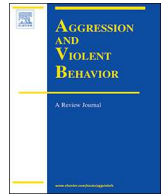




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## Risk factors for (violent) radicalization in juveniles: A multilevel meta-analysis



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### ABSTRACT

Juveniles who become radicalized pose a great threat for society. Although research on radicalization is accumulating, a quantitative review of risk factors for youth radicalization is lacking. Therefore, a series of meta-analyses were conducted on  $k = 30$  studies (247 effect sizes) to examine risk factors for radicalization in youth, yielding significant effects for 15 out of 17 risk domains, ranging in magnitude from  $r = 0.080$  to  $r = 0.482$ . Medium positive effects were found for *activism*, *perceived in-group superiority* and *perceived distance to other people*, while small effects were found for *gender*, *personality*, *delinquency and aggression*, *lower educational level*, *negative peers*, *in-group identification*, *perceived discrimination*, *perceived group threat*, *perceived procedural injustice*, *perceived illegitimacy of authorities*, and *other*, whereas the effect for *poverty* was very small. Moderator analyses showed that the risks of *negative parenting* and *societal disconnection* were smaller for right-wing radicalization than for religious or unspecified radicalization. The risks of *personality* and *perceived group threat* were greater for willingness to carry out extremist acts and extremist behavior than for attitude towards radicalization. Further, when the percentage of ethnic minorities in the sample increased, the risks of *personality*, *negative parenting*, and *societal disconnection* for radicalization were larger.

### 1. Introduction

Since the World Trade Center attacks on 9/11/2001, there has been an increased focus on examining causes of and reasons for radicalization and engagement in extremist or terrorist behavior. Even though the number of deaths by terrorism is decreasing globally since 2014, terrorist-related activity is reported to increase in at least 63% of the countries worldwide (Institute for Economics & Peace, 2019). This led to an increase of studies focusing on religious radicalization, and specifically Islamic radicalization (e.g., Van Bergen, Feddes, Doosje, & Pels, 2015). Additionally, although less known, there is also an increase of studies focusing on other forms of radicalization, such as far-right radicalization (e.g., Pauwels & Heylen, 2017). Despite the lesser attention, more people died as a result of right-wing extremism than of Islamic extremism since 9/11 in the United States (Institute for Economics & Peace, 2019). The 2019 Christchurch mosque shooting in New Zealand is a dreadful recent example of right-wing terrorism. Next to religious and far-right radicalization, other types of radical groups are: far-left, nationalist/separatist, or single-issue groups, such as anti-

abortion (Doosje et al., 2016).

Initially, studies considered radicalization, extremism and terrorism in terms of psychopathology, and aimed to comprise a psychological profile of “the terrorist” (e.g., Cooper, 1978). However, decades of research showed that radicalized extremists or terrorists are often not mentally ill, and may not be different from the general population in this respect (e.g., Corner, Gill, & Mason, 2016). Most researchers have therefore moved away from the idea of considering radicalization in terms of psychopathology. Nowadays, radicalization is not viewed as a condition, but as a process (e.g., Campelo, Oppetit, Neau, Cohen, & Bronsard, 2018; Lösel, King, Bender, & Jugl, 2018). Therefore, Doosje et al. (2016) defined radicalization as “a process through which people become increasingly motivated to use violent means against members of an out-group or symbolic targets to achieve behavioral change and political goals” (p. 79). It is suggested that radicalization is the first step towards extremism and terrorism. The process of radicalization can result in extremism (Borum, 2011), that is, illegal (non)violent acts, motivated by ideology (Netherlands General Intelligence and Security Service, 2019; Van den Bos, 2018). Extremism manifests a closed mind,

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and comes with a distinct willingness to use violence against civilians (Schmid, 2013).

Radicalized individuals in Europe appear to be younger than before (Khosrokhavar, 2014). Juveniles who have become radicalized are at risk for maladaptive developmental trajectories and may constitute a great threat for society when engaging in extremism. To our knowledge, only two systematic reviews focused on youths' inclination to radicalize (i.e., Campelo et al., 2018; Lösel et al., 2018). Campelo et al. (2018) combined 22 quantitative and qualitative studies in their systematic review of risk factors. They concluded that individual factors (e.g., perceived injustice, personal uncertainty, and experiences of abandonment), micro-environmental factors (e.g., family dysfunction, and friendships with radicalized individuals), and societal risk factors (e.g., group polarization, perceived group threat, and geopolitical context) are related to extremism in juveniles. Lösel et al. (2018) provided a quantitative overview of 17 studies on protective factors for extremism. In this review, similar protective factors for extremism were found as for general violence (e.g., employment, appreciative parenting, and contact with non-deviant peers). Moreover, some protective factors specific to extremism were found (e.g., subjective experience of discrimination, and attachment to society) (Lösel et al., 2018). Both reviews provide insight into the subject of radicalization. However, these reviews did not provide a statistical analysis of the data.

Given the potential threat of radicalization in juveniles, more scientific knowledge on risk factors for radicalization is needed. Knowledge on risk factors could provide insight into the etiology of radicalization among juveniles. Primary studies examined a large variety of risk factors that are associated with different radical ideologies, such as radical right-wing and religious groups, which may be the same or different (e.g., Lösel et al., 2018). Additionally, primary studies used different study designs and diverse samples. Further, as the group of individuals who are radicalized is relatively small, studies included relatively few participants showing radicalization, leading to problems with generalizability of results. All these factors make it difficult to draw conclusions about risk factors for radicalization. Therefore, the aim of the present study is to meta-analytically examine (putative) risk factors for radicalization.

Insight into risk factors for radicalization is not only important for knowledge on the etiology of radicalization among juveniles, but also for improving prevention and intervention programs that have been implemented worldwide to prevent radicalization and extremism (e.g., Feddes, Mann, & Doosje, 2015; Thomas, 2010). However, there is limited empirical evidence for the effectiveness of most of these programs. It is plausible to suggest that the effectiveness of these programs is hampered by lack of empirical knowledge on which risks to target. It is therefore important to acquire integrated knowledge from quantitative studies on the factors that are assumed to be associated with the development of radicalization. Specifically insight into dynamic (i.e., changeable) risk factors is needed for intervention purposes, while for risk assessment both dynamic and static (i.e., unchangeable) risk factors are of importance.

### 1.1. Current meta-analysis

The present meta-analysis summarizes the associations between risk factors and radicalization in juveniles. First, the effect of (domains of) risk factors for radicalization among juveniles will be examined. A second aim is to determine if and how the effects of risk domains are moderated by study, sample, and risk factor characteristics.

## 2. Method

### 2.1. Eligibility criteria

Prior to the literature search, several inclusion- and exclusion criteria were formulated. First, studies were selected that examined the

effect on radicalization. Broad outcomes were included in this meta-analysis, as research showed a substantial link between attitudes and behaviors (Ajzen & Fishbein, 1977). Three radicalization outcomes are distinguished: (1) positive attitudes towards radicalization, (2) willingness to engage in (violent) extremist behavior, (3) violent extremist behavior against persons (Lösel et al., 2018). Scholars suggest that pro-extremist attitudes are seen at the early stages of radicalization, while the actual extremist behavior is seen in a much smaller proportion of radicalized individuals at a later stage (McCauley & Moskaleiko, 2008). Following Doosje et al. (2016), research on all radical groups was included (i.e., far-right, far-left, religiously/ethnically, motivated, nationalist/separatist, and special issue groups).

Second, primary studies had to report on at least one risk factor for radicalization. Eligible studies reported on factors (risk factors) that were suggested to increase the likelihood of involvement in or support of radicalization. Third, the maximum mean age of participants had to be 25 years at the start of data collection. The aim of this meta-analysis was to provide insight into radicalization among juveniles; therefore strictness about this mean age criterion was required. There were no clear restrictions of age range in the search, because in samples of university students some outliers in age were expected, that is, one or two students starting or finishing their university education in adulthood. Next, studies had to report on results of bivariate or multivariate analyses of the association between risk factors and radicalization or provide enough details to calculate a bivariate test statistic. Finally, primary studies had to be written in English or Dutch. Due to the fact that research on risk factors and radicalization is limited, there were no restrictions on publication year or quality of the study.

### 2.2. Literature search

The electronic databases PsychINFO, Web of Science, Criminal Justice Abstracts, and Google Scholar were searched. The three main search categories used were age, radicalization and quantitative studies (see Appendix A for an overview of the search terms). Next to the database search, reference lists of all primary articles were searched, as well as reference lists of relevant review articles that addressed the topic of this meta-analysis (e.g., Campelo et al., 2018; Lösel et al., 2018). Moreover, several authors of relevant articles were contacted in order to retrieve additional (un)published studies. After this search, 2394 articles were screened based on title and abstract, which led to 167 articles for a more thorough examination. Studies up until February 2019 were included in this meta-analysis. This search resulted in inclusion of 25 articles reporting on  $k = 30$  different samples meeting the inclusion criteria. See Fig. 1 for a flow chart of the search procedure and Table 1 for an overview of included primary studies (marked with an asterisk in the reference list) and their characteristics.

### 2.3. Coding of studies

For coding of primary studies, a coding form was developed based on the guidelines proposed by Lipsey and Wilson (2001). This coding form was created prior to coding the studies. During the coding-process, when necessary, small improvements were made in this form. The coding form was divided into (1) general study characteristics, (2) sample characteristics, and (3) risk factor characteristics (See Appendix B for the final coding form). In order to extract risk factors from primary studies, risk factors were included of which an association with radicalization was described. In the case that primary studies investigated protective factors representative of a particular risk domain, these variables were included as well. For inclusion in our meta-analysis, the direction of the effect of protective factors was reversed.

The most important variable to code in this meta-analysis was the risk domain in which risk factors could be classified. A risk domain is a group of certain homogeneous risk factors that can be classified into the same domain due to similarity (e.g., having radicalized peers and

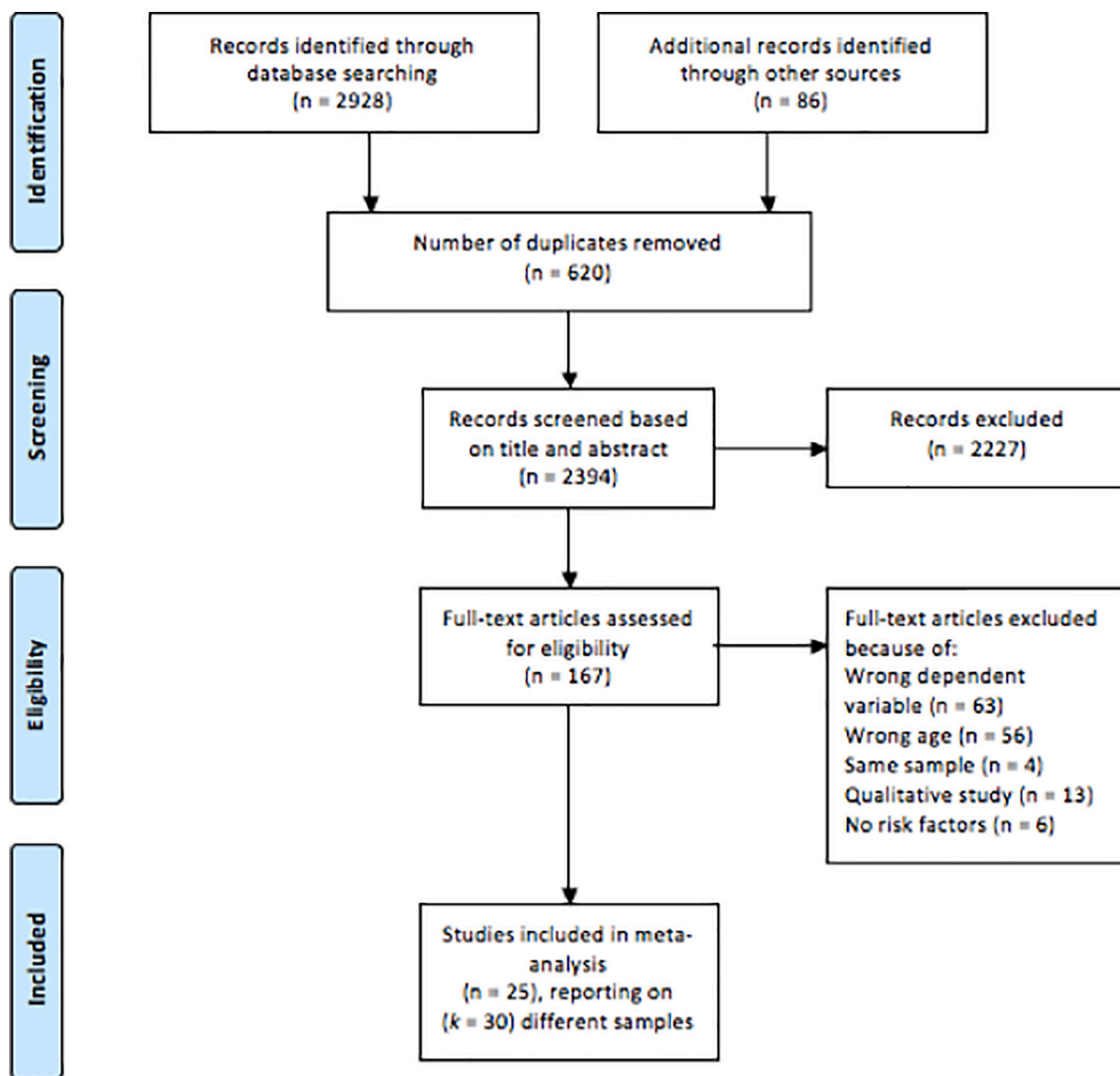


Fig. 1. Flow chart of search.

having deviant peers were categorized into the risk domain *negative peers*). By coding risk domains, an overall effect of each risk domain for radicalization could be estimated. Classification of risk domains was based on a screening of risk factors described in primary studies and information about risk factors provided in reviews about similar subjects.

After classification of risk factors into domains, the following 17 risk domains were distinguished: *Gender* (being male); *Poverty* (factors related to having a low socioeconomic status); *Personality* (factors describing personality characteristics); *Delinquency and aggression*; *Activism* (factors describing participation in legal, non-violent ideologically motivated acts); *Lower educational level*; *Negative parenting* (factors related to parental problems); *Negative peers* (factors describing negative peer relations); *In-group identification* (describing the importance of belonging to a certain group for an individual); *Perceived in-group superiority* (factors describing the feeling of perceiving one's in-group as superior to other groups); *Perceived discrimination* (factors related to the feeling of being discriminated, either as an individual or as a group); *Perceived group threat* (factors related to the feeling that one's in-group is being threatened by others); *Perceived procedural injustice* (factors related to the feeling of being treated with injustice in society);

*Societal disconnection* (factors describing feelings of disconnection to society were one's living in); *Perceived illegitimacy of authorities* (factors related to having disrespect to authorities); *Perceived distance to other people* (factors related to the feeling of experiencing a certain distance to people that think or live differently than oneself); *Other* (factors that could not be classified into one of the previous risk domains). A minimum of five risk factors was required for creating a separate risk domain. See [Appendix C](#) for an overview of the 17 risk domains and types of risk factors classified in these domains.

Next to classifying risk factors into domains, study, sample, and other risk factor characteristics were coded that could possibly moderate the effect of these risk domains on radicalization. Study characteristics coded for moderator analyses were: radicalization outcome (positive attitude towards radicalization, willingness to engage in extremism, or actual extremist behavior) and type of radical ideology. For type radical ideology, three radical groups were created for coding (i.e., right-wing, religious, and unspecified). However, as mentioned before the search was much broader and also included other radical ideologies, such as far-left ideology. Due to the fact that none of the primary studies reported on a specific other radical ideology, it was decided to code both right-wing and religious radical ideologies. Some studies examined

**Table 1**  
Overview of primary studies including their characteristics.

Authors	Year	n	% Males	% Minority	Mean age	Age range	Radical ideology	Radicalization outcome	# Risk factors
Amjad & Wood	2009	144	44.00	N/A	21.50	16–21	UNS	WILL	2
Boehnke, Hagan, & Merkens	1998	590	N/A	N/A	N/A	12–16	RW	ATT	4
Bovier & Boehnke	1999	598	N/A	N/A	15.00	N/A	RW	ATT	4
Doosje, Loseman, & Van den Bos	2013	131	61.00	100	17.27	12–21	RE	ATT, WILL	24
Doosje, Van den Bos, Loseman, Feddes & Mann	2012	1086	55.6	0	16.64	12–21	RW	ATT, WILL	24
Ellis et al.	2015	79	100	100	20.76	18–25	UNS	ATT	9
Feddes, Mann, & Doosje	2015	46	78.00	100	16.93	14–23	RE	ATT, WILL	16
Hagan, Merkens, & Boehnke	1995	489	N/A	N/A	14.57	14–15	RW	ATT	3
Hagan, Rippl, Boehnke, & Merkens (1)	1999	545	N/A	N/A	14.53	N/A	RW	ATT	3
Hagan, Rippl, Boehnke, & Merkens (2)	1999	1684	N/A	N/A	14.73	N/A	RW	ATT	3
Iqbal, O'Brien, Bliuc, & Vergani	2016	118	42.00	100	23.70	18–29	RE	ATT	3
Jansen, Oudolf, Timmer, & Winkel	2015	774	55.50	25.30	16.56	15–21	UNS	WILL	12
Levin, Henry, Pratto, & Sidanius	2003	108	50.00	N/A	20.56	18–34	RE	ATT	2
Moreira, Rique Neto, Sabucedo, & Camino (1)	2018	251	40.60	N/A	23.06	18–30	UNS	WILL	6
Moreira, Rique Neto, Sabucedo, & Camino (2)	2018	201	26.40	N/A	19.52	18–27	UNS	WILL	6
Moskalenko & McCauley (1)	2009	140	14.00	25.00	19.60	17–33	UNS	WILL	7
Moskalenko & McCauley (2)	2009	146	26.00	2.00	17.50	16–28	UNS	WILL	6
Moyano & Trujillo (1)	2014	66	46.97	90.90	N/A	13–17	UNS	WILL	10
Moyano & Trujillo (2)	2014	49	63.27	0	N/A	13–17	UNS	WILL	10
Nivette, Eisner, & Ribeaud	2017	1214	N/A	76.20	15.00	N/A	UNS	ATT	13
Pauwels & De Waele	2014	2879	N/A	N/A	N/A	16–24	RW	ATT, BEH	23
Pauwels & Heylen	2017	723	35.70	N/A	N/A	18–25	RW	ATT, BEH	6
Putra & Sukabdi	2014	309	35.90	N/A	17.85	14–29	RE	ATT	3
Rippl & Seipel	1999	552	49.70	N/A	16.70	14–19	RW	ATT	1
Sabbagh	2005	3331	56.00	N/A	16.40	14–22	RW	ATT	5
Simon, Reichert, & Grabow	2013	341	33.00	100	24.00	18–46	UNS	ATT	11
Van Bergen, Feddes, Doosje, & Pels	2015	232	N/A	100	15.86	14–18	RE	ATT, WILL	10
Van Bergen, Ersanilli, Pels, & De Ruyter	2016	133	48.00	100	15.58	14–18	RE	ATT, WILL	16
Vergani, O'Brien, Lentini, & Barton (1)	2019	146	37.20	N/A	21.60	N/A	RE	ATT, WILL	2
Vergani, O'Brien, Lentini, & Barton (2)	2019	83	66.30	N/A	20.15	N/A	RE	WILL	1

Note. Year = publication year; n = total sample size; % Minority = percentage of minorities; % Male = percentage of males; Mean age = mean age of sample; Age range = age range of sample; Radical ideology: UNS = unspecified, RE = religious, RW = right-wing; Radicalization outcome: ATT = attitude towards radicalization, WILL = willingness to use extremism, BEH = extremist behavior; # Risk factors = number of risk factors retrieved from study; N/A = not available.

an unspecified form of radical ideology; therefore “unspecified radical ideology” was added as third category. These studies measured radicalization, but did not specifically point out whether they measured left-wing, right-wing, religious or other forms of radicalization. Next to these potential moderating variables, study characteristics coded for descriptive purposes were: impact factor of the journal, country of data collection, and publication year of the study.

Besides study characteristics, several sample characteristics were included as potential moderators: mean age of participants, percentage of males, and percentage of ethnic minorities in the sample. Further, some sample characteristics were coded only for descriptive purposes: sample size and age range of participants. Next, the sample characteristic type of study design was coded as potential moderator, however type of study design was not included in moderator analyses, due to the fact that almost all studies were of correlational nature.

Additionally, risk factor characteristics were coded in primary studies. First of all, it was coded whether an included factor was either a risk or a protective factor in the primary study. Second, the type of risk factor (static or dynamic) was coded for each risk factor. Generally, research on risk factors and delinquency shows stronger associations for static risk factors compared to dynamic risk factors (Andrews and Bonta, 2010). However, since risk factors were predominantly dynamic, and in each risk domain factors were either all dynamic or all static, it was not possible to conduct moderator analyses for type of risk factor. Furthermore, it was coded whether the effect size was calculated using outcomes of bivariate analyses or of multivariate analyses.

To establish inter-rater reliability, 10% of the studies were double coded by the first and second author. For the 52 effect sizes that were double-coded, a good average inter-rater reliability of 94% agreement was found. In the case of disagreement on how to code a variable, inconsistencies were resolved until both authors agreed on the final coding decision.

#### 2.4. Calculation of effect sizes

The included primary studies reported on different effect sizes (i.e., t-values, odds ratios, beta's, and correlations). To examine the explanatory value of risk factors, all effect sizes were transformed into Pearson's product moment correlation coefficients (r). Formulas of Lipsey and Wilson (2001), Peterson and Brown (2005), and Rosenthal (1994) were used for these transformations. Due to limited quantitative research into risk factors and extremism, effect sizes were not only calculated using outcomes of bivariate analyses, but as well of multivariate analyses. However, it should be noted that including results of multivariate analyses could lead to biased results because multivariate analyses do not present plain correlations. If a study did not provide the statistical information necessary to calculate an effect size, but reported a non-significant result, an effect size of zero was assigned, which occurred 10 times. This is a commonly used and conservative strategy, which may underestimate the true magnitude of effect sizes (Durlak & Lipsey, 1991). The exclusion of these nonsignificant results from the meta-analysis, however, would result in an overestimation of the magnitude of the combined effect size estimate (Rosenthal, 1995).

Prior to statistical analyses, many scholars suggest transforming Pearson's product moment correlation coefficients into normally distributed Fisher's z-scores (e.g., Lipsey & Wilson, 2001). In line with this, the Pearson's correlation coefficients were transformed into Fisher's z-scores before statistical analyses following formulas of Lipsey and Wilson (2001). However, Fisher's z-scores are more difficult to interpret compared to correlation coefficients. In order to increase this interpretability, the Fisher's z-scores were changed back into correlation coefficients after analyses.

Extreme effect sizes (i.e., outliers) unduly affect the overall (mean) effect size. Therefore, by searching for effect sizes with standardized scores smaller than -3.29 or larger than 3.29, potential outliers in each

risk domain could be detected (Tabachnik & Fidell, 2019). In the risk domain *other*, one of the effect sizes was identified as an outlier with a  $z$ -value exceeding 3.29. In order to reduce the potential disproportionate impact of this outlier, the outlier in the risk domain *other* was substituted with the next highest effect size that fell within the normal range (Tabachnik & Fidell, 2019).

## 2.5. Statistical analyses

Most of the included primary studies investigated multiple risk factors for radicalization among juveniles. Therefore, it was possible to extract multiple effect sizes from these studies. However, extracting multiple effect sizes from one study violates the assumption of independency, because it is likely that effect sizes within one study, are more similar (in size) than effect sizes of different studies (e.g., Lipsey & Wilson, 2001). Therefore, in line with recent published meta-analyses, a three-level approach was applied to account for dependency of effect sizes (see Cheung, 2014; Van den Noortgate, López-López, Marin-Martinez, & Sánchez-Meca, 2013, 2014; Weisz et al., 2017).

In order to calculate combined effect sizes and to conduct moderator analyses, a three-level meta-analytic model was used. In this model, three sources of variance are modeled: sampling variance of the observed effect sizes (Level 1); variance between effect sizes within a study (Level 2); and variance between studies (Level 3). Level 1 variance was calculated based on formulas proposed by Cheung (2014). Additionally, heterogeneity between studies at level 2 and 3 was tested with the Likelihood ratio test (Assink & Wibbelink, 2016). Whenever significant level 2 and/or level 3 variance was found, moderator analyses were conducted to determine whether variation could be explained by study, sample, or risk factor characteristics. As mentioned before, 17 risk domains were created consisting of homogeneous risk factors for radicalization, therefore separate meta-analyses were performed for these 17 risk domains.

The “*rma.mv*” function of the metaphor-package in the R environment (version 3.5.1) was used in order to statistically analyze the results. The syntax described by Assink and Wibbelink (2016) was followed to perform the multilevel meta-analysis. For testing the model coefficients, the method of Knapp and Hartung (2003) was used. Next, two one-sided log-likelihood-ratio-tests were performed to determine whether variances at levels 2 and 3 were significant. Prior to moderator analyses, dummy variables were created of all categorical moderators, and continuous moderators were centered around their means. In all analyses,  $p$ -values  $< .05$  were considered statistically significant.

## 2.6. Missing data

A common problem in meta-analytic research is the “file drawer problem” (Rosenthal, 1979). This refers to the fact that non-significant results are less likely to be published than significant results. Additionally, it is difficult to retrieve and include all relevant studies of the topic of interest in a meta-analysis. As a result, there might be missing data due to publication bias (Rosenthal, 1979). To determine whether there was a publication bias due to missing data, the funnel-plot-based trim and fill method was conducted in the R environment (Duval & Tweedie, 2000). The trim and fill method imputes missing effect sizes based on calculations of existing effect sizes in a funnel-plot. The trim and fill method was preferred above other missing data strategies, because it was found to be superior in detecting publication bias (Idris, 2012). Further, it was decided to determine missing effect sizes for the overall effect with the trim and fill method instead of separate analyses for each of the 17 risk domains, since the power of missing data methods increases with an increase in included number of effect sizes (Idris, 2012).

## 3. Results

### 3.1. Primary studies

The present meta-analysis included 25 studies, describing 30 independent samples ( $k$ ) from 1995 to February 2019. With a total sample of  $N = 17,188$  adolescents and young adults. Study sample sizes ranged from 46 to 3331 participants. Mean age of the participants at start of the study was 17.69 years ( $SD = 2.62$ ). Studies were conducted in Europe ( $k = 21$ ), the USA ( $k = 2$ ), Australia ( $k = 3$ ), The Middle East ( $k = 1$ ), Asia ( $k = 2$ ), and South America ( $k = 1$ ). In total, the coded studies produced 247 separate effect sizes, each reflecting the effect of a (putative) risk factor for radicalization.

### 3.2. Overall effect and publication bias

The results showed a significant overall effect of all investigated risk factors for radicalization of  $r = 0.191$ . According to criteria of Cohen (1988) for interpreting effect sizes ( $r = 0.1$ ,  $r = 0.3$ ,  $r = 0.5$ , indicating small, medium, and large effects, respectively), this is a small to medium overall effect.

Based on visual inspection of the funnel-plot (see Fig. 2), and results of trim and fill-analysis there appeared to be an underestimation of effect sizes. The funnel-plot indicated an asymmetrical distribution of effect sizes. On the right side of the plot, 23 effect sizes were missing, shown with white dots, indicating there was an underrepresentation of the overall effect, and results should be considered with some caution.

### 3.3. Effects of the 17 risk domains

An overview of the overall effects of the 17 domains of risk factors for radicalization is presented in Table 2. Each overall effect represents the correlation between a risk domain and radicalization. The overall effect of 15 domains was significant, and the magnitude ranged from very small ( $r = 0.080$  for *poverty*) to medium correlations ( $r = 0.482$  for *activism*). According to the criteria of Cohen (1988) for interpreting effect sizes, effects of three domains were medium (i.e., *activism*, *perceived in-group superiority*, and *perceived distance to other people*), effects of 11 domains were small (i.e., *gender*, *personality*, *delinquency and aggression*, *lower educational level*, *negative peers*, *in-group identification*, *perceived discrimination*, *perceived group threat*, *perceived procedural injustice*, *perceived illegitimacy of authorities*, and *other*), and the effect of one domain was very small (i.e., *poverty*). The overall effect of two domains (i.e., *negative parenting*, and *societal disconnection*) was not significant, indicating that these effects did not significantly deviate from zero. For these domains the results did not provide evidence for an association with radicalization, however, the effects of the domains *negative parenting* and *societal disconnection* could be marked as trends ( $p < .10$ ).

### 3.4. Heterogeneity of effect sizes

Heterogeneity analyses showed significant level 2 variance in six risk domains, significant level 3 variance in three risk domains and a significant level 2 and 3 variance in one risk domain (see Table 2). These analyses show that there is more variability in effect sizes than may be expected based on sampling variance alone. A possible explanation could be that moderators influence the main effect. No significant level 2 and/or level 3 variance was found in the risk domains *gender*, *poverty*, *delinquency and aggression*, *activism*, *lower educational level*, *perceived illegitimacy of authorities*, and *perceived distance to other people*. Therefore, no moderator analyses were performed for these domains.

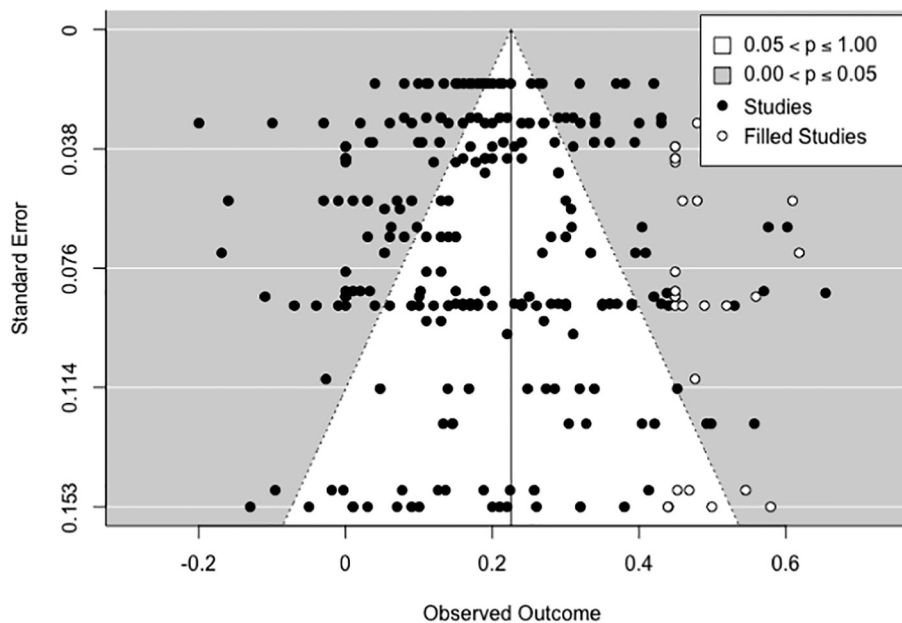


Fig. 2. Funnel plot.

### 3.5. Moderator analyses

In the 10 risk domains in which significant within study (level 2) and/or between study (level 3) variance was found, moderator analyses were performed in order to find variables that could explain differences in observed effect sizes within and/or between studies. In these analyses, the potential moderating effects of study, sample, and risk factor characteristics on the strength of the 10 individual risk domains were examined. An overview of the moderator analyses of the individual risk domains is presented in Table 3. After moderator analyses, five moderating variables were identified, of which two were study characteristics, two were sample characteristics, and one was a risk factor characteristic.

#### 3.5.1. Study characteristics

First, the study characteristic radical ideology (right-wing, religious, or unspecified) was a moderator in the risk domains *negative parenting* and *societal disconnection*. In both risk domains the effects for right-wing radicalization were significantly smaller compared to religious and unspecified radicalization. Second, a moderating effect was found for radicalization outcome (attitude, willingness, or behavior) in the risk domains *personality* and *perceived group threat*. In these risk domains, the effects for willingness to carry out extremist acts and extremist behavior were significantly smaller compared to having a positive attitude towards radicalization.

#### 3.5.2. Sample characteristics

Mean age and percentage of ethnic minorities were sample characteristics that moderated the association between risk factors and radicalization. Mean age of participants was identified as moderator in the risk domains *in-group identification* and *perceived discrimination*. When participants were older, the strength of the association between the risk domain *in-group identification* and radicalization decreased. However, for the risk domain *perceived discrimination* the strength of the association between this domain and radicalization significantly increased if participants were older. Furthermore, percentage of ethnic minorities was found to moderate the risk domains *personality*, *negative parenting*, and *societal disconnection*. The strength of these three risk domains increased, when percentage of ethnic minorities increased. In none of the risk domains, the sample characteristic percentage of males was found to be a significant moderator.

#### 3.5.3. Risk factor characteristics

Lastly, the risk factor characteristic subdomain of risk factors was found to be a moderator in the risk domain *negative parenting*. In this risk domain, the effect of parental control was significantly smaller compared to the effects of having a weak bond with parents or socialization processes of parents. Primary risk/protective factor, and type of analysis (i.e., univariate or multivariate) were no significant moderators in any of the risk domains.

## 4. Discussion

The present study aimed to provide insight into the association between risk factors for radicalization in juveniles by conducting a multilevel meta-analysis. Risk factors for radicalization of 25 studies and 30 independent samples were coded and classified into 17 risk domains. Moreover, moderator effects of study, sample, and risk factor characteristics were examined. The present meta-analysis revealed a small to medium association between risk factors and radicalization. This finding underlines the importance of examining risk factors for radicalization among juveniles. For 15 out of the 17 risk domains significant associations were found between risk factors and radicalization. The risk domains *activism*, *perceived in-group superiority*, and *perceived distance to other people* showed medium effects. The effects were small for *gender*, *personality*, *delinquency and aggression*, *lower educational level*, *negative peers*, *in-group identification*, *perceived discrimination*, *perceived group threat*, *perceived procedural injustice*, *perceived illegitimacy of authorities*, and *other*, and the effect for the *poverty* domain was very small.

The strongest associations between risk factors and radicalization were found for two risk domains: *activism* and *perceived in-group superiority*. The *activism* domain showed the highest associations with radicalization in our study. Activism is defined as participation in legal, non-violent ideologically motivated acts. Interestingly, our findings show that participating in legal, non-violent activism acts is the strongest risk factor for radicalization. A possible explanation is that activism can be viewed as a first (necessary) step, although not sufficient step, in the process of radicalization and subsequent extremism (e.g., Bjørge & Gjelsvik, 2017; Van den Bos, 2018). Consequently, we suggest that juveniles showing activist behavior may become a target of government policies, and perhaps prevention efforts, if juvenile activism develops in a social context that is antagonistic to democratic citizenship. However,

**Table 2**  
Overall mean effect sizes for the 17 risk domains, with corresponding level 2 and level 3 variance estimates.

Domain of risk factors	# Studies	# ES	Fisher's Z (SE)	95% CI	Sig Mean z (p)	Mean r	% Var at level 1	Level 2 variance	% Var at level 2	Level 3 variance	% Var at level 3
Overall	30	247	0.200 (0.016)	0.168, 0.232	< .001***	0.191	5.45	0.020***	79.48	0.004**	15.07
(1) Gender	15	17	0.182 (0.035)	0.109, 0.255	< .001***	0.178	8.41	0.006	38.23	0.009	53.35
(2) Poverty	5	5	0.080 (0.013)	0.043, 0.116	.004**	0.080	100	0.000	0.00	0.000	0.00
(3) Personality	10	26	0.164 (0.033)	0.096, 0.232	< .001***	0.160	11.02	0.006***	50.40	0.005	38.58
(4) Delinquency and aggression	7	10	0.273 (0.032)	0.200, 0.346	< .001***	0.266	21.91	0.000	0.00	0.000+	78.09
(5) Activism	7	9	0.526 (0.049)	0.412, 0.640	< .001***	0.482	12.58	0.000	0.00	0.009+	87.42
(6) Lower educational level	6	6	0.165 (0.034)	0.078, 0.252	.005**	0.163	25.07	0.002	37.46	0.002	37.46
(7) Negative parenting	6	12	0.100 (0.046)	-0.002, 0.202	.053+	0.098	10.89	0.000	0.00	0.011*	89.11
(8) Negative peers	7	14	0.144 (0.046)	0.045, 0.243	.007**	0.139	8.09	0.009**	55.22	0.006	36.69
(9) In-group identification	9	17	0.115 (0.045)	0.019, 0.211	.022*	0.112	6.22	0.009**	41.49	0.011	52.29
(10) Perceived in-group superiority	5	10	0.389 (0.052)	0.271, 0.506	< .001***	0.365	7.62	0.010**	54.36	0.007	38.02
(11) Perceived discrimination	12	26	0.239 (0.039)	0.159, 0.320	< .001***	0.227	8.66	0.001**	4.53	0.003	86.81
(12) Perceived group threat	3	13	0.223 (0.045)	0.126, 0.320	< .001***	0.218	10.49	0.009**	69.36	0.014**	20.15
(13) Perceived procedural injustice	7	10	0.153 (0.044)	0.052, 0.253	.007**	0.149	10.56	0.000	0.00	0.011*	89.44
(14) Societal disconnection	9	16	0.085 (0.047)	-0.015, 0.186	.089+	0.084	7.60	0.002	13.07	0.014*	79.33
(15) Perceived illegitimacy of authorities	3	6	0.210 (0.030)	0.133, 0.288	< .001***	0.205	39.97	0.000	9.38	0.002	50.65
(16) Perceived distance to other people	3	5	0.315 (0.067)	0.129, 0.501	.009**	0.300	11.39	0.001	11.26	0.009	77.35
(17) Other	16	45	0.220 (0.033)	0.154, 0.286	< .001***	0.208	3.80	0.030**	85.38	0.004	10.82

Note. # Studies = number of studies; # ES = number of effect sizes; SE = standard error; CI = confidence interval; Sig = significance; Mean z = mean effect size (Fisher's Z); Mean r = mean effect size (Pearson's correlation); % Var = percentage of variance explained; Level 2 variance = variance between effect sizes from the same study; Level 3 variance = variance between studies.  
+p < .10; \*p < .05; \*\*p < .01; \*\*\*p < .001.

in order to prevent stigmatization, it is important to keep in mind that most activists never become radicalized or engage in extremist behavior (e.g., Bjørge & Gjelsvik, 2017).

After activism, perceived in-group superiority showed the next strongest association with radicalization. Perceived in-group superiority implies that people consider their in-group to be superior to out-groups (e.g., Mazarr, 2004). According to a social psychology perspective, due to an in-group/out-group bias people tend to view behaviors of members in their own group as more positive, whereas out-group members are seen as members with more negative behaviors and traits (Borum, 2011). Thus, our finding that perceived in-group superiority shows a moderate association with radicalization is in line with this perspective on in-group/out-group relationships. However, in-group identification in itself shows a much weaker association compared to perceived in-group superiority. Thus our results suggest that identification with the in-group in itself is not necessarily a problem, whereas assigning superiority to one's in-group is. Campelo et al. (2018)'s finding regarding group polarization, and Lösel et al.'s (2018) finding that Muslims' empathy towards non-Muslims (out-group) is a protective factor against religious radicalization are in line with this finding. In the present study, perceived in-group superiority showed similar associations with right-wing radicalization as with religious radicalization. This indicates that perceiving your own group as superior to other groups is associated with radicalization in general, regardless of the type of radical ideology (e.g. right-wing vs. religious).

Remarkably, negative parenting was not significantly associated with radicalization, which is not in line with the findings from the systematic reviews of Lösel et al. (2018) and Campelo et al. (2018). Lösel et al. (2018) reported that positive parenting had a protective effect, while Campelo et al. (2018) found that family problems were associated with radicalization. However, parenting is an understudied risk factor; only six out of 30 primary studies considered parenting factors as potential risk factors. Additionally, we found a moderating effect of subdomains of risk factors within the risk domain negative parenting. This indicates that the effect of risk factors for radicalization is not similar for all parenting risk factors. More specifically, the effect of a weak bond with parents and socialization processes of parents were both stronger than the effect of parental control. Therefore, the overall effect of the negative parenting domain might be different compared to what could have been the case if more studies examined the bond with parents or socialization processes. It is possible that weaker associations were found between negative parenting and radicalization because of the grouping of all parenting risk factors under one broad risk domain. Unfortunately, grouping was necessary to preserve adequate statistical power.

Risk factors for youth radicalization were different from what has been reported in studies examining risk factors for more general violence in juveniles (e.g., Loeber, 1990; Murray & Farrington, 2010; Shader, 2001). Negative parenting, low socioeconomic status, prior delinquency, aggression, and lower intelligence are considered to be the most important risk factors for juvenile delinquency (Murray & Farrington, 2010; Shader, 2001). Apart from the non-significant association for negative parenting, we found only small or very small significant associations between these risk domains and radicalization. In our meta-analysis, other risk domains proved to be of greater importance for radicalization (i.e., activism, perceived in-group superiority, and perceived distance to other people). This might be ascribed to the specificity of radicalization as outcome variable. Studies on radicalization examine somewhat different risk factors than studies investigating general delinquency or violent behavior. For example, multiple studies included in our meta-analysis followed Doosje, Loseman, and Van den Bos (2013), who conceptualized three determinants of a radical belief system. Therefore, these studies included specific (potential) risk factors for radicalization related to perceived injustice, personal uncertainty, and group threat, which resulted in a high number of specific risk factors for radicalization in our meta-analysis.

**Table 3**  
Results for continuous and categorical variables tested as moderators in 10 risk domains.

Moderator variables	#Studies	#ES	Mean Z (95% CI)	Mean r	$\beta$ (95% CI)	F (df1, df2)a	p	Level 2 variance	Level 3 variance
<b>(1) Personality</b>									
<i>Study characteristics</i>									
Radical ideology	10	26				F (2,23) = 0.682	.515	0.006***	0.006
- Right wing			0.124 (0.014; 0.234)*	0.121					
- Religious			0.227 (0.080; 0.375)**	0.222	0.104 (-0.081; 0.288)				
- Unspecified			0.168 (0.045; 0.291)**	0.166	0.044 (-0.120; 0.209)				
Radicalization outcome	10	26				F (1, 24) = 4.700	.040*	0.004***	0.005 <sup>+</sup>
- Attitude			0.206 (0.127; 0.286)***						
- Willingness or behavior			0.122 (0.046; 0.199)**		-0.084 (-0.164; -0.004)*				
<i>Sample characteristics</i>									
Mean age	6	18	0.118 (-0.002; 0.238)	-	-0.035 (-0.114; 0.043)	F (1, 16) = 0.909	.355	0.000	0.011*
Percentage of males	8	20	0.142 (0.059; 0.224)**	-	0.003 (-0.002; 0.007)	F (1, 18) = 1.633	.218	0.010***	0.003
Percentage of ethnic minorities	7	18	0.170 (0.112; 0.228)***	-	0.002 (0.001; 0.003) **	F (1, 18) = 9.476	.006**	0.000	0.002
<i>Risk factor characteristics</i>									
Subdomain of risk factor	10	25				F (3,21) = 2.945	.056 <sup>+</sup>	0.007***	0.000
- Low self control			0.199 (0.131; 0.267)***	0.195					
- High self-esteem			0.158 (0.036; 0.281)*	0.155	-0.041 (-0.181; 0.099)				
- Personal uncertainty			0.026 (-0.090; 0.141)	0.025	-0.174 (-0.307; -0.040)*				
- Other			0.225 (0.120; 0.329)***	0.219	-0.026 (-0.099; 0.151)				
Risk or protective factor	10	26				F (1, 24) = 0.067	.797	0.007***	0.005
- Risk			0.166 (0.094; 0.239)***	0.162					
- Protective			0.147 (-0.004; 0.298)	0.144	-0.019 (-0.172; 0.133)				
<b>(2) Negative parenting</b>									
<i>Study characteristics</i>									
Radical ideology	6	12				F (2, 9) = 13.610	.002**	0.000	0.001
- Right wing			0.000 (-0.071; 0.071)	-0.000					
- Religious			0.265 (0.168; 0.362)***	0.257	0.265 (0.145; 0.385)***				
- Unspecified			0.146 (0.089; 0.203)***	0.145	0.146 (0.055; 0.237)**				
Radicalization outcome	6	12				F (1,10) = 3.006	.114	0.000	0.010*
- Attitude			0.072 (-0.033; 0.177)	0.072					
- Willingness or behavior			0.177 (0.038; 0.315)*	0.170	0.105 (-0.030; 0.239)				
<i>Sample characteristics</i>									
Mean age	5	11	0.257 (-0.152; 0.667)	-	0.058 (-0.107; 0.223)	F (1, 9) = 0.636	.446	0.000	0.013*
Percentage of males	2	8	0.169 (0.086; 0.251)**	-	-0.020 (-0.042; 0.002)	F (1, 6) = 4.986	.067 <sup>+</sup>	0.000	0.001
Percentage of ethnic minorities	3	9	0.183 (0.142; 0.223)***	-	0.002 (0.001; 0.003)*	F (1, 7) = 11.231	.012*	0.000	0.000
<i>Risk factor characteristics</i>									
Subdomain of risk factor	6	12				F (2, 9) = 8.037	.010*	0.003 <sup>+</sup>	0.000
- Parental control			0.039 (-0.045; 0.123)	0.039					
- Low bond with parents			0.143 (0.039; 0.248)*	0.142	0.104 (-0.030; 0.238)				
- Socialization processes of parents			0.265 (0.169; 0.362)***	0.257	0.226 (0.099; 0.354)**				
Risk or protective factor	6	12				F (1, 10) = 1.236	.292	0.000	0.014*
- Risk			0.114 (-0.006; 0.233)	0.111					
- Protective			0.068 (-0.062; 0.199)	0.070	-0.045 (-0.135; 0.045)				
<b>(3) Negative peers</b>									
<i>Study characteristics</i>									
Radical ideology	7	14				F (2,11) = 0.260	.775	0.009***	0.017
- Right wing			0.156 (-0.065; 0.377)	0.154					
- Religious			0.045 (-0.293; 0.383)	0.045	-0.111 (-0.515; 0.293)				
- Unspecified			0.172 (-0.030; 0.373)	0.159	0.016 (-0.283; 0.315)				
Radicalization outcome	7	14				F (1,12) = 0.699	.420	0.009***	0.006
- Attitude			0.172 (0.048; 0.296)*	0.167					
- Willingness or behavior			0.122 (0.007; 0.238)*	0.117	-0.050 (-0.179; 0.080)				
<i>Sample characteristics</i>									
Percentage of males	4	5	0.136 (-0.336; 0.607)	-	-0.005 (-0.049; 0.038)	F (1,3) = 0.162	.714	0.013**	0.059
Percentage of ethnic minorities	5	6	0.157 (-0.089; 0.403)	-	0.002 (-0.004; 0.009)	F (1, 4) = 1.052	.363	0.000	0.032 <sup>+</sup>
<i>Risk factor characteristics</i>									
Subdomain of risk factor	7	14				F (2, 11) = 1.471	.272	0.007***	0.010 <sup>+</sup>
- Delinquent peers			0.160 (0.028; 0.292)*	0.153					
- Racist peers			0.188 (0.031; 0.345)*	0.179	0.028 (-0.135; 0.191)				

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Table 3 (continued)

Moderator variables	#Studies	#ES	Mean Z (95% CI)	Mean r	$\beta$ (95% CI)	F (df1, df2)a	p	Level 2 variance	Level 3 variance
- Low bond with peers			0.061 (-0.099; 0.220)	0.060	-0.099 (-0.264; 0.065)				
Risk or protective factor	7	14				F (1, 12) = 2.990	.109	0.007***	0.008 <sup>+</sup>
- Risk			0.169 (0.060; 0.279)**	0.162					
- Protective			0.059 (-0.090; 0.207)	0.059	-0.111 (-0.250; 0.029)				
Type of effect size	7	14				F (1, 12) = 0.269	.614	0.009***	0.010
- Univariate			0.157 (0.030; 0.283)*	0.150					
- Multivariate			0.086 (-0.184; 0.356)	0.085	-0.071 (-0.369; 0.227)				
<b>(4) In-group identification</b>									
<i>Study characteristics</i>									
Radical ideology	9	17				F (2, 14) = 3.495	.059 <sup>+</sup>	0.009***	0.004
- Right wing			0.252 (0.112; 0.393)**	0.246					
- Religious			0.107 (-0.013; 0.227)	0.104	-0.146 (-0.330; 0.039)				
- Unspecified			0.017 (-0.114; 0.147)	0.016	-0.236 (-0.428; -0.044)*				
Radicalization outcome	9	17				F (1, 15) = 0.004	.954	0.010**	0.011
- Attitude			0.117 (-0.005; 0.238)	0.114					
- Willingness or behavior			0.113 (-0.008; 0.233)	0.109	-0.004 (-0.145; 0.137)				
<i>Sample characteristics</i>									
Mean age	8	15	0.114 (0.034; 0.195)**	-	-0.035 (-0.064; -0.005)*	F (1,13) = 6.385	.025*	0.010***	0.003
Percentage of males	7	13	0.117 (-0.054; 0.287)	-	0.002 (-0.006; 0.010)	F (1,11) = 0.309	.590	0.013***	0.014
Percentage of ethnic minorities	6	12	0.096 (-0.024; 0.215)	-	-0.001 (-0.004; 0.002)	F (1, 12) = 0.787	.393	0.011***	0.013
<b>(5) Perceived in-group superiority</b>									
<i>Study characteristics</i>									
Radical ideology	5	10				F (1, 8) = 0.003	.960	0.010***	0.011
- Right wing			0.392 (0.186; 0.599)**	0.366					
- Religious			0.386 (0.204; 0.568)**	0.364	-0.006 (-0.282; 0.269)				
Radicalization outcome	5	10				F (1, 8) = 1.487	.257	0.006**	0.012
- Attitude			0.423 (0.273; 0.572)***	0.392					
- Willingness or behavior			0.336 (0.168; 0.504)**	0.321	-0.087 (-0.251; 0.077)				
<i>Sample characteristics</i>									
Mean age	4	8	0.529 (0.244; 0.814)**	-	0.076 (-0.115; 0.268)	F (1, 6) = 0.949	.367	0.011***	0.002
Percentage of males	4	8	0.444 (0.336; 0.553)***	-	0.010 (-0.001; 0.020)	F (1, 6) = 5.099	.065 <sup>+</sup>	0.010***	0.000
Percentage of ethnic minorities	4	8	0.430 (0.324; 0.535)***	-	-0.001 (-0.004; 0.001)	F (1, 6) = 2.303	.180	0.010***	0.000
<i>Risk factor characteristics</i>									
Type of effect size	5	10				F (1, 8) = 2.399	.160	0.010***	0.003
- Univariate			0.426 (0.309; 0.544)***	0.399					
- Multivariate			0.262 (0.046; 0.477)*	0.255	-0.165 (-0.410; 0.080)				
<b>(6) Perceived discrimination</b>									
<i>Study characteristics</i>									
Radical ideology	12	26				F (2,22) = 2.269	.126	0.001**	0.011**
- Right wing			0.236 (0.079; 0.393)**	0.231					
- Religious			0.144 (0.018; 0.270)*	0.142	-0.092 (-0.293; 0.109)				
- Unspecified			0.322 (0.203; 0.440)***	0.299	0.086 (-0.111; 0.282)				
Radicalization outcome	12	26				F (1, 24) = 1.161	.292	0.001 <sup>+</sup>	0.015**
- Attitude			0.253 (0.165; 0.341)***	0.240					
- Willingness or behavior			0.231 (0.144; 0.318)***	0.219	-0.022 (-0.065; 0.021)				
<i>Sample characteristics</i>									
Mean age	9	20	0.230 (0.172; 0.289)***	-	0.036 (0.011; 0.060)**	F (1, 18) = 9.395	.007**	0.000	0.004**
Percentage of males	9	19	0.288 (0.182; 0.395)***	-	-0.003 (-0.009; 0.002)	F (1, 17) = 1.707	.209	0.000	0.016**
Percentage of ethnic minorities	9	20	0.214 (0.104; 0.323)**	-	-0.000 (-0.003; 0.003)	F (1, 18) = 0.008	.931	0.000	0.018**
<i>Risk factor characteristics</i>									
Subdomain of risk factor	12	26				F (1, 24) = 0.004	.949	0.001**	0.013**
- Personal discrimination			0.238 (0.148; 0.328)***	0.225					
- Group discrimination			0.240 (0.158; 0.321)***	0.227	0.002 (-0.049; 0.052)				
<b>(7) Perceived group threat</b>									
<i>Study characteristics</i>									
Radical ideology	3	13				F (2,10) = 0.866	.450	0.010***	0.002

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Table 3 (continued)

Moderator variables	#Studies	#ES	Mean Z (95% CI)	Mean r	$\beta$ (95% CI)	F (df1, df2)a	p	Level 2 variance	Level 3 variance
- Right wing			0.271 (0.137; 0.405)**	0.262					
- Religious			0.152 (-0.002; 0.306)	0.150	-0.119 (-0.323; 0.085)				
- Unspecified			0.245 (-0.006; 0.496)	0.240	-0.026 (-0.311; 0.258)				
Radicalization outcome	3	13				F (1, 11) = 6.931	.023*	0.005***	0.004
- Attitude			0.303 (0.181; 0.426)***	0.294					
- Willingness or behavior			0.172 (0.060; 0.283)**	0.170	-0.132 (-0.242; -0.022)*				
<i>Sample characteristics</i>									
Mean age	3	13	0.078 (-0.119; 0.276)	-	-0.177 (-0.396; 0.041)	F (1, 11) = 3.182	.102	0.009***	0.000
Percentage of males	3	13	0.327 (0.191; 0.462)***	-	-0.021 (-0.047; 0.005)	F (1, 11) = 3.275	.098 <sup>+</sup>	0.008***	0.000
Percentage of ethnic minorities	3	13	0.193 (0.114; 0.272)***	-	-0.001 (-0.003; 0.000)	F (1, 11) = 3.360	.094 <sup>+</sup>	0.008***	0.000
<i>Risk factor characteristics</i>									
Subdomain of risk factor	3	13				F (2, 10) = 1.978	.189	0.007***	0.003
- Intergroup anxiety			0.193 (0.069; 0.317)**	0.190					
- Symbolic threat			0.196 (0.073; 0.319)**	0.193	-0.008 (-0.161; 0.145)				
- Realistic threat			0.287 (0.163; 0.412)***	0.278	0.118 (-0.035; 0.271)				
<b>(8) Perceived procedural injustice</b>									
<i>Study characteristics</i>									
Radical ideology	7	10				F (2, 7) = 1.116	.380	0.000	0.011*
- Right wing			0.099 (-0.075; 0.273)	0.099					
- Religious			0.050 (-0.234; 0.334)	0.050	-0.049 (-0.383; 0.284)				
- Unspecified			0.211 (0.072; 0.349)**	0.206	0.111 (-0.111; 0.334)				
Radicalization outcome	7	10				F (1, 8) = 2.024	.193	0.000	0.010*
- Attitude			0.134 (0.032; 0.236)*	0.131					
- Willingness or behavior			0.163 (0.064; 0.263)**	0.160	0.029 (-0.018; 0.077)				
<i>Sample characteristics</i>									
Mean age	6	8	0.176 (0.016; 0.336)*	-	-0.010 (-0.056; 0.036)	F (1, 6) = 0.294	.607	0.000	0.017*
Percentage of males	6	8	0.146 (-0.016; 0.309)	-	-0.002 (-0.016; 0.309)	F (1, 6) = 0.140	.721	0.000	0.018*
Percentage of ethnic minorities	4	6	0.144 (-0.092; 0.380)	-	-0.001 (-0.006; 0.004)	F (1, 4) = 0.218	.665	0.000	0.025*
<i>Risk factor characteristics</i>									
Risk or protective factor	7	10				F (1, 8) = 0.005	.944	0.000	0.014*
- Risk			0.155 (0.009; 0.302)*	0.152					
- Protective			0.148 (-0.024; 0.321)	0.146	-0.007 (-0.233; 0.219)				
<b>(9) Societal disconnection</b>									
<i>Study characteristics</i>									
Radical ideology	9	16				F (2,13) = 6.606	.010*	0.002 <sup>+</sup>	0.003
- Right wing			-0.151 (-0.302; -0.001)*	-0.150					
- Religious			0.145 (0.043; 0.246)**	0.142	0.296 (0.114; 0.478)**				
- Unspecified			0.110 (0.001; 0.219)*	0.109	0.262 (0.076; 0.448)**				
Radicalization outcome	9	16				F (1, 14) = 0.030	.866	0.003 <sup>+</sup>	0.014*
- Attitude			0.090 (-0.026; 0.207)	0.087					
- Willingness or behavior			0.081 (-0.038; 0.200)	0.080	-0.009 (-0.127; 0.108)				
<i>Sample characteristics</i>									
Mean age	9	16	0.084 (-0.024; 0.192)	-	0.004 (-0.036; 0.044)	F (1, 14) = 0.045	.834	0.002 <sup>+</sup>	0.016*
Percentage of males	8	14	0.085 (-0.036; 0.206)	-	0.001 (-0.003; 0.006)	F (1, 12) = 0.308	.589	0.003 <sup>+</sup>	0.018*
Percentage of ethnic minorities	8	14	0.072 (0.002; 0.142)*	-	0.002 (0.001; 0.004)*	F (1, 14) = 9.860	.007***	0.003 <sup>+</sup>	0.004
<i>Risk factor characteristics</i>									
Risk or protective factor	9	16				F (1, 14) = 0.992	.336	0.003*	0.012*
- Risk			0.034 (-0.110; 0.179)	0.032					
- Protective			0.116 (-0.000; 0.232)	0.114	0.082 (-0.094; 0.257)				
<b>(10) Other</b>									
<i>Study characteristics</i>									
Radical ideology	16	45				F (2, 42) = 0.032	.968	0.030***	0.006
- Right wing			0.232 (0.103; 0.361)***	0.218					
- Religious			0.231 (0.008; 0.455)*	0.225	-0.001 (-0.258; 0.257)				
- Unspecified			0.214 (0.122; 0.306)***	0.202	-0.018 (-0.177; 0.140)				
Radicalization outcome	16	45				F (1, 43) = 1.405	.242	0.029***	0.005
- Attitude			0.191 (0.107; 0.276)***	0.187					

(continued on next page)

Table 3 (continued)

Moderator variables	#Studies	#ES	Mean Z (95% CI)	Mean r	$\beta$ (95% CI)	F (df1, df2) <sup>a</sup>	p	Level 2 variance	Level 3 variance
- Willingness or behavior			0.271 (0.162; 0.381)***	0.248	0.080 (-0.056; 0.216)				
<i>Sample characteristics</i>									
Mean age	12	32	0.219 (0.123; 0.315)***	-	-0.003 (-0.032; 0.025)	F (1,30) = 0.054	.818	0.022***	0.013
Percentage of males	11	31	0.228 (0.118; 0.338)***	-	0.001 (-0.004; 0.007)	F (1, 29) = 0.290	.594	0.019***	0.021 <sup>+</sup>
Percentage of ethnic minorities	6	24	0.215 (0.108; 0.322)***	-	-0.000 (-0.003; 0.003)	F (1,22) = 0.029	.866	0.015***	0.010 <sup>+</sup>
<i>Risk factor characteristics</i>									
Risk or protective factor	16	45				F (1, 43) = 1.852	.181	0.028***	0.006
- Risk			0.243 (0.166; 0.319)***	0.229					
- Protective			0.143 (0.007; 0.278)*	0.138	-0.100 (-0.248; 0.048)				
Type of effect size	16	45				F (1, 43) = 0.005	.941	0.031***	0.004
- Univariate			0.221 (0.150; 0.292)***	0.208					
- Multivariate			0.213 (0.016; 0.411)*	0.211	-0.008 (-0.216; 0.201)				

Note. # Studies = number of studies; # ES = number of effect sizes; Mean Z = Mean effect size (Fisher's Z); CI = confidence interval; Mean r = Mean effect size (Pearson's correlation);  $\beta$  = estimated regression coefficient; Level 2 variance = residual variance between effect sizes from the same study; Level 3 variance = residual variance between studies. a. Omnibus test of all regression coefficients in the model. b. p-Value of the omnibus test. + $p < .10$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

4.1. Moderator effects

Moderator analyses showed that the effects of the risk domains *negative parenting* and *societal disconnection* were moderated by type of radical ideology (right-wing, religious, and unspecified). In these domains, significantly smaller effects were found for right-wing radicalization compared to religious or unspecified radicalization. This finding is not in line with the assumption that different groups of radicalized individuals have common grounds and related developmental processes (Ebner, 2017). The risk domain *societal disconnection* comprises risk factors related to feelings of disconnection to the country one lives in, which logically explains the weaker association for right-wing radicalization. Juveniles showing right-wing radicalization may have a stronger feeling of connection with the ethnic majority of their country, which they perceive to be threatened by immigrants (Doosje et al., 2016). For juveniles showing Islamic radicalization feelings of disconnection from the ethnic (mostly Caucasian white) majority are expected to be high. For the risk domain *negative parenting*, a similar moderating effect by type of radical ideology was found. This finding suggests that problems within the parenting domain might be more important for religious or unspecified radicalization compared to right-wing radicalization. For all other domains no moderating effect of radical ideology was found. A possible explanation could be that for some risk domains there was no variation in radical ideologies, resulting in a lack of statistical power in these risk domains to detect moderator effects for type of radical ideology.

Next, we found a moderator effect for radicalization outcome (attitude, willingness, and behavior) in the risk domains *personality* and *perceived group threat*. The association between *personality* and *perceived group threat* was larger for having a positive attitude towards radicalization than for willingness to carry out extremist acts and extremist behavior itself. Given the larger likelihood to find positive attitudes towards radicalization than extremist behavior in general population samples (McCauley & Moskalenko, 2008), there is probably more research examining attitudes regarding radicalization than the other two expressions of radicalization (willingness to carry out extremism, and extremist behavior). This may result in a bias in observed strength of associations between risk domains and attitudes compared to the other two radicalization outcomes. A further exploration of different radicalization outcomes is recommended in future research to gain a better understanding of differences between attitudes and behaviors that may contribute to radicalization.

Furthermore, percentage of ethnic minorities in the sample was

found to be a moderator in the risk domains *personality*, *negative parenting*, and *societal disconnection*. When percentage of ethnic minorities increased, there was a stronger association between *personality*, *negative parenting*, *societal disconnection* and radicalization. This implies that belonging to an ethnic minority group might be a risk by itself for radicalization, in line with findings of Jansen, Oudolf, Timmer, and Winkel (2015). However, in most risk domains no significant moderating effect was found for percentage of ethnic minorities in the sample. Other reviews did not report on a clear link between ethnic minorities and radicalization or extremism (Campelo et al., 2018; Lösel et al., 2018).

4.2. Implications

In this meta-analytic review risk factors for radicalization were examined, which helps us to identify targets for risk assessment instruments, and prevention and intervention programs aimed at juveniles. Our results lead to several suggestions for improving clinical practice. Currently, multiple risk assessment instruments are used worldwide trying to predict radicalization or extremism; some of the most common assessment instruments are the Violent Extremist Risk Assessment (VERA-2R), Extremism Risk Screen (ERS), and the Identifying Vulnerable People Guidance (IVPG) (Egan et al., 2016; Lloyd & Dean, 2015; Pressman, 2009). However, these assessment tools have their flaws and leave room for improvement (Scarcella, Page, & Furtado, 2016). All of them include a broad array of risk factors for radicalization, but not one focuses on a combination of *activism*, *perceived in-group superiority*, and *perceived distance to other people*. Both VERA-2R and ERS do not include activism, while the IVPG does consider activism as risk factor, but does not focus on in-group/out-group factors (Egan et al., 2016; Lloyd & Dean, 2015; Pressman, 2009). Moreover, none of these instruments have been designed for youth in specific (Scarcella et al., 2016).

The present meta-analysis provides new knowledge on which risk factors are most strongly related to radicalization in juveniles, and which factors therefore should be included in risk assessment. Our results showed an overall small to medium ( $r = 0.191$ ) significant association between all risk factors together and radicalization in juveniles, which is similar to an area under the curve (AUC) statistic of 0.61. A value of 0.61 is considered an acceptable AUC (e.g., Picard-Fritsche, Rempel, Tallon, Adler, & Reyes, 2017). Creating risk assessment tools with high predictive accuracy (high AUC statistics) could increase accuracy in assessment of risks for radicalization. If a new risk assessment

specific for youth would be developed, this AUC of 0.61 may be improved if only the specific risk domains most strongly associated with radicalization (i.e., *activism*, *perceived in-group superiority*, and *perceived distance to other people*) were included. An improvement of risk assessment instruments for juveniles could in turn lead to improvement of prevention.

Currently there is a very limited evidence base for prevention and/or intervention programs aimed at targeting radicalization. This is, among other things, because very few de-radicalization or counter-extremism studies contain empirical data or a systematic analysis of quantitative data (Christmann, 2012; Feddes & Gallucci, 2015; Gielen, 2017). Most programs are not based on quantitative research, but on theoretical frameworks or conceptual models of radicalization or extremism. Moreover, almost none of them have been evaluated with a rigorous empirical methodology (Feddes & Gallucci, 2015). Of all studies considering de-radicalization or counter-extremism programs, most are about community engagement and resilience (Gielen, 2017). However, the problem of stigmatization of a group is often referred to as a by-product of the intervention, which could lead to counter-productive counter-extremism (Gielen, 2017; Nasser-Eddine, Garnham, Agostino, & Caluya, 2011). This problem of stigmatization is therefore important to take into account when creating prevention or intervention programs aimed at targeting radicalization.

It is an important aspect of de-radicalization or counter-extremism programs to target dynamic risk factors strongest associated with radicalization (i.e., *activism*, *perceived in-group superiority*, and *perceived distance to other people*). However, this should not be the only aspect to be considered; protective factors are also very important for creating effective programs (Lösel et al., 2018). Moreover, even though this meta-analysis and the systematic analysis of Lösel et al. (2018) are good starting points, replications are needed.

As our results showed no significant effect of *negative parenting* on radicalization, it might not be beneficial to use parenting programs for de-radicalization aims, while this is still often done in prevention and intervention programs aimed at targeting radicalization among juveniles (e.g., El-Said, 2012; Hermens, Van Kapel, Van Wonderen, & Booijink, 2016). However, also for parenting, it is important that future research further disentangles the parenting role. Possibly, specific parenting aspects are associated with radicalization, whereas other aspects are of less importance.

Only for some risk domains moderator analyses showed differences between radical ideologies (i.e., *negative parenting* and *societal disconnection*). However, for most risk domains, among which those most strongly associated with radicalization, this distinction between types of radical ideology was not found. This suggests that one similar intervention/prevention approach for religious and right-wing radicalization is likely to be effective. This provides opportunities for efficient, universal prevention programs, targeting activism, in-group superiority, and distance to other people. Next, moderator analyses showed that some risk factors were stronger related to radicalization in ethnic minority groups (e.g., *societal disconnection*). Therefore, special attention should be paid to these risk factors in counter-extremism or de-radicalization programs serving programs including ethnic minorities.

#### 4.3. Limitations

There are some limitations that should be considered. First, only a limited number of primary studies were included in this meta-analytic review. In our search we tried to be as exhaustive as possible, and screened almost 2400 titles and abstracts. We included effect sizes derived from both multivariate and bivariate statistics to increase statistical power and preserve maximum information from all available studies, this approach was supported by a moderator analysis that did not yield a significant difference between effect sizes derived from these

different statistics. Despite efforts to include as many studies and effect sizes as possible, the statistical power was too low to conduct multiple moderator analyses. Second, it is complex to synthesize information and perform research on the topic of radicalization and extremism, because there is no agreement on definitions, although definitions that highlight radicalization and extremism as a process gain prominence in literature. Notably, these definitions guided our meta-analytic study. A final limitation is that we were unable to examine which combinations of risk factors or risk domains may be associated with radicalization. For that reason, we performed 17 separate meta-analyses (one for each risk domain), even though it is clear that exposure to multiple risk factors has a cumulative effect (e.g., Loeber, 1990; Shader, 2001).

#### 4.4. Recommendations for future research

When conducting research it is important that a broad array of risk factors be studied to provide a comprehensive understanding of risk factors and the development of radicalization. Freilich and LaFree (2015) point out that even though there are important differences between general crime and radicalization or terrorism, there are definitely considerable similarities as well. In line with this, we suggest a better integration of radicalization research into broader criminological theories. One step would be studying risk factors for general delinquency more in studies focusing on radicalization. Both parenting and peer factors, for example, are relatively understudied in research into this subject. Further, we suggest studying activism because our results show a medium correlation between *activism* and radicalization, indicating that people who are radicalized often have a history of activism. Studying activism might be interesting, because activism is more common than radicalization or extremism, and is therefore easier to examine in diverse large samples (Bjørge & Gjelsvik, 2017). Further research could demonstrate under what conditions activism may change into extremism. As such, research on activism may contribute to interventions targeting healthy and fruitful ways of activism, and thus prevent radicalization and extremism without risking stigmatization.

#### 4.5. Conclusion

This review contributes to the literature on radicalization by meta-analytically examining the effects of several risk domains. Largest effects were found for *activism*, *perceived in-group superiority*, and *perceived distance to other people*. Overall our results suggest that radicalization is determined in a multi-causal way. Currently, many prevention and intervention programs have been implemented worldwide, which are insufficiently based on empirical research. From the results of our meta-analytic review, evidence-based programs can be developed or adapted targeting the most important (dynamic) risk factors for radicalization: activism, in-group superiority and perceived distance to other people.

#### Declaration of competing interest

None.

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## Appendix A. Search terms

## Search Terms

**PsycINFO, Ovid****#1 radicalization**

Political radicalism/ OR extremism/ OR terrorism/ OR Religious Fundamentalism/  
OR Radical Movements/ OR (extremis\* OR terroris\* OR radicali\* OR deradicali\*  
OR fundamentalis\* OR suicide bomber\* OR suicide attack\* OR ideologic\* violen\*  
OR extreme right\* OR white supremacy OR far-right OR radical right OR jihad\* OR  
foreign fighter\* OR isis OR isil OR daesh OR jihad\* OR al-qaeda OR alqaeda OR  
hamas OR hezbollah\* OR taliban\* OR extreme religious\*).ti,ab,id.

**#2 adolescents and young adults (12-25)**

(school age 6 12 yrs OR adolescence 13 17 yrs OR young adulthood 18 29 yrs).ag.  
OR (child\* OR kid OR kids OR puberty OR pubescen\* OR teen\* OR young\* OR  
youth\* OR minors\* OR under ag\* OR underag\* OR juvenile\* OR girl\* OR boy\* OR  
preadolesc\* OR adolecsc\*).ti,ab,id.

**#3 methodology**

Quantitative study.md. OR (cross-sectional\* OR random\* OR odds ratio OR cohen\*s  
D OR control group\* OR control condition\* OR effect size\* OR questionnaire\* OR  
interview\* OR scale\* OR measurement\* OR inventory OR structural equation  
model\* OR anova OR ancova OR linear regression OR multiple regression OR  
logistic regression OR variables OR checklist\* OR moderator\* OR  
mediator\*).ti,ab,id,tm. OR (test\* OR measure\*).tm

**1 AND 2 AND 3 1974 results**

**Web of Science, Thomson Reuters, Web of Science Core Collection****#1 radicalization**

TS=( "extremis\*" OR "terroris\*" OR "radicali\*" OR "deradicali\*" OR  
"fundamentalis\*" OR "suicide bomber\*" OR "suicide attack\*" OR "ideologic\*  
violen\*" OR "extreme right\*" OR "white supremacy" OR "far-right" OR "radical  
right" OR " jihad\*" OR "foreign fighter\*" OR "isis" OR "isil" OR "daesh" OR  
"jihad\*" OR "al-qaeda" OR "alqaeda" OR "hamas" OR "hezbollah\*" OR "taliban\*"  
OR "extreme religious\*")

**#2 adolescents and young adults (12-25)**

TS=( "child\*" OR "kid" OR "kids" OR "puberty" OR "pubescen\*" OR "teen\*" OR  
"young\*" OR "youth\*" OR "minors\*" OR "under ag\*" OR "underag\*" OR  
"juvenile\*" OR "girl\*" OR "boy\*" OR "preadolesc\*" OR "adolesc\*")

**#3 methodology**

TS=( "cross-sectional\*" OR "random\*" OR "odds ratio" OR "cohen\*s D" OR "control  
group\*" OR "control condition\*" OR "effect size\*" OR "questionnaire\*" OR  
"interview\*" OR "scale\*" OR "measurement\*" OR "inventory" OR "structural  
equation model\*" OR "anova" OR "ancova" OR "linear regression" OR "multiple  
regression" OR "logistic regression" OR "variables" OR "checklist\*" OR  
"moderator\*" OR "mediator\*")

**1 AND 2 AND 3 807 results**

**Criminal Justice Abstracts, EBSCO****#1 radicalization**

TX("extremis\*" OR "terroris\*" OR "radicali\*" OR "deradicali\*" OR  
"fundamentalis\*" OR "suicide bomber\*" OR "suicide attack\*" OR "ideologic\*  
violen\*" OR "extreme right\*" OR "white supremacy" OR "far-right" OR "radical  
right" OR " jihad\*" OR "foreign fighter\*" OR "isis" OR "isil" OR "daesh" OR  
"jihad\*" OR "al-qaeda" OR "alqaeda" OR "hamas" OR "hezbollah\*" OR "taliban\*"  
OR "extreme religious\*")

**#2 adolescents and young adults (12-25)**

TX("child\*" OR "kid" OR "kids" OR "puberty" OR "pubescen\*" OR "teen\*" OR  
"young\*" OR "youth\*" OR "minors\*" OR "under ag\*" OR "underag\*" OR  
"juvenile\*" OR "girl\*" OR "boy\*" OR "preadolesc\*" OR "adolesc\*")

**#3 methodology**

TX("cross-sectional\*" OR "random\*" OR "odds ratio" OR "cohen\*s D" OR "control  
group\*" OR "control condition\*" OR "effect size\*" OR "questionnaire\*" OR  
"interview\*" OR "scale\*" OR "measurement\*" OR "inventory" OR "structural  
equation model\*" OR "anova" OR "ancova" OR "linear regression" OR "multiple  
regression" OR "logistic regression" OR "variables" OR "checklist\*" OR  
"moderator\*" OR "mediator\*")

**1 AND 2 AND 3 147 results**

**Google Scholar**

extremism|radicalism|terrorism|radicals|extremists|terrorists|"extreme right"|right-  
wing|radicalization|radicalisation|"ideological violence" adolescents|young  
adults|children|youngsters|adolescence|childhood|girls|boys|students

**350 results screened**

## Appendix B. Coding scheme

Bibliographical information

- StudyID (= unique number for each study)
- Authors of study
- Title of study
- Publication status
- Year of publication
- Name of journal
- Impact factor of journal

#### Sample characteristics

- Total sample size
- Study design (cross-sectional; longitudinal; experimental)
- Mean age of participants (at start of the study). In case of a longitudinal design: mean age at first relevant measurement point
- Age range
- Proportion males in sample
- Proportion ethnic minorities in sample

#### Study characteristics

- Country of data collection (Europe; USA; Middle-Eastern; Asia; Africa; Australia; South-America)
- Radical ideology (religious; right-wing; unspecified)
- Radicalization outcome (attitudes towards radicalization; willingness to engage in extremist acts; extremist behavior)
- Name of assessment scale extremism
- Number of items assessment method extremism
- Cronbach's alpha assessment method extremism

#### Risk factor characteristics

- Number of effect sizes reported on in study
- Name of risk factor
- Domain of risk factor (see [Appendix C](#))
- Type of risk factor (static; dynamic)
- Prior risk or protective factor (risk; protective)
- Assignment of zero to non-significant effect sizes that could not be calculated (yes; no)
- Statistical adjustment of effect size (yes; no)
- Effect size Pearson correlation  $r$
- Effect size Fisher's  $Z$

### **Appendix C. Overview of domains of risk factors and examples of factors classified in each domain, including subdomains controlled for in moderator analyses**

#### **1. Gender**

Being male; being female\*

#### **2. Poverty**

Low socioeconomic status of parents, Low socioeconomic status of family; net income; financial problems family

#### **3. Personality**

Thrill-seeking behavior; self-esteem; coping skills; personal emotional uncertainty; impulsiveness; narcissism; empathy\*

##### *Subdomains*

Low self-control; high self-esteem; personal uncertainty; other

#### **4. Delinquency and aggression**

Violent behavior; rule-breaking behavior; aggression; delinquent drift

#### **5. Activism**

Willingness to participate in legal violence to protect group; intention of activism

#### **6. Lower educational level**

School achievement; educational level; academic success\*

#### **7. Parenting**

Cultural socialization parents; egalitarian socialization parents; restrictive control parents; parental support\*

##### *Subdomains*

Parental control; low bond with parents; socialization processes of parents

#### **8. Peers**

Low social integration with peers; exposure to racist peers; "my friends talk constantly about fights and violent topics"; friendship; deviant peer group

##### *Subdomains*

Delinquent peers; racist peers; low bonds with peers

#### **9. High in-group identification**

Importance of ethnic group; importance of religion; national identification; religious identification

#### **10. Perceived in-group superiority**

Ethnocentrism; perceived Muslim superiority; religious authoritarianism; superiority

#### **11. Perceived discrimination**

Individual relative deprivation; collective relative deprivation; perceived oppression of group; "I see myself as a member of a group that suffers from injustice"; group discrimination

##### *Subdomains*

Personal discrimination; group discrimination

## 12. Perceived group threat

Symbolic threat; realistic threat; intergroup anxiety

Subdomains

Intergroup anxiety; symbolic threat; realistic threat

## 13. Perceived procedural injustice

Perception of justice\*; "I see myself as a member of a group that suffers from injustice"; procedural injustice

## 14. Societal disconnection

I feel connected to the country I live in\*; mainstream connectedness\*; social disconnectedness; rejection of community; belonging to community\*; connection to society\*

## 15. Perceived illegitimacy of authorities

Perceived legitimacy\*; perceived illegitimacy

## 16. Perceived distance towards other people

Alienation; feeling a sense of distance to others; distance to other people

## 17. Other

Violent media consumption; anomia; trauma; PTSD symptoms; Purpose of life; perceived level of effectiveness with regard to actions in society

Note. \* = initial protective factor.

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