone-actor terrorists are individuals who were fully engaged members of radical groups or milieus but who, to varying degrees, became disembedded either voluntarily or involuntarily. This is most clearly exemplified in the subcategory of the Formerly-embedded lone actor. Most commonly, they become detached when they are suspected of having been 'burned' by police or intelligence agencies and subsequently marginalized by their erstwhile colleagues. Others are returned foreign fighters, such as the former al-Shabaab militant who attacked Kurt Westergaard in 2010, and who are formerly-embedded in the sense

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that they are suddenly no longer participating in the violent groups they joined overseas (Malthaner et al., 2017).

The Embedded-Autonomous subcategory refers to lone-actor terrorists who remain active in a milieu, but embark on parallel violent projects by themselves. Mohammed Bouyeri is a case in point; his murder of Dutch filmmaker Theo van Gogh in 2004 appears to have been planned, prepared and executed by him alone, yet Bouyeri was also a participant in the home-grown jihadist Hofstadgroup (Schuurman, Eijkman, & Bakker, 2015). Finally, those within the Embedded-Supported subcategory are on the margins of the phenomenon of lone-actor terrorism, overlapping significantly with broader research on collective or group-based terrorism. They are generally actively recruited by movements, groomed and then encouraged to carry out attacks on their own, albeit with some technical support or guidance, as in the case of Nicky Reilly who tried to detonate a bomb in an Exeter restaurant in 2008 (Pantucci, 2015).

From these six patterns, the Peripheral-Volatile and the Embedded-Autonomous pathways have been selected for further analysis in this article. As they represent two very different radicalization patterns, they are most likely to reveal potential differences in the subsequent phase of pre-attack behavior. Moreover, the 10 Volatile and 23 Autonomous patterns of lone-actor terrorists' radicalization were the most frequently recurrent ones in the larger dataset ($N = 55$) on which this article draws. The decision to focus on the Volatile and Autonomous patterns also rests on the assertion that the Volatile lone actor in the current threat scenario is particular relevant when it comes to so-called 'gangster Jihadism' (Basra & Neumann, 2016), while the Autonomous lone actor connects to widespread worries about 'leaderless resistance' amongst mainly right-wing extremists (Joosse, 2017). The next paragraphs expand on these radicalization patterns to enable the subsequent analysis.

Volatile lone-actor terrorists

Volatile lone-actor terrorists' radicalization is primarily characterized by inconsistency, brief interludes of intense political or religious engagement before reverting to patterns of hedonistic behavior, including habitual drug consumption and, often, violent crime. Their radicalization tends to be more impulsive rather than following a conscious decision, and they dedicate little time to educating themselves about their particular cause. Although many do, for example, peruse Jihadi videos, the emphasis is arguably more on the violence than the theological content (Lindekilde et al., forthcoming).

With regard to their social embeddedness, it is striking that many Volatiles are often socially popular amongst their peers and are immersed in multiple social milieus. However, they fail to fully integrate into radical collective initiatives because they are also perceived to be unreliable by their peers. They are characterized by impulsive behavior, pay little attention to the consequences of their actions, have issues with anger management and established histories of violence in criminal settings. Numerous Volatiles have served prison sentences and prison often serves as a setting of radicalization, either initiating or sustaining these processes (Neumann, 2010). In this sense, Volatiles are at the heart of the current debate on the crime-terror nexus, marking the interface between violent expressions of Salafism and broader patterns of criminal violence (Basra & Neumann, 2016).

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Volatiles' radicalization pathways are propelled by a number of causal mechanisms which are common to collective radicalization as well. Firstly, the mechanism of *unfreezing* is particularly recurrent. It occurs when an individual becomes 'disconnected from everyday routines and relationships' (McCauley & Moskalenko, 2011, p. 80), such a 'loss of connection and status leaves an individual with less to lose in radical action, including violence' (McCauley & Moskalenko, 2011, p. 82). It can be triggered by dramatic life changes, such as familial bereavement, migration, divorce, imprisonment or release from prison. Omar el-Hussein, who in 2015 carried out a series of shootings in Copenhagen, 'unfroze' after he was released from incarceration and faced a life on the outside with few social relations. He immediately reported to the Danish social services and requested help finding a job and getting his life back on track, but none was forthcoming, which appears to have triggered his shooting spree that resulted in two deaths (Jung & Dahlgaard, 2015).

Another key mechanism encountered within the Volatile radicalization pathway, is the presence of an *indirect encouragement cue* (Abelson, 1972). These can take the form of publicly disseminated calls for action by militant groups, such as the demand by Islamic State (IS) spokesperson Abu Muhammad al-Adnani that Canadian Muslims should attack Canadians, 'in any manner or way' (Hegghammer & Nesser, 2015, p. 16). In October 2014, shortly after al-Adnani's declaration, Martin Couture-Rouleau ran over a Canadian soldier. An arguably even more powerful emulative variation of indirect encouragement cues, are attacks carried out by individuals with whom lone-actor terrorists perceive affinity. The Copenhagen shooter, for instance, carried out his attack shortly after the high-profile 2015 attack at the Charlie Hebdo offices in Paris (Chrisafis, 2015; 'Copenhagen gunman', 2016). A final mechanism which is almost exclusive to Volatile lone-actor terrorists is their socialization in violent milieus prior to their radicalization. Their familiarity with violence, often both as victims and perpetrators, can lower cognitive inhibitions to subsequent involvement in acts of terrorism (Akers & Silverman, 2004).

Autonomous lone-actor terrorists

Autonomous lone actors are generally individuals that are both socially and politically well-integrated into radical milieus. These milieus serve as an echo chamber because they host discourses and fellow activists who endorse violence. Over extended periods, these pro-violence discourses can serve to reassure individual lone-actor terrorists that violence is indeed a justified and necessary course of action (Malthaner et al., 2017). Autonomous lone actors often combine extensive everyday political activism with the development of violent plots. Importantly, Autonomous lone-actor terrorists are involved in real-life milieus, not simply online communities. Accordingly, they do have potential opportunities to collectively organize violent initiatives, such as forming an armed militia or more elaborate multi-actor attacks. However, some choose to carry out violent autonomous attacks primarily because they believe they will be more likely to succeed on their own, or feel a particularly strong individual responsibility to act. In the case of Autonomous lone actors at least, this goes against Joosse's assertion that lone-actor terrorists engage in individual attacks because of the absence of collective alternatives (Joosse, 2017).

Compared to Volatiles, the Autonomous radicalization pattern is more drawn-out and steadily incremental (Malthaner et al., 2017). They initially become engaged in some

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form of legal nonviolent contentious politics, become ever-deeper immersed in these milieus before intensifying relations with more radical elements within them. Autonomous lone actors thus tend to be ideologically well-versed in the tenets of their creed and have elaborate justifications for the violence they seek to deploy. It is interesting to note that this radicalization pattern problematizes McCauley and Moskalenko's assertion that the 'slippery slope' mechanism of gradually deepening involvement in political violence does not apply to lone actors (McCauley & Moskalenko, 2017, p. 248). At least as far as the Autonomous subtype is concerned, this mechanism appears particularly salient.

Many Autonomous lone-actor terrorists operate according to a violent logic called 'leaderless resistance'. It became prominent in far-right milieus in the United States in the 1970s and early 1980s and has been described as 'a kind of lone wolf operation in which an individual, or a very small, highly cohesive group, engage in acts of anti-state violence independent of any movement, leader or network of support' (Kaplan, 1997, p. 80). Leaderless resistance was conceived by former Ku Klux Klan militant Louis Beam as a 'child of necessity' due to the ease with which the authorities could infiltrate and dismantle networks. The concept's promotion as a tactic thus reflected weaknesses in the American far-right (Beam, 1992).

In the 1990s, leaderless resistance underwent a European adaptation and began to be referenced by far-right milieus in Germany and Scandinavia (Gardell, 2014). But the greatest boost to the concept's use came when a similar logic was promoted by al-Qaida-inspired jihadist groups in the early 2000s. Abu Musab al-Suri's book, *A Global Islamic Resistance Call*, encouraged Islamist militants to engage in acts of violence individually or in small cells (Fredholm, 2016; Michael, 2012). The same arguments were bolstered by Anwar al-Awlaki's 2010 announcement that jihad was an obligation on all able-bodied Muslims, wherever they might be (Meleagrou-Hitchens, 2011). Most recently, IS has also embraced a Jihadist form of leaderless resistance (Kilcullen, 2016). This has ensured that both isolated Salafi-Jihadist extremists and those embedded to greater or lesser extents in radical milieus, have embraced the notion of conducting individual attacks.

It has been asserted that a key causal mechanism for the Autonomous pattern of lone-actor terrorist radicalization is that of moral shocks (Malthaner et al., 2017). They occur 'when an event or situation raises such a sense of outrage in people that they become inclined toward political action, even in the absence of a network of contacts' (Jasper & Poulsen, 1995, p. 498). They can function as key cognitive turning points, where emotions such as fear or apathy are converted into anger and a sense of obligation to react (Johnston, 2014). Moral shocks can be external political events, such as the Ruby Ridge and Waco incidents which enraged many within the American right-wing milieu and convinced Timothy McVeigh that he was obliged to take action against the Federal Government (Michel & Herbeck, 2001). But such shocks can also be distinctly personal. Anti-abortion terrorist Clayton Waagner had been a career criminal until he cradled the body of his deceased grandchild, which resulted in an overarching sense of guilt for, as he saw it, the millions of children who are killed in abortions (McCauley & Moskalenko, 2014).

Lone-actor terrorist attack planning and preparation

The pathways that can lead individuals to adopt the motivation for committing acts of terrorism can take a variety of forms. A brief glance at how lone actors have planned

and prepared their attacks reveals a similar heterogeneity (Schuurman et al., 2017). Some of the deadliest lone actors, such as Anders Breivik and 'Unabomber' Ted Kaczynski, spent years planning and preparing their attacks. They invested considerable effort into remaining undetected by law enforcement or vigilant citizens. The majority, however, were much less patient and struck when rudimentary means were available, adopting simple and readily available weapons such as firearms, vehicles or basic improvised explosive devices (IEDs). While some of these differences are readily apparent, a finer-grained analysis is required if we are to explore to what degree diverging radicalization patterns may lead to similarly divergent pre-attack behaviors.

Numerous data-driven studies on the characteristics of lone-actor terrorists have been published (Corner & Gill, 2015; Ellis, Pantucci, de Roy van Zuijdewijn, & Bakker, 2016; Gill et al., 2014; Hamm & Spaaij, 2017; Liem, Van Buuren, de Roy van Zuijdewijn, Schönberger, & Bakker, 2017; Schuurman et al., 2017). Some of these have looked at elements of their pre-attack behavior, such as targeting preferences (Gartenstein-Ross, 2014; Gill & Corner, 2016; Gill, Silver, Horgan, & Corner, 2017). These studies have pointed out that lone-actor violence tends not to be spontaneous, but results from at least some measure of planning and preparation (Gill et al., 2014; Spaaij, 2010, 2012).

Nonetheless, most lone actor attacks are relatively unsophisticated in their design and execution. Soft targets are preferred, meaning that civilians or soldiers and policemen on patrol, rather than politicians, who are more likely to have a protective detail or reside in hard-to-reach locations, are the target of choice (COT, 2007; Eby, 2012; Gill et al., 2014; Van der Heide, 2011). Weapon selection shows a preference for the aforementioned firearms and homemade explosives (Gruenewald, Chermak, & Freilich, 2013a, 2013b; Jasparro, 2010; Van der Heide, 2011). It has been argued that lone-actor attacks are less likely to be detected by authorities than group-based plots due to the limited communication flows. At the same time, however, lone actors' relatively limited organizational resources and associated preference for relatively simple attacks, means that, on average, their violent acts tend to be less lethal than attacks conducted by groups (Smith, Gruenewald, Roberts, & Damphousse, 2015; Spaaij, 2012).

Recent work by Schuurman et al. (2017) has looked at lone-actor attack planning and preparation in considerable detail. Their findings challenge some prevalent notions about lone-actor terrorists and the threat they are often perceived to pose by law enforcement and intelligence agencies. While all of these individuals are dangerous, most are not highly capable terrorists. In fact, most are incapable of maintaining operational security, leak their motivation to commit violence in numerous ways, and tend to do so months or even years before the (intended) attack. Echoing a key finding related to lone-actor radicalization, most of the individuals in the Schuurman et al. (2017) study were found to have maintained social ties crucial to their adoption and maintenance of the motivation and capability to commit terrorist violence.

A comparative assessment of lone-actor attack planning and preparation

It is our basic proposition that aggregate findings on lone-actor attack planning and preparation obscure systematic differences related to the way in which the radicalization phase unfolds. Thus, we believe that Volatile and Autonomous lone-actor terrorists will differ

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systematically in terms of pre-attack behavior and choices. More concretely, we formulate eight expectations which will guide our exploratory comparison.

Given their inconsistent behavior and tendency to make impulsive decisions, we expect (1) *Volatiles to have shorter attack planning and preparation timelines than their Autonomous counterparts*. By contrast, the incremental nature of Autonomous lone-actor radicalization, and their embeddedness in a broader milieu supportive of violence, is expected to translate into a capacity to sustain motivation for individual violent projects for longer periods of time. Furthermore, the inconsistent behavioral patterns of Volatile lone actors make us suspect that (2) *Volatile attacks are more likely to be spurred by concrete trigger events that serve as indirect encouragement cues* than Autonomous attackers, who are more grounded in their radical ideology and less in need of immediate encouragement triggers. Also, their extensive social embeddedness in radical milieus make us suspect that (3) *Autonomous lone actors are more likely to receive help with elements of attack planning and preparation than Volatiles*.

In terms of target and weapon selection, we expect the spontaneous and erratic tendencies of Volatiles to correspond to choosing proximate and familiar targets and weapons that can be easily acquired. This leads us to expect that (4) *Volatiles will have a preference for simple weapons like firearms and knives over IEDs.* The opportune approach to target selection also means that we expect (5) *Volatiles' target selection to be ad-hoc and liable to change during attack preparation*. In contrast, we expect Autonomous lone actors to more carefully choose targets which symbolize their ideologically-defined enemies. Being embedded in larger radical movements also provides Autonomous lone actors with more readily-available knowledge about explosives and access to firearms.

Turning to leakage behaviors and operational security, we expect (6) *Volatiles to be more likely to leak information about involvement in suspicious activities and their desire to commit an attack* and (7) *pay little attention to operational security* due to their unreliable and inconsistent behaviors and relative indifference to the consequences of their actions. On the other hand, Autonomous lone actors' prolonged radicalization in radical networks, is predicted to correspond to more awareness about the need to maintain operational security and a greater ability to do so. Finally, the combination of Volatile lone actors' often extensive history of criminal involvement with their tendency to leak intentions, leads us to expect that (8) *Volatiles will be more likely to come to the attention of the authorities during attack planning and preparation*.

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Methodology and data

Methodologically, the present article can be traced back to the dataset on the backgrounds and pre-attack behaviors of 119 lone-actors that Gill et al. (2014) developed. Schuurman et al. (2017) expanded on information in Gill et al.'s work by developing a codebook of 198 variables that looked specifically at various aspects of attack planning and preparation in considerable detail. It is a subset of this second dataset on attack planning and preparation that was subsequently utilized here.

To effectively apply the 198 variables, detailed information needed to be available on the cases under consideration to enable an in-depth reconstruction of the pre-attack process. Therefore, the 119 cases from the Gill et al. dataset were first of all classified according to the richness of the available information on planning and preparatory

activities, which yielded an initial list of 43 individuals for which sufficient data was thought to be available. Schuurman et al. (2017) then added two Canadian, one American, one Danish and eight Dutch cases from the 2004 to 2015 period not included in the original dataset, as they also appeared to offer the requisite level of detail. Data was garnered from media sources, court documents, (auto)biographies and, for the Dutch cases, police investigation files.

In total, therefore, the empirical data on lone-actor attack planning and preparation from which the current article draws consists in the first instance of 55 cases spanning the 1978–2015 timeframe which occurred in North America and Europe (Appendix 2). Applying the Volatile and Autonomous radicalization pathways outlined above to the dataset revealed that it contained 10 Volatile and 23 Autonomous lone-actor terrorists. The Autonomous subset includes 8 anti-abortion, 10 right-wing, 2 Islamist, 2 anti-government and 1 animal-rights terrorist. The Volatile subset is based on 9 Islamist and 1 right-wing terrorist (Appendix 1). An interesting first finding, therefore, is that Islamist terrorists appear to be represented more in the Volatile radicalization pathway, with right-wing and anti-abortion terrorists more likely to radicalize as Autonomous lone actors. Due to the small sample-size, however, it should be emphasized that this is a tentative conclusion.

There is also a geographic distinction between Autonomous and Volatile pathways, with a disproportionate number of the former belonging to the loosely defined American far-right milieu with a greater presence of European based Salafi-jihadists in the Volatile category. The easier availability of firearms in the USA compared to Europe likely influences attacker's choice of weapon. While we recognize these potential selection biases in our data, we argue in the following that the identified differences in Autonomous and Volatile attack planning and preparation cannot be reduced to a matter of ideological preferences or geography. The empirical patterns observed are better explained by differences in the degree of social-embeddedness in radical milieus. However, the results presented here are tentative and further research, including more cases, is needed to determine the relative importance of these confounding variables.

The next section details the degree to which Volatile and Autonomous lone-actors engaged in those planning and preparatory activities that the authors deemed the most relevant for understanding lone-actors' pre-attack behavior. These activities are divided into categories. Attack planning and preparation are those behaviors related to selecting targets and acquiring the means to carry out an attack respectively. Operational security looks at the degree to which lone-actors undertook measures to maintain plot secrecy, whereas leakage behavior assesses whether these individuals wittingly or unwittingly told others of their violent worldviews and intentions (Meloy & O'Toole, 2011). An assessment of the degree to which Volatile and Autonomous lone-actors differ in terms of the amount of time their pre-attack behaviors occupy, rounds off the discussion.

Before proceeding, several important limitations need to be stressed. The 33 cases of Volatile and Autonomous lone-actors analyzed in this study are too few to reach strongly generalizable insights into potential differences in modes of attack planning and preparation. For this reason, no formal statistical test of differences in proportions is reported. Similarly, percentages are given without decimal points to emphasize that we are dealing with a small sample, and that results are therefore sensitive to outliers and smaller changes in coding. This is further underlined by the provision of the number of individuals alongside the percentages. Another point to consider is that descriptive statistics can hide

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qualitative differences; both Volatile and Autonomous lone-actors may engage in particular activities with equal frequency. That does not necessarily mean they are equally effective at those particular tasks; a distinction to keep in mind when assessing our findings.

In short, this article is emphatically exploratory in nature. Our results should be seen as the starting point for an empirically-informed discussion about how variations in radicalization pathways can yield particular forms of attack planning and preparation among lone-actor terrorists, not as the final word on what is a new direction for research on terrorism. Therefore, further research is needed to validate the empirical patterns presented here, and suggested implications for law-enforcement agencies must be seen in this light and remain tentative.

Results

Tables 1 and 2 provide an overview of the exposure to criminal and radical contexts and various forms of pre-attack behaviors engaged in by lone-actor terrorists, and list the percentage of cases for which particular characteristics and behaviors were registered. Because of the relatively small number of Volatile cases under consideration, it makes little sense to detail small perceptual differences between these subgroups as these could be quickly skewed by the addition of only a few new cases. Instead, only those variables in which there is a difference of 20 percentage points or more between the subgroups are specifically discussed below.

Looking at Table 1, the most striking difference in terms of these individuals' personal background relates to their criminal pasts. Both Autonomous and Volatile lone actors have a relatively high incidence of past involvement in violence or violent crime (52% v 60% / 12 v 6 individuals). Similarly, both are almost equally likely to have a history of relatively minor 'infractions'. However, 70% of Volatiles (7 individuals) have a history of serious felony-level criminal involvement versus 'only' 39% of Autonomous lone-actors (9 individuals). These findings underline the different criminal histories likely to characterize both types of radicalization.

Turning to social context variables, a majority of Autonomous and Volatile lone actors have ties to radical, extremist or terrorist (Schmid, 2011, 2013) individuals or groups (78% v 70% / 18 v 7 individuals). Strikingly, however, Volatiles are far less likely to have contacts with individuals who could be seen as leaders within those milieus (10% v 61% / 1 v 14 individuals) and they are only about half as likely to be integrated as formally or informally recognized members in such settings (30% v 57% / 3 v 13 individuals). Further speaking to

Table 1. Exposure to criminal and radical contexts.

	Autonomous ($N = 23$)	Volatile ($N = 10$)
Infraction	61 (13)	60 (30)
Felony	39 (13)	70 (0)
Violent crime	52 (13)	60 (0)
Non-radical contacts	48 (39)	60 (20)
Radical/extremist/terrorist contacts	78 (9)	70 (10)
Radical/extremist/terrorist leader contacts	61 (17)	10 (30)
Radical/extremist/terrorist group membership	57 (4)	30 (0)
Failed attempt to join / create terrorist group	13 (9)	30 (0)
Exposed to justification / encouragement of violence	91 (4)	80 (10)

Percentage shares of cases, percentage 'unknown' in brackets.

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Table 2. Lone actor pre-attack behaviors.

	Autonomous (*N* = 23)	Volatile (*N* = 10)
Received help with planning	26 (13)	0 (20)
Attack was ordered / instigated by another person	4 (0)	0 (0)
Planning initiated by trigger event	57 (17)	40 (20)
Attack was the result of (rudimentary) planning	70 (17)	90 (0)
Attack was spontaneous	10 (17)	0 (0)
Multiple targets considered	43 (22)	40 (40)
Actual target was planned target	74 (0)	40 (10)
Constraints influenced planning process	70 (22)	60 (40)
Target information looked up online	13 (39)	20 (50)
Actual reconnaissance conducted	44 (26)	40 (20)
Received help with preparation	35 (17)	20 (0)
Firearm acquisition	65 (4)	70 (0)
Firearms acquired specifically for attack	47 (20)	71 (29)
IED construction	48 (4)	40 (0)
IED acquired specifically for attack	82 (0)	75 (25)
(Para)military training (not undertaken for attack)	26 (0)	10 (20)
Firearm training	35 (30)	30 (40)
Incendiary acquisition	17 (0)	20 (0)
Other weapons (e.g. cars, knives, bats etc.)	30 (4)	20 (0)
Finances acquired specifically for attack	13 (26)	20 (30)
Remote location acquired specifically for attack	9 (9)	0 (0)
General operational security measures	17 (22)	30 (30)
Data protection measures	4 (4)	0 (0)
Hiding evidence	26 (0)	10 (0)
Leak convictions	87 (9)	90 (10)
Leak involvement in suspicious activities	61 (13)	70 (0)
Unspecific desire to commit an attack	22 (26)	20 (0)
Specific desire to commit an attack	26 (17)	40 (0)
Desire for martyrdom	4 (0)	40 (10)
Issue threats	26 (9)	10 (0)
Known to authorities during plan/prep	48 (9)	80 (0)
Suspected of involvement in terrorism	30 (9)	40 (20)
Attack carried out / Yes, but failed	65/13	60/10
Killed (average)	10,3	2
Wounded (average)	53,9	3,1

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this apparent inability to form enduring social relationships with likeminded individuals, 30% of Volatiles (3 individuals) engaged in a failed attempt to join or create a terrorist group, versus 13% for Autonomous lone-actors (3 individuals). These findings underline the different degrees of social embeddedness found within these differing pathways to involvement in lone-actor terrorist violence.

With regard to attack planning, Table 2 shows that no Volatiles were found to have received help during the planning stages (i.e. with target selection) versus 26% of Autonomous lone-actors (6 individuals). This is in line with our expectation that Volatiles' lower degree of embeddedness in radical milieus makes it less likely they will receive assistance from others. Looking at how attack planning was initiated, Volatiles were more likely to react to a trigger event than Autonomous lone actors (57% v 40% / 13 v 4 individuals), yet the difference is relatively small. Large majorities within Autonomous and Volatiles subtypes engaged in at least rudimentary planning activities (70% v 90% / 16 v 9 individuals).

Particularly noteworthy is that none of the Volatiles engaged in spontaneous acts of violence, despite their erratic behavioral patterns suggesting this as an intuitively logical course of action. Where both subgroups differ considerably with regard to target selection, is that Volatiles stuck to their initially planned targets in only 40% of the cases (4 individuals) against 74% for Autonomous lone-actors (17 individuals), which is in line with our

expectations. While both subgroups appear to engage in forethought and at least some planning, Volatile lone actors appear much more likely to deviate from their plans. Autonomous and Volatile lone actors differed little from each other when it came to conducting actual target reconnaissance (44% v 40% / 10 v 4 individuals) or using the Internet to gain target information (13% v 20% / 3 v 2 individuals).

Moving from planning to the more practically-oriented attack preparation, we see that minorities of both Autonomous and Volatile lone actors received help during practical preparations for their attacks (35% v 20% / 8 v 2 individuals). This is in line with our third expectation. Furthermore, Autonomous and Volatile lone actors displayed a preference for firearms (65% v 70% / 15 v 7 individuals), followed by a predilection for homemade explosives (48% v 40% / 11 v 4 individuals). However, 70% of Volatiles (7 individuals) acquired their weapons specifically for the (intended) attack, versus only 47% of Autonomous lone actors (11 individuals). Again, these findings follow our fifth expectation. Only a minority within both subgroups conducted firearms training or was interested in using incendiary devices or 'other' weapons such as knives. Similarly, very few accrued finances specifically for their intended attacks (which speaks to their generally inexpensive nature) or acquired a remote location to clandestinely conduct preparations (Table 2).

In terms of taking measures to maintain operational security, thus preventing detection and capture before an attack can be carried out; no significant differences between the subgroups were found. Autonomous lone-actors appear slightly more likely to hide incriminating evidence than their Volatile counterparts, but at 16%, the difference is small. Although these results do not convincingly match our expectations in this area, the observed differences are in the expected direction. With regard to leakage behavior, both Autonomous and Volatile lone-actors appear (highly) likely to share their convictions (87% v 90% / 20 v 9 individuals) and their involvement in suspicious activities (61% v 70% / 14 v 7 individuals) with others. Autonomous lone-actors are no more likely to keep quiet about their convictions and intentions than Volatiles, which contradicts our expectations in this regard.

The biggest differences are that, at 40% (4 individuals), Volatiles are much more likely to leak about their desire for martyrdom than Autonomous lone-actors at 4% (1 individual). However, given the number of jihadist cases within the Volatile category this is not very surprising. Secondly, 80% of Volatiles (8 individuals) but only 48% of Autonomous lone-actors (11 individuals) were known to the authorities (though not necessarily suspected of involvement in terrorism) during their planning and preparation activities. This difference may stem from Volatiles greater likeliness of past involvement in felony-level crimes, and supports our last formulated expectation.

Two other sets of findings round off this section of our paper. First, looking at the average number of people killed and wounded per attack reveals a striking difference between Autonomous and Volatile lone actor terrorists. Whereas attacks by Autonomous lone actors on average kill 10,3 people and injure 53,9, terrorist attacks by Volatiles kill 2 and injure 3,1.[1] These figures are heavily influenced by the fact that some of the deadliest lone-actor terrorists, Timothy McVeigh and Eric Rudolph, are designated as Autonomous. Still, that in itself suggests that the Autonomous radicalization pattern may be more likely than the Volatile one to lead to the planning, preparation and execution of particularly deadly types of terrorist attacks.

The greater lethality of Autonomous lone actors is arguably strongly tied to the final set of findings, which relate to the temporal dimensions of pre-attack behavior.

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Table 3. Temporal aspects of pre-attack behaviors.

Averages, time in months prior to attack/arrest	Autonomous ($N = 23$)	Volatile ($N = 10$)
Start contacts w. radical / extremist / terrorist individuals	74	48
Join radical / extremist / terrorist group	52	33
Development of intent to carry out an attack	30	16
Planning activities start	10	4
Preparation activities start	48	4
Operational security start	18	0,1
Leakage of convictions starts	78	31
Leakage of unspecified violent intent starts	52	5
Leakage of specified violent intent starts	53	7

As Table 3 shows, Autonomous lone actors develop an intent to commit a terrorist attack much earlier than Volatiles at averages of 30 v 16 months before the (intended) attack. There are similar differences in terms of the average amount of time devoted to attack planning, preparation and, especially, the observance of operational security measures. It seems logical to assume that the more time spent on these pre-attack behaviors, the higher both the likelihood of the planned attack being carried out and the number of casualties. Conversely, a longer planning and preparation phase also concedes greater time to the authorities to discover the plot. The very short amounts of time Volatiles appear to spend on pre-attack behaviors may require immediate action upon detection.

Conclusion

We conducted a first data-driven investigation of the degree to which different radicalization patterns are likely to lead to distinct forms of attack planning and preparation among lone-actor terrorists. To do so, we drew upon recent work on lone-actors' radicalization pathways and their pre-attack behavior. The discussion focused on two diametrically opposed forms of lone-actor radicalization; termed the 'Volatile' and 'Autonomous' radicalization pathways. Volatiles are characterized by an inability to successfully or fully integrate into radical milieus, forming affiliative ties with radical actors and groups but never truly substantiating them. This is due in large part to their erratic and unpredictable behavioral patterns, which makes it hard for them to gain the trust of would-be co-conspirators and makes it more likely that they will be expelled from or pushed to the fringes of the radical milieus in which they operate. Autonomous lone actors tend to be embedded in radical groups or milieus to a much larger degree, but decide to operate independently or are forced to do so for various reasons.

A first tentative finding is that the Volatile pattern of radicalization predominantly encompasses individuals with jihadist convictions, while right-wing extremists are drawn to the Autonomous pattern. This may underline recent worries about the crime-terror nexus, in which individuals with a criminal background are increasingly seen to adopt jihadist convictions in a short time-frame and express their often-artificial adherence to the tenets of this extremist current by traveling to Syria or committing acts of terrorism at home. By contrast, the prevalence of the Autonomous pattern of radicalization among right-wing extremists likely reflects the well-entrenched notion of 'leaderless resistance' found in that milieu, which predisposes individuals to operate alone even though they are nominally a part of a larger movement.

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The phenomenon of lone-actor violence, notwithstanding the recent upsurge, remains a relatively rare occurrence. Accordingly, our findings reflect small sample sizes and are of restricted generalizability. Nonetheless, they offer a basis for a first examination of the potential differences in the most frequent patterns of lone-actor radicalization and respective forms of pre-attack behavior. In line with our theoretical expectations, we found that Volatiles tend to spend far less time planning and preparing their attacks than Autonomous lone actors. In keeping with their greater isolation, Volatiles were less likely than Autonomous lone actors to receive outside support. We could also partly verify that Volatiles were more likely to change or deviate from their plans for an attack than their Autonomous counterparts.

Like lone actors overall, Volatiles and Autonomous individuals prefer firearms over IEDs. Volatiles, however, are more likely to acquire firearms specifically for the purposes of an attack. This probably reflects the point that Autonomous lone actors tend to be found in right-wing milieus in the U.S., where the acquisition and ownership of such weapons is much easier. Further in line with the expected differences between these forms of radicalization, Volatiles were found to be more frequently known to the authorities while they were conducting pre-attack behaviors, likely due to their criminal pasts.

Other expectations were only partially supported. Volatiles appear more likely to begin attack planning and behavior as a result of a trigger event than Autonomous lone actors. While the difference appears small, this would fit our theoretical expectation of Volatiles being more likely to suddenly adopt a violent ambition than Autonomous lone actors, who tend to engage in such acts only after a longer period of deliberation and preparation. The same tentative conclusion is extended to the finding that Volatiles appear slightly less likely to engage in operational security measures than Autonomous individuals, which means they run greater risks of detection by law enforcement, intelligence agencies or the general public prior to being able to strike. Finally, we could not verify the expectation that Volatiles are more likely to engage in leakage behavior. In fact, both subgroups of lone-actor terrorists appear highly likely to tell others of their convictions and intentions, opening up possibilities for early detection and interdiction.

These findings could have implications for policing and counter-terrorism efforts as well as future research on this subject. To begin with, the extent of leakage by both Autonomous and Volatile lone actors offers a basis for potential optimism in interdicting any attacks prior to their realization. Moreover, if a suspect is believed to resemble a Volatile pattern of radicalization, arguably there is a far greater urgency required in pre-emptive measures to halt an attack. On virtually all fronts, their pre-attack behaviors were of a shorter duration than those of Autonomous lone actors and could sometime be measured in weeks or even days. On the other hand, while Autonomous lone actors pose a significant threat that is potentially greater than the one formed by their Volatile counterparts in terms of lethality, they tend to proceed to committing violence in a slower fashion. This may offer police and intelligence agencies a longer time frame to gather evidence.

In closing, it is pertinent to emphasize the considerable opportunities for carrying out further research on this topic. The most obvious of these is the expansion of the current dataset with more Volatile and Autonomous cases. Given the need for detailed data to accurately reconstruct pre-attack processes, the challenge here is not so much finding such cases as gathering sufficient information to make their inclusion worthwhile. The post-2015 uptick of jihadist lone-actor violence, many cases of which would at first

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glance fit the Volatile pattern, might be especially suited to this endeavor. It would also be beneficial, however, to expand the geographical scope of the dataset by looking beyond North America and Europe. Whichever route is taken, ascertaining the accuracy of our tentative findings regarding the degree to which different radicalization patterns match onto particular modes of pre-attack behavior among lone-actor terrorists, is bound to be of relevance to both academics and counterterrorism professionals.

Note

1. These figures are based on those cases in the dataset in which one or more attacks were carried out and the death or wounding of the perpetrator is not counted.

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Appendix 1. Overview of Autonomous and Volatile cases

	Name	Sex	Born	Attacked in	Year	Ideology
Autonomous						
1	Tony Lecomber	M	1961	UK	1986	Right-wing
2	Rachelle Shannon	F	1956	USA	1993	Anti-abort.
3	John Salvi, III	M	1972	USA	1994	Anti-abort.
4	Paul Jennings Hill	M	1954	USA	1994	Anti-abort.
5	Timothy James McVeigh	M	1968	USA	1995	Anti-gov't
6	Charles Ray Polk	M	–	USA	1995	Anti-gov't
7	Eric Rudolph	M	1966	USA	96–98	Anti-abort.
8	James Kopp	M	1954	USA	1998	Anti-abort.
9	David Copeland	M	1976	UK	1999	Right-wing
10	Benjamin N. Smith	M	1978	USA	1999	Right-wing
12	Clayton Lee Waagner	M	1956	USA	2001	Anti-abort.
13	Volkert van der Graaf	M	1969	Holland	2002	An. Rights
11	Mohammed Bouyeri	M	1978	Holland	2004	Islamist
14	Terry Collins	M	1977	UK	2004	Right-wing
15	Dennis Mahon	M	1951	USA	2004	Right-wing
16	Yeyha Kaddouri	M	1986	Holland	2004	Islamist
17	Robert Cottage	M	1957	UK	2006	Right-wing
18	Mark Bulman	M	1984	UK	2006	Right-wing
19	Martyn Gilleard	M	1977	UK	2008	Right-wing
20	Scott P. Roeder	M	1958	USA	2009	Anti-abort.
21	Terence Gavan	M	1971	UK	2009	Right-wing
22	Kevin Harpham	M	1975	USA	2011	Right-wing
23	Robert L. Dear, Jr.	M	1958	USA	2015	Anti-abort.
Volatile						
1	Mir Aimal Kansi	M	1964	USA	1993	Islamist
2	Buford 'O Neal Furrow	M	1961	USA	1999	Right-wing
3	Maik Reiner	M	1988	Holland	2005	Islamist
4	Kevin Gardner	M	1984	UK	2007	Islamist

(*Continued*)

Appendix 1. Continued.

	Name	Sex	Born	Attacked in	Year	Ideology
5	Isa (Andrew) Ibrahim	M	1989	UK	2008	Islamist
6	Abdulhakim Muhammad	M	1985	USA	2009	Islamist
7	Lors Doukaiev	M	1986	Denmark	2010	Islamist
8	Mohammed Merah	M	1988	France	2012	Islamist
9	Michael Zehaf-Bibeau	M	1984	Canada	2014	Islamist
10	Omar Abdelhamid el-Houssein	M	1992	Denmark	2015	Islamist

Appendix 2. Overview of entire lone-actor attack planning and preparation dataset

	Name	Sex	Born	Attacked in	Year	Ideology
1	Ted Kaczynski	M	1942	USA	1978–95	Single-issue
2	Tony Lecomber	M	1961	UK	1986	Right-wing
3	Walter Leroy Moody, Jr.	M	1935	USA	1989	Anti-gov't
4	Rachelle Shannon	F	1956	USA	1993	Anti-abort.
5	Mir Aimal Kansi	M	1964	USA	1993	Islamist
6	John Salvi, III	M	1972	USA	1994	Anti-abort.
7	Paul Jennings Hill	M	1954	USA	1994	Anti-abort.
8	Rachid Baz	M	1965	USA	1994	Islamist
9	Timothy James McVeigh	M	1968	USA	1995	Anti-gov't
10	Charles Ray Polk	M	---	USA	1995	Anti-gov't
11	Eric Rudolph	M	1966	USA	1996–98	Anti-abort.
12	James Kopp	M	1954	USA	1998	Anti-abort.
13	David Copeland	M	1976	UK	1999	Right-wing
14	Benjamin Nathaniel Smith	M	1978	USA	1999	Right-wing
15	Buford 'O Neal Furrow, Jr.	M	1961	USA	1999	Right-wing
16	Richard Baumhammers	M	1965	USA	2000	Right-wing
17	Clayton Lee Waagner	M	1956	USA	2001	Anti-abort.
18	Volkert van der Graaf	M	1969	Holland	2002	An. Rights
19	Ivan Duane Braden	M	1984	USA	2004	Right-wing
20	Ryan Gibson Anderson	M	1978	USA	2004	Islamist
21	Terry Collins	M	1977	UK	2004	Right-wing
22	Dennis Mahon	M	1951	USA	2004	Right-wing
23	Mohammed Bouyeri	M	1978	Holland	2004	Islamist
24	Yeyha Kaddouri	M	1986	Holland	2004	Islamist
25	Frederique de Jongh	F	1963	Holland	2004	Unclear
26	Maik Reiner	M	1988	Holland	2005	Islamist
27	Robert Cottage	M	1957	UK	2006	Right-wing
28	Mohammed Reza Taheri-azar	M	1983	USA	2006	Islamist
29	Mark Bulman	M	1984	UK	2006	Right-wing
30	Eric Jan Quakkelsteijn	M	1971	Holland	2007	Unclear
31	Kevin Gardner	M	1984	UK	2007	Islamist
32	Nicky Raymond Reilly	M	1986	UK	2008	Islamist
33	Martyn Gilleard	M	1977	UK	2008	Right-wing
34	Isa (Andrew) Ibrahim	M	1989	UK	2008	Islamist
35	Nicholas Roddis	M	1985	UK	2008	Islamist
36	Abdulhakim Muhammad	M	1985	USA	2009	Islamist
37	Scott P. Roeder	M	1958	USA	2009	Anti-abort.
38	Nidal Malik Hasan	M	1970	USA	2009	Islamist
39	Krenar Lusha	M	1979	UK	2009	Islamist
40	Mohamed Game	M	1974	Italy	2009	Islamist
41	Terence Gavan	M	1971	UK	2009	Right-wing
42	Neil Lewington	M	1966	UK	2009	Right-wing
43	Karst Tates	M	1971	Holland	2009	Single-issue
44	Taimour Abdulwahab	M	1981	Sweden	2010	Islamist
45	Lors Doukaiev	M	1986	Denmark	2010	Islamist
46	Anders Behring Breivik	M	1979	Norway	2011	Right-wing
47	Kevin Harpham	M	1975	USA	2011	Right-wing
48	Tristan van der Vlis	M	1986	Holland	2011	Unclear
49	Brunon Kwiecien	M	1967	Poland	2012	Right-wing

(*Continued*)

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Appendix 2. Continued.

	Name	Sex	Born	Attacked in	Year	Ideology
50	Mohammed Merah	M	1988	France	2012	Islamist
51	Bart van Urk	M	1976	Holland	2014	Unclear
52	Michael Zehaf-Bibeau	M	1984	Canada	2014	Islamist
53	Martin Couture-Rouleau	M	1989	Canada	2014	Islamist
54	Omar Abdelhamid el-Houssein	M	1992	Denmark	2015	Islamist
55	Robert L. Dear, Jr.	M	1958	USA	2015	Anti-abort.

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