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Application of the TRAP-18 Framework to U.S. and Western European Lone Actor Terrorists

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ABSTRACT

The purpose of this study is to examine the feasibility and relevance of the Terrorist Radicalization Assessment Protocol-18 (TRAP-18), an investigative framework to identify those at risk of lone actor terrorism. Using public information, we rated TRAP-18 items for 35 U.S. and 38 European jihadism-inspired lone actors (total $N = 77$). Results reveal challenges completing the TRAP-18 using public information: only four of 18 items (Pathway, Identification, Personal Grievance, Framed by Ideology) were rated present more often than absent or unknown. Findings suggest greater relevance of TRAP-18 items to U.S. lone actors, who had a higher average number of items rated present.

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Lone actor terrorism¹ has captured the attention of news media, politicians, and intelligence and security experts for its ability to seemingly come out of nowhere and cause immense harm. The names of lone actor terrorists often become common knowledge along with the stories of their acts of destruction. However, public fears about falling victim to one of these types of attack may be inflated, as studies have shown that lone actor attacks comprise less than two percent of the total number of terrorist attacks around the world.² Despite the relatively low risk to national security presented by lone actors compared to other extremist and terrorist actors, prevention of lone actor terrorist violence has been the focus of a disproportionately high number of research and intelligence community efforts. The significant public concern and potential for grievous harm resulting from lone actor attacks means that these efforts are not without cause, but still calls for the critical evaluation of the products of these efforts. No matter the prevalence, tools used by law enforcement to improve the assessment and management of threats should be empirically supported and valid across the multitude of contexts in which they may be applied. They also should be feasible to use in day-to-day practice and have practical utility. Indeed, even approaches that demonstrate good validity will fail to produce the intended outcomes of improved public safety and national security if they cannot be used as designed in practice.³ To that end, the present study assesses the

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feasibility and applicability of one such framework, the Terrorist Radicalization Assessment Protocol (TRAP-18) among known U.S. and European lone actor terrorists.⁴

The TRAP-18 is an investigative framework for identifying individuals at risk of lone actor terrorist violence.⁵ The structured professional judgment tool is designed for use by threat assessment professionals to guide decision making about an individual's risk for engaging in lone actor terrorist violence. The 18 items are comprised of 10 Distal Characteristics, defined as patterns of belief or behavior related to extremist ideology or participation in terrorism, and eight Warning Behaviors, indicators of imminent violent action. Items are rated "present," "absent," or "unknown" according to TRAP-18 user manual definitions based on the available information. The final judgment about risk is at the sole discretion of the evaluator; item ratings are not summed to create subscale or total "threat" scores, but instead are intended to facilitate the organization and analysis of available data.

In the present study, we first address the feasibility of applying the TRAP-18 to a sample of lone actors, analyzing rates of unknown ratings within items to understand which items can be coded using publicly available information. We begin our approach as such in the tradition of studying nascent violence risk assessments,⁶ and one extremist violence risk assessment,⁷ recognizing that even the most highly predictive items are not helpful in practice if they cannot be applied to the case at hand. We then proceed to analyzing the distribution of "present" and "absent" ratings across TRAP-18 items and conclude with a comparison of item ratings among U.S. and European lone actor terrorists. In the literature review which follows, we first examine the phenomenon of lone actor terrorists generally, then delve into the approaches to assessing risk of lone actor terrorism. The review concludes with considerations of how U.S. and European sociopolitical contexts may influence the landscape of lone actor terrorism.

Literature Review

Though lone actor attacks are relatively rare events in comparison to attacks by group-based terrorists, their prevalence is increasing as they offer strategic advantages in areas that may otherwise be difficult to access.⁸ In the United States specifically, the proportion of attacks carried out by lone actors has steadily increased from five percent of the total number of attacks in the 1980s to over one-third of attacks from 2000 to 2014.⁹ However, studying lone actor terrorism is complicated by the varying definitions that exist, including variations in definitions used within the academic and law enforcement contexts, which may also differ from those used by news media and the general public. The strengths and pitfalls of a number of these definitions are reviewed in a seminal article by Spaaij and Hamm, setting research priorities for the study of lone actor terrorism.¹⁰ Since we focus on the TRAP-18 in this paper, we use the definition of lone actor terrorism set forth by the authors of the TRAP-18 framework. Specifically, in this paper we consider lone actor terrorists to be "those who research, plan, prepare and implement an attack on their own and do not rely on external command and control."¹¹ This definition thus includes both those individuals who support a terrorist organization, but operate outside of the organization, and those who follow a violent

extremist ideology without any specified ties to organizations. “Solo-terrorists” (i.e., individuals who received direct training and operational support from a terrorist organization in the tactics of an attack, but carried out the attack independently)¹² were not considered as meeting the above given definition of lone actors.

Although jihadism-inspired lone actors have rarely been studied as a distinct sample of lone actors, the unique ideological motivations driving this particular type of lone actor terrorist violence merit further examination. Unlike other types of ideological lone actor violence, the sociopolitical underpinnings of conflicts and interpretation of religious texts by jihadist leaders have specifically emphasized the lone actor attack as a supported tactic.¹³ For instance, a reference to a religious interpretation supporting lone actor violence in a speech by Osama Bin Laden has been directly linked to a lone actor terrorist attack. Further, increased religiosity leading up to perpetration of an attack has been found to be more common among al-Qaeda inspired lone actor terrorists through a comparison of 119 right-wing, single issue, and al-Qaeda inspired lone actors in the United States and Europe.¹⁴

Assessing Risk of Lone Actor Terrorist Violence

Within intelligence and security communities, there is a critical need for empirically validated strategies to help triage information and guide decisions about individuals at risk for perpetration of terrorist violence. Increasingly, intelligence analysts are tasked with making sense of a diverse array of information and data from both publicly available and classified sources.¹⁵ The case of the lone actor terrorist, someone guided by extremist principles but operating separately from terrorist organizations, presents a unique challenge; in particular, the lack of outside (and potentially observable) communication during the planning of the attack can make them exceedingly difficult to identify and prevent.¹⁶ Further, evidence suggests that characteristics that contribute to risk for engaging in terrorist acts—that is, risk factors—may differ for lone actor and group-based terrorists.¹⁷ For instance, drawing data from a sample of 72 lone actor terrorist incidents and comparing with international trends in group-based terrorism events, Spaaij shows that the use of firearms is uniquely common among lone actors in contrast to group-based terrorists.¹⁸ Spaaij and other scholars note the distinctive ideological drive that takes place among lone actors, whereby strongly felt personal grievances are blended with ideology espoused by existing groups to create a personalized extremist ideology.¹⁹ Finally, analyzing data from 27 American terrorists who were unaffiliated at the time of carrying out their attacks, Hewitt found that just under one-quarter showed symptoms of mental illness, as compared to less than ten percent of the group-based terrorists.²⁰ As such, approaches developed and validated for assessing and managing the risk of group-based terrorism may not generalize to lone actor terrorism.²¹ For these reasons, there is a need for counterterrorism strategies that are designed specifically for assessing and managing the risk of terrorist acts within the context of lone actors. One potential strategy for identifying individuals who may be at heightened risk of perpetrating lone actor terrorism is the use of the TRAP-18.

As introduced earlier, the TRAP-18 is a structured professional judgment framework for organizing information and making decisions about individuals who are potential lone actors. The TRAP-18 is comprised of 18 items divided into Warning Behaviors and Distal Characteristics, each of which are rated as either “present,” “absent,” or

“unknown.” The eight Warning Behaviors are: 1) Pathway, 2) Fixation, 3) Identification, 4) Novel Aggression, 5) Energy Burst, 6) Leakage, 7) Last Resort, and 8) Directly Communicated Threat. The 10 Distal Characteristics are: 1) Personal Grievance and Moral Outrage, 2) Framed by an Ideology, 3) Failure to Affiliate with an Extremist or Other Group, 4) Dependence on the Virtual Community, 5) Thwarting of Occupational Goals, 6) Changes in Thinking and Emotion, 7) Failure of Sexually Intimate Pair Bonding, 8) Mental Disorder, 9) Creativity and Innovation, and 10) Criminal Violence.

A number of studies have applied the TRAP-18 to various populations of lone actor and group-based terrorists. Foundational studies often used case study methodologies to test and develop items. Among these are studies of the Frankfurt airport attacker,²² Anders Breivik,²³ and the Fort Hood shooter.²⁴ In each of these cases, a single individual, motivated by violent extremism, perpetrated a deadly ideologically-driven attack. The Frankfurt Airport attacker and Fort Hood shooter were both driven by a jihadism-inspired ideology and targeted American military personnel, one on an American military base and the other near an airport in Germany. Anders Breivik, driven by far-right ideology, perpetrated one of the most deadly lone actor attacks, to date, in a mass shooting and bombing that targeted a youth camp in Norway. In two of these studies (Frankfurt airport attacker and Fort Hood shooter) the lone actors were evaluated on the full TRAP-18, finding that 15 (83.3%) and 13 (86.7%) of the items were present, respectively. For Anders Breivik, only the eight Warning Behaviors were investigated, finding that six out of eight (75.0%) were present. There was some overlap in the items for which no evidence was present; in all three case studies, there was no evidence for items Novel Aggression and Directly Communicated Threat. In the two studies evaluating the full TRAP-18, there was no evidence for Criminal Violence. Additionally, in the case of the Fort Hood Shooter, there was no evidence for an additional two items: Failure to Affiliate with an Extremist or Other Group, and Mental Disorder. These findings suggest that, at least in these three cases, the majority of items included the TRAP-18 framework appear to be relevant and descriptive of the characteristics of lone actor terrorists. However select items, such as Novel Aggression, Directly Communicated Threat, Criminal Violence, Failure to Affiliate with an Extremist or Other Group, and Mental Disorder, may not be relevant to lone actors.

Using a comparative approach, the authors of the TRAP-18 tested for prevalence of items by ideology in a sample of 111 lone actor terrorists of various ideologies in the United States and Europe who planned or perpetrated attacks from 1990 to 2014.²⁵ There were no significant differences in the average number of items present in each ideological group, each averaged about 10 out of 18 items rated as present. Results of chi-square analyses demonstrated that radical Islamic lone actors showed more evidence of dependence on the virtual community compared to single-issue lone actors, providing some of the first evidence that the applicability and relevance of TRAP-18 items may vary by ideology. Together, the findings of these initial studies of the TRAP-18 framework suggest that some items may be more relevant than other items for particular groups of lone actors, supporting the need for further research examining differences in item prevalence across different groups of lone actors.

More recent research has examined the performance of the TRAP-18 framework across groups of individuals involved in terrorism in different ways, such as violent and

nonviolent actors. A study of 58 individuals or groups associated with the Sovereign Citizens movement in the United States, for example, found differences in the prevalence of TRAP-18 items between violent and nonviolent cases.²⁶ Results from binary logistic regression showed that the total number of TRAP-18 items rated as present was predictive of perpetration of violent action; subjects with higher scores were approximately two times more likely to be involved in violent action. A second study compared 33 ideologically diverse lone actor terrorists in North America to 23 individuals in the United States and Canada who had come to the attention of law enforcement or mental health services as potential security concerns but did not engage in any action.²⁷ The demographic characteristics of the two groups were compared, showing that lone actors more often were single, had children, and reached higher levels of education. Lone actors and nonactors had similar employment statuses. The proportion of items coded as present and absent revealed that seven items (Pathway, Identification, Energy Burst, Last Resort, Framed by an Ideology, Changes in Thinking and Emotion, and Creativity and Innovation) were significantly more likely to be present among the sample of lone actors than the nonactors, supporting the ability of the TRAP-18 to differentiate between the characteristics of violent and nonviolent persons of interest in lone actor investigations.

The findings of these two studies offer evidence of the TRAP-18 framework's postdictive validity; that is, the ability of the tool to produce scores or estimates that correctly assess the likelihood of lone actor terrorist violence in cases in which the outcome is already known. However, they fall short of offering evidence comparing lone actors of the *same* ideology across geographic regions or sociopolitical contexts. In particular, both studies drew samples from the United States.²⁸ More generally, the body of research evidence supporting the TRAP-18 framework, though promising, is nascent and heavily reliant on case studies or small samples, with potentially limited generalizability. Further empirical research is needed to support its utility in practice, including studies that examine the feasibility and applicability of items included the TRAP-18 framework to samples of lone actor terrorists across diverse sociopolitical contexts.

A number of other risk assessment frameworks for terrorism exist, though to our knowledge the TRAP-18 is the only tool designed specifically for use with lone actor terrorists. A comprehensive review of risk assessments related to terrorism and extremism critiques the transparency of the methodology used by most of the extant research into assessing risk.²⁹ The authors reviewed 37 published studies covering a total of 30 tools, finding that the lack of transparency and assessment of psychometric properties across instruments could likely be tied back to the lack of a standardized reporting framework within the domain of risk assessments for terrorism. Although such standards exist in related fields, they have not been consistently applied to the emerging research on and development of risk assessments for terrorism. Thus, the validity and practical utility of many of these instruments remains unclear and in need of further study.

United States and European Sociopolitical Contexts

While both the United States and Europe have seen an increase in lone actor terrorist attacks since 1978,³⁰ these two geographic regions differ in terms of their sociopolitical contexts. In particular, the United States and Europe have differed meaningfully in recent years with regard to their responses to domestic terrorism and these differences

may have implications for our understanding and application of approaches that seek to support the assessment and management of threat of terrorist violence. For instance, domestically, in the years since the September 11th terrorist attacks, the United States has increasingly embraced sting operations as a method to detect and prevent lone actor terrorist violence, in stark contrast to European countries wherein sting operations are not permitted under law.³¹ Spaaij and Hamm describe how the differential use of sting operations may lead to a difference in the observed methods and sophistication of lone actor attacks. To demonstrate, access to bombs or bomb-making materials used in lone actor attacks perpetrated in the United States may actually be facilitated by the undercover law enforcement agents involved in the sting operation. Outside of the United States, sophisticated methods of attack, including making bombs, are not often seen without support from an established terrorist network.

Moreover, recent research suggests that there are differences in the fundamental drivers of lone actor terrorism within the United States and Europe. For instance, within the United States, the phenomenon and popularity of “leaderless resistance” appears to motivate lone actor terrorism,³² whereas lone actors in Europe appear to be more directed by the goals of the prominent terrorist organizations regarding targets of violence.³³ A review of jihadism-inspired terrorism in Europe—both lone actor and group-based—describes a change in target selection from U.S.-affiliated targets to European targets in response to the directives from Al-Qaeda and European involvement in the War on Terror. Lone actor terrorists who radicalize independently of terrorist organizations appear to nonetheless follow “ideological and strategic guidelines emanating from al-Qaida’s central leadership” and engage in target selection in ways that are similar to group-based terrorists in Europe.³⁴ The tendency of European lone actors look to centralized leadership compared to the tendency of U.S. lone actors to independently engage in violent action suggest that the individual trajectories of radicalization may also differ between lone actor terrorists operating in the United States and Europe. Yet, there is no research, of which we are aware, which has examined and compared the application of threat assessment and management strategies, or the TRAP-18 framework specifically, across lone actors in the United States and Europe. Along with the aims introduced earlier, this is an important gap in knowledge that we seek to address with the present study.

The Present Study

The present study applies the TRAP-18 framework to a sample of 77 jihadism-inspired lone actor terrorists and reports on the feasibility and relevance of the framework overall and compared between lone actor terrorists in the United States ($n = 35$) and Europe ($n = 38$). This investigation is guided by three research objectives:

1. To apply the TRAP-18 to a sample of jihadism-inspired lone actor terrorists and report on the feasibility of using the framework with publicly available information.
2. To describe the characteristics of the framework and distribution of ratings across items.

3. To compare lone actor terrorists from the United States and Europe in terms of the presence of TRAP-18 items and priority recommendations.

By addressing these research objectives, we advance the science and practice regarding the application of the TRAP-18 framework as a counterterrorism strategy in at least three important ways. First, to our knowledge, this study is the first to explore the TRAP-18 focusing uniquely on jihadism-inspired lone actor terrorists. Second, our study represents the first comparison of United States and European lone actors. Prior research has compared United States and European lone actors as a function of their ideologies, not as a function of the sociopolitical contexts represented by geographic regions. Third, though reported on tangentially in prior studies, this study is the first to explicitly address the feasibility of completing the TRAP-18 framework using publicly available information by focusing on the prevalence of items rated as unknown and discussing the characteristics of TRAP-18 assessments in detail.

Method

Sample

The lone actor terrorist dataset was compiled through screening of the Western Jihadism Project database.³⁵ The Western Jihadism Project database is comprised of publicly available information on individuals involved in terrorist plots, connected to terrorist networks, or self-identifying as involved with a terrorist group or action. All individuals must have either primary residence or citizenship in Western country (United States, United Kingdom, Western European, Canada, Australia, and New Zealand). Exceptions to this rule were made for tracking links between Western individuals and prominent leaders of terrorist organizations with citizenship and residence outside of the West. Since 2006, publicly available information has been gathered and synthesized and records have been screened back to the early 1990s. Sources used in the creation of the database include news media, court records, social media posts, and other publicly available records.

As of April 2019 (the date we finalized cases for inclusion in the current investigation), the database comprised 6,462 individuals, representing the largest compilation of data on individuals involved in jihadism-inspired terrorism available to researchers. Accordingly, the Western Jihadism Project database has been used to analyze the social networks and spatial relationships of terrorist organizations as well as investigate subpopulations of terrorism-involved individuals.³⁶ Variables include personal demographic characteristics and links to terrorist groups, plots, and other affiliated individuals. Whenever available, details on the associated organizations and plots, including the nature of the individual's relationship, are included within the database.

To create our analytic dataset of lone actor terrorists, we began by screening the 464 violent plots included in the Western Jihadism Project database. For this screening, the plot descriptions were reviewed to determine whether (1) the plot was undertaken by a single individual or pair of individuals who (2) operated independently of a terrorist organization. A total of 137 plots were identified as potential plots undertaken by lone actors. A subset of plots were screened by two coders, who discussed disagreements and

came to consensus about whether the plot information described a potential lone actor attack. These 137 plots were linked to a total of 234 individuals, a clear indicator that some of the plots were not undertaken by individuals acting without external support. The 234 individuals who were linked to the potential lone actor plots were then screened a second time to determine whether they met the previously stated inclusion criteria for lone actor terrorists. For this second round of screening, the brief biographies of each individual included in the Western Jihadism Project database were reviewed, which provided more details about the individual's radicalization, ideology, and connections to jihadism-inspired organizations. Individuals were excluded if they received extensive aid or support from another individual in preparing for or carrying out the plot, or were not self-directed in the plot (i.e., controlled by another individual or organization). An additional four individuals were identified through keyword searches of the Western Jihadism Project database ("lone" and "singleton").

A subset of the 234 potential lone actors ($n = 69$, 28.6%) was reviewed by two coders and revealed good agreement ($\kappa = .720$) about whether or not the individual was a lone actor.³⁷ Based on the results of this coding, we identified 80 individuals who met the criteria for inclusion in the sample as a lone actor terrorist. However, while coding the TRAP-18, the primary source documents (i.e., news reports, court documents, blog posts) associated with each individual were reviewed which revealed new details showing that three individuals did not, in fact, operate alone. These cases were excluded from the final analytic sample reported upon in this paper. Thus, we report upon results of coding TRAP-18 items for a sample of 77 lone actor terrorists, representing just 1.3% of the total number of individuals within the Western Jihadism Project database at the time of our data extraction.

Table 1 presents the sociodemographic and criminal history characteristics of our analytic sample. Almost half of the 77 lone actor terrorists were born in the years between 1983 and 1990. Lone actor terrorists represented a diverse array of ethnic backgrounds, including White-European, Pakistani, and Moroccan. Among lone actors for whom level of education was known, almost all had completed at least a high school level of education, with most progressing beyond high school to college, technical school, or postgraduate education. About one-third of the lone actors in our sample had converted to Islam, meaning that they had been raised outside of the religion and converted to Islam later in their lives. Among the two-thirds of the sample for whom information on profession was known, most worked in unskilled labor (i.e., service/manual workers). About one-fifth had no recent profession in the period leading up to their apprehension or carrying out of the lone actor plot. Just over one-third of the lone actors in the sample had at least one known instance of criminal activity prior to their involvement in terrorism. Specific prior criminal activities ranged from assault/murder to drug-related offenses and fraud.

U.S. and European Subsamples

Lone actors were included in either the U.S. or European subsample if their primary country affiliation was in the United States or Europe. Primary country affiliation was assigned based upon the country in which the individual spent the most time in the six months prior to their radicalization or participation in terrorist activity. Though

Table 1. Lone actor demographic and criminal history characteristics.

Lone actor characteristics	Full sample (<i>N</i> = 77)	Subsamples		Comparison	
		United States (<i>N</i> = 34)	Europe (<i>N</i> = 38)		
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	χ^2	<i>p</i>
Year of birth				0.44	.932
1973 and earlier	15 (19.5%)	6 (17.6%)	8 (21.6%)		
1974–1982	18 (23.4%)	7 (20.6%)	9 (24.3%)		
1983–1990	35 (45.5%)	17 (50.0%)	16 (43.2%)		
1991 and later	8 (10.4%)	4 (11.8%)	4 (10.8%)		
Missing	1 (1.3%)	0 (0.0%)	1 (1.3%)		
Ethnicity				11.50	.022
African ^a	23 (29.9%)	6 (17.6%)	16 (42.1%)		
Middle Eastern	14 (18.2%)	9 (26.5%)	3 (7.9%)		
Asian	14 (18.2%)	5 (14.7%)	8 (21.1%)		
White European	12 (15.6%)	8 (23.5%)	3 (7.9%)		
Other	9 (11.7%)	6 (17.6%)	3 (7.9%)		
Missing	5 (6.5%)	0 (0.0%)	5 (13.2%)		
Legality of residence				8.09	.018
Legal	63 (81.8%)	29 (85.3%)	29 (76.3%)		
Undocumented	7 (9.1%)	5 (14.7%)	2 (5.3%)		
Unknown ^a	7 (9.1%)	0 (0.0%)	7 (18.4%)		
Highest level of education				7.38	.117
Less than high school	3 (3.9%)	1 (2.9%)	2 (5.3%)		
High school	11 (14.3%)	11 (32.4%)	0 (0.0%)		
Technical school	2 (2.6%)	1 (2.9%)	1 (2.6%)		
College	20 (26.0%)	14 (41.2%)	6 (15.8%)		
Postgraduate	4 (5.2%)	3 (8.8%)	1 (2.6%)		
Missing	37 (48.1%)	4 (11.8%)	28 (73.7%)		
Profession				12.75	.013
Unskilled labor	16 (20.8%)	7 (20.6%)	9 (23.7%)		
Skilled labor	4 (5.2%)	2 (5.9%)	2 (5.3%)		
Military and police/security ^a	9 (11.7%)	8 (23.5%)	0 (0.0%)		
Other ^a	6 (7.8%)	1 (2.9%)	4 (10.5%)		
No recent profession	14 (18.2%)	11 (32.4%)	3 (7.9%)		
Missing	28 (36.4%)	5 (14.7%)	20 (52.6%)		
Asylum seeker	6 (7.8%)	3 (9.7%)	2 (6.7%)	FET	> .999
Conversion to Islam	26 (33.8%)	16 (47.1%)	8 (21.6%)	FET	.027
Criminal behavior prior to radicalization	31 (40.3%)	19 (55.9%)	10 (26.3%)	FET	.016

Notes. FET indicates Fisher's Exact Test. Totals may not equal 100% due to rounding.

^aIndicates the specific categories within which Bonferonni-corrected posthoc comparisons showed that U.S. and European lone actors differed significantly.

individuals may be included in the Western Jihadism Project database if they hold primary residence in any European country, only eight countries were represented among the 38 European lone actors: Austria, Belgium, France, Germany, Italy, Spain, Sweden, and the United Kingdom. Only five lone actor terrorists were not from either the United States or a European country; those lone actors were from Canada ($n=3$) and Australia ($n=2$) and were excluded from analyses comparing U.S. and European samples.

Table 1 also presents the sociodemographic and criminal history characteristics of U.S. and European lone actors. As can be seen in Table 1, U.S. and European lone actors were similar in many ways. Specifically, there were no significant differences on year of birth, level of education, and being an asylum seeker, $ps \geq .117$. As seen in the full sample, U.S. and European lone actors were most frequently born between 1983 and 1990, with the second highest proportion born between 1974 and 1982. Though

information on education was unknown for almost three-quarters of the European lone actors, lone actors were fairly well educated in both subsamples, often completing high school or advanced education. Asylum seekers were rare in both subsamples, comprising less than one in 10 of the lone actors.

U.S. and European lone actors also differed in meaningful ways, including their ethnicity, legality of residence, profession, conversion to Islam, and criminal behavior prior to radicalization. Almost half ($n = 16$, 48.5%) of European lone actors were of African ethnicities, as compared to less than one-quarter ($n = 6$, 17.6%) of U.S. lone actors. There was a significant difference in the legality of lone actor's residence in their current country; however, posthoc analyses revealed that the difference was in the number rated as unknown, meaning that their legal status could not be determined from the publicly available information. No U.S. lone actors had unknown legal statuses, while legality of residence was unknown for seven (18.4%) European lone actors. Over three-quarters of U.S. and European lone actors were legal residents of their countries, and less than one out of 10 of the lone actors in the sample were undocumented. In terms of professions, U.S. and European lone actors differed on the prevalence of military and police/security careers and other professions. Specifically, over one-quarter of the U.S. lone actors were in military and police/security careers, compared to none of the European lone actors. A far greater proportion, almost one-quarter, of European lone actors were in other professions, compared to only one U.S. lone actor. As noted earlier with regard to education, a larger proportion of European than U.S. lone actors were missing information on their profession. Among U.S. lone actors, conversion to Islam was fairly common, occurring in just under half of all cases, compared to less than one-quarter of European lone actors. Known criminal behavior prior to radicalization was also fairly common among both samples, but significantly more so among U.S. lone actors: over half of U.S. lone actors were known to have engaged in criminal behavior prior to radicalization compared to just over one-quarter of European lone actors.

Measures

TRAP-18

As introduced earlier, the TRAP-18 is an investigative framework for organizing information and assisting with determinations of risk.³⁸ The TRAP-18 is comprised of two subcomponents: Warning Behaviors and Distal Characteristics. The eight Warning Behaviors are: 1) Pathway, 2) Fixation, 3) Identification, 4) Novel Aggression, 5) Energy Burst, 6) Leakage, 7) Last Resort, and 8) Directly Communicated Threat. The 10 Distal Characteristics are as follows: 1) Personal Grievance and Moral Outrage, 2) Framed by an Ideology, 3) Failure to Affiliate with an Extremist or Other Group, 4) Dependence on the Virtual Community, 5) Thwarting of Occupational Goals, 6) Changes in Thinking and Emotion, 7) Failure of Sexually Intimate Pair Bonding, 8) Mental Disorder, 9) Creativity and Innovation, and 10) Criminal Violence. During the coding process, we developed study-specific operational definitions and coding conventions for each TRAP-18 item to promote consistency between coders and application to the Western Jihadism Project database. We provide these operational definitions and coding conventions in the [Appendix A](#).

Consistent with the structured professional judgment approach to assessing risk, TRAP-18 item ratings are meant to facilitate the organization of information and guide and support, but not replace, the evaluator's decision making regarding threat of lone actor terrorism.³⁹ To be clear, the item ratings are not summed to create total or subscale scores that are then used to determine a probability of lone actor terrorism. Instead, the items ratings are used to inform two priority recommendations. The first, Active Monitoring, is suggested when a clustering of Distal Characteristics is present. For the purposes of this study, we defined a "clustering" as the presence of three or more Distal Characteristics. Active Monitoring means that the case would continue to be observed to determine if there are other indicators of imminent action. The second priority recommendation, Active Risk Management, is suggested when at least one Warning Behavior is present and entails undertaking immediate risk management activities. We adhered to this guidance in this study. The TRAP-18 concludes by asking the evaluator to address a number of open-ended questions, such as whether relevant risk factors are present that were not captured by the TRAP-18, the likely method and targets of violence if it were to occur, potential protective factors, and other external factors which may exacerbate the situation.

Procedures

Before using the TRAP-18, all coders completed the online TRAP-18 training provided by the Global Institute of Forensic Research and reviewed the user manual.⁴⁰ The training is approximately two hours long and covers the foundational theories and research used to develop the TRAP-18, as well as all the item definitions and coding guidance. The online training and user manual both provide extensive case examples of lone actor terrorism. All members of the research team then met to develop our study-specific codebook to guide the application of the TRAP-18 to our analytic sample of lone actor terrorists drawn from the Western Jihadism Project database. A lone actor terrorist's profile was randomly selected; we began by first independently reading all information associated with the profile, then proceeded to collaboratively decide on the appropriate rating (present, absent, or unknown) for each item on the TRAP-18. Items were rated as present when there was sufficient information to conclude that one or more elements of the item were evident. The rating of absent was used when there was evidence to show that elements of the item definition were *not* met. Items were rated as unknown when there was not enough information to make a decision about presence or absence of the item or when the information that was available provided conflicting evidence regarding presence or absence. Collaborative coding was repeated for a second, randomly selected lone actor. Coders then independently coded two more lone actors, pausing in between to discuss how each item was coded. Throughout this process, coders discussed disagreements as they arose and added to a document of working definitions for each TRAP-18 item as decisions were made about the correct rating of an item. Sometimes, these disagreements arose from simple causes, such as overlooking a part of the individual's profile that contained necessary information. In other cases, disagreements were due to varied interpretations of an element of the TRAP-18 item or confusion about how to rate the item with limited data. For example, considering the first TRAP-18 item (Pathway), coders initially disagreed on whether actions taken in the planning of an attack could count as the presence of this

item if the individual ultimately decided not to carry out the act or chose to act in a different manner. We collaboratively determined that Pathway should be coded present, even if the attack did not occur as planned, because the action of the attack does not negate the planning that had happened previously. This coding convention can be seen recorded in the [Appendix A](#) of study specific coding notes for Pathway. Once we were satisfied with our study operational definitions and coding conventions, the TRAP-18 was coded for all 77 lone actors. A random subset of 20 lone actors (26.0% of our analytic sample) was assessed by all coders to assess inter-rater reliability. Analyses revealed excellent inter-rater reliability ($\alpha = .950$).

Analytic Plan

To understand the feasibility of coding TRAP-18 items based on publicly available information, we calculated descriptive statistics and measures of central tendency for the TRAP-18 item ratings overall and across its subcomponents (i.e., Warning Behaviors and Distal Characteristics). This approach has been used in prior investigations examining the feasibility of using risk assessments and decision making frameworks in practice.⁴¹ We also examine the prevalence (i.e., frequency and percentage) of unknown ratings for each item. To address our second research objective of describing the characteristics of TRAP-18 assessments, we compare the prevalence and distribution of present, absent, and unknown ratings per item using chi-square tests. We additionally report on the prevalence of the priority recommendations. To address our third research objective of comparing TRAP-18 assessments completed on U.S. and European lone actors, we perform chi-square tests of the prevalence of items coded as present and the priority recommendations between the two subsamples.

Results

Feasibility

To address our first research objective of determining the feasibility of completing the TRAP-18 using publicly available information, we examined the prevalence of unknown ratings overall, by subcomponent, and by item. Within a case, an item was rated as unknown if there was not conclusive evidence for either the presence or absence of indicators of the item. These frequencies and percentages are presented in [Table 2](#).

The degree to which a given item could not be rated as either present or absent, but instead had to be rated as unknown, ranged considerably. Specifically, the number of items rated as unknown per case ranged from just one item (5.6%) to 16 items (88.9%) out of the 18 total possible items. There were no cases for which *every* TRAP-18 item was rated as either present, absent, or unknown. So, for all cases, there was some distribution of items across the possible ratings of present, absent, or unknown.

Examining the prevalence of unknown versus absent or present ratings revealed that coders were significantly more likely to mark two-thirds of the TRAP-18 items (i.e., 12 items) as unknown than as present or absent, χ^2 s ≥ 6.87 , $ps < .009$ (see [Table 2](#)). These items were: Fixation, Novel Aggression, Energy Burst, Leakage, Last Resort, Directly Communicated Threat, Failure to Affiliate, Thwarting of Occupational Goals,

Table 2. Summary of TRAP-18 item ratings among full sample.

TRAP-18 Items	Frequency of endorsement <i>n</i> (%)			Comparison	
	Present	Absent	Unknown	χ^2	<i>p</i>
<i>Warning behaviors</i>					
Pathway	63 (81.8%)	0 (0.0%)	14 (18.2%)	31.18	<.001
Fixation	15 (19.5%)	0 (0.0%)	62 (80.5%)	28.69	<.001
Identification	64 (83.1%)	0 (0.0%)	13 (16.9%)	33.78	<.001
Novel aggression	1 (1.3%)	18 (23.4%)	58 (75.3%)	66.73	<.001
Energy burst	36 (46.8%)	3 (3.9%)	38 (49.4%)	30.10	<.001
Leakage	18 (23.4%)	4 (5.2%)	55 (71.4%)	54.10	<.001
Last resort	27 (35.1%)	0 (0.0%)	50 (64.9%)	6.87	.009
Directly communicated threat	4 (5.2%)	6 (7.8%)	67 (87.0%)	99.92	<.001
<i>Distal characteristics</i>					
Personal grievance and moral outrage	56 (72.7%)	0 (0.0%)	21 (27.3%)	15.91	<.001
Framed by an ideology	67 (87.0%)	0 (0.0%)	10 (13.0%)	42.20	<.001
Failure to affiliate	3 (3.9%)	12 (15.6%)	62 (80.5%)	78.73	<.001
Dependence on the virtual community	41 (53.2%)	0 (0.0%)	36 (46.8%)	0.33	.569
Thwarting of occupational goals	17 (22.1%)	4 (5.2%)	56 (72.7%)	57.07	<.001
Changes in thinking and emotion	27 (35.1%)	1 (1.3%)	49 (63.6%)	44.99	<.001
Failure of sexually-intimate pair bonding	7 (9.1%)	18 (23.4%)	52 (67.5%)	42.88	<.001
Mental disorder	34 (44.2%)	1 (1.3%)	42 (54.5%)	36.81	<.001
Creativity and innovation	2 (2.6%)	72 (93.5%)	3 (3.9%)	125.48	<.001
Criminal violence	27 (35.1%)	6 (7.8%)	44 (57.1%)	28.23	<.001

Notes. *N* = 77. χ^2 , chi-squared test of distribution of present, absent, and unknown ratings.

Changes in Thinking and Emotion, Failure of Sexually Intimate Pair Bonding, Mental Disorder, and Criminal Violence. Among these items, three were rated as unknown over 80% of the time (i.e., Fixation, Directly Communicated Threat, and Failure to Affiliate), suggesting that a coding determination regarding presence or absence of these items can almost never be made based upon publicly available information. One TRAP-18 item, Energy Burst, was rated unknown in just under half of the cases, suggesting that it may be possible to improve the feasibility of coding this item with minor adjustments to the definition or available information.

A related analysis shows that, on average, nine TRAP-18 items (50.0%, *M* = 9.49, *SD* = 3.36, median = 9.00, mode = 8.00) were rated as unknown by the coders per case. In other words, on average, half of the TRAP-18 items could not be rated for a given lone actor in our sample. Consideration of items within the subcomponents suggest that Warning Behaviors were more challenging to rate than were Distal Characteristics. To demonstrate, out of the eight Warning Behaviors, coders rated an average of five items—or almost two-thirds (62.5%)—as unknown per case (*M* = 4.62, *SD* = 1.79, median = 5.00, mode = 4.00). The number of Warning Behaviors items rated as unknown per case ranged from none to all eight items (i.e., 0.0% to 100.0%). Out of the 10 Distal Characteristics, coders rated an average of five items (50.0%, *M* = 4.87, *SD* = 2.09, median = 5.00, mode = 5.00) as unknown per case. Among Distal Characteristics, the number of items rated as unknown across all cases ranged from 0 to nine (0.0% to 90.0%).

Characteristics of TRAP-18 Assessments Overall

For our second research objective, we sought to describe the characteristics of TRAP-18 assessments overall, reporting on the prevalence and distribution of present, absent, and unknown ratings overall and by item. Examining first the characteristics of all TRAP-18

items, coders rated an average of about seven out of 18 items as present (38.9%, $M=6.61$, $SD=2.71$, median = 7.00, mode = 4.00) and about two items as absent (11.1%, $M=1.88$, $SD=1.15$, median = 2.00, mode = 1.00) per case. The number of items rated as present per case ranged from one to 12 (5.5% to 66.6% of the possible 18 items), while the number of items rated as absent ranged from 0 to seven (0.0% to 38.8%). The higher number of items rated as present than absent suggests that the TRAP-18 items are relevant to lone actor terrorists overall. However, with the range of items rated as present starting as low as one and less than half of items rated as present, on average, our findings raise potential concerns about the applicability of items across lone actors.

Among the eight Warning Behaviors items, coders rated an average of three items as present (37.5%, $M=2.96$, $SD=1.53$, median = 3.00, mode = 3.00) and less than one item as absent (12.5%, $M=0.40$, $SD=0.67$, median = 0.00, mode = 0.00) per case. Across cases, the number of Warning Behavior items rated as present ranged from 0 to six (0.0% to 75.0%), while the number rated as absent ranged from 0 to three (0.0% to 37.5%). Two Warning Behaviors were significantly more likely to be rated as present than absent or unknown, both of which were rated as present over 80% of the time: Pathway and Identification. Since the presence of one or more Warning Behaviors results in a priority recommendation of Active Risk Management, the high prevalence of present ratings for these two items lead to the vast majority of individuals in our sample ($n=73$, 94.8%) receiving this recommendation. This finding is expected due to our use of a sample of known lone actors.

Among the 10 Distal Characteristics items, coders rated an average of four items as present (40.0%, $M=3.65$, $SD=1.79$, median = 4.00, mode = 3.00 and 4.00) and one item as absent (10.0%, $M=1.48$, $SD=0.80$, median = 1.00, mode = 1.00) per case. Across cases, the number of Distal Characteristics items rated as present ranged from 0 to eight (0.0% to 80.0%), while the number of items rated as absent ranged from 0 to four (0.0% to 40.0%). Two Distal Characteristics were significantly more likely to be rated as present than absent or unknown: Personal Grievance and Moral Outrage and Framed by an Ideology. Given the somewhat low average number of Distal Characteristics rated as present, just under three-quarters of cases ($n=56$, 72.7%) were recommended for Active Monitoring. As a reminder, this recommendation requires a clustering of Distal Characteristics, which was defined as three or more items in the current study.

Further examination of the priority recommendations showed considerable overlap between those recommended for Active Minority and Active Risk Management. Specifically, 55 of our 77 cases (71.4%) received priority recommendations for both Active Monitoring and Active Risk Management. Of the remaining cases, 18 (23.4%) received an Active Risk Management priority recommendation, but were not recommended for Active Monitoring and one case (1.3%) received an Active Monitoring priority recommendation, but was not recommended for Active Risk Management. Three cases (3.9%) did not meet criteria for either the Active Monitoring or Active Risk Management priority recommendations. As all lone actors within our sample were involved in the planning or perpetration of a lone actor terrorist plot, we had expected all individuals to qualify for Active Risk Management. As such, our findings show that

the priority recommendation guidelines may underestimate threat of lone actor terrorism among certain individuals.

As described earlier in this paper, 12 of the TRAP-18 items were rated unknown more frequently than they were rated either present or absent. For four of the six remaining items, coders were significantly more likely to rate them as present than either unknown or absent (see Table 2). Those four items are: Pathway, Identification, Personal Grievance and Moral Outrage, and Framed by an Ideology. The prevalence for these items ranged from 72.7% (Personal Grievance and Moral Outrage) to 87.0% (Framed by an Ideology). Only one item, Creativity and Innovation was significantly more likely to be rated as absent than either present or unknown. This item was rated as absent in 93.5% of cases. There was no significant difference in the distribution of present, absent, and unknown ratings for one item: Dependence on the Virtual Community. In other words, on average, this item was rated present about as often as it was rated absent or unknown, questioning the relevance of the construct to our sample of jihadism-inspired lone actors.

Known Groups Comparison: U.S. and European Lone Actors

To address our third research objective regarding the prevalence of TRAP-18 items among samples of U.S. and European lone actors, we first performed pairwise comparisons on the average number of items rated as present. Results revealed significant differences between the two groups. A significantly higher average number of items were rated as present among U.S. lone actors ($M = 7.29$, $SD = 2.55$, median = 7.00, mode = 7.00, Range 1.00 to 12.00) as compared to European lone actors ($M = 5.74$, $SD = 2.60$, median = 6.00, mode = 4.00, Range 2.00 to 11.00), $t(70) = 2.56$, $p = .013$. There was also a significant difference in the average number of items rated as unknown, $t(70) = 2.13$, $p = .037$. Specifically, fewer items were rated as unknown for U.S. lone actors ($M = 8.76$, $SD = 3.10$, median = 9.00, mode = 8.00, Range 1.00 to 16.00) than European lone actors ($M = 10.42$, $SD = 3.46$, median = 10.50, mode = 8.00, Range 2.00 to 16.00). That said the average number of items rated as unknown was high for both groups, representing at least half of the TRAP-18 items. There was no significant difference in the average number of items coded as absent for U.S. and European lone actors, $p = .651$. In both subsamples, about two items were rated as absent per case, on average.

We then examined differences in the distributions of present ratings for each item between U.S. and European lone actors, shown graphically in Figure 1. Results showed that the distribution of ratings differed significantly between U.S. and European lone actors on two items: Energy Burst and Leakage. Coders rated Energy Burst as present for a greater percentage of U.S. lone actors (58.8%) than European lone actors (34.2%), $\chi^2(1) = 4.31$, $p = .038$. Similarly, Leakage was rated as present for a greater, albeit still relatively small, percentage of U.S. lone actors (35.3%) than European lone actors (13.2%), $\chi^2(1) = 4.79$, $p = .029$. The ratings for two other items—Fixation and Dependence on the Virtual Community—showed a similar trend of being rated present more frequently for U.S. lone actors compared to European lone actors, but the differences were not significant, $p = .080$ and $p = .061$, respectively.

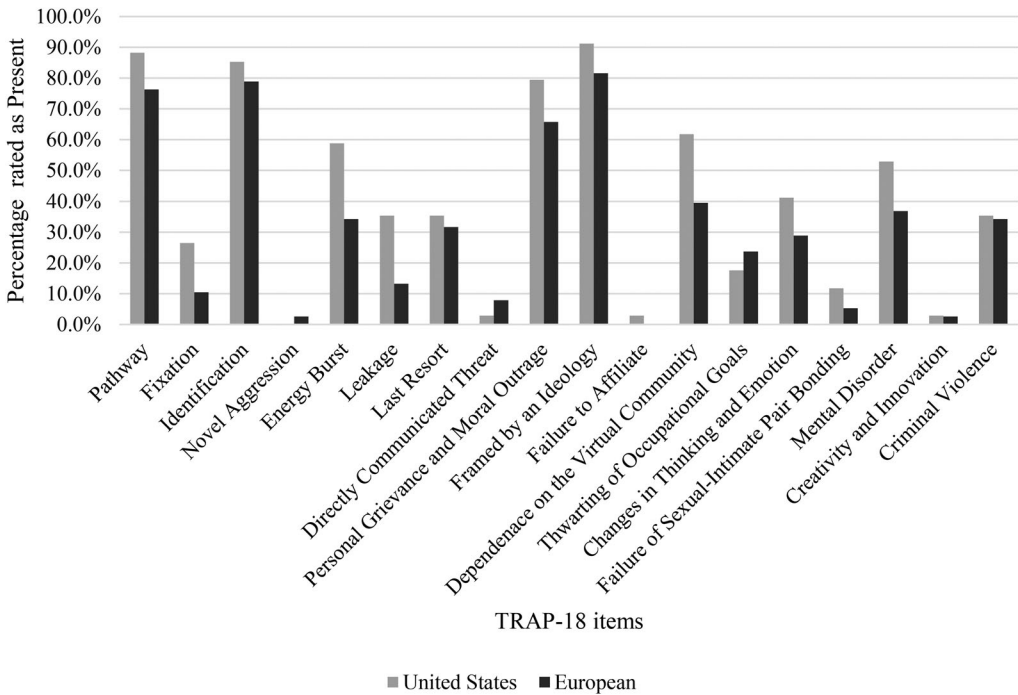


Figure 1. Percentage of items rated as present among U.S. and European samples of lone actors.

The final step of our known groups comparison tested for differences in the priority recommendations produced through completion the TRAP-18. Results of these comparisons are displayed graphically in [Figure 2](#). Our analyses showed a significant difference in the proportion of U.S. lone actors and European lone actors recommended for Active Monitoring, Fisher’s exact test, $p = .034$. Specifically, the vast majority of U.S. lone actors were coded as meeting the criteria for Active Monitoring ($n = 29$, 85.3%) compared to just under two-thirds of European lone actors ($n = 23$, 60.5%). We did not find a significant difference in the proportion of U.S. and European lone actors recommended for Active Risk Management, $p = .117$. So, while the differences we observed in the present, absent, and unknown item ratings appears to affect Active Monitoring priority recommendation, there was no such impact on the Active Risk Management priority recommendation.

Discussion

Lone actor attacks were popularized by the “leaderless resistance” message of right-wing extremist leaders,⁴² but the tactic has since spread to other ideologies with recent research showing that Al-Qaeda-inspired attacks were more likely to be perpetrated by lone actors.⁴³ Although lone actors are a very small proportion of all terrorist actors, they perpetrate about one quarter of all terrorist attacks in the United States.⁴⁴ The secrecy around the planning of lone actor attacks makes prevention difficult, and as a result, lone actor terrorism is a pressing security concern in the United States and Europe. Evidence-based threat assessment tools may support counterterrorism strategies

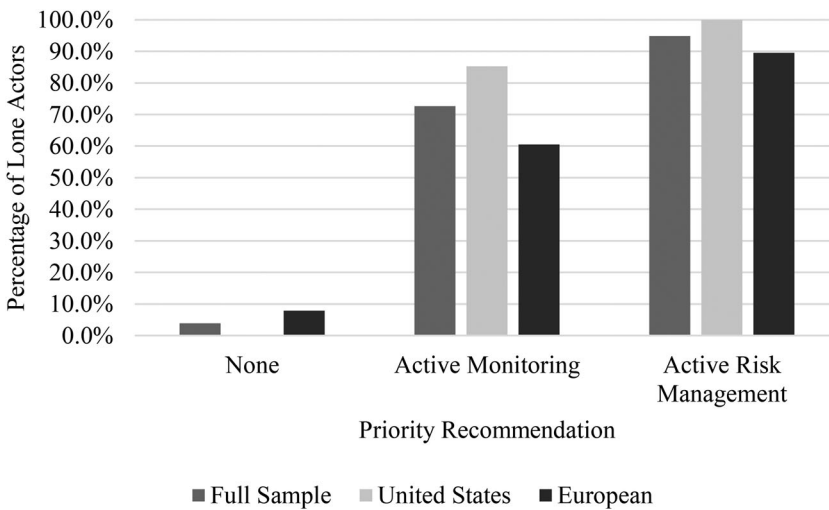


Figure 2. Percentage of lone actors given each TRAP-18 priority recommendation.

to detect and prevent lone actor terrorism. To that end, our findings add to the growing body of literature on the TRAP-18 framework. In particular, we present the first findings to explicitly suggest some concerns regarding the feasibility of coding items using only publicly available information. Our findings also show that differences in the United States and European sociopolitical contexts may contribute to differences in the prevalence of TRAP-18 items, and accordingly, potential differences in indicators of lone actor terrorist action across these contexts. By examining a sample solely of jihadism-inspired lone actor terrorists, we avoid testing for relevance of TRAP-18 items and priority recommendations from assessments across lone actors of diverse ideologies.

Our first research objective was to assess the feasibility of completing TRAP-18 items with our sample using publicly available information. While previous research on the TRAP-18 has similarly drawn data from public records, extant studies have not explicitly reported on feasibility of completing TRAP-18 assessments by examining the rates of unknown ratings. However, our finding suggests the importance of such an investigation with regard to the use of the TRAP-18 in practice. Indeed, in our sample of lone actors, two-thirds of the TRAP-18 items—12 out of the 18 total items—were more often rated as unknown than present or absent. These low-feasibility items generally reflect specific details about the lone actor's mental state (i.e., Fixation, Energy Burst, Last Resort, Changes in Thinking and Emotion, and Mental Disorder), prior violence (i.e., Novel Aggression and Criminal Violence), vocational success (i.e., Thwarting of Occupational Goals), interpersonal relationships (i.e., Failure of Sexual-Intimate Pair Bonding and Failure to Affiliate with an Extremist or Other Group), and communications (i.e., Leakage, Directly Communicated Threat). Half of these low-feasibility items were Warning Behaviors and the other half, Distal Characteristics. Given the greater number of Distal Characteristics compared to Warning Behaviors, these findings suggest that Warning Behaviors tended to be more difficult to rate based on publicly available information. These findings make intuitive sense, Distal Characteristics generally reflect historical information that is more likely to be documented in some way compared to Warning Behaviors, which typically reflect more transient (or dynamic) proximal risk

factors that may be less likely to be noted in official records (unless an individual is monitored in some way). On the one hand, predictive utility of historical risk factors is well-documented; these factors can support the identification of groups of individuals at heightened risk.⁴⁵ On the other hand, research demonstrates the importance of proximal risk factors for identifying short-term, more imminent threat to public safety.⁴⁶ As such, in its current form, the TRAP-18 completed using public records may be less useful in supporting the identifying specific individuals who may engage in lone actor plots from amongst a group of individuals at risk of lone actor terrorism more generally.

Items related to planning or perpetration of the plot (i.e., Pathway and Creativity and Innovation) and the lone actor's ideological motivation (i.e., Identification, Personal Grievance and Moral Outrage, and Framed by an Ideology) were more readily coded in our sample. This finding suggests that information regarding planning and perpetrating lone actor plots, as well as the motivation for the plot, is more likely to be captured in public records than are details regarding the individual's social and interpersonal context. Indeed, the "if it bleeds, it leads" approach to news programing reflects the mass media's tendency to focus on the specifics regarding the methods of violent events, as well as efforts to answer questions regarding why an individual would want to engage in such violence. The frequent rating of items regarding lone actors' current circumstances as unknown also may reflect lesser public interest in humanizing an individual lone actor.

Some of these findings are congruent with the case studies of the TRAP-18; specifically, these case studies similarly failed to find evidence supporting the presence of Novel Aggression, Directly Communicated Threat, and Criminal Violence.⁴⁷ However, overall, these case studies were much more successful in coding based upon publicly available information, finding evidence for the presence of the majority of TRAP-18 items. This is likely due to the studies' use of widely covered lone actor cases in which the plot was successfully carried out, causing deaths and injuries. In all three cases, the lone actors survived the perpetration of the attack, and many details of their lives were presented and examined in the subsequent criminal trials. Thus, the TRAP-18 may be more suitable for postdictive analyses when a great deal of information is available to public, either through extensive reporting by the media or release of court documents on the case.

Our findings regarding feasibility connect to several important discussions and topics of research in the field. First, ideological motivation and grievance have been explored in many studies on lone actor and group-based terrorism.⁴⁸ As mentioned above, three items related to ideological motivation were often present among our sample. Along with the two items on planning and perpetration that were also often rated as either present or absent, these items could be tested for their utility as a short-term screening tool that may represent a first step in the threat assessment process and may support decisions about whether or not to search for further information on a given case. Such strategies are gaining popularity in related fields, such as violence risk assessment.⁴⁹

Second, prior research has established that mental illness is more prevalent among lone actors than group-based terrorists,⁵⁰ which is supported by our results despite the high prevalence of unknown ratings for the item Mental Disorder. This item was observed to be present in nearly half of the sample ($n = 34$, 44.2%), similar to what has

been found in other studies which place the prevalence of mental illness among lone actors in the range of 22–40%.⁵¹ Although mental illness among lone actors appears to be more common than mental illness in the general population, it may only be useful to distinguish between individuals at risk of lone actor compared to group-based terrorism amongst those at heightened risk of radicalization. Yet, the majority of lone actors *do not* show signs of mental illness, both in the current and prior research. Further, “mental illness” is not one thing. Future research should explore whether there are differential associations between certain types of mental disorders—and perhaps more importantly, specific symptoms of mental illness—and lone actor terrorism.

Third, although several studies have shown social isolation is commonly seen among lone actors,⁵² we did not find evidence for the absence of TRAP-18 items related to interpersonal relationships. Instead, these items (i.e., Failure of Sexual-Intimate Pair Bonding and Failure to Affiliate with an Extremist or Other Group) were most often rated as unknown, indicating that further research and information beyond that which is publicly accessible would be needed to establish the nature and extent of the lone actor’s interpersonal relationships. Further, this finding makes it unclear whether a similar trend of social isolation was present within our sample or if the finding is an artifact of the differing samples used within previous research. Understanding lone actors’ interpersonal relationships, or lack thereof, contributes to both knowledge about drivers of lone actor terrorism and practical guidance for law enforcement regarding intervening to prevent lone actor terrorist violence.

Despite many items being rated as unknown, most lone actors were still recommended for Active Monitoring or Active Risk Management, the TRAP-18 framework’s two priority recommendations. Because we completed TRAP-18 assessments on a sample of known lone actor terrorists, *all* individuals in our sample arguably should have received at least one of these priority recommendations. Instead, the framework produced three false negatives—individuals who *were not* recommended for either priority category and yet *were* involved in the planning or perpetration of a lone actor terrorist plot. Reasons for these false negatives are not known. It is possible that these individuals displayed distal characteristics or warning behaviors not captured within the TRAP-18. It is also possible that our interpretation of “clustering” for the Active Monitoring priority recommendation was too rigid. Our study is the first to report on prevalence of the TRAP-18 priority recommendations, it is not clear how others may interpret and apply “clustering” nor is it clear how our interpretation of “clustering” would play out in other samples.

We interpreted “clustering” of Distal Characteristics to mean three or more present within any given case and applied this rule across all cases for consistency. In practice, interpretation of “clustering” would be up to the evaluator, who may see fit to recommend Active Monitoring in the presence of two compelling Distal Characteristics. For all three of the individuals who did not receive any priority recommendation, two Distal Characteristics were rated as present, just outside our established criteria. Specifically, Personal Grievance and Moral outrage was rated as present for all three; Mental Disorder was rated as present for two; and Framed by an Ideology was rated as present for one. All other items (including Warning Behaviors) were rated as unknown. Similar false negatives could occur in the real world when there is little information

available on a person of potential interest. Future research should continue to explore the feasibility of coding these items in practice, as well as whether there may be additional or alternative items for inclusion among Distal Characteristics. Another avenue to explore is how evaluators make decisions about these priority recommendations, including their interpretations and application of the “clustering” of Distal Characteristics that inform the Active Monitoring recommendation. As a starting point, we recommend that a rigid definition should not be applied across all cases—such as we did in this study—to afford discretion and minimize the possibility of false negatives.

Our final set of analyses compared the prevalence of TRAP-18 items among U.S. and European lone actors. Our findings suggest that two to four TRAP-18 items may be more commonly present, and thus, potentially more relevant for U.S. than European lone actors: Fixation, Energy Burst, Leakage, and Dependence on the Virtual Community. We hypothesize two possible explanations for this trend. The first possibility is that information on items among U.S. lone actors may be more often available due to the heightened use of sting operations, which were used with nine of the U.S. lone actors and only one of the European lone actors. That is, the sting operations themselves may produce detailed information about the planning, preparation, and tactics surrounding the act. While previous research suggests the use of sting operations may skew data on lone actor terrorists toward more sophisticated methods of attack,⁵³ our findings suggest they also result in more publicly available information on lone actor terrorists. In particular, we saw that the use of sting operations provided data on events leading up to the attack, including disclosure of the method of a planned plot to undercover agents. The observations made by undercover law enforcement agents, made available to the public through court documents, could be linked to our findings related to differences in Energy Burst (i.e., an increase in activity leading up to the attack) and Leakage (i.e., communication to a third party about the intent to carry out an attack) between U.S. and European lone actors.

Another possible explanation for the differences we found between U.S. and European lone actors reflects the overwhelming influence of Western—and particularly American—researchers on the field of terrorism. Specifically, there may be factors more relevant to European than U.S. lone actors that have systemically been overlooked.⁵⁴ A noted gap in the field is research that integrates individual-level and environmental or situational characteristics to examine risk for terrorism.⁵⁵ This point becomes particularly relevant to comparisons of terrorist actors across different geographic regions. Indeed, there are noted differences between the United States and Europe in the societal-level drivers of lone actor terrorism. Specifically, lone actor terrorism in the United States has historically been linked to the trend of “leaderless resistance” while European lone actor terrorism is often undertaken as a response to the tactical recommendations of Al-Qaeda and associated groups.⁵⁶ Consideration of current messaging from established terrorism groups acting in various regions regarding the tactical use of lone actor attacks may supplement the individual-level factors to augment the predictive validity and practical utility of the TRAP-18.

Our findings must be considered in the context of several limitations. First, reliance on a dataset compiled using publicly available information, and being somewhat

restricted to sources written in English, may not have captured all relevant documents or testimony needed to accurately code all TRAP-18 items. It is likely that some items (e.g. Changes in Thinking and Emotion) could only be completed after an interview with the individual themselves or based on information from close friends or family. To the extent possible, we sought reliable translations of source documents written in languages other than English and considered multiple sources to make final decisions about coding. The nature of the lone actor terrorism means that many of the cases within our sample were widely reported on, often in multiple languages. Thus, rarely were coders basing decisions solely upon a single, translated source. However, we cannot rule out the possibility that we were unable to translate key sources written in languages other than English, or that mistakes in translation misrepresented information, which may have limited our ability to rate some TRAP-18 items. While public records may not be the ideal data source, it is also a common starting point for intelligence analysts when attempting to make a preliminary decision about whether or not the case merits further investigation, and as such is a relevant avenue for study. Limiting documents to solely those written in English may also reflect the reality of the initial stages of an investigation. That said, publicly available information has been the dominant data source in studies of the TRAP-18. Future research should test the feasibility and utility of the TRAP-18 completed by evaluators in the context of routine practice (as opposed to researchers) and/or using diverse data sources, including collateral informants, interviews, etc., in addition to public records. Our sample size, though comparable to those of other published studies on lone actor terrorists, was small and may have limited our power to detect potential differences between U.S. and European lone actors. However, the small sample size reflects the reality of the phenomenon: lone actors are estimated to comprise a mere two percent of all terrorist actors.⁵⁷ Finally, our analyses were based upon a sample of jihadism-inspired lone actor terrorists residing in the West and, as such, may not generalize to other populations of lone actors or other types of terrorists. Yet, given recent evidence that prevalence of TRAP-18 items differs between lone actors of varying ideologies,⁵⁸ research within ideological groups of lone actors is critical. The limitations notwithstanding our study is the first to both examine the feasibility and applicability of the TRAP-18 to a sample of only jihadism-inspired lone actors, as well as the first to compare lone actors of the same ideology across two sociopolitical contexts. We are also the first to report on the priority recommendations given by the TRAP-18, contributing evidence regarding its practical utility in the United States and Europe.

Overall, our findings raise questions regarding the feasibility of completing TRAP-18 using publicly available information and thus, its practical utility, at least during the early stages of investigation. However, our findings do not speak to predictive validity. While many of the items that were more feasible to code in the present study do align with extant research showing personal grievance as a factor driving terrorist action, there were also instances in which we could not code items that are empirically-supported risk factors, notably items related to social isolation. Further, based upon the overwhelming ratings of absent for Creativity and Innovation, a novel means for carrying out the attack does *not* appear to be a factor with utility in determining who will or will not attempt lone actor terrorism. Thus, future research could test both shortened

versions of the TRAP-18 and versions without the Creativity and Innovation item to determine if there are practical benefits to these approaches. Taken together, our results suggest that some TRAP-18 items show promise, but that the framework as a whole may lack feasibility for identifying jihadism-inspired lone actors, particularly among lone actors in Europe. More research is needed to explore the generalizability of our findings and strategies for improving the feasibility of completing the TRAP-18 in practice, including how contextual or situational factors may be incorporated in the threat assessment process.

Notes

1. Though a number of definitions of “lone actor terrorism” exist, within this paper we use the definition of “those who research, plan, prepare and implement an attack on their own and do not rely on external command and control” (Meloy & Yakeley, 2014, p. 350).
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Appendix A

Table A1. Study-specific coding notes for the TRAP-18 items.^a

TRAP-18 item	Coding notes
<i>Warning behaviors</i>	
Pathway	Rating as present requires evidence of premeditation or impending action; can take the form of written materials, threats, outlining routes, establishing where and when the attack will take place. May be rated as present even if the attack does not take place
Fixation	Rating as present requires a clear link between preoccupation and deterioration
Identification	Can rate as present for a close association with weapons (i.e., stockpiling, collecting, building, or naming weapons). It is not sufficient simply to buy several weapons for an attack. May be rated as present when support for an extremist organization or cause is publicly declared or explicitly supported by the act
Novel aggression	May be rated as present if there is a violent act in the weeks, days, or months leading up to the attack
Energy burst	Activities months in advance may be considered evidence of presence of Energy Burst if there is a clear link to the plot. Rating as present requires a clear deviation from normal routine of activities. May be rated as present if there is a threat against the target followed by an attack, provided the individual hasn't previously made threats against the target
Leakage	May be rated as present for posting online about the plot and for communication with undercover law enforcement, provided the lone actor does not know they are law enforcement. Communicating plans to others involved in the plot is <i>not</i> the presence of Leakage. Usually rated as unknown because not enough is known about outside contacts
Last resort	Rating as present requires clear last resort mentality or violent action imperative, usually in the form of beliefs that compel the person to commit a violent act
Directly communicated threat	Must be communicated to the target or law enforcement. Communication to undercover law enforcement does not qualify
<i>Distal characteristics</i>	
Personal grievance and moral outrage	May be rated as present for any grievance/outrage, does not require clear link to the plot. Name calling (i.e., "infidel") is not sufficient to rate as present, must be connected to a specific grievance. May be rated as present for individuals showing that they are distressed by harm that has been caused to themselves or their communities
Framed by an ideology	May not be rated as present solely for expressing support for a jihadist group or possession of jihadist materials. Marking present requires evidence that they espouse the ideology/beliefs that justify their action
Failure to affiliate with an extremist or other group	Mark as absent (1) if the individual has never attempted to affiliate with a group or (2) has been successful in their attempts to join groups. Attempts to join gangs or autonomous cells may be considered
Dependence on the virtual community	May be rated as present for accessing online resources or computer programs related to extremism, including social media use. Rated as unknown if computer or social media use is not mentioned or if it is unclear where or how extremist materials were obtained
Thwarting of occupational goals	To rate as present, evidence of a setback must be paired with evidence of what the person wanted to achieve. For example, a person came to the United Kingdom to look for work, but was currently unemployed
Changes in thinking and emotion	Rated based upon direct quotes or information from close associates. Conversion alone is not sufficient to rate as present

(continued)

Table A1. Continued.

TRAP-18 item	Coding notes
Failure of sexually-intimate pair bonding	Rated as absent if there was any evidence of long-term relationships, even if those relationships did not work out. Rating as present required explicit evidence of serial relationship failures; in many cases this information was too personal to be public and was rated as unknown. Rated as present for compulsive use of pornography or sex addiction
Mental disorder	May be rated as present based on clinician diagnoses, evidence given by family, or self-report. Coded as unknown unless the presence or absence of a disorder was explicitly stated. Substance use disorders (i.e., addiction) were rated as present
Creativity and innovation	May be rated as present/absent even if the plot is not fully carried out, based on available information about the intended means of attack. Plots involving threats, bombs, and kidnaping are generally not rated as present, unless using a novel means of accomplishing the act
Criminal violence	Rated as present if there is evidence of criminal activity before the terrorist activity. The individual does not need to have been arrested or involved in the justice system to rate as present. Differs from novel aggression in that it does not need to take place in the days, weeks, or months leading up to the attack

^aFull definitions for each item can be found in the TRAP-18 user manual (Meloy, 2017).