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Risk and Threat Assessment Instruments for Violent Extremism: A Systematic Review

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Frontline law enforcement, police, and security personnel of various backgrounds have the challenging task to identify extremists who have a high risk for committing violent acts, describe driving risk trajectories, prioritize the use of scarce resources, and develop individualized risk management plans. In this line of work, risk and threat assessment instruments are frequently used to standardize the development of individual risk profiles and guide decision-making processes. The scope of this article is to provide an overview of the current state-of-the-art risk and threat assessment instruments for violent extremism by conducting a systematic literature research. Comparisons of the following instruments' characteristics, development, application, and validation are reported: Violent Extremism Risk Assessment, Version 2–Revised (VERA-2R), Terrorist Radicalization Assessment Protocol (TRAP-18), Extremism Risk Guidelines 22+ (ERG 22+), Multi-Level Guidelines Version 2 (MLG Version 2), Islamic Radicalization (IR-46), Structured Assessment of Violent Extremism (SAVE), Radicalisation Awareness Network Center of Excellence Returnee 45 (RAN CoE Returnee 45), Regelbasierte Analyse potentiell destruktiver Täter zur Einschätzung des akuten Risikos—islamistischer Terrorismus (in English: rule-based analysis of potentially destructive perpetrators to assess the acute risk—Islamist terrorism; RADAR-iTE), and Investigative Search for Graph-Trajectories (INSiGHT). Most instruments are applied to violent extremism in general without specification of ideological phenomena; however, some are specifically developed for Islamism or right-wing extremism or certain subtypes of extremists like returnees. The number of factors, factor structures, and final risk evaluation varied substantially between instruments. The development of the instruments was regularly based on scientific theories and empirical data analysis approaches. However, data about the predictive validity was seldom available. Finally, future challenges and existing uncertainties within the approaches were discussed.

Public Significance Statement

The detection of violent extremists prior to an attack and the identification of extremist offenders' risk profiles in treatment settings are important preconditions for the prevention of extremist violence. This review shows and discusses the strengths and weaknesses of different risk assessment instruments developed to detect violent extremists. The findings show that there exist different traditional psychological risk assessment approaches as well as computational algorithms for the prevention of extremist violence.

Keywords: violent extremism, terrorism, risk assessment, threat assessment

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continued

Terrorist attacks and acts of violent extremism are ranked high among the most concerning threats to security in Western countries (Europol, 2020; North Atlantic Treaty Organization, 2022) and have strongly influenced the work of policymakers, social agents, and researchers in recent years. Incidents of violent extremism attracted broad media attention, including the Islamist attacks on the World Trade Center in 2001, in Paris 2015, and Nizza 2016, the right-wing extremist attacks in Germany by the so-called National Socialist Underground between 1998 and 2011, Anders Breivik's killing spree in 2011, and the attack in Christchurch, New Zealand in 2019. Yet often overlooked, violent extremism is not limited to those single events occasionally reported in the media. For example, Perliger (2012) provided a data set that summarized over 4,000 acts of right-wing extremist violence between 1990 and 2015 in the United States, and similar data are also available for Europe (Ravndal, 2016, 2017). The Global Terrorism Index reported 7,142 recorded victims worldwide caused by terrorism only in the year 2021; this number peaked in 2015 with 3 times as many deaths. Despite the concern of Western nations, most terrorist attacks were recorded in conflict zones, such as the Sahel zone and Afghanistan. Over the last 5 years, politically motivated attacks happened 5 times more often and overtook religiously motivated terrorism in numbers (Institute for Economics and Peace, 2022). Concerning extremist violence, right-wing extremists and Islamists are more likely to use violence than left-wing extremists in a worldwide comparison, and Islamist attacks produced more fatalities than right-wing extremist attacks. This difference shrinks when focusing on Western countries where right-wing extremist violence picked up the pace and caused roughly the same number of victims as Islamism (Jasko et al., 2022).

One important task for research in this area concerns the definitions of extremism and terrorism, which exposed a greater challenge than one might expect. For example, Schmid (2014) summarized multiple research approaches to define violent extremism. Based on his work, violent extremism refers to an ideation far from the ordinary, in which pluralism, the common good of all people, legal rules to which also the rulers have to adhere, and self-determination of the people are rejected. Extremists differ from other actors with extreme opinions in their willingness to use violence to reach their goals and their refusal for compromises. Terrorism refers to "a doctrine about the presumed effectiveness of a special form or tactic of fear-generating, coercive political violence" (Schmid, 2012, p. 158) and the use of violence also against civilians for propagandistic and psychological effects. Violent extremist and terrorist attacks are rare consequences of radicalization processes. In the case of extremist violence and terrorist attacks, various types of actors are detectable and can be further differentiated into individuals who act alone (so-called *lone actors* or *lone wolves*) and others who act as a member of a group. These groups can be small and isolated (so-called *cells*) or large organized movements (Clemmow et al., 2020; Gill et al., 2014; Guldimann & Meloy, 2020; Horgan et al., 2018).

Due to the need to understand radicalization trajectories and the rising awareness in the scientific research community, numerous studies have been published concerning etiological models of violent extremism. In more recent years, research focused on the complex interplay of risk factors, network dynamics, and sociopolitical and psychological mechanisms. Hafez and Mullins (2015) described radicalization as a gradual process of socialization into an extremist belief system that creates the option to use violent means. McCauley and Moskalenko (2017) developed a two-pyramid model displaying the radicalization of opinion and action separately and discussing several radicalizing factors from an individual, group-oriented, and sociopolitical point of view. The authors highlighted the possibility that an individual participates in radical actions without any radical ideas (McCauley & Moskalenko, 2016) or remains inactive despite extremist attitudes. Hence, radicalization does not necessarily have to lead to violent behavior but may set a stage for

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its acceptance or support by nonviolent behaviors like donations or logistic support (Hafez & Mullins, 2015; McCauley & Moskalenko, 2017).

Facing these multiple challenges of terrorism and violent extremism, risk and threat assessment instruments for violent extremism can play a decisive role in the prevention of attacks and in the planning and implementation of individually tailored risk management strategies for (potential) violent extremists and terrorists. The assessment process is concerned with the detection, collection, and evaluation of valuable and relevant information and its utilization to assess the risk that an uncertain hazardous criterion incident occurs. The criterion incident is the event that is ought to be predicted and prevented (Heilbrun et al., 2020; Meloy & Hoffmann, 2021). Based on scientific research, theoretical models and various tools (e.g., checklists, casework reports, complex instruments, or software programs) are used by governmental institutions and facilities as well as social service organizations.

The current article focuses on detecting the present state-of-the-art tools used for risk and threat assessment of violent extremism with the aim of extending the existing literature (G. Hassan et al., 2022; Logan & Lloyd, 2019; Scarcella et al., 2016; Vuković, 2022) in two aspects: First, the focus of the present review lies on severe, physical violence as a central outcome and goes beyond radicalization or nonviolent extremist offenses like financial support or participation. Second, this review further focuses on assessment instruments that can be used to guide decision-making processes, which go beyond mere checklists, questionnaires, or lists of relevant factors without an integration model toward violent extremism. The identified instruments are systematically compared by using various criteria.

Method

Preparation of the Literature Search

Studies included in the present review were obtained through a systematic review of the literature on risk and threat assessment instruments for violent extremism. Before reviewing the literature, inclusion criteria had to be formulated by applying the following criteria: First, relevant articles had to be concerned with extremist individuals. Research articles that described instruments to assess events or dynamics on the group level, parties, states, and so forth besides the individual assessment of a person were excluded. Second, relevant articles had to be concerned with the prediction of severe, physical violence. Following the definition of Pressman et al. (2017), violence occurred when a person acted intentionally which led to or could have led potentially to significant physical harm to one or more individuals. Also, studies had to address concrete risk or protective factors for the assessment of risk and threat. Studies had to be published in English or German language. By applying these inclusion and exclusion criteria, a collection of search terms was compiled that were semantically structured by the key subjects of the inclusion criteria (see Table 1).

The systematic search process was conducted by using multiple databases. These were PubPsych, Web of Science, Online Content Datenbanken Psychologie (OLC Psychologie), PsyJournals, International Bibliography of the Social Science (IBSS), Sociological Abstracts, Open Science Framework, and Google Scholar. The screening of the databases took place from June 13, 2021, to July 17, 2021, and was performed mainly by the first author in collaboration with the second author. Afterward, the review was expanded by a forward and backward search of the identified literature that fulfilled the inclusion criteria. The search term had to be slightly adapted for IBSS and Sociological Abstracts due to specificities in the application of logical operators in these databases. Databases were configured to display the articles in the order of their relevance. Afterward, the first hundred results of each database were individually screened for relevance.

The search term presented in Table 1 generated a wide range of applicable articles concerned with the assessment of violent extremism that varied from comparatively unstructured lists of risk factors over checklists and models to relatively detailed and complex assessment and case management manuals. To extract risk and threat assessment instruments, further inclusion criteria were formulated and applied to the articles: The instruments' assessment process had to be (a) based on risk and protective factors as items and (b) lead to a graduated judgement or a formulation of risk scenarios, management/treatment plans, or prioritizations. For all detected instruments, the authors of the manual or the responsible institutions, security agencies, and so forth were contacted to provide

Table 1
Semantic Classification of the Search Words

Semantic classification	Search words in English	Search words in German
Extremist ideology	*terrorist*, islamis*, fanat*, ideolog*, *extremis*, "right-wing," "extreme right," "far right," racist*, *fascist*, radical*, "single issue," "hate crime"	*terrorist*, islamis*, fanat*, ideolog*, *extremis*, rechtsextrem*, "rechte Gewalt," "linke Gewalt," rassist*, *faschist*, linksextrem*, *radikal*, hassverbrechen
Severe, physical violence	*terror*, amok*, *attack*, explosi*, *bomb*, *ihad*, homicid*, murder*, violen*, massacre*, "manslaughter," "lone actor," "lone wolve," assault*, arson, "mass shooting," harm*, suicid*, martyr*	*terror*, amok*, *attack*, explosi*, *bomb*, *ihad*, *mord*, tötung*, *mörder*, *gewalt*, *anschlag, *anschläge, massaker, einzeltäter*, "einsamer wolf," brand*, spreng*, suizid*, märtyr*
Assessment instrument	*management, *checklist*, *instrument, *manual*, screen*, *monitor*, "risk assessment," "threat assessment," dangerousness, assessment*, judgement*, inventory, protocol*, tool*, guid*, "SPJ," "structured professional judgement," actuaric*, "red flag," "risk factor," "protective factor," "risk profile"	*management, *checklist*, *instrument, *manual*, screen*, *monitor*, bedrohungs*, gefährlichkeit*, risikoeinschätzung, *risikobeurteilung, *inventar*, *protokoll*, *richtlinie*, *handbuch, aktuarisch*, risikofaktor*, schutzfaktor*, *warnhinweis*, risikoprofil*

Note. Search terms within a semantic category were linked with "OR" operations. Semantic categories were separated by brackets and connected with the logical operator "AND," thus ensuring that at least one search term per search category was present in the Results section. The use of the logic operator "*" allowed for the search of different root words (e.g., searching for "violen*" would show results including "violen-t" as well as "violen-ce").

all developers of instruments the same opportunity to share relevant information for the review.

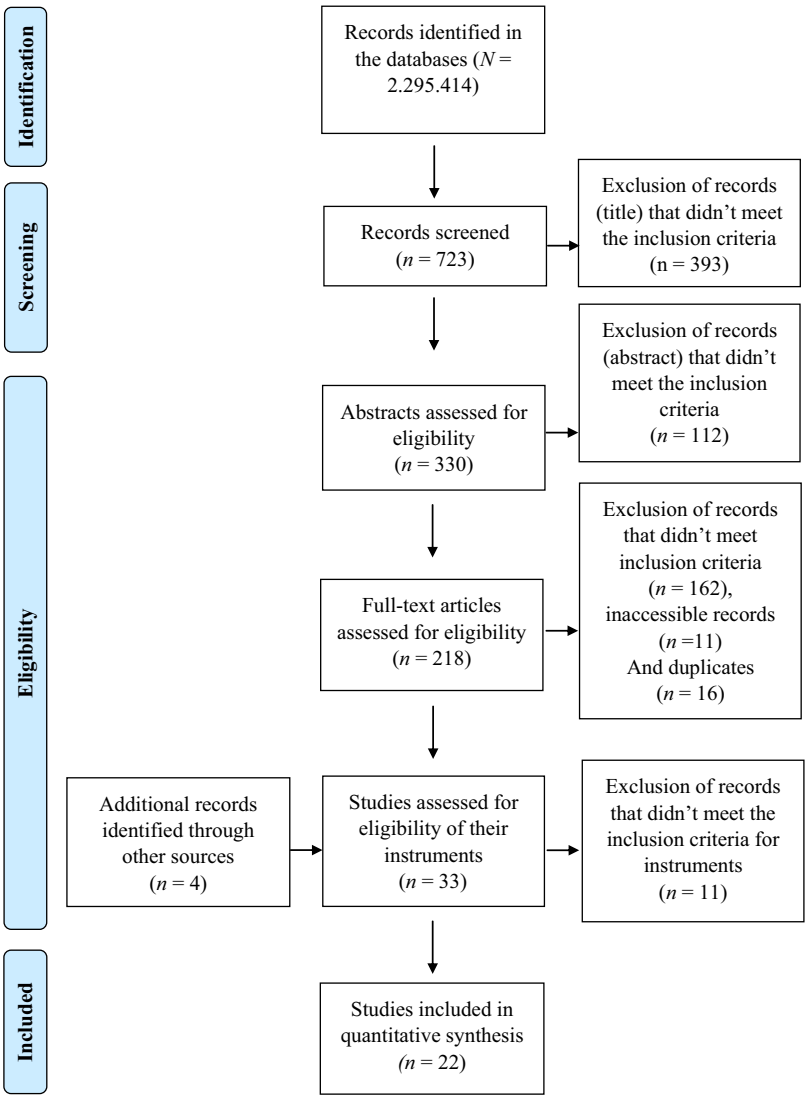
The systematic literature research led initially to a total of 2,295,414 identified articles.[1] The systematic literature research started with the screening of 723 articles and resulted finally in 22 suitable articles (see Figure 1 for details).

Excluded Instruments, Checklists, and Other Articles

The following instruments were identified by applying the search term but did not meet the additional inclusion criteria for risk assessment instruments. Therefore, they will not be described in detail in the present study but should be at least briefly mentioned here. The Identifying Vulnerable People (IVP; Cole et al., 2009) did not fulfill the requirement of a graduated judgement or further scenario planning, or management, whereas the Screener Islamismus (Böckler et al., 2017) was more likely to check tendencies of radicalization and did not focus on violent extremism as the main outcome. The early screening guide for jihadi terrorism (Neo et al., 2017) and the Extremism and Violence Risk Identification Scale (B. Hassan et al., 2021) also did not meet the inclusion criteria of a final graduated judgement or further scenario formulation, management planning, or other. The Extremism and Violence Risk Identification Scale was exceptional regarding its self-report approach but lacked an in-depth cross-validation. The dynamic radicalization model (Klausen et al., 2020), the model described by Kebbell and Porter (2012), the person–exposure patterns (Clemmow et al., 2020), the clustering approach of risk assessment of terrorists and extremist prisoners (Silke, 2014), and the risk categories proposed by Borum (2015) all introduced a list of relevant risk factors or categories for violent extremism combined with models or ideas of factor integration. Yet, their exclusion is also based on a lack of a final graduated judgement or of further scenario formulation, or management planning. Similarly, simple factor collections, that is, lists of risk factors without an underlying structure, like the list of warning signs for potential mass shooters and suicide terrorists by Lankford (2018) or the collection of protective

[1] The high number of identified articles is mainly due to artificial results in the databases IBSS and Sociological Abstracts, which produced 2,211,930 and 71,620 search results, respectively. Most articles did not fit the topic due to a deviation in the search options in this database, that is, articles describing chemical "radicals" emerged as fitting the search criteria. The first hundred results are reviewed after sorting the results for relevance, which yielded satisfactory results.

Figure 1
Flowchart of the Search and Screening Process



Note. This Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram is based on the guidelines by Moher et al. (2009). See the online article for the color version of this figure.

factors against extremism and violent radicalization by Lösel et al. (2018) were excluded. Due to missing information, the Leaking als Warnsignal für terroristische Bedrohungslagen und Anschläge bei rechtsextremen Tätern (in English: leaking as warning signal for terrorist threats and attacks by right-wing extremists; Nieße et al., 2021), an upcoming German assessment tool to judge the risk of violent extremism based on leakage behavior, could not be included.

Comparison Criteria

The remaining articles thematizing risk and threat assessment instruments in the field of violent extremism were compared along the

following criteria. Differences between instruments may depend on the date and location of development as well as on the setting in which the assessment process is conducted. Available information about the development process was collected, and instruments were categorized by the purpose of their application, that is, threat management as the prevention of imminent extremist violence and risk management to guide decision making in the context of treatment and rehabilitation (Meloy & Hoffmann, 2021). Additionally, differences between the instruments' populations of interest were analyzed. More specifically, the instruments' focus on one specific ideological orientation, that is, Islamism, or claimed applicability on multiple ideological orientations of violent extremism were assessed. Furthermore, instruments' focus on special characteristics or certain subtypes within this population, that is, gender, age, psychopathologies, and types of violent extremists like lone actors, cells, or returnees were analyzed. In the next category, available information regarding the content of risk and protective factors, the risk dimensions or scale to rate the factors, and the final risk formulation were collected. Available categories of risk factors were described to give an idea of the content and the structure of the instrument (e.g., the number of categories and factors). An important aspect of the characteristic of risk and protective factors relates to the question of whether they are static or dynamic, thus changeable over time. Of special interest is the integration of protective factors which could potentially reduce the risk of a hazardous outcome or relate to the resources or capacities of a person to withdraw from violent extremism (Lösel et al., 2018). Furthermore, items and factors can vary regarding the consideration of time relevance and the quality of information. The integration of factor scores into a final risk formulation may vary from quantitative statistical approaches to more clinical risk formulation principles like, for example, scenario formulation or a detailed behavioral analysis (Borum, 2015), which can both include intervention planning. Research indicates that risk formulations based on statistical approaches predict violence more reliably than intuitive clinical approaches (Ægisdóttir et al., 2006; Wertz et al., 2023), but combinations of both risk formulation principles are possible (Skeem & Monahan, 2011). Therefore, the instruments' risk assessment approach will be broadly estimated as closer to either the clinical pole or the statistical pole. In the final category for comparison, the instruments' psychometric properties in the form of their reliability and validity are described.

Results

After the application of the criteria to narrow down the range of instruments, 22 articles were left that described nine risk assessment instruments that matched the above-described requirements (see Table 2).

Comparison of the Instruments

Violent Extremism Risk Assessment, Version 2–Revised

Development, Origin, and Application. The Violent Extremism Risk Assessment (VERA; Pressman, 2009) was originally developed by Elaine Pressman in Canada in 2009. Due to concerns about its validity and reliability (Pressman & Flockton, 2012), a revised version of VERA-2 was developed. The current and more enhanced version of the instrument is the VERA, Version 2–Revised (VERA-2R). In 2016, as an add-on to VERA-2, a cyber risk analysis tool for violent extremism was presented with the name CYBERA, which supports the assessment of relevant cyber content (Dean & Pettet, 2017). Indicators were operationalized in a user-friendly and criteria-based way, and its indicators were based on empiric findings and expert knowledge (Pressman et al., 2017), and scientific literature research (Rettenberger, 2016). CYBERA was based on the same development approach and structure as VERA-2 (Pressman & Ivan, 2016). VERA-2R is applied in Europe, North America, Australia, and Southeast Asia. It is applied within the criminal justice system, social rehabilitation, national security or intelligence services, and police forces. It can be used by psychologists, psychiatrists, behavioral specialists, forensic social workers, and any person with sufficient diagnostic expertise who assesses potential violent extremists. Users must be trained and licensed for the application; a follow-up training is recommended. The instrument aims to detect risk trajectories to match interventions for disengagement and deradicalization and to identify and prioritize individuals at risk for engagement in violent extremism at an early stage as well as

Table 2
Reviewed Risk and Threat Assessment Instruments for Violent Extremism

Instrument	Authored by	Population of interest	Risk and/or threat management	Training required
VERA-2R	Pressman, Canada	Any violent extremist	Risk and threat management	Yes
TRAP-18	Meloy, United States	Any violent extremist; validated, for example, lone actors, autonomous cells, sovereign citizens, terrorist offenders of national security interest	Threat management	An annual license is required and training courses are available
ERG 22+	Lloyd and Dean, United Kingdom	Any convicted violent extremist	Risk management	Yes
MLG	Cook, Hart, and Kropp, Canada	Any violent extremist; focus on individuals perpetrating group-based terrorist violence	Risk and threat management	No
IR-46	Dutch National Police, Netherlands	Islamists, right-wing and left-wing extremists	Threat management	No information
SAVE	Dean and Pettet, Australia	Any violent extremist; focus on terrorists, shooters, and militants	Risk and threat management	Yes
RAN Returnee 45	Radicalisation Awareness Network, Europe	Islamists returning from zones that are/were controlled by terrorist organization(s)	Risk and threat management	No information
RADAR-iTE	Federal Police Office and University of Constance, Germany	Islamists of national security interest	Threat management	Yes
INSiGHT	Hung, Jayasumana, and Bandara, United States	Islamists	Threat management	Yes

Note. This table serves only as orientation, more detailed information is provided in the corresponding segments of the review below. VERA-2R = Violent Extremism Risk Assessment, Version 2–Revised; TRAP-18 = Terrorist Radicalization Assessment Protocol; ERG 22+ = Extremism Risk Guidelines 22+; MLG = Multi-Level Guidelines Version 2; IR-46 = Islamic Radicalization; SAVE = Structured Assessment of Violent Extremism; RAN CoE Returnee 45 = Radicalisation Awareness Network Center of Excellence Returnee 45; RADAR-iTE = Regelbasierte Analyse potentiell destruktiver Täter zur Einschätzung des akuten Risikos—islamistischer Terrorismus (in English: rule-based analysis of potentially destructive perpetrators to assess the acute risk—Islamist terrorism); INSiGHT = Investigative Search for Graph-Trajectories.

individuals that pose a national security threat. The tool focuses on risk management but can be used in the context of threat management as well (Lloyd, 2019; Pressman et al., 2017).

Population of Interest and Outcome. VERA-2R "can be applied to extremist environmental activists, political ideological supporters of the Islamic State or Al Qaida, violent anti-abortion activists, extreme nationalists or extreme and violent right-wing or left-wing activists" (Pressman et al., 2017, p. 16). The risk of loners as well as members of extremist groups can be assessed. Also, assessment is authorized for accused, arrested, or convicted individuals and by assessors of national security agencies within their responsibilities. The criterion behavior is defined as extremist violence: "violence as a physical act causing injury, or harm or killing or the threat of such action. … [V]iolence is based on ideological goals" (Pressman et al., 2017, p. 8). VERA-2R contains 34 factors that are allocated to five domains: beliefs, attitudes, and ideology (seven factors); social context and intention (seven factors); history, action, and capacity (six factors); commitment and motivation (eight factors); and protective/risk-mitigating indicators (six factors). Eleven additional factors are formulated and can be rated as well.

Content, Factor Characteristics, Risk Formulation, and Risk Assessment Approach. Factors are rated on a 3-point scale ranging between *low (not present)*, *medium (present to a certain degree)*, and *high (clearly present or to a high degree)*, ratings as "medium-high" or "low-medium" between the scale points are possible. Each factor is accompanied by rating guidelines and questions in case of a face-to-face interview with the assessed individual. Three of the 34 factors could be identified as static, the other factors can be understood as dynamic. Six protective factors are included in the current version for the first time. Risk assessment should be repeated periodically to detect changes in risk. Particularly the motivational factors are included to identify goals for interventions and to measure the interventions' effectiveness. The overall risk is formulated by using the categories "low," "medium," or "high" without numeric forms of risk communication. Assessors are instructed to weigh the importance of each factor and domain on their behalf in terms of the overall risk (Pressman et al., 2017). A written final judgement including the weighting of factors and domains as well as describing the risk, protective, and motivational factors are recommended (Lloyd, 2019).

Furthermore, VERA-2R utilizes the scenario planning technique based on the detailed assessment results (Lloyd, 2019). The use of additional factors is possible and utilizes a simple "present" versus "not present" scale. VERA-2R was developed along in accordance with the structured professional judgement (SPJ) risk assessment and management approach (C. D. Webster et al., 1997). The list of risk and protective factors is standardized, as well as the scoring procedure and the inclusion of additional factors are possible. The consideration of risk factors and the final risk formulation are left to the assessor but strategies in the form of scenario planning are recommended and taught in the official training course.

Psychometric Properties. Pressman et al. (2017) described VERA-2R findings of the interrater reliability (IRR) of four raters on four cases that lead to Kendall's *W* values of .60–.82, which can be interpreted as very good to excellent reliability indices (Gisev et al., 2013). Beardsley and Beech (2013) examined the psychometric properties of VERA based on five prominent cases of violent extremism and coded the ratings numerically (2 = *high*, 1 = *medium*, 0 = *low* or *unknown*). The two raters showed an interrater agreement (IRA) of 85.7%. The IRR for each case resulted in κ values of .76 or higher ($p < .001$), which again represented very good to excellent reliability (Gisev et al., 2013). Pressman et al. (2017) presented violent extremists scoring significantly higher on VERA-2R's risk indicators than individuals who committed nonextremist violent offenses. In comparison to well-known state-of-the-art risk assessment instruments for violence, violent extremists scored significantly lower than violent offenders in general.

Terrorist Radicalization Assessment Protocol

Development, Origin, and Application. The Terrorist Radicalization Assessment Protocol (TRAP-18; Meloy, 2018) was first published in the United States in 2017.[2] According to the developer, the instrument can be used by members of different occupational groups being engaged

[2] Most of the following information was given by the developer himself. The statements were further addressed with the found literature.

and trained in threat assessment and management, that is, probation and parole agents, law enforcement personnel, and mental health clinicians. It was primarily developed for community use in interdisciplinary teams, and the instrument focuses on threat prevention and management.

Population of Interest and Outcome. Following the developer's recommendation, the generalizability across ideologies exists for at least the phenomena of jihadism, extreme right-wing, and single-issue terrorism (e.g., environmentalism, antiabortionism, and animals' rights). The persons of interest are already of concern for law enforcement or counterterrorism professionals. The instrument originally focused on characteristics of lone-actor terrorists, but it was successfully applied to other extremist populations (see the Psychometric Properties subsection of the Content, Factor Characteristics, Risk Formulation, and Risk Assessment Approach section). The criterion behavior was defined as physical violence toward others that results in injury or death. The instrument was built on a rational–theoretical construction strategy, which is based on the broad empiric research literature about violent extremism published in the last 2 decades. The instrument consists of two categories of risk factors, eight proximal warning behaviors and 10 distal characteristics. All of them are based on observable behaviors (Meloy, 2018), which is particularly relevant for the application of users without profound psychological diagnostic training.

Content, Factor Characteristics, Risk Formulation, and Risk Assessment Approach. Factors are not quantified, instead, the absence, presence, or insufficient information to score a factor should be documented. However, for research purposes, regularly study authors quantify these ratings with 0 = absent and 1 = present (Böckler et al., 2020; Fernández García-Andrade et al., 2019; Meloy, 2018). Most factors are dynamic in nature, and only some of the distal characteristics are static (Guldimann & Meloy, 2020; Lloyd, 2019). No protective factors are included but some narrative questions ask for protective factors during the assessment process. The final judgement is not based on risk levels but uses a scenario planning as well as a case prioritization and monitoring procedure. The TRAP-18 is closer to the clinical pole due to the qualitative factor coding and the lack of statistical risk formulation. The final judgement is open to the assessor's judgement and experience and leads to scenario and management planning.

Psychometric Properties. The psychometric properties of the TRAP-18 were repeatedly examined (Allely & Wicks, 2022; Guldimann & Meloy, 2020). Substantial to perfect IRR between two raters for the overall TRAP-18 were identified with a Cohen's $\kappa = .895$ ranging from .69 to 1.0 for the warning behaviors and .75–1.0 for the distal characteristics in a study investigating 22 individuals who carried out acts of terrorism in Europe (Meloy, 2018; Meloy et al., 2015). Another study found substantial IRR for the proximal factors, $\kappa = .687$, and good results for the distal factors, $\kappa = .812$, between two raters analyzing 58 associates of the sovereign citizen movement in the United States (Challacombe & Lucas, 2019).

The use of the TRAP-18 was found as appropriate for assessing autonomous cells and individual perpetrators (Meloy, 2018), for far-right and single-issue terrorism including animal rights, antiabortion and environmentalism (Meloy & Gill, 2016), and sovereign citizen actors (Challacombe & Lucas, 2019). Findings also displayed an appropriate discriminant validity in differentiating terrorist offenders from individuals who were categorized as a national security threat but did not commit an attack. Effect sizes ranged from medium to large, $\phi = .35–.70$ (Meloy et al., 2019). Böckler et al. (2020) set a cutoff value of 8.5 (of a maximum score of 18) that led to high-risk versus low-risk and moderate-risk judgements and identified adequate content validity in a German sample of violent and nonviolent Islamists. They found the following values: sensitivity = .65, specificity = .95, positive prediction values = .81, negative prediction values = .89, and area under the receiver operating characteristic curve, AUC = .88. They discussed the possibility of performance improvement of the TRAP-18 by weighting specific factors. Fernández García-Andrade et al. (2019) presented an AUC value of 1.00 in a predictive accuracy examination of mentally ill patients with a criminal history by discriminating patients who showed extremist violence. Along with previous work (Goodwill & Meloy, 2019), proximal factors rather than distal factors were found to distinguish between violent and nonviolent Islamists confirming the underlying theoretical model of the tool and the importance of dynamic factors in the risk assessment of violent extremism.

Extremism Risk Guidelines 22+

Development, Origin, and Application. The Extremism Risk Guidelines 22+ (ERG 22+; Lloyd & Dean, 2015) is the property of Her Majesty's Prison and Probation Service (HMPPS, earlier named as NOMS, National Offender Management Service) and is regularly used in United Kingdom and Wales. It is the revised version of the Structured Risk Guide that has been published in 2011 (Augestad Knudsen, 2020; Lloyd, 2019; Lloyd & Dean, 2015; Powis, Randhawa-Horne, & Bishopp, 2019). The tool was derived from systematically analyzing the international scientific literature about terrorism, case file evaluations and comparisons of terrorist and nonterrorist offenders, and expert feedback (Augestad Knudsen, 2020; Lloyd, 2019; Lloyd & Dean, 2015). Based on the ERG 22+, the derivates Vulnerability Assessment Framework and Extremism Risk Screen were developed to assess early steps into radicalization (Augestad Knudsen, 2020; Lloyd & Dean, 2015). The development and appropriate training and registration of assessors for the ERG 22+ is the HMPPS's responsibility (Augestad Knudsen, 2020; Lloyd, 2019). The tool was conducted for trained forensic psychologists and experienced probation officers, and official training is mandatory (Lloyd & Dean, 2015). The tool is used by frontline users in decision-making positions within a multidisciplinary context for risk management of sentenced terrorist offenders in prison. Threat management is not the guideline's main purpose (Augestad Knudsen, 2020; Lloyd, 2019; Lloyd & Dean, 2015), it "is used to inform decisions about sentence planning, relocation, intervention, reintegration, parole, release, recall, license conditions, and supervision" (Lloyd & Dean, 2015, p. 49).

Population of Interest and Outcome. The ERG 22+ is applicable to all ideological phenomena such as Islamism, the far-right, animal rights activists, or other phenomena of single-issue terrorism (Augestad Knudsen, 2020; Lloyd & Dean, 2015; Logan & Lloyd, 2019). The developers mentioned that the instrument can assess females and gang members as well (Lloyd & Dean, 2015). Assessments were conducted for males and females, different ethnicities, supporters of terrorist acts (trainers/instructors for terrorism, possessor and distributors of terrorist material), individuals involved in preparing terrorist attacks, extremist-motivated murder attempts, and extremist-motivated severe bodily harm (Powis, Randhawa-Horne, & Bishopp, 2019). The assessment procedure is usually applied within the first year after the conviction. Hence, users are asked to include information from direct interviews with the assessed individual. Sometimes offenders suspected of extremist involvement without an according offense are examined (Lloyd & Dean, 2015; Powis, Randhawa-Horne, Elliott, & Woodhams, 2019). The guideline's original purpose was to assess "the risk of serious harm in the context of an individual's beliefs, intent, motivation and capability" (S. Webster et al., 2017, p. 1), and the instrument was used to prevent terrorist violence (Herzog-Evans, 2018). The 22 factors are split up into three domains: engagement (13 factors), intent (six factors), and capability (three factors). The engagement category describes factors that motivate one to become involved with a group or an ideology, the intent category describes the willfulness to offend in line with ideological beliefs, and the capability category describes factors concerning abilities, knowledge, and measures that enable one to carry out an attack. The ERG 22+ is especially concerned with facets of motivating factors for extremist offenses (Lloyd & Dean, 2015).

Content, Factor Characteristics, Risk Formulation, and Risk Assessment Approach. No scores or probabilities are calculated, factors are instead qualitatively assessed to lead to a complete picture of the risk (Lloyd & Dean, 2015). In clinical practice, however, users often summarize the present risk factors to an overall risk score (Augestad Knudsen, 2020). Powis, Randhawa-Horne, and Bishopp (2019) presented an ordinal rating for the factors in "strongly present," "partly present," and "not present." The domains are rated ordinally, for intent and engagement in "low," "medium," and "high" and capability in "minimal," "some," and "significant." Protective factors are not included, but the ERG 22+ assists users with questions on how present risk factors could also include protective aspects (Lloyd, 2019; Lloyd & Dean, 2015). Only three of the guideline's factors are static, the risk is predominantly understood as dynamic. Hence, the assessment should be examined periodically to capture changes in risk adequately (Augestad Knudsen, 2020; Lloyd, 2019; Lloyd & Dean, 2015). The manual guides the user

toward a detailed picture of push and pull factors to explain offenses and describe future behavior to inform risk management and derive risk management strategies; scenario planning is encouraged but not further guided (Lloyd, 2019; Lloyd & Dean, 2015; Powis, Randhawa-Horne, & Bishopp, 2019). The formulation-guided assessment focuses on risks and needs and serves as an approach closer to the clinical pole. Assessors record evidence of factors that are significant for an individual's pathway toward violent extremism (Lloyd, 2019).

Psychometric Properties. Powis, Randhawa-Horne, Elliott, and Woodhams (2019) rated the factors as 0 (*not present*), 1 (*partly present*), and 2 (*strongly present*). Also, intent and engagement scores were rated as 0 (*low*), 1 (*medium*), and 2 (*high*) as well as 0 (*minimal*), 1 (*some*), and 2 (*significant*) for the capability domain. Two raters showed a high overall IRA of 93%, and the overall IRR was also high (intraclass correlation coefficients, ICC = .96; 95% CI [.93, .98]). IRA values for overall domains were high, ranging from an agreement of 90% to 93%. The IRRs for the domains engagement (ICC = .95; 95% CI [.92, .97]), intent (ICC = .99; 95% CI [.97, .99]), and capability (ICC = .95; 95% CI [.91, .99]) were almost perfect. The IRA for single factors varied from 86% to 100%, and the IRR for single factors the ICC values varied from .92 to 1.00. Findings concerning content validity did not completely support the current three-domain structure but revealed instead five to seven possible underlying subscales (Powis, Randhawa-Horne, & Bishopp, 2019).

Multi-Level Guidelines Version 2

Development, Origin, and Application. The risk factors of the Multi-Level Guidelines Version 2 (MLG; Cook et al., 2013) were developed based on a systematic and comprehensive literature review (Lloyd, 2019); additionally, experts were interviewed for feedback (Cook, 2014). The main user group is professionals of the criminal justice system as well as security and clinical health institutions who should have expertise in the assessment of individuals and group-related violence. The MLG measures changes in risk and serves to monitor an individual's pathway. Furthermore, direct threat communication is also part of the risk and threat assessment process of the MLG.

Population of Interest and Outcome. The MLG is applicable to every ideological phenomenon, it targets individual violent extremists within a terrorist group context and group-based terrorist violence. Group-based violence (criterion behavior) was defined as the

> Actual, attempted or threatened physical injury that is deliberate and nonconsensual by an individual whose decisions and behaviour are influenced by a group to which they current belong or are affiliated with. Affiliation can include identification without membership to the group, i.e., lone wolves. (Cook et al., 2013, p. 1)

Content, Factor Characteristics, Risk Formulation, and Risk Assessment Approach. The first version of the MLG contained 18 factors in four categories (Cook, 2014), in the second version, the remaining 16 factors were evenly distributed in four domains: individual risk factors, individual-group factors, group factors, and group-societal factors (Cook & Vargen, 2022; Lloyd, 2019). The factors were conceptualized as motivators, disinhibitors, and destabilizers (Cook, 2014). Risk factors are not scored numerically but are assessed based on their presence before the current offense and during the current offense (or the current status of the case/individual person). A factor's presence is rated as "absent," "possibly or partially present," and "present," or it is noted that there is not enough information available for the judgement. Factors are also evaluated for relevance in "not relevant," "possibly or partially relevant," "relevant," or no information available. The judgement of the factors is guided by instructions in the form of questions (Cook, 2014; Cook et al., 2013). Risk is perceived as dynamic; and therefore, reassessment is recommended in a time span between a few weeks to every year (Lloyd, 2019). The final judgement includes scenario planning and results in case management planning and risk or threat communication, which is also guided by instructions. The management planning consists of monitoring and surveillance, supervision and controlling, treatment and assessment, and protection of victims. Users are also asked to consider any indications of other violence risks, such as common violence, sexual violence, self-harm, or suicide. The final judgement communication must include "five conclusory opinions … : (1) case prioritization, (2) risk for violence, (3) risk for serious or life-threatening violence, (4) risk for imminent violence, and (5) likely victims" (Cook et al., 2013, p. 14). Assessors are allowed and invited to consider the inclusion of additional case-

relevant factors. The instrument is to be described as a rather clinical tool. Information is collected and evaluated for presence and relevancy. Planning of violent scenarios and case management are part of the assessment.

Psychometric Properties. The ICC of the first version of the MLG ranged from .38 to 1.00 (Cook, 2014). Thirteen of the 18 original factors accounted for substantial ICC values and another three could not be calculated due to insufficient variability in the ratings. IRRs were conducted for every domain as well as for the final judgement: individual risk factors (ICC = .95), individual-group factors (ICC = .84), group factors (ICC = .78), group-societal factors (ICC = .86), and the total score (ICC = .81) showed all high IRR values. The evaluation of case prioritization (ICC = .93), risk of violence (ICC = .90), risk of life-threatening violence (ICC = .92), and risk of imminent violence (ICC = .89) showed substantial IRR as well. IRRs were also conducted for the MLG (Hart et al., 2017) for relevance ratings: individual risk factors (ICC = .80; 95% CI [.10, .98]; $p = .028$), individual in-group factors (ICC = .78; 95% CI [−.02, .97]; $p = .039$), group factors (ICC = .92; 95% CI [.51, .99]; $p = .003$), group-societal factors (ICC = .57; 95% CI [−.55, .95]; $p = .139$), and the total score (ICC = .89; 95% CI [.38, .99]; $p = .010$) showed excellent IRR values. Ratings for the presence of risk factors were the following: individual risk factors (ICC = 1.00; lack of variability), individual in-group factors (ICC = .95; 95% CI [.65, .99]; $p = .002$), group factors (ICC = .99; 95% CI [.93, 1.00]; $p < .001$), group-societal factors (ICC = .87; 95% CI [.16, .99]; $p = .017$), and the total score (ICC = .89; 95% CI [.38, .99]; $p = .010$) showed again very high IRR.

Islamic Radicalization

Development, Origin, and Application. The Islamic Radicalization (IR-46; Lloyd, 2019) was developed and initially published in 2009 by the Dutch national police. The tool's development was based on analyses of case pathways, the available scientific literature, and interviews with experts. A theoretical model containing stages of radicalization was developed and extensively analyzed and modified if necessary with the help of case data (Lloyd, 2019). According to the developers, the tool is updated every 3 years and the current version is IR 2.0 (43). The assessment takes place in settings of public prosecutions, mental health, youth protection, and probation services. Potential users are experienced clinicians of the police, intelligence services, members of the probation/prison service, or any other person in a similar position with access to the necessary information. The tool is introduced as a threat management tool by detecting how "likely it is that a person would actually be able to carry out an attack" (Lloyd, 2019, p. 49).

Population of Interest and Outcome. The tool was originally developed to assess Islamists (Lloyd, 2019), but the current tool IR 2.0 (43) covers three key areas: Islamist, right-wing, and left-wing extremism. The assessed individuals are already "suspected radicalized person[s]" (Lloyd, 2019, p. 22) by the Dutch police. The instrument measures "the degree of radicalization and extent to which the person sees violence as an acceptable mean to 'promote' or realize his/her ideals" (Lloyd, 2019, p. 20). The IR-46 consists of 26 ideological indicators—including the assessment of intentions—and 20 social context and capability indicators. The current version of IR 2.0 (43) holds 43 factors in total (Lloyd, 2019).

Content, Factor Characteristics, Risk Formulation, and Risk Assessment Approach. Every factor of the IR 2.0 (43) is rated on a "3-point scale between yes and no" (Netherlands National Police, 2021, p. 2), and all factors are dynamic. The tool includes the possibility to add an unlimited number of protective factors. Indicators are not summarized to formulate a risk. Risk scores are described as the relation between different types of indicators and phases or degrees of radicalization (Lloyd, 2019). In IR 2.0 (43), these degrees are "use of violence," "acceptance of the use of violence," "social estrangement," and "preliminary phase." The assessment should be continuously repeated and updated to detect trends in the individual's development. Scenario and intervention planning are not explicitly included in the final judgement. Users should derive adequate measures of monitoring and corrective actions on their own—the opportunity of a clinical override is possible. The IR-46 is introduced as an SPJ instrument due to the information provided by the manual. However, there is some reason to place it between the poles of clinical and statistical risk assessment approaches, but with proximity to the statistical pole due to its factor scoring and algorithmic approach indicating risk levels as the final judgement.

Psychometric Properties. Until now, there are no available studies that provide information about the psychometric properties of the instrument.

Structured Assessment of Violent Extremism

Development, Origin, and Application. The precursor of Structured Assessment of Violent Extremism (SAVE) is the revised version of the prototype Risk Assessment for Violent Extremists (RAVE) and was originally developed in Australia by Geoff Dean at the Griffith University and Graeme Pettet at the School of Mathematical Sciences (Dean, 2014). The tool was developed for operational policing/national security work to complete common terrorist/extremist risk assessments. It was developed based on a scientific literature research, experts' revision, and methodological validation of RAVE in six countries. Its theoretical foundation is a neurocognitive learning model of radicalization (Dean & Pettet, 2017). The application requires a brief training with the tool. The tool focuses on the assessment of a general risk but also alerts examiners about an acute threat (Dean & Pettet, 2017).

Population of Interest and Outcome. The instrument aims at "assessing the risk of would-be violent extremists, not those already convicted" (Dean & Pettet, 2017, p. 92). It is supposed to be applied generally covering the areas of terrorism, right-wing and left-wing militants, and shooters (Dean, 2014; Dean & Pettet, 2017; Logvinov, 2019). The criterion behavior is described as "forms of mass killings like in deadly riots, fatal stabbings and so forth" (Dean, 2014, p. 13). The tool consists of a checklist containing 30 risk factors and a software program visualizing the risk potential by a "3D 'risk surface' and 2D 'risk contour'" (Dean & Pettet, 2017, p. 93). Content-related information is rarely accessible, the authors mentioned that SAVE shares similar factors with the ERG 22+, TRAP-18, and VERA but focuses on cognitions and extreme thinking. The 30-item checklist consists of a terrorism scale, a militancy scale, and a shooter scale (Dean & Pettet, 2017). Logvinov (2019) outlines three key areas of the prototype RAVE: causing factors, psychological mechanisms of self-categorization, and capabilities that may have particularly influenced the revised version of SAVE.

Content, Factor Characteristics, Risk Formulation, and Risk Assessment Approach. Dean (2014) showed a snapshot of a 5-point scale for each factor from 0 (*weak*) to 5 (*strong*), the majority of the factors are expected to be dynamic. The 2D risk contour, the 3D risk surface, and a histogram result in four levels of prioritization outcomes: "first priority: immediate action," "second priority: urgent review," "third priority: regular monitoring," and "fourth priority: periodic follow-up." The three risk columns of the mentioned histogram display the *estimated risk* (based on the assessor's intuition concerning the file information), *calculated risk* (based on the assessor's 30-item checklist score), and *temporal risk* (based on the individual's neurocognitive learning trajectory for extreme thinking); a "'validated' professional judgement occurs when all three risk data points are aligned within the same risk level" (Dean & Pettet, 2017, p. 98). Discrepancies between the risk scores lead to various alerts that suggest a revision of the assessment (Dean & Pettet, 2017). SAVE claims to be an SPJ instrument comparable to VERA and the ERG. However, the output of its visualization software program is graphic and based on factor scores. Furthermore, the present tool includes a measurement of the assessor's subjectivity and biases. SAVE ranges between the clinical and statistical pole with proximity to the statistical approach.

Psychometric Properties. Dean and Pettet (2017) described a "considerable degree of convergent validity" in line with ERG, VERA, and TRAP-18. The authors claimed the risk factors "[to be], and have been, empirically and theoretically validated as reliable and robust risk indicators for violent extremism risk assessments" (Dean & Pettet, 2017, p. 98). The validation took place with a sample of nine violent extremist subjects and 50 raters (Dean, 2014), but exact values or further evaluations of psychometric properties were not accessible.

Radicalisation Awareness Network Center of Excellence Returnee 45

Development, Origin, and Application. Radicalisation Awareness Network Center of Excellence Returnee 45 (RAN CoE Returnee 45) was developed in the Netherlands by the Centre of Excellence within the Radicalisation Awareness Network for police and multiagency cooperation teams (Meines et al., 2017; von Berg, 2019), particularly for practitioners who are in contact with returning foreign terrorist fighters (so-called

returnees). The instrument is applicable in the context of threat management as well as risk assessment because it leads to an evaluation of "returnee risks and intervention measures" (Meines et al., 2017, p. 26). This tool guides the assessment of acute risk behaviors, and it allows practitioners to create adequate interventions to decrease an individual's risk.

Population of Interest and Outcome. The instrument targets Islamism and Salafism. The assessed individuals are returnees from territories that were partly controlled by terrorist groups such as in Iraq and Syria. The tool contains five domains with 45 factors in total: content-related information of the motivation before and after the travel to the territory (11 factors), the social context before and after (eight factors), the experiences in the combat zones (six factors), the decision to return (seven factors), and the arrival back home (13 factors; Logvinov, 2019; von Berg, 2019).

Content, Factor Characteristics, Risk Formulation, and Risk Assessment Approach. RAN CoE Returnee 45 includes static and dynamic as well as protective and risk factors (Logvinov, 2019; von Berg, 2019) that are assessed by using the levels "high," "medium," and "low" (Meines et al., 2017). Finally, the judgement leads to a quick overview of risk levels of the present critical behavior and provides a starting point for a multiagency case management discussion for further investigation and intervention planning. It is stressed that the tool does not lead to a risk prediction but should be used instead along with further assessment methods by professionals. RAN CoE Returnee 45 can be categorized as being closer to the clinical approach utilizing the principles of an SPJ instrument (von Berg, 2019). The development is based "on [the] experience with the aforementioned risk assessment tools [ERG22+, IR46, VERA-2, and ERG22+]" (Meines et al., 2017, p. 30). However, Logvinov (2019) described the item extraction method as rather unsystematic and intuitive.

Psychometric Properties. Meines et al. (2017) described the need for a cross-verification of the tool. To our knowledge, there is no data about the reliability or validity available.

RADAR-iTE

Development, Origin, and Application. Regelbasierte Analyse potentiell destruktiver Täter zur Einschätzung des akuten Risikos—islamistischer Terrorismus (in English: rule-based analysis of potentially destructive perpetrators to assess the acute risk—Islamist terrorism; RADAR-iTE) was developed in 2017 by the Federal Criminal Police Office of the German police (*Bundeskriminalamt*) in collaboration with the Department of Forensic Psychology of the University of Constance.[3] The development of RADAR-iTE was based on a systematic research of the scientific literature, expert interviews, and feedback loops from its practical application by clinicians (Sonka et al., 2020). The assessment requires expertise in the field and special training in the application. The instrument is applied for threat management to efficiently concentrate police resources on individuals at high risk for an attack. Hence, its purpose is to prioritize extremists known by the police along the highest risk to carry out an attack. After the initial risk assessment, high-risk individuals are further examined in special case management conferences (Bundeskriminalamt, 2022).

Population of Interest and Outcome. The instrument targets politically motivated violence from the Islamist spectrum. The assessed individuals are already known by the police (Bundeskriminalamt, 2022). Other characteristics or guidelines for the categorization are not shared with the public. Violence is defined as a politically motivated, severe act of violence against the state or its citizens—such as a terrorist attack. *RADAR-iTE* consisted of 73 factors, and the number of factors was reduced to 59 factors in the revised version of *RADAR-iTE 2.0* (Sonka et al., 2020).

Content, Factor Characteristics, Risk Formulation, and Risk Assessment Approach. Detailed content-related information is not publicly accessible so far. Relevant factors are included in the final risk formulation by adding +1 for risk factors and −1 for

[3] The Federal Criminal Police Office of the German police recently developed a similar risk prioritizing threat assessment instrument for the population of police known right-wing extremists in cooperation with the Centre for Criminology (Kriminologische Zentralstelle—KrimZ), which was implemented in Spring 2022. The instrument, so-called RADAR-rechts, follows similar or identical principles and expands the applicability of RADAR system to the spectrum of right-wing extremism in Germany. There is no official publication available yet, and thus, we decided to skip a detailed introduction.

protective factors. The instrument contains static and dynamic factors as well as risk and protective factors. Individuals are categorized into two risk levels: "high risk" or "moderate risk" with the help of an empirically determined cutoff value. The total risk score should not be interpreted as an interval scale but should be used as an indicator of belonging to a "high-risk"—or "moderate-risk"—population. Specific factors or certain combinations of factors are described as so-called red flags, which means that a higher risk is expected, and an individual's risk level is changed to "high" independently of the initial score. On the other hand, the combination of different protective factors could lead to a green flag suggesting that it is no longer necessary to further assess the target person. Otherwise, it is advised to reassess a person after 1 year. In case of a high risk, a person is reassessed earlier (Sonka et al., 2020). A clinical override and the consideration of additional factors are not intended. The risk assessment instrument is accompanied by a detailed manual that provides clear operationalization and coding rules of all risk and protective factors. The final risk judgement is based on the sum score to categorize a person as high or moderate risk. Because of the use of a predefined cutoff score, RADAR-iTE 2.0 is allocated to be closer to the statistical approach.

Psychometric Properties. Measures of reliability for RADAR-iTE 2.0 were reported for the final risk level and the sum score in 10 cases by 12 raters. The reliability values for the risk categories and the total sum score yielded the same result (ICC = .91; 95% CI [.79, .97]; $p \leq .001$), which could be interpreted as an excellent effect size. The ability of RADAR-iTE to discriminate between high- and moderate-risk cases (this risk level was already examined before the instrument was developed) was calculated in a sample of 117 individuals and yielded a good effect size (AUC = .76), the revised version RADAR-iTE 2.0 had a slightly higher value (AUC = .78; Sonka et al., 2020).

Investigative Search for Graph-Trajectories

Development, Origin, and Application. The Investigative Search for Graph-Trajectories (INSiGHT; Hung et al., 2018) was developed by researchers from the Colorado State University, United States. INSiGHT is a machine learning–based program assisting law enforcement and intelligence agencies in monitoring and screening individuals associated with indicators of extremist violence. Indicators were derived from the Klausen dynamic radicalization model (Klausen et al., 2016, 2020), which was developed by psychologists, criminologists, and political scientists and was repeatedly tested for its validity. The researchers based their model on data of 135 Al-Qaeda-inspired violent extremists, available from public and governmental databases (Hung et al., 2018). The automated and in-the-loop technology of INSiGHT identifies individuals who are most likely to become violent extremists and provides early warning to appliers. The developers suggested formal users' training for risk assessors.

Population of Interest and Outcome. *INSiGHT* investigates individuals with a Salafi-jihadist ideology. The technology detects radicalization trends of individuals or groups "whose behaviors indicate a significant risk for violence" (Hung et al., 2018, p. 52) by targeting "potential home-grown violent extremist" (Hung et al., 2018, p. 56). The relevant behavioral indicators are operationalized and defined in a codebook, which contains scoring rules to identify the relevance of an indicator. The model assigns the indicators to four stages: preradicalization/cognitive opening (five indicators), lifestyle adaption (seven indicators), extremist engagement (seven indicators), and preparing for criminal action (four indicators).

Content, Factor Characteristics, Risk Formulation, and Risk Assessment Approach. Indicators are not labeled as present or absent but appear within a visualization graph. The approach focuses on dynamic risk indicators, static parts of the technology's system place the detected persons within the network approach. Protective factors are not included. Red flags highlight the most alerting indicator behaviors. Some indicators are only able to occur in conjunction with other indicators and do not refer to risk indications solely. This algorithmic graph pattern matching methodology collects data and performs its analysis on the complete network periodically. The trajectory for each case is graphically visualized for security agency personnel, and bilateral connections to other assessed individuals can be displayed. Due to the early stadium of development, the tool has no threshold to classify individuals in high or moderate risk levels. INSiGHT assists in monitoring and screening for individuals who show indicators of violent extremism. It also supports the prioritization

of cases to focus investigative resources most efficiently. The approach of this tool supports the surveillance of individuals and does not follow the standard risk assessment approach. The computational approach using algorithms to detect networks and visualize pathways shows proximity to the statistical pole.

Psychometric Properties. To our knowledge, until now, there are no psychometric properties available.

Discussion

The first finding of the systematic literature research presented in this study is that several different standardized risk and threat assessment instruments for violent extremism exist ranging from relatively unstructured factor lists to psychometric sound assessment instruments. In total, nine risk assessment instruments were presented in detail regarding different predefined criteria to provide clinicians and policymakers a comprehensive overview about the current status of the assessment practice and research. The instruments originated from North America, Europe, and Australia indicating a developmental focus in Western countries. The publication dates ranged from 2009 to 2022,[4] and six of the instruments were revised at least once. This finding can be interpreted as an indicator for a comparatively young but growing interest in this area of assessment methods. Instruments were mainly developed by social scientists, three instruments were developed and utilized by state authorities, and the remaining instruments were developed mostly at universities and one by an international organization. The instruments were regularly developed incorporating the current status of research in combination with empirical evidence as well as feedback from experts in the field. Most of the reviewed risk assessment instruments utilized risk and/or threat assessment approaches that combined static and dynamic risk factors and final risk formulation principles of statistical and clinical assessment.

The instruments were all supposed to be applied by security agencies or prison and probation services. Due to this context of the application, at least four tools had a restricted communication regarding the instrument structure and functioning. This aspect is understandable from the perspective of security and safety but aggravated transparent discussion and comparison of all relevant properties of the instruments. Risk assessment instruments for violent extremism appear to be in use mostly by specialists in the field, which leads to a more limited applicability for individuals lacking the necessary expertise and access to classified case information. Five instruments saw training as mandatory and conducted licensing or registration procedures of trained users. In accordance with the extraordinary and complex task to judge potential violent extremists, training appears indeed highly recommendable to warrant a correct and scientifically approved application, especially when relying on more clinical approaches like SPJ instruments. A few instruments specialized in the assessment and management of threats, whereas the others claimed to be applicable to risk and threat management. This differentiation is of interest to choose an instrument depending on the context and reason for the implementation of a risk assessment instrument.

Five instruments were applicable for different ideological phenomena. Instruments that focused on one extremist orientation solely were predominantly focused on violent Islamism. Only one instrument, the currently developed RADAR-rechts, focused specifically on violent right-wing extremism. Whether or not universal approaches to assess the risk of violent extremism without tailored risk categories for a specific extremist ideology is feasible, remains a task for future research and would go beyond the scope of the present review. In general, ideologies and perpetrators of extremist violence share several risk factors, yet recent research indicates that right-wing and Islamist extremists differ in various aspects (Gill et al., 2014; van Prooijen & Kuijper, 2020). To this day, the literature about violent extremism and terrorism is vastly dominated by studies and samples of Islamist extremists (Bjørgo & Ravndal, 2019; Knäble et al., 2021), and comparisons between right-wing and Islamist violent extremists are scarce.

Two instruments specialized for certain subtypes of violent extremists, that is, lone actors, returnees, homegrown extremists, and shooters. However, tools were often not specifically developed for these subtypes but claimed to be applicable without supporting this hypothesis

[4] The implementation of RADAR-rechts as part of the German RADAR-system took place in 2022.

by empirical data (which is, of course, extremely difficult to realize or in some cases simply not possible). Finally, extremist violence as a criterion outcome includes a broad range of different behaviors, including spontaneous hate crimes, escalating violence in confrontation with a group seen as an opponent, for example, in the context of demonstration, ranging up to carefully planned assaults of political enemies or even terrorist attacks. Taken together, it seems almost impossible to predict this broad range of different behaviors with a single instrument. Specifying the outcome of violent extremism as severe, life-threatening violence might be an explanation for why the RADAR-system as a statistical instrument showed promising effect sizes when differentiating between actors of severe extremist violence and other extremists, although not relying on the gold standard of an SPJ instrument. Monahan (2012) recommended the SPJ approach as the gold standard to utilize expert knowledge in combination with structured factors and rules when assessing the risk for terrorist violence. Another aspect that has rarely been addressed in the reviewed instruments relates to different roles in violent extremist and terrorist violence including the attacker, facilitating accomplices, and more distal supporters of violent acts (Victoroff, 2005).

Most information gaps were related to the psychometric properties of the instruments. For four of the instruments, relevant information was not accessible or could not be found. This leaves the question unanswered as to whether an empirical evaluation of the psychometric properties was not conducted or not published openly. When available, reliability measures were mostly found to be substantial to excellent. Data about any validity measure was even more scarce but could be interpreted as substantial to excellent if available. Only for few instruments information about validation analyses conducted by researchers besides the instrument's authoring team were available. The lack of external evaluation of instruments could lead to an overestimation of the instruments' assessment quality (Fazel, 2019). Therefore, more independent evaluations of the psychometric properties of all instruments presented in this review could be considered as highly recommendable from a methodological standpoint. Albeit the obstacle of low base rates of terrorist events and severe violent extremism for such validation studies, several accessible databases exist consisting of comprehensive data collections of violent extremists and terrorist offenders. Such databases could be used more frequently to validate risk assessment instruments in the field of violent extremism, which could be considered by developers and independent researchers (Alberda et al., 2021; Jensen et al., 2016; LaFree & Dugan, 2007).

Limitations

The present review had several important limitations, which must be kept in mind when the findings are interpreted. The first limitation is due to linguistic restrictions in the systematic literature research. Instruments that originate from non-English or non-German published works could not be found. National security agencies were found to be a driving force behind the development of risk assessment instruments for violent extremism; hence, it is reasonable that more instruments have been developed in other countries but are probably represented in the national language only. A further limitation refers to the inaccessibility of information, which may be at least caused by security and safety considerations to restrict the public access of information.

Conclusion

Successful application of risk and threat assessment instruments depends usually on the collaboration between scientists and practitioners during and after the developmental process. It is highly recommended to install feedback loops between cooperating agencies. If risk assessment instruments for violent extremism exist in other countries outside North America, Europe, and Australia, communication of their approaches would be of great interest to compare influences of cultural differences within the tools' development and performance. The collaboration between independent scientists and practitioners should also be considered to revise and evaluate risk and threat assessment instruments' content, application, and risk communication between assessors and other key actors. Evaluation should be evidence-based, psychometrically appropriate, and independent evaluations should be supported,

if possible, by publishing and sharing relevant information like manuals or guidelines. Another argument can be made for validation studies that are conducted independently from an instrument's developer to reduce authoring bias and analyze external validity (Fazel, 2019; Singh et al., 2013). Especially, the risk communication represents an important challenge and is the foundation of effective management and intervention planning (Ritter et al., 2023). Standardizing risk communication schemas, knowledge about interrelated risk estimates and management strategies, as well as efficient use of resources beside others can be enhanced in such collaborations.

Furthermore, instruments must be dynamically adapted to ongoing changes. Such changes can concern that the first cohort of already convicted violent extremists may be released soon from imprisonment. The instruments' capability to reliably measure changes in extremist ideologies, grievances, and risk trajectories should be critically reviewed. In this regard, it seems to be necessary that upcoming instruments are in need to assess a growing mass of information that may be mostly online content. Modern technologies like machine-learning approaches or other computer-driven algorithms may be of use to evaluate this quantity and quality of information. Upcoming research is already investigating how well radicalization is assessable in social media posts by using factors of ERG 22+, IVP, TRAP-18, MLG, and VERA-2 (Neo, 2021). Others assess the risk of lone-actor terrorism with publicly available information using the TRAP-18 (Brugh et al., 2020) or with linguistic analysis of manifests (Kupper & Meloy, 2021). In special cases, frontline personnel facing potential upcoming violent extremists appears to be laypersons, such as teachers, prison personnel, or social workers. This personnel often has a profound insight into relevant aspects of a case, and their knowledge should be integrated into the risk assessment process (Hausam et al., 2020). Furthermore, the relevance to capture the dynamic of risk is of high importance to manage individuals that have been known for a long time, as well as detecting accelerated pathways toward violent extremism (Böckler et al., 2015). Therefore, periodic reassessments and inclusion of dynamic and protective factors are reasonable. Capturing not only a singular risk status but also trajectories as well as network connections may be of interest in the future.

In conclusion, assessing the risk of violent extremism has come a long way in the past decades, and several threat and risk assessment instruments have been developed to assist in decision-making processes concerning a heterogeneous and permanently developing population.

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