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Who will be a lone wolf terrorist?

Mechanisms of self-radicalisation and the possibility of detecting lone offender threats on the Internet



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Sammanfattning

Ensamagerande terrorister, s.k. ensamvargsterrorister, utgör ett växande hot mot civil säkerhet, delvis på grund av det faktum att internet underlättar radikaliseringsprocesser genom spridning av extrema åsikter. Det finns ingen entydig gärningsmannaprofil för ensamvargsterrorister, då variationen är stor vad gäller ideologi, social bakgrund, psykopatologi och personlighetstyp. En bedömning av vilka personer i en population av politiska extremister som utgör en risk för att begå terrorhandlingar kan alltså inte enbart byggas på individuell bakgrund eller personlighetsdrag. Det som återstår att basera en riskbedömning på är de potentiella gärningsmännens beteende under den tid som närmast föregår attacken. Beteenden som empiriskt har visats föregå terrorattacker och andra planerade våldshandlingar såsom massmord eller skolskjutningar, så kallade varningsbeteenden, kan därför spela en viktig roll i bedömningar av potentiella terrorhot.

Varningsbeteenden föregår ofta terrordåd och föregås i sin tur av en radikaliseringsprocess där en individ gradvis inträder i ett tillstånd av beredskap att använda planerat våld i syfte att hävda en ideologisk ståndpunkt. De flesta ensamvargsterrorister har genomgått en process av självradikalisering där media har spelat en avgörande roll. Det medium som under det senaste decenniet har haft störst inverkan på radikaliseringsprocessen är obestriddligen internet, som samtidigt som det har underlättat processen, även har skapat en större möjlighet att upptäcka varningsbeteenden.

Utifrån en befintlig typologi bestående av åtta olika varningsbeteenden kommer föreliggande rapport att befatta sig med de tre som mest sannolikt går att härleda ur gärningsmannens kommunikation på internet: (1) Avslöjande av avsikt, då gärningsmannen i förväg, mer eller mindre specifikt och mer eller mindre avsiktligt, informerar en tredje part om sin förestående handling, (2) fixering, som uttrycker en extrem upptagenhet med en person eller en sakfråga, och (3) identifikation, som innefattar en självbild präglad av krigar- och hjältefantasier, och/eller ett starkt intresse för vapen eller militära medel och strategier, liksom identifikation med andra radikala tänkare eller tidigare ensamvargsterrorister.

Syftet med föreliggande rapport är dels att utifrån olika hypoteser belysa de intra- och socialpsykologiska mekanismerna bakom självradikalisering, dels att undersöka möjligheten att med semi-automatiserade tekniker för textanalys upptäcka varningsbeteenden genom individers sätt att uttrycka sig i text på internet.

Nyckelord: terrorism, radikaliseringsprocess, textanalys

Summary

Solo actor terrorism, also known as lone wolf terrorism, is a growing threat against civil security, partly due to the fact that Internet access makes it easier than ever to engage in study and dissemination of extremist views. A large variation regarding factors such as ideology, social background, psychopathology and personality type means there is no clear profile for lone wolf terrorists. An assessment of which individuals from a population of political extremists that will go on to commit acts of terrorism can therefore not only be based on factors such as individual experiences or personality traits. A threat assessment should rather be based on the potential perpetrator's behaviour during the time closely preceding the attack. Hence, behaviours that have been empirically proven to precede terrorist attacks and other incidents of planned violence, such as mass murder or school shootings, so called warning behaviours, can have an important role in assessing lone wolf terrorist threats.

Warning behaviours often precede terrorist acts and are in their turn preceded by a radicalisation process, where an individual gradually enters a state of mind characterised by a proneness to premeditated violence with the purpose of advancing an ideology. Most lone wolf terrorists have gone through a process of self-radicalisation, wherein media has had a crucial role. Internet is indisputably the medium that has had the greatest influence on the radicalisation process during the last decade. However, while it has facilitated the process, the Internet has also created new possibilities of discovering warning behaviours prior to an actual terrorist attack.

From an existing typology of eight different warning behaviours, the three that can most easily be inferred from the subject's Internet communication will be discussed in the following report: (1) Leakage, when the subject, more or less specifically and more or less intentionally, informs a third party about an intent to perpetrate a terrorist attack, (2) fixation, which expresses an extreme preoccupation with a person or cause or extensive gathering of facts about a target, and (3) identification, which comprises a self-image characterised by fantasies about being a hero or warrior and/or a strong interest in weapons and military paraphernalia, as well as a strong influence from other radical proponents of lone wolf terrorism.

The aim of the following report is firstly, to shed light on different hypotheses about the psychological mechanisms behind self-radicalisation and the interaction between the individual and the environment during the radicalisation process, and secondly, to examine the possibility of using semi-automatic techniques for text analysis of the subjects Internet communication to discover warning behaviours.

Keywords: terrorism, radicalisation, text analysis

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1 Introduction

Lone wolf terrorism, also called solo actor terrorism or lone offender terrorism, is a phenomenon that dates back to at least nineteenth century European anarchism. In the twentieth century, it has been associated with the concept of *leaderless resistance*, a tactic favoured among such ideologies as white supremacy and anti-government extremism. During the latest few decades, lone wolf attacks have been carried out by proponents of various ideologies, including jihadists as well as animal rights and environmental activists.

In recent years, there has been an increasing concern about lone wolf terrorism among world leaders in intelligence and security, as well as terrorism experts (Borum, Fein & Vossekuil., 2012). A reason for concern is that a widespread and increasing use of the Internet facilitates self-radicalization through extremist websites, while simultaneously the easy availability of material such as tutorials on bomb-making or geographical information increases the capability for individuals to carry out advanced terrorist attacks. On the other side, the fact that potential lone wolf terrorists reside on the Internet provides counterterrorism with the advantage of new possibilities of detecting them before they strike. In order to find potential terrorist threats on the Internet one needs to know what to look for. Are there any common characteristics that separate prospective lone wolf terrorists from other political extremists? If so, what would they be?

The present work is an examination of potential answers to these questions. It will deal with background factors, mechanisms of radicalization and the possibility of detecting pre-attack behaviour on the Internet. The main focus of pre-attack behaviour will be on verbal behaviour that is expressed online, on for instance blogs, twitter, chat rooms or discussion forums.

Part 2 of the present work concerns lone wolf terrorism and self-radicalisation from an individual perspective. In section 2.1, the difficulties of defining lone wolf terrorism are observed, while section 2.2 explores some background factors that might underlie a development into lone wolf terrorism. Section 2.3 is an exploration of theories about self-radicalisation. Part 3 concerns behaviour often observed prior to terrorist- and other attacks, as well as the possibility of detecting such behaviour in Internet communication. In section 3.1, a typology of warning behaviours originally compiled by Meloy, Hoffmann, Guldman and James (2012) is referred, and a further differentiation is made between overt and covert, verbal and non-verbal warning behaviours. In section 3.2, certain linguistic markers, which can be detected with different text analysis techniques, are proposed for three different warning behaviours. Part 4 is a discussion of limitations and complications regarding the suggestions in part 3, and also offers some proposals for future research.

2 The path to lone wolf terrorism

2.1 Defining lone wolf terrorism

A definition of the term lone wolf terrorism has to be made in two steps. We need to firstly define the concept of *terrorism*, and in the next step distinguish the subset *lone wolf terrorism* from other kinds of terrorism. How terrorism is defined depends largely on who does the defining. Subsequently, there are several different definitions of the concept in use in different contexts. It is, of course, a social construct, infected by political and ideological bias, “one man’s terrorist is another man’s freedom fighter”. For the present purpose, we define a *terrorist act* as a violent act aimed at attaining a political, ideological or religious goal, with the intention to coerce, intimidate or communicate a political message to a larger audience than the immediate victims (Jackson 2011, Spaaji, 2012). A *terrorist* is someone who has been involved in a terrorist act.

As for the second step, Spaaji (2010) defines the key features of a *lone wolf terrorist* as a terrorist who (1) operates individually, (2) does not belong to an organised terrorist group or network but may sympathise and share an ideology with them), and (3) whose modus operandi is conceived and directed by the individual without any direct outside command or hierarchy. These features separate lone wolf terrorists from terrorists belonging to organisations. What separates lone wolf terrorists from for instance political assassins, school shooters and attackers of public figures, is the motivation and intention behind the attack; to convey a political message to the public by the use of violence.

Due to a difficulty of correctly placing perpetrators of violent attacks in the lone wolf category, there is a lack of consensus about terminology regarding lone offender terrorism. It is often somewhat unclear both what the motive is, and to what extent other people have been involved in the attack. As Spaaji (2012) points out, the boundaries of lone wolf terrorism are inevitably fuzzy. Furthermore, the more closely some of the known lone wolf attacks are examined, the clearer it becomes how common “hybrid” characteristics are (Borum, Fein, Vossekuil, 2012).

The case of Rashid Baz illustrates the difficulty of strictly defining lone wolf terrorism. In 1994, Baz shot at a van with 15 Hasidic students on Brooklyn Bridge, wounding four of them and killing one. The shooting was considered to be result of road rage until 1999, when an investigation into the crime was opened and it was reclassified as an act of terrorism, due to the fact that he was intentionally targeting Jews. Rashid Baz shot at the students at his own initiative and he did not belong to any terrorist organisation. Yet, it turned out that two relatives had helped him hide the weapons he used, although claiming neither to know anything about his involvement in the crime, nor share his radical hatred

for Jewish people. However, phone records retrieved by the police later proved that these family members had been in contact with a member of Hamas. Furthermore, witnesses testified that Baz had attended a service at the Islamic Society of Bay Ridge in Brooklyn, where he had listened to a sermon calling for revenge on Jews for a recently occurred killing of Muslims in Hebron. One witness claimed that after the sermon, Baz appeared enraged and determined to act (Dunleavy, 2012). What at first seemed to be a random and improvised shooting, five years later proved to be an act of political violence. As for his loneness, it is still contested. To what degree were Baz's relatives involved in the crime? And did their connections to Hamas have anything to do with it? And can Baz, although not personally addressed, actually be said to have been commanded by the imam at the Islamic Society of Bay Ridge?

Jackson (2011) warns about the cliché image of the isolated lone wolf terrorist. There can be no such thing as a completely autonomous lone wolf terrorist, since terrorism, being a political act by definition, is also a social act, meaning that anyone engaging in it must have a significant interest in the world around them. "The lone wolf terrorist depends on others for ideas if not for action" (McCauley & Moskalenko, 2011b).

Different approaches have been applied in order to tackle the issue of who is a lone wolf terrorist and who is not. Pantucci (2011) has created a typology, where Islamist lone wolf terrorists fall into one of the four categories *Loner*, *Lone Wolf*, *Lone Wolf Pack* or *Lone Attacker*, depending on the degree to which they operate autonomously. Presumably, this typology can be transferred to lone wolf terrorists of other ideological convictions. A *Loner* has no connections to known extremists or groups, while Pantucci's *Lone Wolf* has support from other militant extremists. *Lone attackers* operate alone, but with direct organisational control by an extremist organisation. *Lone wolf packs* are self-radicalised, but operate in pairs or small groups.

Borum et al. (2012) propose instead a dimensional approach, built on the three dimensions *loneness*, *direction* and *motivation*. For each of these dimensions, a continuous scale is applied. Loneness has to do with the degree of independence of activity. In one end of the continuum is an offender who initiated, planned, prepared for and executed the attack without direct assistance from any other person. In the other end of the spectrum is an offender who had direct assistance from one or two others. Direction has to do with the autonomy of decision-making, and the degree of guidance the offender has received from any known member of an extremist group. Motivation has to do with clarity of causation, or purpose. While Borum's approach respects the inevitable fuzziness of the concept, Pantucci's discrete categorisation has the advantage of making the concept more manageable.

2.2 Individual circumstances

2.2.1 Ideology

Lone wolf terrorists have diverse ideological sources. Among those included in the database of lone wolf terrorism,¹ the four most common ideologies are right-wing extremism/white supremacy (17%), Islamism (15%), anti-abortionism (8%) and nationalism/separatism (7%) (Spaaji, 2012). In one third of the cases there is no identifiable ideology. This is sometimes due to the ideology being kept secret, or to confusion regarding what the ideology might be.

It is common, as in the case of Eric Rudolph, that lone wolf terrorists create their own ideologies, combining aversion with religion, society, or politics with a personal frustration (Spaaji 2010).

Eric Rudolph, also known as the Olympic Park bomber, was sentenced for life for four bombings across the southern United States (the Centennial Olympic park in Atlanta during the Olympics, two abortion clinics and a lesbian bar) between 1996 and 1998, killing three and wounding more than 120. Rudolph was an anti-abortionist, but also a white supremacist, and a member of the Christian Identity movement. In his own statement, he claims his actions to be anti-abortion as well as anti-gay, but denies affiliation with the Christian Identity movement (Springer, 2009).

Even though lone wolves are not members of terrorist groups, they usually sympathise with a larger movement, or have previously been a member or affiliate of one. Lone wolf terrorists are more often than not strongly influenced by wider communities that provide ideologies that cultivate an alternate sense of morality justifying the destruction of life and property that terrorism entails (Jackson 2011, Spaaji, 2012).

2.2.2 Social background

Case studies of lone wolf terrorists display a variety of social backgrounds. More often than not, they tend to be highly educated and relatively socially advantaged. Certain life experiences, such as childhood abuse, are common, but not always present in their early lives. Several, but not all, of the known lone wolf terrorists have suffered an earlier trauma that can clearly be linked to

¹ Spaaji (2012) has compiled a database of all terrorist attacks carried out by lone individuals between 1968 and 2010 in the 15 countries covered in the European Commission Sixth Framework research project *Transnational Terrorism, Security and the Rule of Law*. The database comprises 88 lone wolves who have committed a total of at least 198 terrorist attacks. Any ambiguous incidents are excluded from the list.

political conviction later in life (MacCauley & Moskalenko, 2011b, Spaaji, 2012).

2.2.3 Psychopathology

It is sometimes argued that terrorists in general should not be regarded as suffering from any identifiable psychopathology (c.f. Spaaji, 2012). However, case studies and quantitative studies of lone wolf terrorists show that they do seem to have a higher incidence of psychological disturbance than other terrorists (and the population in general) (Pantucci 2011, Spaaji 2010). Four out of five terrorists in case studies conducted by Spaaji (2012) were diagnosed with a personality disorder. Four out of five also seem to have experienced depression at some point. Two have been diagnosed with schizophrenia, although these diagnoses are contested.

Lone wolf terrorists often display a degree of social ineffectiveness and social alienation. Some have tried to be member of a group, but failed. Sometimes they have been expelled from an organisation due to being too extreme or difficult to work with. Importantly, the nature of the psychological disorder or social ineffectiveness typically does not cause them to become cognitively disorganised, or lose touch with reality (Spaaji, 2012). The mere fact that they are capable of planning and carrying out acts of political violence speaks against any severe psychological illness. If anything, it speaks for a high degree of self-efficacy.

2.2.4 Personality

There is no single personality type or profile of the lone wolf terrorist. This is not surprising, considering that personality traits are notoriously poor predictors of behaviour (c.f. Mischel, 1968, Cook, 1984). The absence of common denominators regarding social background, personality traits, or ideology implicates that the only link between lone wolves is their behaviour, i.e., the behaviour of committing premeditated acts of radical violence. Assumed that any voluntary action is preceded by a set of cognitions and emotions that motivate the individual to act in a certain way, it would be fair to assume that there are similarities in behaviour preceding different acts of radical violence. Insofar as this behaviour can be observed, there is a possibility to take pre-emptive measures against terrorist attacks. Applying a social-cognitive perspective of so called *reciprocal determination* (Bandura, 1986), where personality, environment and behaviour influence each other in a pattern of two-way causal links, might help an understanding of how some people can be brought to the point where they see themselves as having a responsibility to promote their ideologies through violent action. The present work will consider the psychological

phenomena underlying lone wolf terrorism as dynamic and changeable, a question of state rather than trait.

2.3 The mechanisms of radicalisation

2.3.1 Radicalisation of lone wolf terrorists

As stated in section 2.2, a lone wolf terrorist does not, as far as we know, in any fundamental respect differ from any of us. There is no inherent trait, no “lone wolf gene”, that can explain why some people become lone wolf terrorists, which means one will have to assume that they all have entered the mindset of a terrorist after having gone through a process gradually making them more inclined to use political violence. This process we refer to as *radicalisation*. McCauley and Moskalenko (2011b) consider radicalisation a psychological trajectory that can happen to any person, group or nation. However, bearing the social-cognitive perspective in mind, some people may be more susceptible to radical influences than others. Arguably, there are certain experiences and circumstances that make some people more easily radicalised than others. In accordance with this approach, the radicalisation process can be construed as a process that begins very early in life. However, the present work will focus on the part of the process where the intensity of a perceived group conflict is gradually increased, while the mechanisms inhibiting the use of planned violence are gradually broken down.

Some lone wolf terrorists have been radicalised in an organisation which they have later left. Others, probably the majority, are self-radicalised via media or informal contacts with radical thinkers. In the radicalisation of lone wolf terrorists, group dynamics do not play the same role as in radicalisation of terrorists in networks. This does not mean that lone wolf radicalisation takes place in a vacuum. Inter-group dynamics typically do influence lone individuals, even when there is no direct support or command from others, for example in their framing of grievances and justifications for violence against the enemy (Spaaji, 2012).

2.3.2 A brief outline of the process

The radicalisation process should be viewed as a “complex and dynamic set of circumstances and mechanisms that shape the individuals causal story” (McCauley & Moskalenko, 2011b). The process is more or less unique for every lone wolf terrorist, hence there is no use mapping the exact structure of it. Yet, there are certain basic psychological mechanisms of radicalisation that seem to be at work whenever anyone goes through the process. These will be briefly discussed in this section.

The cornerstone of terrorism is a sense of grievance, a perceived injustice (c.f. Borum, 2003, McCauley & Moskalenko, 2008). Sometimes this comes as a result of having been a victim of injustice, sometimes it is a result of having witnessed injustice against other people. In the next step, this sense of grievance is taken to a group level, where both victim and perpetrator are raised to the level of classes or categories. This is referred to as *group grievance*, or political grievance (McCauley & Moskalenko, 2008). If strong enough, the grievance evokes a *desire for justice* and revenge on those considered responsible for the injustice. And finally, there is what ultimately differentiates a potential lone wolf terrorist from all the others who share a violent ideology: the sense of an *obligation to act*.

2.3.3 Explaining group grievance

According to McCauley and Moskalenko (2011b), psychology does not currently offer the kind of attribution theory required to understand when and how individual events are interpreted in terms of conflict between groups. Regarding the question why terrorists would, against their own self-interest, feel the need to seek justice for others, they offer the hypothesis of *altruism*. There are evolutionary benefits of altruism, for instance, if you share your food with a neighbour today, you may get a share of her food tomorrow. This system works only if there are no cheaters, i.e., individuals who contribute nothing, yet reap the benefits of others' willingness to share. A way of protecting the system by preventing people from cheating is to punish those who do.

Strong reciprocity is the tendency to punish cheaters in order to retain the system of cooperation. In a prisoner's dilemma game, participants are offered to either cooperate or not cooperate. The outcome depends on whether the other participant also decides to cooperate. Cooperating is the winning strategy, since it leads to the highest gains, *provided that the other participant also chooses to cooperate*. Cooperation when the other participant does not cooperate, on the other hand, leads to the greatest loss. Thus, the dilemma is whether one should trust the other participant to cooperate. Experiments have been carried out where participants in a prisoner's dilemma game were offered a chance to use some of their own winnings to punish defectors. 40 to 60 percent of participants chose to pay to punish defectors, even when they knew that they themselves had not been cheated. Punishing "bad people", or carrying out justice, even when one does not benefit from it, becomes an expression of altruism no less than helping people. By assuming that terrorists belong to these 40 to 60 percent, we might approach an understanding of what makes someone act on group grievance (Moskalenko & McCauley 2011a).

McCauley and Moskalenko go one step further and stress the importance of *empathy* as a factor that may count toward radical action via altruism. Against this, it can be argued that strong reciprocity might as well stem from a *rigid*

concern for justice, a feeling of the importance of playing by the rules. According to Ginges, Atran, Sachdeva and Medin (2011), terrorists do indeed tend to have a rule-bound logic of moral appropriateness, rather than a utilitarian one. Instead of making decisions rationally, on a basis of cost-benefit analyses, they tend to adhere to previously stipulated rules.

Another hypothesis that could explain the step from personal to group grievance, is that many lone wolf terrorists are, at least in part, responding to their private demons through the mechanism of *externalization*, where one's own grievances are projected onto something external. In these cases, an underlying, personal, motive is subconsciously covered by a political one that is used as a rationale for committing violence (Maccauley, 2011b, Spaaji, 2012). The political motive gives the violence a sort of moral legitimacy.

2.3.4 Group identification and collectivist values

Personal and political grievances are usually understood to move individuals by eliciting strong emotion. Anger has previously been proven to elicit intergroup bias (c.f. DeSteno et al., 2004), but being a brief emotion, it would not be able to sustain political violence planned and carried out over periods of months and years. To understand how the sense of grievance and desire for justice becomes so strong that it creates enough motivation to plan and commit violent acts, we have to look to the concept of *group identification*.

Though acting alone, a lone wolf terrorist does identify with a larger group, namely the group for the benefit of which the terrorist action is committed. Even in cases when the subject is not part of the "beneficial" group (as for instance anti-abortionists), there is usually a very strong sense of moral obligation toward the group, which can be construed as identification with a cause (McCauley, 2008). When identification with a group is combined with the perception that the group is being victimised, negative identification with the enemy group ensues. Negative identification is an important part of radicalisation, since it facilitates demonising or dehumanising the perceived enemy, which in the next step justifies violence (Moskalenko and McCauley, 2011). According to Moskalenko and McCauley, this combination of identification and group conflict is perpetuated since successes of the ingroup are rewarding, while successes of the outgroup are punishing, thus perpetuating the negative identification and desire for revenge. It follows that the longer one is engaged in a conflict, the stronger the identification will be, and vice versa. Hence, the stability of group identification can explain the stability of group conflict, revenge and justice-seeking. That, according to Moskalenko and McCauley, explains why the mental states underlying an act of lone wolf terrorism need not be marked by strong emotion or arousal, but rather be steady, planful and workmanlike (McCauley 2011a).

Most people who identify with a group or cause extend their sympathy, but would not sacrifice their own comfort to change an unsatisfactory state of affairs. Why are some people ready to extend resources and risk personal safety for the benefit of others? Studies conducted by Ginges et al. (2011), show that moral commitment to the ingroup and values associated with group identity appear to be strong indicators of potential radical violence. Strong identification with the ingroup often equates collectivistic values, where the needs of the group tend to override the needs of the individual, which not only justifies violence against innocents, but also can serve to explain the element of self-sacrifice, since from a collectivist point of view the self is not as important as the group.

2.3.5 The role of the environment in self-radicalisation

An enabling environment is important for lone wolves as well as for organised terrorists (Spaaji, 2012). A lack of social life and obligations facilitates the self-radicalisation process, since it isolates the subject from other influences or social control, while also providing the space and time necessary for developing an ideology and planning for an attack (McCauley & Moskalenko, 2011b, Spaaji, 2012). Just as people are recruited to cults at turning points in their lives, people may be more vulnerable to radicalisation when they have few everyday commitments and attachments to prevent them from committing time and energy to political activities, or nobody around to provide a different perspective on the conflicts they are engaged in. As mentioned in section 2.2.3, many lone wolf terrorists do indeed suffer a social ineptitude which at some point in their lives has made them more or less isolated.

While lone wolf terrorists may have few friends in physical life, the Internet provides them with direct access to a community of like-minded individuals around the world, a community that can act as a replacement for the social environment they lack in the real world. Easy availability of extremist material both online and offline means that individuals can teach themselves the extremist creed and use this material to define and justify their actions and worldview (Pantucci, 2011). Self-studies have been an important part of the radicalisation of all of Spaajis' (2012) case studies, and with Internet access it is easier than ever to engage in study and dissemination of extremist views.

Online chat rooms or discussion forums are venues where extreme attitudes and beliefs may be exchanged, reinforced, and validated. Glaser, Dixit and Green (2002) note that in studies of racial violence and hate crime over the Internet, it has been demonstrated that the anonymity of the web and the culture of chat rooms leads to an increased level of endorsement for violence than is actually felt by the participants. This is consistent with social comparison theory, which stipulates that individuals with more extreme values than average in the group-favoured direction gain a higher status in the group than those who express more moderate views (Levinger and Schneider, 1968, referenced in McCauley and

Moskalenko, 2008). Hence, the opportunity of raising one's status among peers can be an incentive in the trajectory towards more extreme views.

2.3.6 Influence

It is relatively common for lone wolf terrorists to communicate with their audiences through statements, letters, manifestos or videos sent to news media or posted on the Internet. This behaviour facilitates a contamination or inspiration effect, in the sense that it can inspire copycat behaviour. Many lone wolf terrorists are indeed inspired by, and trying to emulate, previous attackers. For instance, the Brixton nail bomber, David Copeland, was inspired by Eric Rudolph's Olympic Park bombing, and in his turn inspired British terrorist Neil Lewington (Casciani, 2009, Hopkins & Hall, 2000). A related phenomenon is when radical thinkers (who would not themselves commit terrorist acts) act as influencers and encourage people with the same radical views to take action.

3 Behavioural markers of radical violence

3.1 Warning behaviours as a means of threat assessment

3.1.1 Overt and covert pre-attack behaviour

Common for all lone wolf terrorists is that their deeds are preceded by some amount of *preparation*. Lone wolf terrorists typically plan and prepare their attacks carefully and thoroughly (Spaaji, 2012), which means that before an attack, there is a process of preparation during which the subject is vulnerable to detection. Anyone who starts preparing a terrorist attack must have an *intent*, which cannot be directly observed, but might be verbally expressed by the subject, or inferred from some other behaviour. Intent is based on *motivation*, a set of needs, cognitions and emotions that gives behaviour its energy and direction that is necessary for anyone to follow through with any planned activity (Reeve, 2005). In threat assessment it is common to distinguish capability from intent (c.f. Stewart & Burton, 2008). What is referred to as motivation in the present work can be viewed as a sort of psychological capability, as opposed to physical capability which is obtained during the preparation phase.

Insofar as these three factors are conveyed by behaviour, it is possible to distinguish potential terrorists from people holding extremist views but lacking in motivation to act upon them. Observable behaviour that corresponds with preparation for an act of radical violence, or with motivation to commit it, can be considered a behavioural marker for radical violence, or an indicator of elevated threat.

In behavioural science a distinction is made between overt and covert behaviour. Overt behaviour is any observable, verbal or non-verbal, behaviour. Covert behaviour is any private or unobservable cognitive, emotional, or physiological event, such as thoughts, perceptions, attitudes and beliefs. Since covert behaviours cannot be observed from the outside, the only way to gain knowledge about them is by making inferences from overt behaviours that they are assumed to correspond with. Any behaviour concerning motivation falls under the covert category, but can be assumed to be expressed through language.

3.1.2 A typology of warning behaviours

The study of behavioural markers for radical violence, what Meloy et al. (2012) labels *warning behaviours*, is an essential part of assessing the threat of lone wolf terrorism. Meloy et al. broadly define warning behaviours as any behaviour that “precedes an act of targeted violence, is related to it, and may, in certain cases, predict it”. As such, warning behaviours can be viewed as indicators of increasing or accelerating risk. As a means of moving towards a structured method of threat assessment, Meloy et al. propose the following typology of warning behaviours:

1. *Pathway warning behaviour* - research, planning, preparation or implementation of an attack.
2. *Fixation warning behaviour* - behaviour that indicates an increasingly pathological preoccupation with a person or a cause,
3. *Identification warning behaviour* - behaviour indicating strong identification with previous attackers, close association with weapons or other military paraphernalia, identification of oneself as an agent to advance a particular cause.
4. *Novel aggression warning behaviour* - violent behaviour unrelated to the eventual targeted violence, showing the capacity of violence.
5. *Energy burst warning behaviour* - an increase, usually in the days or weeks before an attack, of the frequency or variety of activities related to the target.
6. *Leakage warning behaviour* - communication of intent to a third party.
7. *Last resort warning behaviour* - an expression of increasing desperation or distress, with the conclusion that there is no alternative action other than violence.
8. *Directly communicated threat warning behaviour*.

This typology is constructed through the consideration of empirical case studies and group studies of previous acts of targeted violence. As pointed out by the authors, it is sensitive to hindsight bias and confirmatory bias as well as lacking in predictive validity. Nevertheless, it has face validity and may provide a useful beginning structure for further operational thinking and research (Meloy et al., 2012).

Some of these warning behaviours (1, 5) signal that the subject has started to prepare an attack, others (6, 8) express an intent to commit radical violence, while (2, 3, 7) signal a strong motivation to commit radical violence but no concrete plans. (4) Indicates the subject’s capacity of violence. Moreover, the categories are not conceptually equivalent and can at times be partly overlapping. Fixation and identification warning behaviours are different from the other six warning behaviours in the sense that they do not describe overt behaviour, but psychological constructs that can only be inferred through other behaviour

(Meloy et al., 2012). The next section offers a suggestion about how these behaviours can be detected in a subject's online behaviour.

3.1.3 Warning behaviours: The case of Neil Lewington

In October 2008, British Neo-Nazi Neil Lewington was arrested on a train at Lowestoft station after drunkenly urinating on a platform and abusing a female train conductor. A search of his bag accidentally uncovered two home-made bombs, which he later confessed to having manufactured at his home in Reading. Later investigation of his bedroom at his parents' home found a small scale bomb factory where he had apparently been working on converting tennis balls into shrapnel bombs, and a notebook labelled "Waffen SS UK members' handbook" including drawings of electronics and chemical mixtures, but no details about intended targets. In the handbook, under the heading 'Targeting or Attacking Pakis' he had written sub-sections which included 'Observing Asians in their cars', 'Planting motion sensitive bombs' and 'Hit and run by vehicles'. It also included a claim that the Waffen SS UK, a hitherto unheard-of organisation, had 15 two-member cells planning random bombings to drive 'non-British' people from the country.

At the trial, it was revealed that Lewington had an "unhealthy interest" in David Copeland, Ted Kaczynski and Tim McVeigh. He had also spent time searching for girlfriends on chat lines, where he had made racist remarks and spoken of converting tennis balls into bombs. For instance, the prosecution told the court how Lewington had said to one woman that "the only good Paki was a dead Paki". His defence lawyer argued there was insufficient evidence to say Lewington, a loner who had been unemployed for 10 years after losing his last job owing to drunkenness, was a terrorist rather than just an "oddball". "just a big pest, a nuisance" He suggested Lewington was a "silly, immature, alcoholic, dysfunctional twit, fantasising to make up for a rather sad life". Nevertheless, Lewington was sentenced to a minimum of six years for preparation for terrorism (Casciani, 2009).

Lewington displayed no less than four different warning behaviours. He had procured material and knowledge necessary to make bombs (pathway warning behaviour), was strongly influenced by other terrorists (identification warning behaviour), and bragged online about his bomb-making and radical views (leakage warning behaviour). Also, a significant part of his life seemed to evolve around bombs and racist ideology (fixation warning behaviour). If Lewington had displayed only one warning behaviour the defence lawyer's characterisation of him as "just a big pest" might have been more reassuring.

3.2 Detecting warning behaviours in written social media

3.2.1 Linguistic markers for radical attitudes

Much of a terrorist's behaviour preceding an attack takes place in real life, where the subject engages in preparations (e.g. buying fertilizer to make a bomb, buying guns, or gathering information about the target), or expresses opinions and values consistent with radical action. However, the subject may also communicate opinions, values, and sometimes even actual intent on the Internet. Verbal expressions of more or less consciously experienced mindsets or attitudes that have previously been observed among known perpetrators of radical violence, might also be found in the subject's communication on for instance blogs or discussion boards. Certain words or phrases might serve as linguistic markers for these opinions, values, mindsets or attitudes, and as such can be used as input to computer algorithms so that they may be able to recognize signs of an increased risk of radical action.

Of the eight different warning behaviours defined by Meloy et al. (2012), some are of a more communicative nature than others. Aside from direct threat, leakage is possibly the most obvious and important warning behaviour in this context, but fixation and identification warning behaviours can also be traced in communication on the Internet. Here, the possibility of detecting leakage, fixation and identification warning behaviours in Internet communication will be discussed, since these three have the greatest potential to be discovered with text analysis methods applied on public information accessible from the Internet. (e.g. extremist discussion boards) Here, a few suggestions of linguistic markers will be presented. These are at this stage merely hypotheses that remain to be tested and evaluated. The suggestions should be seen as one of the first steps toward a tool for text analysis that can be used for lone wolf terrorist threat assessment by detecting warning behaviours in written text. Suitable techniques for detecting these linguistic markers are presented in Cohen et al. (in press).

3.2.2 Leakage

Leakage, the communication to a third party of an intent to do harm to a target, usually infers a preoccupation with the target and may signal the research, planning and/or implementation of an attack. Data suggest that leakage commonly occurs in cases of targeted violence, ranging from school shootings to attacks on public figures. Leakage in this sense can be intentional or unintentional, and more or less specific with regards to the act. Studies on public figure attacks and assassinations have found a suggestive pattern of leakage, where an attack often has been preceded by indirect, conditional or direct threats

aimed to people associated to the target, or bizarre or threatening communication to politicians, public figures or police forces, but not by threats posed directly at the target. In different studies, the occurrence of pre-attack leakage ranges from 46% to 67%. Case studies also show that leakage is often accompanied by other warning behaviours (Meloy and O'Toole, 2011).

The motivation for leakage can be intentional or unintentional, ranging from a need for excitement, a desire to frighten, attention-seeking or simply a fear and anxiety about the impending act. Leakage is sometimes a result of the subject's desire to memorialise their deed following their death or incarceration. Leaked information of intent in written communication is likely to contain auxiliary verbs signalling intent (i.e., "I will...", "...am going to...") together with words expressing violent action, either overtly or, perhaps more likely, through euphemisms. Also, like in the case of Neil Lewington, telling about possessing weapons or certain knowledge can also be a signal of leakage.

3.2.3 Fixation

Meloy et al. (2012) define fixation warning behaviour as any behaviour indicating an increasingly pathological preoccupation with a person or a cause, for instance increasing perseveration on the object of fixation, increasingly strident opinion, or increasingly negative characterization of the object of fixation and an angry emotional undertone.

Extensive gathering of fact about the target is another expression of fixation. For instance, anti-abortionist Clayton Waagner spent several months gathering target information on 42 different abortion doctors, planning to kill them with stolen firearms, before settling for another approach, i.e. sending more than 500 letters with faux-anthrax to abortion clinics across the USA (Moskalenko & McCauley, 2011a). Sometimes the subject gathers information with the explicit purpose of using it for preparing an attack; in that case the behaviour would be considered pathway warning behaviour. At other times, fact-gathering may start as an expression of fixation, with the idea and planning of an attack taking place after, and sometimes as a result of, the subject having gathered enough information to make it possible.

The fixated person expresses a preoccupation with the group or person considered responsible for the subject's grievance by allocating large amounts of time to discussing, theorising about, or studying the perceived enemy. A tendency to perseverate on an issue or a person, would, in written communication, result in text wherein one person, group or issue is mentioned by the subject with a significantly higher frequency than it is mentioned by other discussants. Also, frequent combinations of certain key terms, for instance "Jew" and "communism", can reveal a fixation with a certain idea.

3.2.4 Identification warning behaviour

Identification warning behaviour is defined as behaviour indicating a desire to be a “pseudo-commando”, have a warrior mentality, closely associate with weapons or other military or law enforcement paraphernalia, identify with previous attackers or assassins, or identify oneself as an agent to advance a particular cause. Narcissistic ideas and fantasies about oneself are also counted to this group of warning behaviours (Meloy et al., 2012). This rather broad definition concerns both self-image and influence from others. Any behaviour conveying strong group identification may also be counted to this category, although it is not discussed by Meloy et al.

Lone wolf terrorists and attackers of public figures often tend to identify themselves as a kind of warrior, a person who is prone to use structured violence for a “higher cause”. In these cases, use of military terminology and a strong interest in weapons, military strategies and paraphernalia can be seen, usually combined with a narcissistic fantasy of oneself as a rescuer, the one who sees what is wrong and does something about it (Meloy et al., 2012). Subjects who identify with warrior mentality are likely to use a language influenced by military terminology. They may also be active on websites for people with an interest in weapons and warfare. It is not uncommon that identification with warrior mentality is visually expressed on the Internet in the form of images or videos where the subject poses with weapons, such as the pictures of Anders Behring Breivik wearing a compression sweater and pointing an automatic weapon against the camera (Cohen et al, in press). A sense of moral obligation to act can be expressed through the usage of words related to duty, honour and justice.

As mentioned in section 2.3.7, the subject may be very influenced by, and in a sense identify oneself with, some other radical thinker or leader. This kind of identification with another radical thinker can, aside from frequent quoting and mentioning, be expressed by a similarity in language. The subject may use the same terminology as the role model, and can possibly even adapt a similar sentence structure. Anders Behring Breivik, for instance, was highly influenced by the Norwegian anti-Islamic blogger Fjordman, whom he quoted extensively in his manifesto. At one point, they were actually thought to be the same person (Taylor, 2011). In cases like this it is possible to use author recognition techniques to identify similarities.

According to McCauley and Moskaleiko (2008), activists tend to express more anger or grief when something negative happens to the ingroup, and greater joy when something positive happens. This means that linguistic expressions of strong emotions related to group identification might be an indicator of the strength of the identification, and for an elevated risk. In order to find out which positive or negative sentiments are present in a text, or which kinds of emotions that are expressed, sentiment and affect analysis techniques can be used.

Identification with a group or cause can be expressed for instance by a usage of positive adjectives in connection with mentioning of the ingroup. Similarly, a usage of negative adjectives in connection with mentioning of a group or person may indicate negative identification. References to the ingroup can be detected by investigating the use of first person plural pronouns (“we” and “us”), while much use of third person plural pronouns (e.g., “they” and “them”) according to Pennebaker and Chung (2008) can be seen as an indicator of extremism.

4 Limitations, complications and future research

Although early warning signs are often possible to identify in retrospect, it is much harder to gather and accurately assess such intelligence beforehand. According to Spaaji (2012), prevention of lone wolf attacks is complicated by the following five key factors:

1. Lone wolf terrorists operate alone and tend to be secretive about their operations,
2. there may be few clear warning signs before lone wolf terrorists strike, since they are likely to be relatively socially isolated and may avoid contact with others,
3. they display a variety of backgrounds with a wide spectrum of ideologies and motivations which makes it difficult to predict from which environment they stem,
4. it is extremely difficult to differentiate between those extremists who intend to commit attacks and those who simply express radical beliefs, and
5. many lone wolf terrorists carry out only one attack, rather than a more prolonged terrorist campaign characteristic of most group-actor terrorism.

This might sound discouraging, but while monitoring of online extremist communities may not suffice to prevent an attack, it can help to develop an understanding of the ideological environments from within which a lone wolf terrorist might emerge (Spaaji, 2012), and may also facilitate an understanding of the mechanisms of self-radicalisation. However, it should be noted that theories discussed in the present work are related to lone wolf terrorists' communication on the Internet and thus fail to include those who do not choose to communicate with others in such a fashion. A lone wolf terrorist, who communicates with someone prior to an attack, may differ in several psychological respects from someone who commits an attack without prior communication.

Aside from the difficulty of predicting behaviour on an individual level, the very low base rate in the population under consideration makes it all the more impossible to draw conclusions from group data to predict which subjects will turn out to be violent. Low base rates increase the number of false positives, meaning that for any terrorist check list, there will be several individuals that match the criteria, yet would never commit an act of radical violence. How to handle the abundance of false positives is ultimately a question of resources (Will it be too costly and arduous to closely monitor activities that are most likely harmless?) and ethics (Should someone not have the right to have

extremist views and unhealthy obsessions in private, without being subjected to surveillance and regarded as a criminal?).

While behaviour cannot be predicted, what can be done is a rough separation of individuals into risk groups, such as high, moderate or low, based on how many statistical associations a subject shares with the group of people from which the ones who will go on to commit violence are most likely to emanate (Meloy, 2012). Future research on warning behaviours should include a development and refinement of the typology of warning behaviours, as well as some sort of ranking scale with respect to the likelihood that a certain behaviour or combination of behaviours will be followed by an attack. The study of well-established risk profiles such as the Stalking Profile (MacKenzie et al., 2009) and HCR-20 (Webster, Douglas, Eaves and Hart, 1997) might be helpful in this work. A review of different violence risk assessment tools and predictive validity can be found in Singh, Grann & Fazel (2011). Empirical and theoretical work also needs to be done to corroborate (or reject) the hypotheses presented in section 3.2. The methods for text analysis proposed in Cohen et al. (in press) should be applied to existing material, i.e. digital traces of pre-attack Internet communication from previous lone wolf terrorists.

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