5

Radicalisation across the community and forensic units: a systematic literature review on the psychology of violent extremism

Sören Henrich, Jane L. Ireland and Michael Lewis

Introduction

Over the past years, research has fostered a deeper understanding of radicalisation, with scholars agreeing that a universal psychosocial pathway towards extremist violence can be assumed (Sageman, 2008; Borum, 2012a), determined by various factors (King and Taylor, 2011). However, the literature relating to preventing and countering violent extremism (P/CVE) often relates to the psychological escalation of individuals only within the community. Little is known about radicalisation in secure forensic settings like prisons or forensic hospitals, leading authors like Mulcahy and colleagues (2013) to frame prisons as so-called 'breeding grounds for terrorists' (p 4). Adding to the challenges in these settings is that risk factors relevant to extremist violence appear to overlap considerably with risk factors for general violence (for example, Dhumad et al, 2020). Nevertheless, more recently, Silke and colleagues (2021) reviewed 29 publications from 2017 onwards and found that prisons can serve as a disruption to the pathway, aiding rehabilitation efforts. With tentative insight into the wider

rehabilitation system (Christmann, 2012; Feddes and Gallucci, 2015), empirical evidence becomes arguably more inconclusive when exploring radicalisation in forensic hospitals. This is due to the unclear role of mental health issues and protective factors in developing violent extremism (for example, Gill and Corner, 2017).

Other areas of uncertainty include the role of ideology and sociodemographic features (for instance, age, socioeconomic status, education) in the radicalisation process. For both, research has failed to yield conclusive findings (Kruglanski and Fishman, 2006; Borum, 2015), for example, leading governmental guidance to exclude ideology as a requirement when referring individuals to preventative initiatives (Patel and Hussain, 2019). These and other challenges faced in P/CVE make a continuous, up-to-date overview of the currently available empirical evidence necessary. This chapter therefore produces a systematic review of the psychology of extremist violence, exemplifying one of the ways evidence is produced to inform policy and practice regarding prevention interventions. Systematic reviews, jointly with meta-analytic studies, are considered the highest level of evidence-synthesis methods and a key to evidence-based practice.

However, methodological issues and limited generalisability impact some of the currently available systematic reviews. Out of the wealth of overviews (for example, Christmann, 2012; Schmid, 2013; Feddes and Gallucci, 2015; Scarcella et al, 2016; Lösel et al, 2018; Gøtzsche-Astrup and Lindekilde, 2019; Vergani et al, 2020; Silke et al, 2021), only the reviews by Scarcella et al (2016), Lösel et al (2018), Vergani et al (2020) and Silke et al (2021) followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA; Moher et al, 2009). These four publications appear to be the only ones reporting the search process in detail; for example, Scarcella et al (2016) explicitly presented a detailed quality appraisal of the reviewed studies. Furthermore, all reviews present some differences in the included studies, likely due to the reviews' varying theoretical outlooks. Some overviews include research that is not directly related to radicalisation.

Hence, the present review aims to summarise the relevant factors for an individual's psychological development towards

extremist violence. The literature search focused on understudied areas, like the radicalisation of forensic patients, the role of mental health issues in the process, protective factors, and factors discussed to be relevant for more than one ideology. Following best practices, the systematic literature review employed methodology from earlier examples, which included defining a clear research question, summarising empirical evidence and evaluating study quality. The goal is to offer an updated perspective to support P/CVE efforts.

It is expected that:

1. A multitude of competing concepts will be highlighted (King and Taylor, 2011), with most of the research focused on group processes (for example, Sageman, 2008) and the role of ideology (Patel and Hussain, 2019). However, the latter will yield inconclusive findings (for example, Borum, 2015).
2. There will be limited insight into radicalisation in forensic mental health populations (Al-Attar, 2020; Trimbur et al, 2021).
3. Studies exploring sociodemographic profiles will present contradictory findings (Kruglanski and Fishman, 2006). Similarly, risk factors for radicalisation will yield inconclusive findings, overlapping considerably with risk factors for general violence (for example, Dhumad et al, 2020).
4. There will be limited considerations of mental health issues and protective factors (for example, Gill and Corner, 2017).

Methodology

Adhering to the best practice examples outlined, the current systematic literature review followed the PRISMA standards (Moher et al, 2009). The process included establishing a clear research rationale, followed by transparent inclusion and exclusion criteria for search strings, outlined databases and quality appraisal. All steps are explained in detail in the following sections.

Data search

A publication was included in the final set of studies when it met all the following criteria:

1. the paper had to present factors that influence the radicalisation process;
2. the presented factors had to be distinct;
3. the presented factors had to be individual, not social or organisational, factors;[1] and
4. the publication had to provide measurable and verifiable evidence for the presented factors.

Papers were excluded if they did not offer any quantifiable empirical evidence, which was the case for guidelines or commentaries. Furthermore, articles were not included when they were reviews, as they represented already synthesised knowledge. Lastly, publications addressing aspects not directly linked to the psychological process of radicalisation, such as organisational or sociopolitical factors, were not part of the final set of papers. While studies outlining the effects of deradicalisation programmes technically do not reflect the radicalisation process itself, they were viewed as valuable additions as they could reference mitigating influences on extremist violence and, thus, were included.

Three different iterations of search strings were used, exploring only English-language articles published until April 2019, with a second updated search conducted to capture literature until April 2023: Radicali★ation OR terrorism OR extremis★. These keywords were combined separately with one of the following three search strings in the respective search:

- AND (vulnerability OR victim)
- AND (prison OR criminal OR offender★)
- AND (assessment OR risk assessment OR screening)

All resulting search strings also outlined exclusion criteria at the end: NOT legislation OR law★ OR regulation OR policy OR eco★ OR history OR cancer OR injury OR metaboli★ OR chem★. All search strings were also tested in reverse to ensure that no larger sections of the literature were excluded despite meeting the inclusion criteria. The search was conducted using the following databases: PsycINFO, PsycARTICLES, MEDLINE, Criminal Justice Abstracts, SocINDEX, and International Security and Counter Terrorism Reference Center.

Quality appraisal

Per PRISMA suggestions, each included study's quality was classified as 'good', 'fair' or 'poor' (Moher et al, 2009). Therefore, the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies checklist and the Quality Assessment of Case-Control Studies checklist (National Heart, Lung, and Blood Institute, nd) were merged into a 15-item checklist to capture the predominant methodology in the reviewed papers most appropriately. Additionally, some changes were made on the content level to represent the counter-terrorism literature more appropriately. These changes included the presence of explicit definitions, review of multiple ideologies and level of statistical analyses.

Analysis

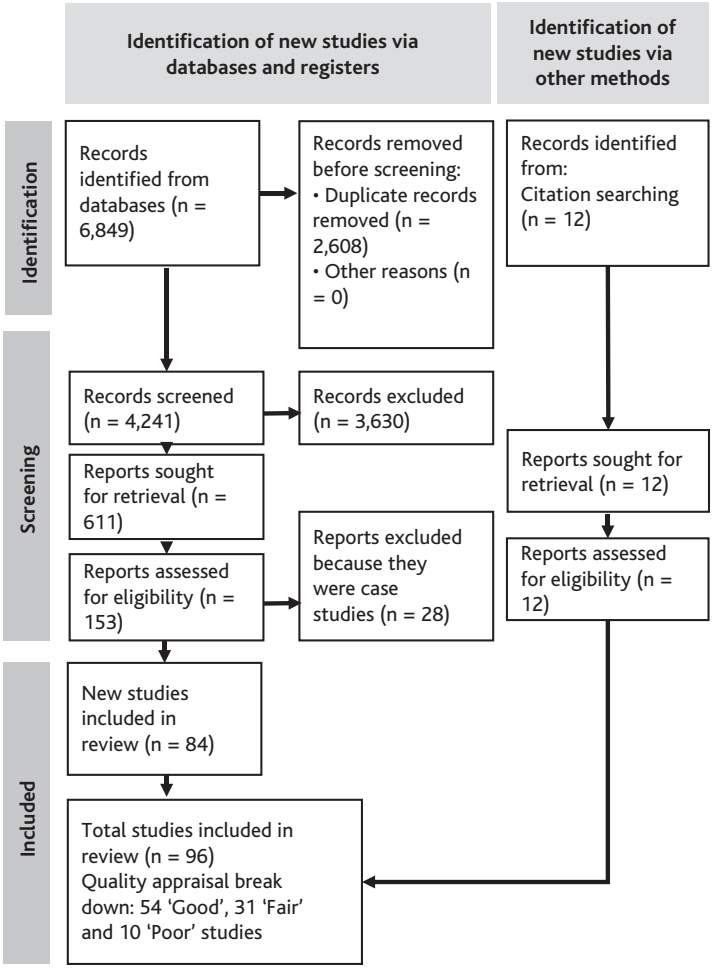
The Grounded Theory Approach (Martin and Turner, 1986) structures data in an inductive manner (that is, the synthesis of general principles based on specific observations), as opposed to a hypothetico-deductive approach (that is, proposing a falsifiable hypothesis by using observable data). The reason for its utilisation lies in the recency of the academic enquiry into counter-terrorism. It can be divided into four stages, all of which we applied to the current analysis. First, the data were assigned codes. This was achieved in conjunction with the second step, in which some codes were summarised with the concepts so that they were all related. Next, all concepts derived from the data set were summarised in categories. Finally, these categories were related to each other to propose new insights.

Results

Entering the search strings in the databases resulted in 6,849 articles, of which 2,608 were duplicates. Further, 3,630 articles were removed because their titles were deemed irrelevant to the aims of the current study. An additional 458 articles were removed based on their abstracts. For the remaining 153 articles, full-text copies were obtained and screened regarding the inclusion criteria in more detail. As a result, 69 articles were

removed, with 28 being case studies and not reporting any statistically relevant empirical data. Twelve articles were added due to a hand search of the full-text references. The final set of 96 articles was subjected to a quality appraisal. Fifty-four were labelled 'good', 31 were labelled 'fair' and ten were labelled 'poor' (see Figure 5.1). The reference list for the 96 articles is provided in Appendix 5A.2.

Figure 5.1: Flowchart depicting the search process for the systematic literature review



A second independent assessor randomly reviewed 10 per cent of the articles from the abstract and text stage, achieving an interrater agreement of 92.5 per cent. Furthermore, another assessor independently appraised the quality of all 96 included articles, resulting in an interrater agreement of 87.7 per cent. Minor discrepancies on item level were resolved via discussion.

Characteristics of included studies

In 24 instances, an unspecified international focus was employed (see Appendix 5A.1). Most were US publications (n = 28), followed by the UK, with nine publications. Articles from non-Western countries (including Palestine, Israel, Russia, Thailand, Kenya, Indonesia and Iran) made up 14 of the 93 included studies.[2]

Seventy-three articles reported quantitative methodology, ten reported qualitative methodology and 12 used a mixed-method approach. The most common study format was surveys (n = 24), followed by interviews (n = 16), case files (n = 28) and publicly available information (n = 12). However, 12 articles used multiple data collection methods, meaning that the total count of the methods listed exceeds 63. Case files and public information were most often used when studying terrorist samples (n = 27) and lone actors (n = 15). Other types of participants and data sources were students and adolescents (n = 14) and members of Muslim communities (n = 8). Again, it should be noted that some studies utilised several different sample types, resulting in an overlap between articles. Only two studies explored practitioners working in the field to deduce relevant factors of radicalisation.

Themes based on the grounded theory approach

Based on the previously described analysis, 27 subordinate themes were found in the 96 included articles (see Table 5.1). These were summarised in eight themes:

1. extremism enhancing attitudes;
2. criminogenic indicators impacting on offence risk;
3. social influences exposing individuals to extremism;

4. conflicting findings of the contribution of mental health issues to radicalisation;
5. aversive events/circumstances obstructing individuals' prosocial goal obtainment;
6. impaired functioning facilitating extremist attitudes and/or violence;
7. conflicting findings regarding the utility of sociodemographic characteristics in the prediction of radicalisation; and
8. content of radicalisation cognitions.

Table 5.1: Overview of factors derived from the thematic analysis, listed from most to least empirical support

Factor	No. of studies covering the factor	Good quality	Fair quality	Poor quality
Extremism enhancing attitudes	**41**	**24**	**14**	**3**
Ideology	25	15	9	1
Religion	12	7	3	2
Political attitude	2	1	1	0
Political engagement	1	1	0	0
Worldview	1	0	1	0
Criminogenic indicators impacting offence risk	**39**	**23**	**11**	**5**
History of violence	11	7	2	2
Past offence characteristics indicating preparedness	16	9	6	1
Protective factors countering extremism	9	6	2	1
Factors motivating engagement with extremism	3	1	1	1
Social influences exposing individuals to extremism	**36**	**20**	**13**	**3**
Group process	20	10	7	3
Presence of delinquent peers	11	7	4	0
Prison experience	5	3	2	0

Table 5.1: Overview of factors derived from the thematic analysis, listed from most to least empirical support (continued)

Factor	No. of studies covering the factor	Good quality	Fair quality	Poor quality
Conflicting findings of the contribution of mental health issues to radicalisation	**31**	**17**	**13**	**1**
Depression	10	6	3	1
Non-specific mental health difficulties	10	5	5	0
Personality disorder	5	2	3	0
Anxiety	3	2	1	0
Early childhood memories	2	1	1	0
Substance use	1	1	0	0
Aversive events/circumstances obstructing individuals' prosocial goal obtainment	**29**	**21**	**6**	**3**
Strain	18	12	4	3
Discrimination	11	9	2	0
Impairment functioning facilitating extremist attitudes and/or violence	**21**	**15**	**5**	**1**
Cognitive impairment	10	6	4	0
Emotional impairment	7	6	1	0
Impulsiveness	4	3	0	1
Conflicting findings regarding the utility of sociodemographic characteristics in the prediction of radicalisation	**17**	**7**	**8**	**2**
Sociodemographic characteristics	12	5	5	2
Gender	5	2	3	0
Content of radicalisation cognitions	**15**	**11**	**4**	**0**
Loss of significance	7	4	3	0
Mortality salience	4	4	0	0
Moral considerations	3	2	1	0
Revenge	1	1	0	0

Each theme and its related sub-ordinate themes are presented next, commencing with the concepts that appear to be studied most often.

Extremism enhancing attitudes

The first emerging theme researched the most often (n = 41) relates to 'ideological' (n = 25), 'religious' (n = 12) or 'political' attitudes (n = 2). Both 'political engagement' and 'worldview' were researched once. These concepts do not appear distinct (for example, Bartlett et al, 2010) and are debated as not being equally important. For example, Schils and Verhage (2017) doubt ideology is the main driver. The attitudes entail mostly good-quality studies (n = 24) and fair-quality studies (n = 14). Ideology appears to have been studied the most frequently, utilising mostly good-quality methodology (n = 15). 'Religion' (n = 7) and 'political' beliefs (n = 2) have been less frequently studied, but also with good-quality methodology. 'Political engagement' presented with one good study and general 'worldview' inclusion has been rated as fair. These attitudes often appear to serve as prosocial legitimisation for violence (Trujillo et al, 2009; Stankov, Higgins et al, 2010; Cohen, 2016). They likely inform pre-offence behaviour (Capellan, 2015), such as target selection (Speckhard and Ahkmedova, 2006; Coid et al, 2016). However, complex relationships have been observed recently between radical beliefs and several other factors, such as social control and peer presence, have been observed (Becker, 2021).

As such, they appear to hold predictive power (Bhui et al, 2014a; Pauwels and De Waele, 2014; Kerodal et al, 2016; Schils and Pauwels, 2016; Challacombe and Lucas, 2019; Obaidi et al, 2022) and, hence, are studied in the context of threat assessments (Laor et al, 2006; Loza, 2010; Doosje et al, 2013; Meloy et al, 2015; Meloy and Gill, 2016; Groppi, 2017).

On a content level, 'religion' appeared to facilitate radicalisation, especially when extremists used spirituality to subscribe meaning to their crisis (Speckhard and Ahkmedova, 2006; Askew and Helbardt, 2012), emphasising collective as opposed to individual strain (Adamczyk and LaFree, 2019). Hence, religion is hypothesised to be a recruitment tool (Speckhard and Ahkmedova,

2006). Linked to this, extremist leadership derives authority from their perceived closeness to divine power (Stankov, Higgins et al, 2010). However, generalisability is limited, as most studies focused on Islamist terrorism (Loza, 2010).

Bhui et al (2016) found that political engagement appears to reduce the likelihood to sympathise with political violence in their sample of South Asian immigrants living in the United Kingdom. Nevertheless, political activism can be an effective predictor of extremist violence in screening instruments (Egan et al, 2016). This is discussed in conjunction with social influences in the next sections. Furthermore, a worldview presenting general disgust with society can contribute to radicalisation (Stankov, Saucier et al, 2010).

Criminogenic indicators impacting offence risk

The second most researched theme (n = 39) represents factors directly linked to the risk of an offence, including recidivism (that is, the risk of reoffending). This included 'history of violence' (n = 11), 'past offence characteristics indicating preparedness' (n = 16), 'protective factors countering extremism' (n = 9) and 'factors motivating engagement with extremism' (n = 3). The studies present mostly good-quality studies (n = 23), followed by fair-quality studies (n = 11) and five poor studies. Violence appears to be studied mainly using good-quality research (n = 7), while past offence characteristics and other motivations exhibit roughly equal amounts of good and fair studies. Lastly, protective factors seemed to show mostly good empirical evidence (n = 6).

A history of general violence was consistently found to increase the risk for radicalisation (for example, Liem et al, 2018), likely because it indicates psychological capability for violence (Gill et al, 2017). While Thijssen et al (2023) found that 60 per cent of 82 convicted extremists in a Dutch prison had been convicted of violent crimes in the past, Bronsard et al (2022) observed less likelihood for prior convictions when comparing radicalised minors to teenagers convicted of non-extremist delinquency. Violence was also operationalised as violent rhetoric (Egan et al, 2016). The readiness can express itself as self-defence (Bartlett

et al, 2010) or as a need for excitement (for example, Askew and Helbardt, 2012). Certain forms of violence, such as previous use of weapons, seem predominantly used by lone actors (McCauley et al, 2013). Those offenders might be better captured with psychological dynamics related to school shooters (McCauley et al, 2013).

A general history of criminal activity also appeared to increase the risk of radicalisation (Gill et al, 2017). This is captured in offence characteristics, including the pre-offence phase. Factors included leakage (that is, disclosing plans to others) and attack location familiarity (Gill et al, 2017, 2021; Kupper and Meloy, 2021; Clemmow, Gill et al, 2022). Others included familiarity with past victims, use of weapons, number of victims, the presence of additional offenders (Gruenewald et al, 2013; Liem et al, 2018; Schuurman et al, 2018), as well as lethality and level of planning (Pitcavage, 2015). Most factors are used in threat assessment as they have been found as feasible predictors of extremist violence (for example, Meloy et al, 2015; Egan et al, 2016; Meloy and Gill, 2016; Challacombe and Lucas, 2019). On the content level, offence motivation is often found relevant (for example, Cohen, 2016). Some offenders offered prosocial motivations for joining an extremist organisation (Cohen, 2016) or popularity (Peddell et al, 2016). However, female offenders especially provided antisocial reasoning such as revenge or personal vendetta (Jacques and Taylor, 2008).

Variables mitigating radicalisation are summarised under protective factors. Symptoms of depression were indirectly negatively associated with violence, as they impacted general psychopathology (Coid et al, 2016). Similarly, community-based narratives countering recruitment (Joosse et al, 2015), a combination of resilience and self-control (Merari et al, 2010), prosocial engagement and social control (Becker, 2021), and critical adverse life events (Bhui et al, 2016) decreased the risk for extremism. The latter are discussed as surprising (Bhui et al, 2016), given that grievance is usually framed as a contributing factor to radicalisation (to be discussed later). However, in combination with political engagement, it appeared to foster social connectedness, protecting individuals from radicalisation (Bhui et al, 2014a, 2016). Overall, the findings emphasise the

importance of structured psychological interventions (Jensen et al, 2020; Cherney and Belton, 2021).

Social influences exposing individuals to extremism

Thirty-six studies explored the social environment of radicalised individuals, namely 'group processes' (n = 20), 'presence of delinquent peers' (n = 11) and 'prison experience' (n = 5). Most studies exhibited good-quality (n = 13), followed by fair-quality studies (n = 8) and three poor-quality studies. Both group processes (n = 10) and the presence of delinquent peers (n = 7) present mostly good-quality research, while the prison experience entails good (n = 3) and fair-quality methodology (n = 2) in nearly equal parts.

On a collective level, strong group identity (Arndt et al, 2002; Victoroff et al, 2012), conformity to group norms (Askew and Helbardt, 2012), fraternity, participating in a hierarchy (Speckhard and Ahkmedova, 2006; Trujillo et al, 2009; Horgan et al, 2018), and active involvement in an extremist group online or offline (Weinberg and Eubank, 1987; Blazak, 2001; Berko and Erez, 2006; Holt and Bolden, 2014; Schils and Verhage, 2017) were considered linked to radicalisation. The latter was also shown to improve the use of predictive instruments, among other factors (Egan et al, 2016). On a content level, peer pressure and exploitation within extremist groups were utilised to recruit suicide bombers, especially female extremists (Jacques and Taylor, 2008). Furthermore, the perception of the in-group being threatened appeared to have an energising effect on individuals, consequently engaging in extremist violent behaviour (Dillon et al, 2020; Yustisia et al, 2020; Ebner et al, 2022; Pfundmair et al, 2022).

Generally, the presence of delinquent peers, such as gang members, contributed to radicalisation (Gruenewald et al, 2013; Pauwels and De Waele, 2014; Egan et al, 2016; Jasko et al, 2017; Schuurman et al, 2018; Becker, 2021). Especially when they are viewed as worthy of being imitated (Bartlett et al, 2010) or when they share pro-violent attitudes, for example, in families (Weinberg and Eubank, 1987; King et al, 2011; Schils and Verhage, 2017; Dhumad et al, 2020).

This is also applicable to peer influences in prison settings (Trujillo et al, 2009), especially when radicalised individuals are not separated from the extremist in-group (Jensen et al, 2020). Radicalisation appears more likely in these environments when individuals are disillusioned or cynical about prosocial engagement with the criminal justice system. Overall, LaFree et al (2020) demonstrated that prison stays – and particularly the occurrence of radicalisation within these settings – is a reliable predictor for future extremist violence (Thijssen et al, 2023).

Conflicting findings of the contribution of mental health issues to radicalisation

This theme encapsulated 'depression' (n = 10), 'personality disorder' (n = 5), 'anxiety' (n = 3), 'early childhood memories' (n = 2), 'substance use' (n = 1) and 'non-specified mental health difficulties' (n = 10). Most studies exhibited good- (n = 17) or fair-quality (n = 13), with depression displaying the best-quality research (n = 6). Personality disorders, in turn, exhibited a fair evidence basis (n = 3).

Several studies have linked general psychiatric symptomatology to an increased risk of radicalisation (Gruenewald et al, 2013; Chermak and Gruenewald, 2015; Meloy et al, 2015; Coid et al, 2016; Meloy and Gill, 2016; Liem et al, 2018; Challacombe and Lucas, 2019; Corner et al, 2019). However, they do not explicitly name them in their design. More specifically, depression- and anxiety-related symptomatology appeared to make an individual more vulnerable to radicalisation (Bhui et al, 2016), like rumination (Bhui et al, 2014a). This was considered likely related to death-related thoughts (Taubman-Ben-Ari and Noy, 2010). These aspects appeared to be researched most frequently in the context of suicide bombings (Speckhard and Ahkmedova, 2006; Merari et al, 2010; Brym and Araj, 2012). However, the extent to which suicidality contributes to radicalisation in those cases is unclear. Bhui et al (2014b) found no association between depression or anxiety with extremist violence but extremist sympathies (Bhui et al, 2020), and Coid et al (2016) found a negative relationship between depression and extremism.

Additionally, some personality disorder symptoms were found to contribute to radicalisation, including self-concept instability, like narcissism (Dechesne, 2009), antisocial personality disorder (Dhumad et al, 2020; Candilis et al, 2021), or any diagnosis relating to cluster C personality disorders of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; Merari et al, 2010). Merari and Ganor (2022) concluded that psychopathology amplified the assailants' motivation to escape their lives, resulting in terrorist attacks.

Krout and Stagner (1939) explored early positive and negative childhood memories in the context of psychodynamic theories. They found that abandonment led to antagonism and, subsequently, extremism. These findings were not replicated by Dhumad et al (2020), who compared 160 terrorists with 65 murderers and a non-criminal control group (n = 88). Their findings suggest that both criminal groups were less likely to be subjected to harsh treatments in childhood. However, terrorists exhibited higher levels of disobedience when younger.

Only one study by Gill et al (2021) explicitly explored the relation of substance use to extremist violence. They observed a higher likelihood of mass shooters having a history of substance use when compared to lone actors, likely impacted by how they cope with stress.

Aversive events/circumstances obstructing individuals' prosocial obtainment of goals

Twenty-nine studies explored this theme, including 'strain' (n = 18) and 'discrimination' (n = 11). The former was divided into individual and collective strains. Both strain (n = 12) and discrimination (n = 9) seemed equally well supported by good-quality research. However, the latter exhibited no poor-quality studies, while the former counted three poor-quality studies.

On an individual level, violence may emerge because of struggle (Pauwels and De Waele, 2014), especially in combination with other personal variables. These included a lack of resilience (Dechesne, 2009), experiencing disillusionment related to mainstream culture (Klausen et al, 2020), and when an individual faced a situation threatening their control or predictability

(McCauley et al, 2013; Ebner et al, 2022). Again, these factors were proven useful for threat assessment (Meloy et al, 2015, 2021; Meloy and Gill, 2016; Challacombe and Lucas, 2019; Kupper and Meloy, 2021). Collectively, relative deprivation[3] (Peddell et al, 2016), nationalistic struggles (Jacques and Taylor, 2008) and generational divisions (Blazak, 2001) appeared relevant to radicalisation. However, this seemed likely only for individuals already holding pro-violent ideas (Nivette et al, 2017). Meanwhile, Groppi (2017) found no significant link between economic disparity and being of Muslim faith supporting violence.

Linked to strain was discrimination, which is often framed as a separate concept (Pauwels and De Waele, 2014). This is operationalised as perceived injustice and group threat (Victoroff et al, 2012; Doosje et al, 2013; Schils and Verhage, 2017; Yustisia et al, 2020), individuals' reactions to stereotypes (Kamans et al, 2009), and social exclusion or poor social inclusion (Pauwels and De Waele, 2014; Schils and Pauwels, 2016; Pretus et al, 2018). The subjective perception appears more important than actual victimisation, for example, explored in conjunction with the Alt-Right movement (Boehme and Isom Scott, 2020). However, discrimination only appears to support radicalisation in conjunction with other factors (for example, distorted worldview, presence of delinquent peers) and does not distinguish terrorists from others (for example, Bartlett et al, 2010).

Impaired functioning facilitating the development of extremist attitudes and/or violence

This theme comprised 21 articles addressing 'cognitive impairment' (n = 10), 'emotional impairment' (n = 7) and 'impulsiveness' (n = 4). Cognitive impairment was nearly equally displaying good (n = 6) and fair evidence (n = 4), while emotional impairment was mainly supported by good-quality studies (n = 6). Impulsiveness had been explored by mostly good-quality studies (n = 3) and one poor study.

Cognitive impairment is related to impacted intellectual functioning, including reduced cognitive flexibility (Baele, 2017) and increased cognitive rigidity (Cohen, 2012). Vice versa, cognitive flexibility and high levels of emotional expression appear

unrelated to extremist views (Muluk et al, 2020). However, higher cognitive abilities were also related to conservatism if the relationship was influenced by low political involvement (Kemmelmeier, 2008). It appears extremists cannot integrate complex cognitions into their political ideas, often expressed as pronounced black-and-white thinking (Savage et al, 2014). Other functions related to radicalisation were the increased need for cognitive closure (Webber et al, 2018) and impaired social cognitions and/or failure to affiliate with others (Challacombe and Lucas, 2019). The latter appeared to have predictive utility in threat assessment (Meloy et al, 2015; Meloy and Gill, 2016), but only in combination with other impaired functions (Baez et al, 2017).

This could include the second subordinate theme, emotional impairment. It appeared that difficulty in emotional recognition distinguished between terrorists and other non-criminal combatants (Baez et al, 2017). Similarly, a lack of empathy was more commonly associated with radicalised individuals than other violent behaviours (Bronsard et al, 2022). Additionally, terrorists exhibited higher levels of proactive aggression (Baez et al, 2017). Baele (2017) found that extremists, especially lone actors, appeared to have generally higher levels of negative emotions. Emotion dysregulation and the expression of aggression, grievance and general negative emotions were successfully utilised in threat assessment (Meloy et al, 2015; Meloy and Gill, 2016; Challacombe and Lucas, 2019).

Radicalisation was also linked to impulsiveness, specifically failures in impulse regulation (Egan et al, 2016) and participation in general risk-seeking behaviour (McCauley et al, 2013; Pauwels and De Waele, 2014). Pauwels and De Waele (2014) concluded that thrill drove the radicalisation process more than impulsivity. However, in a more complex analysis of the same data set, a lack of self-control appeared directly linked to extremist violence (Schils and Pauwels, 2016).

Conflicting findings regarding the utility of sociodemographic characteristics in the prediction of radicalisation

Seventeen studies explored several sociodemographic characteristics (for example, ethnicity, education, income; $n = 12$) and specifically

gender (n = 5) regarding radicalisation or extremist violence. Studies relating to inconsistencies reported equally good and fair quality in methodology (each n = 5) and two poor studies. Gender was studied in three fair-quality studies, followed by two good-quality studies.

Overall, sociodemographic features resulted in inconsistent findings (Coid et al, 2016). Groppi (2017) found no significant link between economic disparity and other common sociological variables. Similarly, Klausen et al (2016) found no significant links between early school dropouts and radicalisation. Comparing suicide bombers with the Palestinian public also yielded no significant differences (Brym and Araj, 2012). They noted that most offenders were unmarried, with 40 per cent being students and 5 per cent unemployed (Brym and Araj, 2012). Lone actors also do not seem different to non-ideological active shooters (Capellan, 2015). But Gruenewald et al (2013) found in their review of the Extremist Crime Database that lone actors were more likely to be younger when following a right-wing ideology, especially when having a university degree (Hollewell and Longpré, 2022). These findings were partially replicated by Chermak and Gruenewald (2015), who found that terrorists following White supremacists, Islamists or left-wing ideology exhibited significantly different age and relationship status profiles. For example, Islamists tended to be older, and Islamists and White supremacists were less often in a committed relationship (Chermak and Gruenewald, 2015). Similarly, Liem et al (2018) showed that 60 per cent of investigated lone actors were single, which made them comparable to homicidal offenders, among other factors (for instance, employment status and level of education).

However, only two studies significantly distinguished radicalised individuals from the general public. Sociodemographic stress indicators, such as unemployment or loss of a relationship, linked a sample of mass murderers to extremism (Gill et al, 2017). Similarly, distressing events and the responses of various age groups, genders and education levels were linked to radicalisation (Webber et al, 2017). Some studies focused exclusively on gender. For example, Berko and Erez (2007) interviewed 14 female Palestinian terrorists and found that most women did not join extremist movements to experience empowerment. Instead, Jacques and Taylor's

(2008) findings suggest female suicide bombers were motivated by personal vendettas. When exploring ideologies, González et al (2014) reviewed the Extremist Crime Database and showed that women seem more likely to join left-wing causes or causes linked to eco-activism. However, they were less likely to actively participate in a terrorist offence or become a lone actor (González et al, 2014).

Content of radicalisation cognitions

Fifteen studies investigated thoughts and perceptions linked to radicalisation, summarised as 'loss of significance' (n = 7), 'mortality salience' (n = 4), 'moral considerations' (n = 3) and 'revenge' (n = 1). Here, most included studies were rated as presenting with good quality (n = 11).

Losing significance (for example, employment loss) or needing more significance (for instance, due to narcissism), increased vulnerability to radicalisation (Jasko et al, 2017; Webber et al, 2017, 2018; Pfundmair et al, 2022). This could result from isolation, as suggested by findings of ten interviews with ex-members of right-wing movements (Bérubé et al, 2019). Dhumad et al (2020) did not directly study the loss of significance, but in their interpretation, they contextualised deprivation and other justifications brought forward by the investigated offenders (n = 160) with the task of reinstating an individual's significance. This central driving dynamic appears to be a significant factor for individuals on the pathway towards an extremist offence compared to those who merely endorse extremist views (Dillon et al, 2020).

Similarly, thoughts regarding an individual's mortality could lead to extremist views (Arndt et al, 2002; Pfundmair et al, 2022). Underlying mechanisms could be a combination of escalating political conditions and low perceived personal vulnerability (that is, how political conditions would affect their personal lives or that of their loved ones [Hirschberger et al, 2009]). However, individuals with war experience only endorsed political violence when considering additional adversary rhetoric (Hirschberger et al, 2009). Ruminations about the self also increased the accessibility of mortality-related thoughts, which triggered the individual's focus on perceived social transgressions to their

group (Taubman-Ben-Ari and Noy, 2010). This resulted in unfavourable opinions regarding other groups, likely contributing to radicalisation.

Moral considerations were shown to increase the likelihood of extremism. For example, individuals supporting violence focused merely on the outcome (Baez et al, 2017). Furthermore, Nivette et al (2017) showed in their sample of 1,675 Swiss pupils that individuals who experienced strain were more likely to support extremist violence when also exhibiting a high level of moral and legal neutralisation techniques (that is, morally disengaging from an argument or idea to justify violence, for instnace, by reframing own harmful behaviour as honourable or heroic).

Lastly, one study explored revenge as a motivating factor for extremist violence (Tschantret, 2021). When comparing right-wing terrorists ($n = 12$), Islamist terrorists ($n = 12$) and texts from a control sample ($n = 9{,}660$), it was observed that right-wing ideology appears to be preoccupied with themes of revenge, including vengeance, and causing chaos.

Discussion

The systematic literature review offered an overview of relevant factors influencing the risk of radicalisation while also reflecting on the quality of the empirical evidence. Eight themes emerged: extremism enhancing attitudes; criminogenic indicators impacting on offence risk; social influences exposing individuals to extremism; conflicting findings of the contribution of mental health issues to radicalisation; aversive events/circumstances obstructing individuals' prosocial goal obtainment; impaired functioning facilitating extremist attitudes and/or violence; conflicting findings regarding the utility of sociodemographic characteristics in the prediction of radicalisation; and content of radicalisation cognitions. These themes confirmed the first prediction that a multitude of factors determine radicalisation. However, only limited insight was gathered about radicalisation in forensic populations, with only five publications (Trujillo et al, 2009; Decker and Pyrooz, 2020; Jensen et al, 2020; LaFree et al, 2020; Thijssen et al, 2023) researching the prison context. This confirmed the second prediction that only limited insight into

the radicalisation of forensic mental health populations would be yielded, replicating findings from Mulcahy and colleagues (2013), who criticised the lack of research in this area.

Instead, most research is related to attitudes, justifications and aversive events, all key components of risk assessments. These represent central constructs of risk assessments. The popularity of these themes might stem from their apparent face validity. For example, it is reasonable to conclude that strains like discrimination push individuals away from mainstream culture towards fringe movements. The frequent coverage of these themes could also be due to their accessibility. For example, the exploration of factors like ideology and religion is predominantly comprised of publications that utilise publicly available information about extremist offenders (for example, Capellan, 2015; Challacombe and Lucas, 2019). In these cases, it is arguably simpler to discern the presence of these factors than to uncover more complex features requiring access to secure data.

The influence of ideology on radicalisation was a frequently examined theme, though the review revealed mixed results about its impact. This inconsistency reflects the ongoing debate in literature and aligns with our predictions. Recent developments suggest that ideology is not necessarily a prerequisite for radicalisation, with scholars such as Borum (2015) and Vergani and colleagues (2020) arguing that not every radicalised individual must present with an understanding of ideological agendas. This notion ties into the more recent distinction between cognitive and behavioural radicalisation as distinct outcomes (Vidino, 2010; Neumann, 2013), with only the former associated with ideological preoccupation, while the latter is more closely related to extremist violence.

Furthermore, the review highlighted sociodemographic characteristics as equally contested. No consistent findings could be found which would constitute a terrorist profile. This reflects conclusions by Kruglanski and Fishman (2006), who refuted the search for sociodemographic root causes. The inconsistent findings are likely due to two reasons. First, the theme subsumed the most fair- and poor-quality studies of this review compared to their good-quality studies. The predominant use of correlational designs was likely unable to detect underlying mechanisms not

represented in an individual's sociodemographic characteristics. Second, the reviewed studies found an overlap between terrorists and other violent offenders, for example, murderers (for example, Gill et al, 2017).

This and the overlap of criminogenic indicators for radicalisation with factors for general violence affirm the prediction that neither sociodemographic profiles nor risk factors for radicalisation will yield conclusive findings. These indicators are the second most researched aspect in this review, likely due to scholars exploring factors well-established for other risk assessments (for example, HCR-20 by Douglas et al, 2013). Like the general violence literature (De Ruiter and Nicholls, 2011), protective factors also appeared understudied in this review. Some mitigating influences seemed to represent inverted risk factors; for example, violence-triggering critical life events were found to aid prosocial reorientation (Bhui et al, 2016).

However, this review yielded distinct factors separating radicalisation research from general violence discourse. In line with the prediction that most research will emphasise group processes, factors like group identity were well-substantiated. The fact that the presence of delinquent peers was linked to an increased risk of radicalisation confirms the notion of this process as inherently social (for example, Borum, 2012b). The tentative findings are promising – these influences presented consistently good-quality studies, especially compared to other themes. Similarly, the review found that the content of cognitions appeared to distinguish radicalised individuals from general violence. The studies utilised the most experimental designs of the included publications, such as written scenarios, to elicit emotional or moral responses (for example, Hirschberger et al, 2009; Baez et al, 2017). Further research is needed to explore whether those cognitions can be naturally observed.

The prediction was confirmed that mental health issues would yield inconclusive findings. While the review found many publications, no single diagnosis could be empirically linked to radicalisation. This was likely due to the consistently poor-quality study designs, for example, not specifying the explored psychopathology. Similarly, the review yielded no consistent findings for impaired functioning. Again, aspects like

impulse control deficits, antisocial personality style or emotional dysregulation are also considered relevant for some offenders of general violence (for example, Douglas et al, 2013). The lack of specificity arguably impacted the understanding of its influence on radicalisation. Overall, this reflects scholars' concerns about the empirical evidence in the field (for example, Gill and Corner, 2017; Al-Attar, 2020), urging for further exploration of these facets.

In sum, several trends are observable in the literature. The more recent studies appear more consistently of good quality than earlier research. For example, studies include more causal inferences rather than purely correlational designs and are more frequently gaining access to primary data. This is also reflected in the explored factors, seemingly focusing more on underlying mechanisms that explain the radicalisation process (for instance, group processes, grievances and protective factors) than outwardly observable factors, such as openly endorsed ideology or sociodemographic features. However, the new possible explanations for the origins of extremist violence are only tentative. Overall, the radicalisation process appears well understood, seemingly encouraging scholars to explore more complex presentations, such as the impact of mental health issues on extremist violence or the radicalisation of complex forensic populations. Again, more research is required to aid future P/CVE initiatives successfully.

In conclusion, several factors were identified as crucial and empirically well-supported in the radicalisation process. However, some influences present considerable overlap with the general violence literature (that is, history of violence, preparedness, and sociodemographic features like income, education or gender). Additionally, the review yielded little insight into the radicalisation of forensic populations, especially when they present with complex needs, as mental health issues appear understudied. As the literature seems particularly limited in this context, the next step must gather insight into groups in secure services. This should combine professionals' views on these dynamics, like the research by Trujillo et al (2009) and primary data, such as interviews with radicalised individuals or case files on their presentation in secure settings. Among other aspects, the primary data would allow for further exploration of the uncertain areas and especially the overlap

of risk factors of radicalisation with factors related to general violence. As a result, the current review emphasised the need for a formulation approach to support P/CVE, for example, through care pathway planning or risk assessment and management.

The current study is a reminder of the importance of synthesising knowledge based on the critical reflection of how evidence is produced and its integral contribution to continuously improving evidence-based practice. Overviews of this kind allow the identification of areas that require increased research intention in the future but also offers reassurance to practitioners about well-established concepts and approaches. Currently, it appears that the psychology of P/CVE has fully captured the presence of factors relevant to the radicalisation process. Now, renewed efforts must be made to understand their relevance for the development of extremist violence.

Limitations

The review is limited in several ways. The study only considered English language articles. Hence, alternative empirically substantiated influences in other countries are not included. It is unclear what additional relevant factors for radicalisation might be well established in other cultural settings, limiting the generalisability of the summarised findings. The review only focused on research directly investigating radicalisation and extremism, discarding findings of similar dynamics based on other schools of thought. Some mechanisms, for example, the violence-strain link, have been well-researched for other offence types. Hence, a broader perspective might elicit more empirical support for the factors listed here. Lastly, only a qualitative synthesis of the findings was conducted utilising thematic analysis. This approach restricts insight into the extent of empirically well-established evidence as opposed to more elaborate methods like meta-analyses that, for example, weigh effect sizes against the study qualities.

Summary

- The most well-established influences on radicalisation appear to be aversive events and attitudes which endorse extremism.

- A lack of empirical evidence was identified pertaining to the role of mental health issues, protective factors and radicalisation in forensic populations.
- The role of ideology is inconclusive in the radicalisation process and is suspected to be of only minor importance.
- Sociodemographic characteristics alone appear unhelpful in explaining the radicalisation process, echoing the field's shift away from utilising profiles.
- Risk factors supported by the most empirical evidence appear to be the same factors discussed for general violence without any radicalisation indication.
- However, tentative findings based on good-quality studies suggest that social processes, such as group socialisation, might uniquely influence the development towards an extremist violent offence.
- Overall, it appears that the research quality has improved over the last ten years as the field has explored more nuanced facets of radicalisation.

Suggested directions for future research

- Future research should prioritise discerning the overlap of risk factors present in both extremist violence cases and general violent offending behaviour. Exploring interactions between these factors is further suggested, as their presence during the radicalisation pathways has been well-established.
- It is necessary to conduct an in-depth analysis of the impact of mental health issues on radicalisation and violent extremist behaviour, particularly among forensic populations with complex needs. This endeavour presents a valuable opportunity to gain a comprehensive understanding of the underlying causes that drive individuals towards violent extremism.
- Further research is necessary utilising primary data, meaning insights based directly on research with radicalised individuals, instead of accounts about this population. The latter appears to dominate the current literature, which impacts current insight in the field.

Appendix 5A.1: Study characteristics of all reviewed English-language publications of research

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Adamczyk and LaFree, 2019	Good	International	Religion, sociodemographic	QNT; cross-sectional survey	N = 45,923 survey participants
Altier et al, 2021	Good	International	Recidivism, risk factors	QNT; cross-sectional	N = 87 autobiographical accounts of individuals involved in terrorism
Arndt et al, 2002	Good	United States	Mortality salience, psychological distancing, group identification	QNT; randomised experimental trial in two studies	N_1 = 47 students N_2 = 91 students
Askew and Helbardt, 2012	Poor	Thailand	Motivation	QUL; analysis of interviews, case files and propaganda	N = 3 Patani warriors
Baele, 2017	Good	International	Emotions, cognitive flexibility	QNT; linguistic analysis of written texts	N_1 = 11 lone actors N_2 = 3 peaceful political figures N_3 = thousands of texts as baseline
Baez et al, 2017	Good	United States	Intellectual and executive functioning aggression emotion recognition moral judgement	QNT; comparison of surveys and experiment with matched control group	N_1 = 66 right-wing terrorists N_2 = 66 community-based participants
Bartlett et al, 2010	Good	International	Social and personal characteristics, religion and ideology	QNT, QUL; interviews and case files	N_1 = 58 Islamist terrorists N_2 = 28 radical Muslims (no conviction) N_3 = 71 young Muslims

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Becker, 2021	Good	United States	Social control, social learning, sociodemographic	QNT; cross-sectional	*N* = 1,757 domestic extremists
Berko and Erez, 2006	Fair	Palestine	Gender, recruitment, prison experience	QUL; interviews	*N* = 14 women detained for security offences
Bérubé et al, 2019	Fair	Canada	Radicalisation trajectories	QUL; interviews	*N* = 10 former members of violent right-wing extremist groups
Bhui et al, 2014a	Good	United Kingdom	Psychosocial adversity, social capital, mental health	QNT; cross-sectional survey	*N* = 608 of Pakistani or Bangladeshi origin (18–45 years old)
Bhui et al, 2014b	Good	United Kingdom	Health, anxiety, depression	QNT; cross-sectional survey	*N* = 608 of Pakistani or Bangladeshi origin (18–45 years old)
Bhui et al, 2016	Good	United Kingdom	Life events, political engagement, depression	QNT; cross-sectional survey	*N* = 608 of Pakistani or Bangladeshi origin (18–45 years old)
Bhui et al, 2020	Good	United Kingdom	Depression, dysthymia, anxiety, post-traumatic stress	QNT; cross-sectional survey	*N* = 618 of Pakistani or Bangladeshi origin (18–45 years old)
Blazak, 2001	Poor	United States	General Strain Theory	QUL; interviews	*N* = 65 skinheads
Boehme and Isom Scott, 2020	Good	United States	Perceived victimhood	QNT; cross-sectional survey	*N* = 754 White Americans

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Bronsard et al, 2022	Good	France	Several sociodemographic, clinical and psychological variables, including empathy and suicidality	QNT; comparison group	N_1 = 31 convicted terrorists N_2 = 101 teenage delinquents
Brookes and McEnery, 2020	Fair	United Kingdom	Ideological struggle	QNT, QUL; correlational, thematic analysis	N = unspecified; texts by British Islamist terrorists
Brym and Araj, 2012	Poor	Palestine	Sociodemographic details, depression	QUL; interviews	N_1 = NR; relatives of suicide bombers
Candilis et al, 2021	Good	Iraq	Sociodemographic factors, motivation, attitudes, psychopathology	QNT; Latent Class Analysis	N = 160 convicted terrorists
Capellan, 2015	Fair	United States	Sociodemographic details, role of ideology	QNT; comparison of case files and public information with control group	N_1 = 40 incidents of ideologically motivated shooters N_2 = 242 incidents of non-ideologically motivated shooters
Challacombe and Lucas, 2019	Good	United States	TRAP-18: personal pathway, fixation, identification, novel aggression, energy burst, leakage, last resort, threat, grievance and moral outrage, ideology, failure to affiliate with extremist	QNT; comparison of case files and public information with control group	N_1 = 30 violent individuals N_2 = 28 non-violent individuals both associated with sovereign citizen movement

Reference	Quality	Country	Central constructs	Study design	Participants demographic
			group, dependence to virtual community, thwarting occupational goals, emotional and cognitive changes, failure of intimate bonding, psychopathology, creativity, violence		
Chermak and Gruenewald, 2015	Good	United States	Sociodemographic details, criminogenic conditions, offender type and timing	QNT; comparison of case files & public information	N_1^A = 637 right-wing extremists N_2^A = 182 left-wing extremists N_3^A = 155 Al-Qaeda members
Cherney and Belton, 2021	Good	Australia	Deradicalisation intervention	QNT; cross-sectional	*N* = 14 convicted terrorists
Clemmow et al, 2022a	Good	United States	Propensity, situation, preparatory, leakage, network	QNT; cluster analysis	*N* = 183 lone actors
Clemmow et al, 2022b	Good	UK	Risk Analysis Framework	QNT; psychometric network modelling	*N* = 1,500 members of public
Cohen, 2012	Fair	United States	Cognitive rigidity	QNT; cross-sectional comparison of text analyses	*N* = 483 students
Cohen, 2016	Fair	Palestine	Reasoning, motivation	QNT; cross-sectional comparison of thematic text analyses	*N* = 211 suicide bombers

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Coid et al, 2016	Good	United Kingdom	Attitude, psychiatric morbidity, ethnicity, religion	QNT; cross-sectional survey	N = 3,679 men, 18–34 years old
Corner et al, 2019	Fair	International	Psychopathology, religion	QNT; cross-sectional comparison of sequential analyses	N^B = 125 lone actors
Cramer et al, 2023	Good	United States	Hate-Motivated Behaviour Checklist (HMBC); demographic information, Hate-Motivated Behaviour, social-political characteristics	QNT; cross-sectional survey, factor analysis	N = 463 students
Dechesne, 2009	Fair	United States	Violence, struggle, narcissism	QNT; randomised experimental comparison	N = 128 students
Decker and Pyrooz, 2020	Good	United States	Imprisonment-extremism nexus	QNT, QUL; interviews, cross-sectional	N = 802 released inmates
Dhumad et al, 2020	Good	Iraq	Childhood, family, personality (Significance Quest Theory)	QNT; survey and interviews for comparison with control-groups	N_1 = 160 convicted terrorists N_2 = 65 convicted murders N_3 = 88 community members without criminal history
Dillon et al, 2020	Fair	International	In-group, societal grievances, pursuit for significance	QNT, QUL; thematic analysis, cross-sectional	N_1 = 14 violent foreign fighters; 2,000 posts N_2 = 18 non-violent supporters; 2,000 posts

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Doosje et al, 2013	Fair	The Netherlands	Perceived procedural justice, emotional uncertainty, perceived group threat, ideology	QNT; cross-sectional online questionnaire	*N* = 131 Muslims (12–21 years)
Ebner et al, 2022	Good	International	Linguistic categories related to threat, in- versus out-group thinking, role models, hopelessness	QNT, QUL; correlational, ethnographic	*N* = 200,000 QAnon messages unspecified violent and non-violent control groups
Egan et al, 2016	Good	United Kingdom	Identifying Vulnerable People (IVP) guidance, religious/cultural/social isolation, risk taking behaviour, sudden changes in religious practice, violent rhetoric, deviant peers (view reference for all 16 items)	QNT; cross-sectional analysis of public available data	*N* = 157 convicted terrorists
Gill et al, 2017	Fair	United States	Sociodemographic details, development, antecedent attack, attack preparation, commission properties	QNT; cross-sectional comparison of case files with codebook	N_1 = 115 lone actors
Gill et al, 2021	Good	International	Demographic, psychologic, behavioural	QNT; bivariate and multivariate statistical analyses	N_1 = 71 lone-actor terrorists N_2 = 115 public mass murderers

Reference	Quality	Country	Central constructs	Study design	Participants demographic
González et al, 2014	Fair	United States	Gender	QNT; comparison of case files with control-group	N_1^A = 49 far-right female lone actors N_2^A = 36 eco female lone actors N_3^A = 244 far-right male lone actors N_4^A = 135 eco male lone actors
Groppi, 2017	Fair	Italy	Sociodemographic details, attitudes, grievance, ideology, identity crisis	QNT, QUL; survey, interviews, focus groups with cross-sectional comparison	N = 440 Muslims
Gruenewald et al, 2013	Fair	United States	Sociodemographic details, psychopathology, victim characteristics, relationship	QNT; cross-sectional analysis of case files	N^A = 96 far-right lone actors
Hirschberger et al, 2009	Good	Iran	Mortality salience, perceived adversary intent, personal vulnerability	QNT; randomised and comparison with control-group experiment	Study 1 N = 80 students Study 2 N = 308 students Study 3 N_1 = 114 students with exposure to war N_2 = 116 students without exposure to war

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Hollewell and Longpré, 2022	Fair	International	Emotional regulation, self-esteem, impulsiveness, self-motivation, trait empathy, Facebook engagement, action and participation, uses and gratification, positive online experiences, social context, extremist attitudes	QNT; cross-sectional	N = 499 online users
Holt and Bolden, 2014	Poor	International	Technological skills	QUL; thematic analysis of written communication	N = 60 online threads of White supremacists (a total of 117 users)
Horgan et al, 2018	Good	United States	Behavioural mapping of recruiters, supporters, actors	QNT; cross-sectional comparison of case files and public information	N = 183 convicted terrorists
Jacques and Taylor, 2008	Good	International	Gender, motivation, recruitment, attack outcome	QNT; comparison of public information with control group	N_1 =30 female suicide bombers N_2 = 30 male suicide bombers
Jasko et al, 2017	Good	United States	Economic and social loss of significance, presence of radicalised others	QNT; cross-sectional profile comparison	N = 1,496 terrorists (varying ideologies)
Jensen et al, 2020	Fair	United States	Protective factors	QNT, QUL; life-course narrative, group comparison	N = 50 far-right extremists

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Joosse et al, 2015	Poor	Canada	Counter-narratives regarding recruitment	QUL; cross-sectional comparison with interviews	N = 118 individuals with Somalian background
Kamans et al, 2009	Good	The Netherlands	Negative meta-stereotypes	QNT, QUL; cross-sectional interviews and surveys	N = 88 teenagers with Moroccan background
Kemmelmeier, 2008	Fair	United States	Cognitive abilities, political attitudes	QNT; cross-sectional survey	N_1 = 7,279 students N_2 = NR; participants from all states
Kerodal et al, 2016	Fair	United States	Offence types, commitment to ideology	QNT; comparison of case files with control groups	N_1^A = 142 far-right homicides N_2^A = 103 far-right financial schemes N_3 = 27 homicide N_4 = 33 financial schemes
Khazaeli Jah and Khoshnood, 2019	Fair	International	Sociodemographic, criminogenic indicators, psychopathology, modus operandi	QNT; cross-sectional	N = 37 lone-actor terrorists
King et al, 2011	Fair	Indonesia	Attitudes, family support	QNT, QUL; cross-sectional interviews and surveys	N = 20 immediate relatives of 16 Jema'ah Islamiyah members
Klausen et al, 2016	Poor	United States	Age-crime curve	QNT; cross-sectional case file comparison	N = 600 Islamist terrorists
Klausen et al, 2020	Good	United States	Sociodemographic, New York Police Department four-phase model	QNT; behavioural sequencing	N = 130 case files of homegrown jihadists

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Krout and Stagner, 1939	Fair	United States	Early childhood memories	QNT; survey comparison with control group	N_1 = 153 members of extremist movement (Young People's Socialist League and Young Communist League) N_2 = 97 individuals from the community
Kupper and Meloy, 2021	Good	International	TRAP-18	QNT; correlational comparison	N = 30 manifestos of committed or planned attacks
LaFree et al, 2020	Good	United States	Prison	QNT; matched comparison	N = 675 convicted terrorists
Laor et al, 2006	Good	Israel	Ideology, resilience, family, trauma responses	QNT; cross-sectional surveys	N = 1,105 adolescents exposed to terrorism
Liem et al, 2018	Good	Europe	Event characteristics, sociodemographic details, psychological background, violence	QNT; matched comparison of case files	N_1 = 98 lone actors N_2 = 300 homicides; 3 matched to each in N_1
Loza, 2010	Poor	Canada	Political views, attitudes towards women, attitudes towards Western culture, religiosity, condoning fighting	QNT; cross-sectional assessment	N = 89 incarcerated offenders
McCauley et al, 2013	Poor	United States	Grievance, unfreezing, status-and-risk-seeking, history of weapons use, violence	QNT; comparison of governmental reports with control group	N_1 = 83 lone actors N_2 = 41 school shooters

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Meloy and Gill, 2016	Fair	International	TRAP-18	QNT; cross-sectional comparison of case files	N^{B} = 111 lone actors
Meloy et al, 2015	Good	Europe	TRAP-18	QNT; cross-sectional comparison of public information	N = 22 lone actors
Meloy et al, 2021	Good	International	TRAP-18	QNT; time sequence analysis	N = 125 lone-actor terrorists
Merari and Ganor, 2022	Fair	Palestine	Psychotic background, severe personality disorder, suicidality	QUL; interviews	N = 45 convicted terrorists
Merari et al, 2010	Fair	Palestine	Ego strength, psychopathic deviation, personality style	QNT; assessment comparison with control group	N_1 = 15 thwarted suicide bombers N_2 = 12 prisoners due to political violence N_3 = 14 prisoners due to ordering suicide bombings
Muluk et al, 2020	Good	Indonesia	Cognitive flexibility, emotional expression	QNT, QUL; ethnographic	N = 66 convicted terrorists
Nivette et al, 2017	Good	Switzerland	Collective strain, moral/legal constraints	QNT; cross-sectional and longitudinal comparison with interviews	N = 1,214 students aged 15–17

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Obaidi et al, 2022	Good	United States	Extremist Archetypes Scale	QNT; factor analysis	N_1 = 307 White majority members N_2 = 308 White majority members N_3 = 317 Muslim minority members
Pauwels and De Waele, 2014	Good	Belgium	Social integration, discrimination, procedural justice, beliefs/attitudes, peer delinquency	QNT; cross-sectional comparison with surveys	*N* = 2,879 adolescents
Peddell et al, 2016	Poor	United Kingdom	Vulnerabilities, motivation, mechanisms	QUL; thematic analysis of focus group	*N* = 5 counter-terrorism practitioners
Pfundmair et al, 2022	Fair	International	Personality factors, individual processes, group processes	QNT; comparitve frequency	*N* = 81 case files of Islamist extremists
Pitcavage, 2015	Poor	International	Ideological composition, lethality	QNT; cross-sectional comparison with data bases	*N* = 35 lone actors
Powis et al, 2021	Good	United Kingdom	ERG22+	QNT; factor analysis	*N* = 171 Islamist extremists
Pretus et al, 2018	Good	Spain	Social exclusion	QNT; comparison with randomised experimental allocation to fMRTs	*N* = 38 Sunni Muslim Moroccan men vulnerable to radicalisation

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Savage et al, 2014	Fair	Kenya	Integrative complexity of ideology	QNT; cross-sectional comparison of verbal data	*N* = 24 Kenyan and Somali men vulnerable to radicalisation
Schils and Pauwels, 2016	Good	Belgium	Extremist propensity, exposure to violent extremism, perceived injustice, social integration, perceived alienation, perceived procedural justice, religious authoritarianism	QNT; cross-sectional comparison with surveys	*N* = 6,020 adolescents
Schils and Verhage, 2017	Good	Belgium	Injustice, identity, ideology, social environment, active involvement, online versus offline	QUL; cross-sectional comparison with interviews	*N* = 12 adolescents
Schuurman et al, 2018	Fair	International	Personal background, social context, attack planning, attack preparation, operational security, leakage, postoperation activities, other activities	QNT; cross-sectional comparison of public information (supplemented with primary data where possible)	N^{B} = 55 lone actors
Shortland et al, 2022	Good	United States	Short-term psychological consequences of exposure to extremist material on extremist cognitions	QNT; between-group experimental design	*N* = 1,112 participants

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Speckhard and Ahkmedova, 2006	Fair	Russia	Organisational motivation, community support for suicide attacks, individual motivation, political aspects, religious aspects, foreign influences, ideology, martyrdom, seeking answers, fraternity	QNT, QUL; cross-sectional comparison with interviews	*N* = 32 relatives of 51 suicide terrorists
Stankov et al, 2010a	Fair	International	Justification of violence, religious reasoning, blaming Western legislations	QNT, QUL; cross-sectional comparison with linguistic analyses and thematic analyses	Study 1 *N* = 132 extremists' statements Study 2 *N* = 452 students
Stankov et al, 2010b	Fair	International	Pro-violence, Vile World, Divine Power	QNT; cross-sectional comparison with survey	*N* = 2,424
Taubman-Ben-Ari and Noy, 2010	Good	Israel	Death-related thoughts, rumination about self-consciousness, cultural worldviews	QNT; cross-sectional comparison with survey	Study 1 *N* = 56 students Study 2 *N* = 212 students
Thijssen et al, 2023	Fair	The Netherlands	Sociodemographic, criminogenic indicators, psychopathology	QNT; correlational	*N* = 82 convicted terrorists
Trujillo et al, 2009	Good	Spain	Group hierarchy, group identity, legitimisation of violence, religion	QNT; cross-sectional comparison with survey	*N* = 192 prison officials

Reference	Quality	Country	Central constructs	Study design	Participants demographic
Tschantret, 2021	Good	International	Personality factors	QNT; between-group	N_1 = 12 right-wing terrorists N_2 = 12 Islamist terrorists N_3 = 9,660 controls
Victoroff et al, 2012	Fair	International	Justification of suicide bombings, discrimination, difficulties being Muslim, group identity	QNT; cross-sectional comparison with survey	N_1 = 1,627 European Muslims N_2 = 1,050 US Muslims
Webber et al, 2017	Good	International	Loss of significance, threat of significance, opportunity for significance gain, ideology, group processes, sociodemographic details	QNT; cross-sectional comparison of public information	N = 219 suicide bombers
Webber et al, 2018	Good	International	Loss of significance, cognitive closure	QNT; cross-sectional comparison with survey	Study 1 N = 74 incarcerated members of a Philippine terrorist organisation Study 2 N = 237 incarcerated members of Sri Lankan terrorist organisation Study 3 N = 196 US participants from general public

Reference	Quality	Country	Central constructs	Study design	Participants demographic
					Study 4 N = 344 US participants from general public
Weinberg and Eubank, 1987	Fair	Italy	Role in organisation, gender, family relationships, relationships with other terrorists	QNT; comparison of case files with control group	N_1 = 451 incarcerated female terrorists N_2 = 2,512 incarcerated male terrorists
Yustisia et al, 2020	Good	Indonesia	Perception of threat, quantity of social contact	QNT; cross-sectional	N = 66 convicted terrorists

Note: QNT = quantitative methodology; QUL = qualitative methodology; NR = not reported.

Appendix 5A.2: References of studies included in the systematic review of research

Adamczyk, A. and LaFree, G. (2019) 'Religion and support for political violence among Christians and Muslims in Africa', *Sociological Perspectives*, 62(6): 948–79.

Altier, M.B., Leonard Boyle, E. and Horgan, J.G. (2021) 'Returning to the fight: An empirical analysis of terrorist reengagement and recidivism', *Terrorism and Political Violence*, 33(4): 836–60.

Arndt, J., Schimel, J., Greenberg, J., Pyszczynski, T. and Solomon, S. (2002) 'To belong or not to belong. that is the question: Terror management and identification with gender and ethnicity', *Journal of Personality & Social Psychology*, 83(1): 26–43.

Askew, M. and Helbardt, S. (2012) 'Becoming Patani warriors: Individuals and the insurgent collective in southern Thailand', *Studies in Conflict & Terrorism*, 35(11): 779–809.

Baele, S.J. (2017) 'Lone-actor terrorists' emotions and cognition: An evaluation beyond stereotypes', *Political Psychology*, 38(3): 449–68.

Baez, S., Herrera, E., García, A.M., Manes, F., Young, L. and Ibáñez, A. (2017) 'Outcome-oriented moral evaluation in terrorists', *Nature Human Behaviour*, 1(6): 1–9.

Bartlett, J., Birdwell, J. and King, M. (2010) 'The edge of violence: A radical approach to extremism', *Demos*: 5–75.

Becker, M.H. (2021) 'When extremists become violent: Examining the association between social control, social learning, and engagement in violent extremism', *Studies in Conflict & Terrorism*, 44(12): 1104–24.

Berko, A. and Erez, E. (2007) 'Women in terrorism: A Palestinian feminist revolution or gender oppression?', *Intelligence*, 30(6): 1–14.

Bérubé, M., Scrivens, R., Venkatesh, V. and Gaudette, T. (2019) 'Converging patterns in pathways in and out of violent extremism', *Perspectives on Terrorism*, 13(6): 73–89.

Bhui, K., Everitt, B. and Jones, E. (2014) 'Might depression, psychosocial adversity, and limited social assets explain vulnerability to and resistance against violent radicalisation?', *Plos One*, 9(9): e105918.

Bhui, K., Warfa, N. and Jones, E. (2014) 'Is violent radicalisation associated with poverty, migration, poor self-reported health and common mental disorders?', *PloS One*, 9(3): e105918.

Bhui, K., Silva, M.J., Topciu, R.A. and Jones, E. (2016) 'Pathways to sympathies for violent protest and terrorism', *The British Journal of Psychiatry*, 209(6): 483–90.

Bhui, K., Otis, M., Silva, M.J., Halvorsrud, K., Freestone, M. and Jones, E. (2020) 'Extremism and common mental illness: Cross-sectional community survey of White British and Pakistani men and women living in England', *The British Journal of Psychiatry*, 217(4): 547–54.

Blazak, R. (2001) 'White boys to terrorist men: Target recruitment of Nazi skinheads', *American Behavioral Scientist*, 44(6): 982–1000.

Boehme, H.M. and Isom Scott, D.A. (2020) 'Alt-white? A gendered look at "victim" ideology and the alt-right', *Victims & Offenders*, 15(2): 174–96.

Bronsard, G., Cohen, D., Diallo, I., Pellerin, H., Varnoux, A., Podlipski, M.A., et al (2022) 'Adolescents engaged in radicalisation and terrorism: A dimensional and categorical assessment', *Frontiers in Psychiatry*, 12: 2585.

Brookes, G. and McEnery, T. (2020) 'Correlation, collocation and cohesion: A corpus-based critical analysis of violent jihadist discourse', *Discourse & Society*, 31(4): 351–73.

Brym, R.J. and Araj, B. (2012) 'Are suicide bombers suicidal?', *Studies in Conflict & Terrorism*, 35(6): 432–43.

Candilis, P.J., Cleary, S.D., Dhumad, S., Dyer, A.R. and Khalifa, N. (2021) 'Classifying terrorism: A latent class analysis of primary source socio-political and psychological data', *Behavioral Sciences of Terrorism and Political Aggression*, 15(1): 1–18.

Capellan, J.A. (2015) 'Lone wolf terrorist or deranged shooter? A study of ideological active shooter events in the United States, 1970–2014', *Studies in Conflict & Terrorism*, 38(6): 395–413.

Challacombe, D.J. and Lucas, P.A. (2019) 'Postdicting violence with sovereign citizen actors: An exploratory test of the TRAP-18', *Journal of Threat Assessment and Management*, 6(1): 51–9.

Chermak, S. and Gruenewald, J.A. (2015) 'Laying a foundation for the criminological examination of right-wing, left-wing, and Al Qaeda-inspired extremism in the United States', *Terrorism and Political Violence*, 27(1): 133–59.

Cherney, A. and Belton, E. (2021) 'Evaluating case-managed approaches to counter radicalization and violent extremism: An example of the Proactive Integrated Support Model (PRISM) intervention', *Studies in Conflict & Terrorism*, 44(8): 625–45.

Clemmow, C., Bouhana, N., Marchment, Z. and Gill, P. (2022) 'Vulnerability to radicalisation in a general population: A psychometric network approach', *Psychology, Crime & Law*, 29(4): 1–29.

Clemmow, C., Gill, P., Bouhana, N., Silver, J. and Horgan, J. (2022) 'Disaggregating lone-actor grievance-fuelled violence: Comparing lone-actor terrorists and mass murderers', *Terrorism and Political Violence*, 34(3): 558–84.

Cohen, S.J. (2012) 'Construction and preliminary validation of a dictionary for cognitive rigidity: Linguistic markers of overconfidence and overgeneralization and their concomitant psychological distress', *Journal of Psycholinguistic Research*, 41(5): 347–70.

Cohen, S.J. (2016) 'Mapping the minds of suicide bombers using linguistic methods: The corpus of palestinian suicide bombers' farewell letters (CoPSBFL)', *Studies in Conflict & Terrorism*, 39(7–8): 749–80.

Coid, J.W., Bhui, K., MacManus, D., Kallis, C., Bebbington, P. and Ullrich, S. (2016) 'Extremism, religion and psychiatric morbidity in a population-based sample of young men', *The British Journal of Psychiatry*, 209(6): 491–7.

Corner, E., Bouhana, N. and Gill, P. (2019) 'The multifinality of vulnerability indicators in lone-actor terrorism', *Psychology, Crime & Law*, 25(2): 111–32.

Cramer, R.J., Cacace, S.C., Sorby, M., Adrian, M.E., Kehn, A. and Wilsey, C.N. (2023) 'A psychometric investigation of the hate-motivated behavior checklist', *Journal of Interpersonal Violence*, 38(7–8): 5638–60.

Dechesne, M. (2009) 'Explorations in the experimental social psychology of terrorism: The struggle-violence link and its predictors', *Revue Internationale De Psychologie Sociale*, 22(3–4): 87–102.

Decker, S.H. and Pyrooz, D.C. (2020) 'The imprisonment-extremism nexus: Continuity and change in activism and radicalism intentions in a longitudinal study of prisoner reentry', *PLoS One*, 15(11): e0242910.

Dhumad, S., Candilis, P.J., Cleary, S.D., Dyer, A.R. and Khalifa, N. (2020) 'Risk factors for terrorism: A comparison of family, childhood, and personality risk factors among Iraqi terrorists, murderers, and controls', *Behavioral Sciences of Terrorism and Political Aggression*, 12(1): 1–17.

Dillon, L., Neo, L.S. and Freilich, J.D. (2020) 'A comparison of ISIS foreign fighters and supporters social media posts: An exploratory mixed-method content analysis', *Behavioral Sciences of Terrorism and Political Aggression*, 12(4): 268–91.

Doosje, B., Loseman, A. and Van Den Bos, K. (2013) 'Determinants of radicalization of Islamic youth in the Netherlands: Personal uncertainty, perceived injustice, and perceived group threat', *Journal of Social Issues*, 69(3): 586–604.

Ebner, J., Kavanagh, C. and Whitehouse, H. (2022) 'The QAnon security threat: A linguistic fusion-based violence risk assessment', *Perspectives on Terrorism*, 16(6): 62–86.

Egan, V., Cole, J., Cole, B., Alison, L., Alison, E., Waring, S., et al (2016) 'Can you identify violent extremists using a screening checklist and open-source intelligence alone?', *Journal of Threat Assessment and Management*, 3(1): 21–36.

Gill, P., Silver, J., Horgan, J. and Corner, E. (2017) 'Shooting alone: The pre-attack experiences and behaviors of US solo mass murderers', *Journal of Forensic Sciences*, 62(3): 710–14.

Gill, P., Silver, J., Horgan, J., Corner, E. and Bouhana, N. (2021) 'Similar crimes, similar behaviors? Comparing lone-actor terrorists and public mass murderers', *Journal of Forensic Sciences*, 66(5): 1797–804.

González, A.L., Freilich, J.D. and Chermak, S.M. (2014) 'How women engage homegrown terrorism', *Feminist Criminology*, 9(4): 344–66.

Groppi, M. (2017) 'An empirical analysis of causes of Islamist radicalisation: Italian case study', *Perspectives on Terrorism*, 11(1): 68–76.

Gruenewald, J., Chermak, S. and Freilich, J.D. (2013) 'Distinguishing "loner" attacks from other domestic extremist violence: A comparison of far-right homicide incident and offender characteristics', *Criminology & Public Policy*, 12(1): 65–91.

Hirschberger, G., Pyszczynski, T. and Ein-Dor, T. (2009) 'Vulnerability and vigilance: Threat awareness and perceived adversary intent

moderate the impact of mortality salience on intergroup violence', *Personality and Social Psychology Bulletin*, 35(5): 597–607.

Hollewell, G.F. and Longpré, N. (2022) 'Radicalization in the social media era: Understanding the relationship between self-radicalization and the Internet', *International Journal of Offender Therapy and Comparative Criminology*, 66(8): 896–913.

Holt, T.J. and Bolden, M. (2014) 'Technological skills of white supremacists in an online forum: A qualitative examination', *International Journal of Cyber Criminology*, 8(2): 79–93.

Horgan, J., Shortland, N. and Abbasciano, S. (2018) 'Towards a typology of terrorism involvement: A behavioral differentiation of violent extremist offenders', *Journal of Threat Assessment and Management*, 5(2): 84–102.

Jacques, K. and Taylor, P.J. (2008) 'Male and female suicide bombers: Different sexes, different reasons?', *Studies in Conflict & Terrorism*, 31(4): 304–26.

Jasko, K., LaFree, G. and Kruglanski, A. (2017) 'Quest for significance and violent extremism: The case of domestic radicalization', *Political Psychology*, 38(5): 815–31.

Jensen, M., James, P. and Yates, E. (2020) 'Contextualizing disengagement: How exit barriers shape the pathways out of far-right extremism in the United States', *Studies in Conflict & Terrorism*, 46(3): 1–29.

Joosse, P., Bucerius, S.M. and Thompson, S.K. (2015) 'Narratives and counternarratives: Somali-Canadians on recruitment as foreign fighters to Al-Shabaab', *British Journal of Criminology*, 55(4): 811–32.

Kamans, E., Gordijn, E.H., Oldenhuis, H. and Otten, S. (2009) 'What I think you see is what you get: Influence of prejudice on assimilation to negative meta-stereotypes among Dutch Moroccan teenagers', *European Journal of Social Psychology*, 39(5): 842–51.

Kemmelmeier, M. (2008) 'Is there a relationship between political orientation and cognitive ability? A test of three hypotheses in two studies', *Personality and Individual Differences*, 45(8): 767–72.

Kerodal, A.G., Freilich, J.D. and Chermak, S.M. (2016) 'Commitment to extremist ideology: Using factor analysis to move beyond binary measures of extremism', *Studies in Conflict & Terrorism*, 39(7–8): 687–711.

Khazaeli Jah, M. and Khoshnood, A. (2019) 'Profiling lone-actor terrorists: a cross-sectional study of lone-actor terrorists in Western Europe (2015–2016)', *Journal of Strategic Security*, 12(4): 25–49.

King, M., Noor, H. and Taylor, D.M. (2011) 'Normative support for terrorism: The attitudes and beliefs of immediate relatives of Jema'ah Islamiyah members', *Studies in Conflict & Terrorism*, 34(5): 402–17.

Klausen, J., Morrill, T. and Libretti, R. (2016) 'The terrorist age-crime curve: An analysis of american islamist terrorist offenders and age-specific propensity for participation in violent and nonviolent incidents', *Social Science Quarterly*, 97(1): 19–32.

Klausen, J., Libretti, R., Hung, B.W. and Jayasumana, A.P. (2020) 'Radicalization trajectories: An evidence-based computational approach to dynamic risk assessment of "homegrown" jihadists', *Studies in Conflict & Terrorism*, 43(7): 588–615.

Krout, M.H. and Stagner, R. (1939) 'Personality development in radicals', *Sociometry*, 2(1): 31–46.

Kupper, J. and Meloy, J.R. (2021) 'TRAP-18 indicators validated through the forensic linguistic analysis of targeted violence manifestos', *Journal of Threat Assessment and Management*, 8(4): 174–99.

LaFree, G., Jiang, B. and Porter, L.C. (2020) 'Prison and violent political extremism in the United States', *Journal of Quantitative Criminology*, 36: 473–98.

Laor, N., Wolmer, L., Alon, M., Siev, J., Samuel, E. and Toren, P. (2006) 'Risk and protective factors mediating psychological symptoms and ideological commitment of adolescents facing continuous terrorism', *Journal of Nervous and Mental Disease*, 194(4): 275–8.

Liem, M., van Buuren, J., van Zuijdewijn, J.R., Schönberger, H. and Bakker, E. (2018) 'European lone actor terrorists versus "common" homicide offenders: An empirical analysis', *Homicide Studies: An Interdisciplinary & International Journal*, 22(1): 45–69.

Loza, W. (2010) 'The prevalence of Middle Eastern extremist ideologies among some Canadian offenders', *Journal of Interpersonal Violence*, 25(5): 919–28.

McCauley, C., Moskalenko, S. and Van Son, B. (2013) 'Characteristics of lone-wolf violent offenders: A comparison of assassins and school attackers', *Perspectives on Terrorism*, 7(1): 4–24.

Meloy, J.R. and Gill, P. (2016) 'The lone-actor terrorist and the TRAP-18', *Journal of Threat Assessment and Management*, 3: 37–52.

Meloy, J.R., Roshdi, K., Glaz-Ocik, J. and Hoffmann, J. (2015). 'Investigating the individual terrorist in Europe', *Journal of Threat Assessment and Management*, 2(3–4): 140–52.

Meloy, J.R., Goodwill, A., Clemmow, C. and Gill, P. (2021) 'Time sequencing the TRAP-18 indicators', *Journal of Threat Assessment and Management*, 8(1–2): 1–19.

Merari, A. and Ganor, B. (2022) 'Interviews with, and tests of, Palestinian independent assailants', *Terrorism and Political Violence*, 34(8): 1595–616.

Merari, A., Diamant, I., Bibi, A., Broshi, Y. and Zakin, G. (2010) 'Personality characteristics of "self martyrs"/"suicide bombers" and organizers of suicide attacks', *Terrorism and Political Violence*, 22(1): 87–101.

Muluk, H., Umam, A.N. and Milla, M.N. (2020) 'Insights from a deradicalization program in Indonesian prisons: The potential benefits of psychological intervention prior to ideological discussion', *Asian Journal of Social Psychology*, 23(1): 42–53.

Nivette, A., Eisner, M. and Ribeaud, D. (2017) 'Developmental predictors of violent extremist attitudes: A test of general strain theory', *Journal of Research in Crime and Delinquency*, 54(6): 755–90.

Obaidi, M., Skaar, S.W., Ozer, S. and Kunst, J.R. (2022) 'Measuring extremist archetypes: Scale development and validation', *Plos One*, 17(7): e0270225.

Pauwels, L. and De Waele, M. (2014) 'Youth involvement in politically motivated violence: Why do social integration, perceived legitimacy, and perceived discrimination matter?', *International Journal of Conflict & Violence*, 8(1): 135–53.

Peddell, D., Eyre, M., McManus, M. and Bonworth, J. (2016) 'Influences and vulnerabilities in radicalised lone-actor terrorists: UK practitioner perspectives', *International Journal of Police Science & Management*, 18(2): 63–76.

Pfundmair, M., Aßmann, E., Kiver, B., Penzkofer, M., Scheuermeyer, A., Sust, L. and Schmidt, H. (2022) 'Pathways toward jihadism in western Europe: An empirical exploration of a comprehensive model of terrorist radicalization', *Terrorism and Political Violence*, 34(1): 48–70.

Pitcavage, M. (2015) 'Cerberus unleashed: The three faces of the lone wolf terrorist', *American Behavioral Scientist*, 59(13): 1655–80.

Powis, B., Randhawa, K. and Bishopp, D. (2021) 'An examination of the structural properties of the Extremism Risk Guidelines (ERG22+): A structured formulation tool for extremist offenders', *Terrorism and Political Violence*, 33(6): 1141–59.

Pretus, C., Hamid, N., Sheikh, H., Ginges, J., Tobeña, A., Davis, R., Vilarroya, O. and Atran, S. (2018) 'Neural and behavioral correlates of sacred values and vulnerability to violent extremism', *Frontiers in Psychology*, 9: 2462.

Savage, S., Khan, A. and Liht, J. (2014) 'Preventing violent extremism in Kenya through value complexity: Assessment of being Kenyan being Muslim', *Journal of Strategic Security*, 7(3): 1–26.

Schils, N. and Pauwels, L.J.R. (2016) 'Political violence and the mediating role of violent extremist propensities', *Journal of Strategic Security*, 9(2): 72–93.

Schils, N. and Verhage, A. (2017) 'Understanding how and why young people enter radical or violent extremist groups', *International Journal of Conflict & Violence*, 11(1): 1–17.

Schuurman, B., Bakker, E., Gill, P. and Bouhana, N. (2018) 'Lone actor terrorist attack planning and preparation: A data-driven analysis', *Journal of Forensic Sciences*, 63(4): 1191–200.

Shortland, N., Nader, E., Thompson, L. and Palasinski, M. (2022) 'Is extreme in the eye of the beholder? An experimental assessment of extremist cognitions', *Journal of Interpersonal Violence*, 37(7–8): NP4865–NP4888.

Speckhard, A. and Ahkmedova, K. (2006) 'The making of a martyr: Chechen suicide terrorism', *Studies in Conflict & Terrorism*, 29(5): 429–92.

Stankov, L., Higgins, D., Saucier, G. and Knežević, G. (2010) 'Contemporary militant extremism: A linguistic approach to scale development', *Psychological Assessment*, 22(2): 246–58.

Stankov, L., Saucier, G. and Knežević, G. (2010) 'Militant extremist mind-set: Proviolence, vile world, and divine power', *Psychological Assessment*, 22(1): 70–86.

Taubman-Ben-Ari, O. and Noy, A. (2010) 'Self-consciousness and death cognitions from a terror management perspective', *Death Studies*, 34(10): 871–92.

Thijssen, G., Masthoff, E., Sijtsema, J. and Bogaerts, S. (2023) 'Understanding violent extremism: Socio-demographic, criminal and psychopathological background characteristics of detainees residing in Dutch terrorism wings', *Criminology & Criminal Justice*, 23(2): 290–308.

Trujillo, H.M., Jordán, J., Gutiérrez, J.A. and González-Cabrera, J. (2009) 'Radicalization in prisons? Field research in 25 Spanish prisons', *Terrorism and Political Violence*, 21(4): 558–79.

Tschantret, J. (2021) 'The psychology of right-wing terrorism: A text-based personality analysis', *Psychology of Violence*, 11(2): 113–22.

Victoroff, J., Adelman, J.R. and Matthews, M. (2012) 'Psychological factors associated with support for suicide bombing in the Muslim diaspora', *Political Psychology*, 33(6): 791–809.

Webber, D., Klein, K., Kruglanski, A., Brizi, A. and Merari, A. (2017) 'Divergent paths to martyrdom and significance among suicide attackers', *Terrorism and Political Violence*, 29(5): 852–74.

Webber, D., Babush, M., Schori-Eyal, N., Vazeou-Nieuwenhuis, A., Hettiarachchi, M., Bélanger, J.J., et al (2018) 'The road to extremism: Field and experimental evidence that significance loss-induced need for closure fosters radicalization', *Journal of Personality and Social Psychology*, 114(2): 270–85.

Weinberg, L. and Eubank, W.L. (1987) 'Italian women terrorists', *Terrorism*, 9(3): 241–62.

Yustisia, W., Shadiqi, M.A., Milla, M.N. and Muluk, H. (2020) 'An investigation of an Expanded Encapsulate Model of Social Identity in Collective Action (EMSICA) including perception of threat and intergroup contact to understand support for Islamist terrorism in Indonesia', *Asian Journal of Social Psychology*, 23(1): 29–41.

Notes

[1] As only factors relating directly to the individual's decision-making process are deemed beneficial for formulation efforts (for example, Taylor and Horgan, 2006).

[2] In the literature, it is often discussed that research increased after 9/11 (for example, Schmid, 2013). However, publications presenting empirical data, which is the focus of this systematic literature review, only notably increased from 2009 onwards, with 83 of 96 articles published since then; only two articles published before the 2000s met the inclusion criteria.

[3] The individual's perception of the level of deprivation their group faces compared to other groups in a given society (Peddell et al, 2016).

References

Al-Attar, Z. (2020) 'Severe mental disorder and terrorism: When psychosis, PTSD and addictions become a vulnerability', *The Journal of Forensic Psychiatry & Psychology*, 31(6): 950–70.

Borum, R. (2012a) 'Radicalization into violent extremism I: A review of social science theories', *Journal of Strategic Security*, 4(4): 7–36.

Borum, R. (2012b) 'Radicalization into violent extremism II: A review of conceptual models and empirical research', *Journal of Strategic Security*, 4(4): 37–62.

Borum, R. (2015) 'Assessing risk for terrorism involvement', *Journal of Threat Assessment and Management*, 2(2): 63–87.

Christmann, K. (2012) 'Preventing religious radicalisation and violent extremism: A systematic review of the research evidence', *Youth Justice Board for England and Wales*. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/396030/preventing-violent-extremism-systematic-review.pdf [Accessed 12 September 2023].

De Ruiter, C., and Nicholls, T.L. (2011) 'Protective factors in forensic mental health: A new frontier', *International Journal of Forensic Mental Health*, 10(3): 160–70.

Dhumad, S., Candilis, P.J., Cleary, S.D., Dyer, A.R. and Khalifa, N. (2020) 'Risk factors for terrorism: A comparison of family, childhood, and personality risk factors among Iraqi terrorists, murderers, and controls', *Behavioral Sciences of Terrorism and Political Aggression*, 12(1): 1–17.

Douglas, K.S., Hart, S.D., Webster, C.D. and Belfrage, H. (2013) *HCR-20V3: Assessing Risk for Violence: User Guide* [measurement instrument], Burnaby: Mental Health, Law, and Policy Institute, Simon Fraser University.

Feddes, A.R. and Gallucci, M. (2015) 'A literature review on methodology used in evaluating effects of preventive and de-radicalisation interventions', *Journal for Deradicalization*, 5: 1–27.

Gill, P. and Corner, E. (2017) 'There and back again: The study of mental disorder and terrorist involvement', *American Psychologist*, 72(3): 231–41.

Gøtzsche-Astrup, O. and Lindekilde, L. (2019) 'Either or? Reconciling findings on mental health and extremism using a dimensional rather than categorical paradigm', *Journal of Forensic Sciences*, 64(4): 982–8.

Jacques, K. and Taylor, P.J. (2008) 'Male and female suicide bombers: Different sexes, different reasons?', *Studies in Conflict & Terrorism*, 31(4): 304–26.

King, M. and Taylor, D.M. (2011) 'The radicalization of homegrown jihadists: A review of theoretical models and social psychological evidence', *Terrorism and Political Violence*, 23(4): 602–22.

Kruglanski, A.W. and Fishman, S. (2006) 'The psychology of terrorism: "Syndrome" versus "tool" perspectives', *Terrorism and Political Violence*, 18(2): 193–215.

Lösel, F., King, S., Bender, D. and Jugl, I. (2018) 'Protective factors against extremism and violent radicalization: A systematic review of research', *International Journal of Developmental Science*, 12(1–2): 89–102.

Martin, P.Y. and Turner, B.A. (1986) 'Grounded theory and organizational research', *The Journal of Applied Behavioral Science*, 22(2): 141–57.

Moher, D., Liberati, A. and Tetzlaff, J. (2009) 'Preferred reporting items for systematic reviews and meta-analysis: The PRISMA statement', *PLoS Medicine*, 6(7): e1000097.

Mulcahy, E., Merrington, S. and Bell, P.J. (2013) 'The radicalisation of prison inmates: A review of the literature on recruitment, religion and prisoner vulnerability', *Journal of Human Security*, 9(1): 4–14.

National Heart, Lung, and Blood Institute (nd) 'Study quality assessment tools', *National Heart, Lung, and Blood Institute*. Available from https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools [Accessed 8 July 2019].

Neumann, P.R. (2013) 'The trouble with radicalization', *International Affairs*, 89(4): 873–93.

Patel, M. and Hussain, M. (2019) 'Channel in practice' [presentation], Faculty of Forensic Clinical Psychology Autumn Meeting 2019, 'Extremism: The Role of Applied Psychology with Individuals, Services and Systems', Liverpool, UK, October.

Sageman, M. (2008) 'A strategy for fighting international Islamist terrorists', *The Annals of the American Academy of Political and Social Science*, 618(1): 223–31.

Scarcella, A., Page, R. and Furtado, V. (2016) 'Terrorism, radicalisation, extremism, authoritarianism and fundamentalism: A systematic review of the quality and psychometric properties of assessments', *PloS One*, 11(12): e0166947.

Schmid, A.P. (2013) 'Radicalisation, de-radicalisation, counter-radicalisation: A conceptual discussion and literature review', *The International Center for Counter-Terrorism*, 4(2) .

Silke, A., Morrison, J., Maiberg, H., Slay, C. and Stewart, R. (2021) 'The Phoenix Model of Disengagement and Deradicalisation from Terrorism and Violent Extremism', *Monatsschrift für Kriminologie und Strafrechtsreform*, 104(3): 310–20.

Talyor, M. and Horgan, J.G. (2006) 'A conceptual framework for addressing psychological process in the development of the terrorist', *Terrorism and Political Violence*, 18: 585–601.

Trimbur, M., Amad, A., Horn, M., Thomas, P. and Fovet, T. (2021) 'Are radicalization and terrorism associated with psychiatric disorders? A systematic review', *Journal of Psychiatric Research*, 141: 214–22.

Vergani, M., Iqbal, M., Ilbahar, E. and Barton, G. (2020) 'The three Ps of radicalization: Push, pull and personal. A systematic scoping review of the scientific evidence about radicalization into violent extremism', *Studies in Conflict & Terrorism*, 43(10): 854–85.

Vidino, L. (2010) 'Countering radicalization in America', *United States Institute of Peace*. Available from https://www.usip.org/sites/default/files/resources/SR262%20-%20Countering_Radicalization_in_America.pdf [Accessed 12 September 2023].