



Review Article

Early maladaptive schemas, suicidal ideation, and self-harm: A meta-analytic review

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ABSTRACT

Background: Understanding the risk factors for suicidality is essential to the prevention of death by suicide and the effective treatment of suicidal ideation and self-harm. The objective of this review was to summarise the evidence on the associations between suicidal ideation, suicidal or non-suicidal self-harm, and early maladaptive schemas.

Method: A systematic review and meta-analysis was completed based on the PRISMA statement. Searches were conducted via PubMed, PsycInfo, and CINAHL. Included studies were peer-reviewed and reported on the bivariate association between one or more of the 18 schemas and either suicidal ideation or self-harm behavior.

Results: We included 17 studies reporting more than 200 associations. Suicidal ideation demonstrated a large mean correlation with Defectiveness Shame ($r = .50$ [.43, .57]), moderate correlations with Social Isolation ($r = .43$ [.34, .50]), Failure ($r = .35$ [.27, .42]), and Dependence Incompetence ($r = .33$ [.13, .51]), and small correlations with Subjugation ($r = .26$, [.13, .38]) and Emotional Inhibition ($r = .29$ [.13, .44]). Self-harm demonstrated small correlations with Emotional Deprivation ($r = .21$, [.13, .29]), Social Isolation ($r = .29$, [.18, .38]), and Emotional Inhibition ($r = .19$, [.13, .24]).

Limitations: Confidence in the findings is limited by high heterogeneity across several analyses and the inability to investigate possible moderators due to the low number of included studies.

Conclusions: Believing that one is isolated, unlovable, or incapable is associated with an increased risk of suicidal thoughts. The findings correspond with the risk factors identified by the Interpersonal Theory of Suicide: thwarted belonging and burdensomeness.

1. Introduction

Suicide, defined as the act of taking one's life, is a public health concern that has devastating effects on families and communities (Steele et al., 2018). Estimates indicate that over 800,000 people die from suicide annually, equating to a global suicide rate of 10.7 per 100,000 population (World Health Organization, 2014). Suicidal ideation refers to thoughts or patterns of thinking that pertain to life being unfulfilling or not worth living and results in a preoccupation with self-destruction, and whether to act on these thoughts (Ford and Gómez, 2015). Ideation can range in intensity from a passive wish to die to active thoughts that involve a plan to end one's life (Turecki et al., 2019). Self-harm refers to intentional self-inflicted injury (e.g., cutting, burning, scratching, or hitting oneself) (Lewis et al., 2015; Steele et al., 2018). Individuals who self-harm may engage in this behavior with or without an intent to die (Ford and Gómez, 2015) but are at elevated risk of suicide (Andover and Gibb, 2010). Non-suicidal motivations for self-

harm include the regulation of severe levels of distress, to communicate suffering, and to punish one's self (Ford and Gómez, 2015).

Identifying the risk factors that underpin suicidal ideation and self-harm is a global public health priority (World Health Organization, 2014). This knowledge can inform risk assessment and facilitate the development of individualized approaches to the treatment and prevention of suicide and suicide-related outcomes. Suicidal thoughts and behaviors are influenced by multiple social, cultural, biological, and environmental factors (Ma et al., 2016). Risk factors commonly associated with suicide include psychiatric history, unemployment, and low socioeconomic status (McClatchey et al., 2017). In particular, a history of childhood adversity, such as emotional abuse, has been consistently linked with increased risk of suicide in later life (Brodsky and Stanley, 2008; Thompson et al., 2019). However, given their historical nature, adverse childhood events are static risk factors that cannot be directly modified. In contrast, dynamic risk factors, such as psychological and cognitive correlates of suicidality, are modifiable and can be tar-

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ged by individualized therapeutic interventions. Identifying the dynamic cognitive risk factors that underpin suicidality is, therefore, an important agenda for suicide research.

The current review focuses on Early Maladaptive Schemas as cognitive risk factors for suicidal ideation and self-harm behavior. Broadly, a schema is an abstraction or pattern of the distinctive elements of an object or event, that influences how incoming information is organized and perceived (Thorndyke and Hayes-Roth, 1979). The concept of schemas is commonly associated with Piaget's (1936) theory of cognitive development, which describes how children develop cognitive models to interpret their environment and experiences. In the context of psychotherapy, Beck's (1991) Cognitive Theory frames schemas as cognitive vulnerabilities that form in response to childhood adversity and are associated with psychopathology in adulthood.

Young et al. (2003) expanded Beck's work by identifying 18 specific early maladaptive schemas relating to negative beliefs about oneself and one's relationships with others (here in referred to as schemas; see On-line supplement 1 for a full list of the schemas and their definitions). Similar to dysfunctional internal working models in attachment theory (Bowlby, 2005), Young et al. (2003) conceptualized schemas as comprising cognitive, affective, somatic, and memory-based elements. Schemas are theorized to develop when core emotional needs in childhood or adolescence are not met due to overt abuse (e.g., emotional abuse), the absence of adequate care and nurturance (e.g., emotional neglect), or more subtle parenting behaviors (e.g., over-anxious parenting) (Pilkington et al., 2020). For example, the Abandonment schema is the expectation that people will leave or cannot be relied upon for support and is theorized to develop in response to inconsistent or absent caregiving during childhood. In adulthood, schemas can be activated by experiences erroneously perceived to be similar to these traumatic early experiences, eliciting strong negative affect and maladaptive coping behaviors. For example, ambiguous social cues, such as a partner avoiding eye contact, may be interpreted as meaning that one is about to be abandoned, prompting the individual to become overly clingy, pushing the partner away (schema perpetuation) rather than attempting to meet one's needs for stability and security in adaptive ways (schema healing). Schemas are thus conceptualised as the mechanism underlying the relationship between unmet childhood needs and psychopathology and maladaptive behavior in adulthood, including suicidality (Young et al., 2003).

The broader theoretical models that seek to explain pathways to suicidal ideation and behaviors have similarly emphasized the salience of cognitive risk factors. Namely, the Interpersonal Theory of Suicide (Joiner et al., 2012; Van Orden et al., 2005; Van Orden et al., 2010), the Integrated Motivational-Volitional model (O'Connor and Kirtley, 2018; O'Connor, 2011), and the Schematic Appraisals Model of Suicide (Johnson et al., 2008; Johnson et al., 2010) identify cognitive factors associated with suicidal risk that conceptually overlap with several of Young's early maladaptive schemas.

The Interpersonal Theory of Suicide suggests that individuals develop hopelessness and a desire to die when they feel unable to change two constructs: "thwarted belongingness" and "perceived burdensomeness" (Chu et al., 2017). Humans have an innate need to belong and feel connected to others. Thwarted belongingness refers to the cognitive-affective state resulting from this need for social connection not being met (Van Orden et al., 2010). In support of the Interpersonal Theory of Suicide, the empirical literature demonstrates that social isolation is one of the strongest and most reliable predictors of suicidal ideation, suicide attempts, and suicidal behavior (Chu et al., 2017). Further to this, Van Orden et al. propose that an individual is at increased risk of suicide when thwarted belongingness intersects with perceived burdensomeness. Perceived burdensomeness comprises two aspects: self-hatred and a belief that one is a burden or liability on others. The theory proposes that if an individual believes they are burdening others, such as family members, they may perceive that others would be "better off without them," thus triggering a desire to die.

The Integrated Motivational-Volitional model (O'Connor and Kirtley, 2018; O'Connor, 2011) builds upon the Interpersonal Theory of Suicide by identifying that the absence of thwarted belongingness and perceived burdensomeness can prevent a sense of entrapment (defeat or humiliation from which there is no perceived escape) from transitioning into suicidal ideation or intention, and, ultimately, suicidal behavior (Ordonez-Carrasco et al., 2020). Klonsky and May's (2015) Three Step Model similarly posits that connectedness can protect against the escalation of suicidal ideation in individuals experiencing pain and hopelessness. In alignment with schema theory, these models emphasize that the perceived frustration of interpersonal needs is a key factor in the development of suicidal ideation and progression to behavior.

The cognitive risk factors identified in these contemporary theories of suicidal ideation and behavior correspond with several of Young's schemas. Hopelessness conceptually overlaps with Young's Failure and Negativity Pessimism schemas. The Failure schema relates to expectations that one will inevitably fail and is incapable compared to others, whilst Negativity Pessimism is characterized by a pervasive focus on the negative aspects of life such as death and pain, while minimizing the positive aspects. Both these schemas encompass a sense of hopelessness that life is inevitably bad and will not improve and, therefore, may be significant predictors of suicidal risk.

Thwarted belongingness is distilled by Van Orden et al. into the cognition "I am alone," which directly corresponds with Young's Social Isolation schema: feeling that one is isolated, different from others, and not part of a group or community. Self-perceptions that one is a burden or flawed over-laps with Young's Defectiveness Shame and Emotional Deprivation schemas. Defectiveness Shame is the feeling one is bad, worthless, or unlovable, while Emotional Deprivation is the perception that one will not receive adequate care and nurturance from others. Therefore, based on the Interpersonal Theory of Suicide, the Social Isolation, Failure, Defectiveness Shame and Emotional Deprivation schemas may be stronger predictors of suicidal behavior than other schemas.

A meta-analytic review by Chu et al. (2017) found support for the Interpersonal Theory of Suicide theory, but concluded that there is likely to be numerous cognitive risk factors involved in the etiology of suicidal behavior. The Schematic Appraisals Model of Suicide (Johnson et al., 2008; Johnson et al., 2010) suggests that a cluster of cognitive structures contribute to the development and perpetuation of suicidal thoughts and acts: the suicide schema network. Each time the suicide schema network is activated by negative social interactions, the network is strengthened. This corresponds with Young's notion of schema perpetuation and William and Teasdale's differential activation hypothesis (Williams et al., 2008), that suicidality can be understood as a response to the activation of negative information processing biases when an individual experiences a depressed mood state (e.g., I am a failure), which in turn perpetuate low mood, creating a feedback loop.

Examining all 18 schemas as predictors of suicidal ideation and self-harm behavior could both validate and extend existing suicide theories, such as the Interpersonal Theory of Suicide. For example, based on the Abandonment-Symbiosis hypothesis that suicidal behavior stems from childhood experiences of emotional abandonment (Orbach, 2007), the Abandonment schema may also be related to increased risk of suicidal ideation and self-harm. Clarifying which schemas are the strongest predictors of suicidal ideation and self-harm can extend theoretical accounts of the specific cognitive risk factors associated with suicidality.

1.1. The current review

The aim of this systematic review and meta-analysis was to evaluate the literature examining early maladaptive schemas as risk factors for suicidal ideation and self-harm behavior. In addition to theoretical implications, establishing the status of the evidence on schemas and suicidality has implications for treatment and prevention. Schema Therapy has demonstrated effectiveness in treating disorders often characterized by self-harm and suicidal ideation, such as chronic depression and Bor-

derline Personality Disorder (Bamelis et al., 2014; Farrell et al., 2009; Giesen-Bloo et al., 2006; Hawke and Provencher, 2013; Renner et al., 2013). Identifying the specific schemas that are most strongly related to suicide-related outcomes could inform suicide risk assessment and identify therapeutic targets. Evaluating the evidence on schemas and suicide-related outcomes can also clarify directions for future research.

2. Method

We completed a systematic review and meta-analysis to examine the associations between suicidal ideation and deliberate self-harm, and Young's 18 early maladaptive schemas. The review adheres to the PRISMA guidelines (Moher et al., 2009). On-line Supplement 2 presents the PRISMA checklist for this review.

2.1. Search strategy

Searches of the electronic databases PsycInfo, PubMed, and CINAHL were conducted on 26 November 2019 using the search terms "Young AND Schema." A broad search string was intentionally used given the relatively small evidence base on early maladaptive schemas. The search terms could appear anywhere in the full text, and no publication date limits were applied. Searches were limited to articles that were peer-reviewed and written in English. We completed manual searching of the reference lists of studies included from the initial search (the hand search), and papers citing these in Web of Science (the forward search). These searches were conducted on 10 June 2020.

2.2. Selection criteria

Studies eligible for inclusion were required to meet the following criteria: (a) employed a case-control, longitudinal, cross-sectional, or retrospective study design; (b) published in a peer-reviewed journal; (c) analyzed one or more of the 18 early maladaptive schemas (as defined by Young et al.) as a predictor variable; (d) analyzed suicidal ideation and or suicidal or non-suicidal self-harm behavior as an outcome variable; and (e) reported association/s in sufficient detail for unadjusted bivariate effect sizes to be calculated.

Studies were excluded if: (a) the article did not report original data (e.g., the article was a review paper, meta-analysis, or discussion paper); (b) the article was not in English; (c) measures were administered following exposure to an intervention; (d) early maladaptive schemas were analyzed as total or domain composite scores (e.g., Disconnection and Rejection domain score); or (e) the predictor was schema modes (e.g., the Schema Mode Inventory). The first author screened all the potential studies for inclusion based on the article title and abstract, and if necessary, the full text. The third author independently confirmed that all included studies warranted inclusion. See Fig. 1.

2.3. Data extraction and management

Independent data extraction was completed by two authors (PP and AB) using a standardized spreadsheet. Extracted data included descriptive information about the sample, details of the predictor and outcome variables, and the effect size and direction. PP collated the data extraction, and discrepancies were resolved through discussion. To manage articles that reported multiple associations for the variables of interest, we developed decision hierarchies (see On-line supplement 3).

2.3.1. Quality assessment

The quality of included studies was independently assessed by AB and PP using the Newcastle-Ottawa Scale (Wells et al., 2015) adapted for cross-sectional studies by Modesti et al. (2016). The following criteria were used to rate studies: (1) Representativeness of the sample: (a) truly representative of the average in the target population (all subjects or random sampling), (b) somewhat representative of the average in the

target population (non-random sampling), (c) unclear or no description of the sampling strategy; (2) Sample size: (a) justified and satisfactory, (b) not justified ($N < 100$); (3) Ascertainment of the exposure (risk factor): (a) validated measurement tool, (b) non-validated measurement tool, but the tool is available or described, (c) no description of the measurement tool, and (4) Assessment of outcome: (a) independent blind assessment, (b) record linkage, (c) self-report, (d) no description.

2.4. Meta-analysis procedures

We completed meta-analyses investigating the 18 schemas as predictors of suicidal ideation and self-harm behavior via *Meta-Essentials* (Suurmond et al., 2017). The correlation coefficient r was used as the summary effect size metric as it was the effect size reported by most studies and is easy to interpret. If the study authors reported effect sizes other than correlation coefficients (e.g., M and SDs), r was calculated based on the available data using the on-line *Practical Meta-Analysis Effect Size Calculator* (Wilson, 2001).

As we anticipated considerable heterogeneity, all analyses used a random-effects model, applied with the inverse variance weighting method with an additive between-studies variance component based on the DerSimonian-Laird estimator (DerSimonian and Laird, 1986). Fisher's r -to- z transformation (Fisher, 1921) was used.

The extent of the heterogeneity was assessed using the I^2 statistic (0% to 40%: might not be important; 30% to 60%: may represent moderate heterogeneity; 50% to 90%: may represent substantial heterogeneity; 75% to 100%: considerable heterogeneity; Higgins et al., 2019). The minimum number of studies required for subgroup analyses and publication bias tests to be meaningful is 10 per meta-analysis (Higgins et al., 2019). As none of the meta-analyses included more than 10 studies, these tests are not reported.

Sensitivity analyses examined the influence of correlations reported by primary studies that appeared to be outliers. Correlations were classified as outliers if the lower bound of the 95% confidence interval for the primary study effect size was higher than the upper bound of the pooled effect confidence interval (unusually large effect), or the converse (unusually small effect) (Viechtbauer and Cheung, 2010).

2.5. Interpretation of meta-analysis findings

When interpreting the pooled effect size estimates, r of at least .1 is small, .3 medium, and .5 large (Cohen, 1992). In addition to evaluating the magnitude of the effect, we rated each meta-analysis on confidence or certainty that the true effect is similar to the estimated effect. Certainty in the effect size estimates was rated based on two criteria adapted from the Grading of Recommendations Assessment, Development and Evaluation (GRADE) guidelines: imprecision (Guyatt et al., 2011a) and inconsistency (Guyatt et al., 2011b). Precision was downgraded if the lower bound of the confidence interval around the pooled estimate was lower than .10 (i.e., the confidence interval did not contain a small effect or greater). Consistency was downgraded if I^2 was 60% or greater (i.e., substantial to considerable heterogeneity; Higgins et al., 2019). Estimates downgraded on precision and consistency were categorized as 'low certainty' (i.e., low confidence that the true effect is similar to the estimated effect), estimates downgraded on one criteria only were categorized as 'moderate certainty' and estimates that were not downgraded were categorized as 'high certainty'.

3. Results

3.1. Characteristics of included studies

In total, 17 studies were eligible for inclusion (see Table 1). The studies were mostly published in the past five years, with the oldest published in 2005. All studies used a cross-sectional design and recruited samples ranging in size from 29 to 766 participants ($MdnN = 83$). The

Table 1
Characteristics of included studies

Author and year	Sample characteristics					Location	Early Maladaptive Schemas		Outcome		
	N	Sample type	% Female	Age, years M (SD)	Sample description		Measure	Language	Measure	Period	Method
Azadi et al. (2019)	82	Clinical	59%	34.8 (9.1)	Inpatients with schizophrenia	Iran	YSQ (75)	Persian	BSSI - suicidal ideation	Past week	SR
Ahmadpanah et al. (2017)	60	Clinical	64%	45.0 (8.14)	Inpatients with MDD	Iran	YSQ (232)	Farsi	MR – self harm [suicide attempts]	Past three to six weeks	Mixed
Castille et al. (2007)	105	Mixed	68%	19.0 (3.3)	Young people from clinical and university sites	USA	YSQ (205)	English	DSHI - self harm	Lifetime	SR
Dench et al. (2005)	50	Clinical	68%	35.5 (8.5)	Psychiatric inpatients	UK	YSQ (75)	English	IBS-R - self harm	Current	SR
Dutra et al. (2008)	107	Clinical	84%	38.3 (11.2)	Outpatients in therapy for trauma	USA	YSQ (75)	English	SRBQ-R - suicidal ideation	Past three months	SR
									SRBQ-R – self harm [suicide attempts]	Past three months	SR
Flink et al. (2017)	79	Clinical	58%	40.5 (11.7)	Outpatients with MDD	Finland	YSQ (90)	Finnish	BDI Item 9 - suicidal ideation	Current	SR
Khosravani et al. (2019)	100	Clinical	43%	36.7 (8.5)	Inpatients in remission from BD	Iran	YSQ (75)	Persian	BSSI - suicidal ideation	Past week	SR
									MR – self harm [suicide attempts]	Lifetime	SR
Khosravani et al. (2017)	60	Clinical	52%	33.9 (12.7)	Psychiatric outpatients	Iran	YSQ (75)	Persian	BSSI - suicidal ideation	Past week	SR
Klibert et al. (2014)	415	Non-Clinical	60%	19.6 (1.46)	University students	USA	YSQ (205)	English	INQ - suicidal ideation	Recently	SR
Langhinrichsen-Rohling et al. (2017)	766	Non-Clinical	70%	19.9 (3.7)	University students	USA	YSQ (75)	English	SIQ - suicidal ideation	Past month	SR
Lawrence et al. (2010)	29	Clinical	90%	18.6 (3.6)	Outpatients at an early intervention service for BPD	Australia	YSQ (75)	English	SCID - self-harm	Lifetime	Int
Leppanen et al. (2016)	60	Clinical	85%	32.4 (8.6)	Patients with severe BPD	Finland	YSQ (232)	Finnish	BPDSI-IV - self-harm	Past three months	Int
Lewis et al. (2015)	392	Non-Clinical	73%	18.6 (1.2)	University students	Canada	YSQ (75)	English	DSHI - self harm	Lifetime	SR
Nilsson (2016)	49	Clinical	75%	33.1 (6.7)	Outpatients in remission from BD	Denmark	YSQ (90)	NR	MR – self-harm [suicide attempts]	Lifetime	Mixed
Pauwels et al. (2016)	487	Clinical	100%	21.4 (5.9)	Inpatients with EDs	Belgium	YSQ (205)	Dutch	SIQ-TR - self harm	Lifetime	SR
Quirk et al. (2015)	228	Non-Clinical	75%	19.4 (2.0)	University students	USA	YSQ (90)	English	SS - self harm	Past 6 months	SR
Weingarden et al. (2018)	83	Clinical	68%	34.6 (12.7)	Patients in two academic medical centres	USA	YSQ (75)	English	BDI Item 9 – suicidal ideation	Past week	SR

Note. BPDSI = Borderline Personality Disorder Severity Index; BDI = Beck Depression Inventory; BSSI = Beck Scale for Suicidal Ideation; IBS-R = Impulsive Behaviors Scale Revised; DSHI = Deliberate Self Harm Inventory; Int = Interview; INQ = Interpersonal Needs Questionnaire; MR = Medical Records; NR = Not Reported; SR = Self-report questionnaire; SCID = Structured Clinical Interview for DSM; SIQ = Suicide Ideation Questionnaire; SIQ-TR = Self Injury Questionnaire Treatment Related; SRBQ-R = Self-harm and Risk Behaviors Questionnaire-Revised; SS = Study Specific; YSQ = Young Schema Questionnaire.

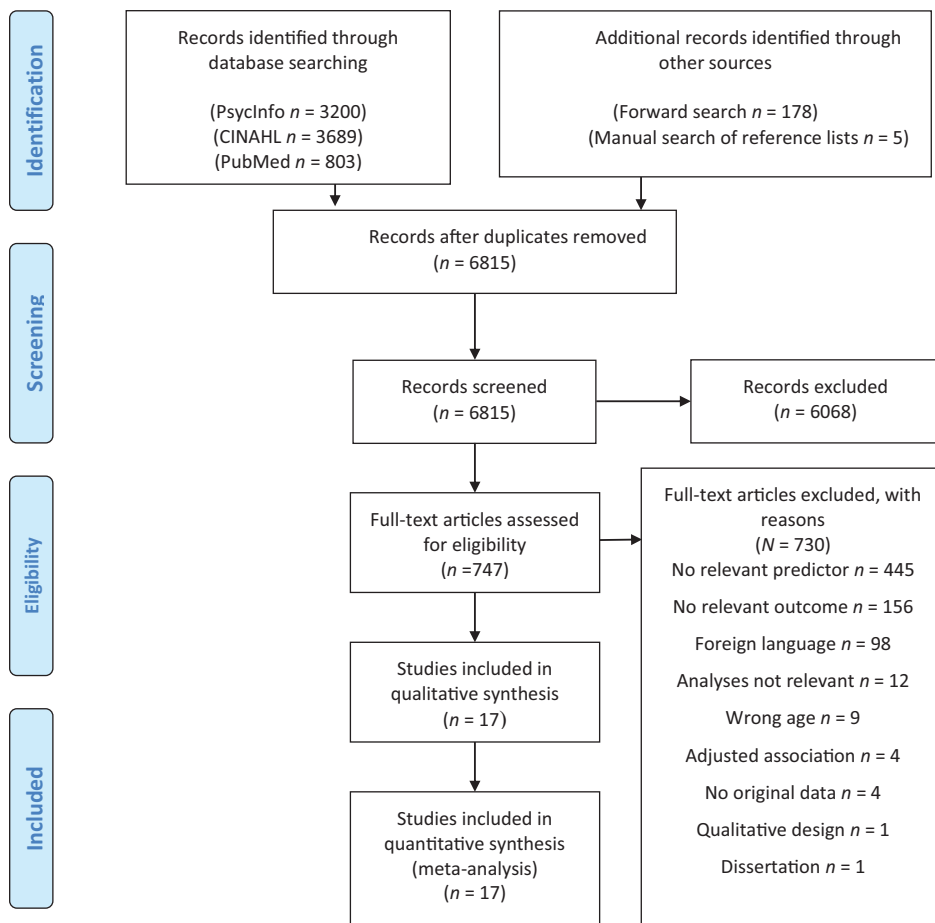


Fig. 1. PRISMA Flow-diagram.

samples included both men and women, except one, which comprised females only. However, samples tended to comprise an unbalanced number of females ($M = 70\%$). The mean age of participants ranged from 18.6 ($SD = 1.2$) to 45.0 ($SD = 8.14$) years. The participants were primarily recruited from clinical settings ($k = 12$). The remaining samples comprised university students ($k = 4$), and one study combined participants from clinical and university sites into a single sample. The clinical samples were diverse and included inpatients and outpatients with schizophrenia, trauma, Major Depressive Disorder, Bipolar Disorder, Borderline Personality Disorder, Eating Disorders, and other unspecified psychiatric illnesses. Studies were completed in the United States of America ($k = 6$), Iran ($k = 4$), Finland ($k = 2$), Canada ($k = 1$), Denmark ($k = 1$), Australia ($k = 1$), the United Kingdom ($k = 1$), and Belgium ($k = 1$).

3.2. Quality assessment

Overall, studies obtained similar quality ratings (see Table 2). Most studies used samples rated as being “somewhat representative of the average in the target population” (non-random sampling; $k = 10$). Of the remaining studies, six were rated as “truly representative,” and one was “unclear.” Approximately half of the studies used samples of less than 100 participants and did not justify this based on power analysis ($k = 9$), while the remaining eight studies were rated “justified and satisfactory.” All studies assessed the risk factors (early maladaptive schemas) using a version of the Young Schema Questionnaire, as this was a requirement for inclusion in the review. The suicidal ideation and self-harm behavior outcomes were assessed using validated self-report measurement tools ($k = 10$), clinical interview, ($k = 2$), single-item self-report ($k = 2$), a

combination of client report and medical records ($k = 2$), and a self-report measure designed by the authors ($k = 1$).

3.3. Meta-analytic findings

The meta-analysis results are summarized in Tables 3 and 4 and in text below, and the primary study findings are summarized in On-line Supplement 4. In total, 27 meta-analyses were completed, ranging in size from five to nine associations, with pooled sample sizes ranging from 405 to 1192. Given the volume of analyses, only significant effect size estimates are reported in the text. Influential cases (Lewis et al., 2015; Pauwels et al., 2016) were detected in all the self-harm meta-analyses except Entitlement. Leave-out-analyses were completed to calculate the pooled effect with the influencer cases omitted and demonstrated that outliers had a substantial influence (see Online Supplement 5). Outliers were excluded from the relevant meta-analyses presented in Tables 3 and 4 but are retained and indicated in bold in On-line Supplement 4 for transparency.

3.4. Suicidal ideation

Suicidal ideation demonstrated a large mean correlation with the Defectiveness Shame schema, moderate correlations the Social Isolation, Failure, and Dependence Incompetence schemas, and small correlations with the Subjugation and Emotional Inhibition schemas. The Emotional Deprivation schema demonstrated a moderate correlation with suicidal ideation, but heterogeneity was detected ($I^2 = 78\%$).

Table 2
Quality assessment

	Representativeness	Sample Size	Assessment of the risk factor	Assessment of the outcome
Ahmadpanah et al. (2017)	Truly	Not justified (N<100)	Validated measurement tool	Client report/medical records
Azadi et al. (2019)	Truly	Not justified (N < 100)	Validated measurement tool	Self-report
Castile et al. (2007)	Unclear	Justified and satisfactory	Validated measurement tool	Self-report
Dench et al. (2005)	Somewhat	Not justified (N < 100)	Validated measurement tool	Self-report
Dutra et al. (2008)	Somewhat	Justified and satisfactory	Validated measurement tool	Self-report
Flink et al. (2017)	Somewhat	Not justified (N < 100)	Validated measurement tool	Self-report (Single item)
Khosravani et al. (2019)	Somewhat	Justified and satisfactory	Validated measurement tool	Self-report
Khosravani et al. (2017)	Truly	Not justified (N < 100)	Validated measurement tool	Self-report
Klibert et al. (2015)	Somewhat	Justified and satisfactory	Validated measurement tool	Self-report
Langhinrichsen-Rohling et al. (2017)	Somewhat	Justified and satisfactory	Validated measurement tool	Self-report
Lawrence et al. (2011)	Somewhat	Not justified (N < 100)	Validated measurement tool	Interview
Leppanen et al. (2016)	Truly	Not justified (N<100)	Validated measurement tool	Interview
Lewis et al. (2015)	Somewhat	Justified and satisfactory	Validated measurement tool	Self-report
Nilsson et al. (2016)	Truly	Not justified (N < 100)	Validated measurement tool	Client report/medical records
Pauwels et al. (2016)	Somewhat	Justified and satisfactory	Validated measurement tool	Self-report
Quirk et al. (2014)	Somewhat	Justified and satisfactory	Validated measurement tool	Self-report (Developed by study authors)
Weingarden et al. (2018)	Truly	Not justified (N < 100)	Validated measurement tool	Self-report (Single item)

Table 3
Early maladaptive schemas and suicidal ideation meta-analyses

Schema	r	95% CI	I ²	k	Pooled N	Imprecision	Inconsistency	Certainty
Emotional Deprivation	.37	.15, .55	78%	6	1194		-1	Moderate
Abandonment	.26	.07, .43	69%	6	1194	-1	-1	Low
Mistrust Abuse	.36	.06, .60	80%	5	428	-1	-1	Low
Social Isolation	.43	.34, .50	14%	6	1194			High
Defectiveness Shame	.50	.43, .57	58%	9	1682			High
Failure	.35	.27, .42	0%	5	428			High
Dependence Incompetence	.33	.13, .51	59%	5	428			High
Enmeshment	.23	.01, .43	63%	5	428	-1	-1	Low
Subjugation	.26	.13, .38	2%	5	428			High
Self-Sacrifice	.12	.00, .25	43%	6	1194	-1		Moderate
Emotional Inhibition	.29	.13, .44	38%	5	428			High
Unrelenting Standards	.15	-.01, .31	73%	6	1194	-1	-1	Low

Note. Pooled estimates in bold were rated as high certainty. The Vulnerability to Harm, Insufficient Self-Control, Entitlement, Approval Seeking, Negativity Pessimism and Punitiveness schemas did not have sufficient data available for meta-analysis.

^aEuropean American subsample

^bAfrican American subsample

Table 4
Early maladaptive schemas and self-harm meta-analyses

Schema	R	95% CI	I ²	k	Pooled N	Imprecision	Inconsistency	Certainty
Emotional Deprivation	.21	.13, .29	21%	9	1130			High
Abandonment	.26	.11, .39	64%	9	1075		-1	Moderate
Mistrust Abuse	.15	.06, .25	46%	9	1130	-1		Moderate
Social Isolation	.29	.18, .38	27%	8	738			High
Defectiveness Shame	.26	.06, .45	91%	8	1025		-1	Moderate
Failure	.23	.00, .45	86%	7	797	-1	-1	Low
Dependence Incompetence	.05	-.38, .45	98%	7	797	-1	-1	Low
Vulnerability to Harm	.26	-.01, .49	81%	6	690	-1	-1	Low
Enmeshment	.01	-.29, .30	96%	7	797	-1	-1	Low
Subjugation	.18	-.05, .39	94%	8	1025	-1	-1	Low
Self-Sacrifice	.08	-.03, .19	0%	6	405	-1		Moderate
Emotional Inhibition	.19	.13, .24	0%	6	405			High
Unrelenting Standards	.10	-.02, .22	30%	7	797	-1		Moderate
Insufficient Self-control	.11	.00, .21	46%	8	1023	-1		Moderate
Entitlement	.12	-.14, .36	86%	6	785	-1	-1	Low

Note. Pooled estimates in bold were rated as high certainty. Approval Seeking, Negativity Pessimism and Punitiveness schemas did not have sufficient data available for meta-analysis.

3.5. Self-harm behavior

Self-harm behavior demonstrated small correlations with the Emotional Deprivation, Social Isolation, and Emotional Inhibition schemas. The Abandonment schema demonstrated a small correlation with self-harm, but heterogeneity was detected (I² = 64%).

4. Discussion

The aim of this systematic review and meta-analysis was to evaluate the evidence on early maladaptive schemas as correlates of suicidal ideation and self-harm behavior. Our findings aligned with the Interpersonal Theory of Suicide (Joiner et al., 2012; Van Orden et al., 2005; Van Orden et al., 2010). Moderate to large effect size estimates sug-

gested that individuals who report thoughts of suicide are more likely to believe that they are inherently unlovable (Defectiveness Shame $r = .50$ [.43, .57]), isolated (Social Isolation $r = .43$ [.34, .50]), and uncared for (Emotional Deprivation $r = .37$ [.15, .55]), incapable of success (Failure $r = .35$ [.27, .42]), and unable to handle daily life (Dependence Incompetence $r = .33$ [.13, .51]). Suicidal ideation also demonstrated small correlations with Subjugation ($r = .26$, [.13, .38]) and Emotional Inhibition ($r = .29$ [.13, .44]), suggesting suicidal thoughts are associated with beliefs that expressing one's feelings will be met with disapproval or retaliation from others. The Social Isolation ($r = .29$, [.18, .38]), Emotional Deprivation ($r = .21$, [.13, .29]), and Emotional Inhibition ($r = .19$, [.13, .24]) schemas were also linked to self-harm. Finally, the Abandonment schema, which encompasses the expectation that the people one relies upon for care will leave or be unavailable, was correlated with self-harm ($r = .26$ [.11, .39]), but not suicidal ideation.

These effects are similar in magnitude to those found in [Chu et al.'s \(2017\)](#) systematic review and meta-analysis of the research on the Interpersonal Theory of Suicide. Chu et al. found that perceived burdensomeness ($r = .48$, $p < .001$) and thwarted belongingness ($r = .37$, $p < .001$) were moderately correlated with suicidal ideation. The finding that suicidal ideation was related to schemas relating to impaired autonomy and competence is consistent with contemporary theories, such as the Integrated Motivational-Volitional model ([O'Connor and Kirtley, 2018](#); [O'Connor, 2011](#)) and the Three Step Model ([Klonsky and May, 2015](#)). Schemas relating to a low sense of personal agency may contribute to a sense of entrapment and hopelessness, which are identified by these theories as precursors to suicidal thoughts. Previous meta-analyses have also demonstrated a longitudinal association between hopelessness and increased risk of suicidal ideation ([Ribeiro et al., 2018](#)).

Small correlations were also found between suicidal ideation and the Subjugation and Emotional Inhibition schemas, which both involve inhibiting needs, desires, or emotions in fear of retaliation, abandonment, or disapproval. Individuals with these schemas may be less likely to use adaptive emotion regulation strategies, such as healthy emotional expression, to mitigate emotional pain ([Lewis et al., 2015](#)). Therefore, the individual resorts to maladaptive ways of coping with their distress, such as fantasizing about death or attempting suicide.

The finding that Emotional Inhibition schema was correlated with suicidal and non-suicidal self-injury is also consistent with the notion that individuals who endorse the Emotional Inhibition schema tend to be detached from emotional and somatic cues. Therefore, individuals with this schema may be more able to overcome the innate instinct for survival and fear that normally deters individuals from self-harming. This fits with the notion that individuals exposed to painful and traumatic events (e.g., physical abuse) experience less fear of death and physical pain, which in turn increases their capability for suicide ([Chu et al., 2017](#)).

Schemas associated with fear or expectation of abandonment and a lack of consistent emotional nurturance (i.e., the Abandonment and Emotional Deprivation schemas) were associated with self-harm, although findings across studies were somewhat inconsistent. These findings align with the Abandonment-Symbiosis hypothesis ([Orbach, 2007](#)). The association between Abandonment and self-harm is also consistent with conceptualizations of self-harm as an attachment protest behavior, that functions to desperately communicate a need for nurturance ([Farrell et al., 2012](#)). This corresponds with findings that perceiving interpersonal rejection may be correlated with non-suicidal self-injury ([Stepp et al., 2008](#)). The Abandonment and Emotional Deprivation schemas may also overlap with perceived burdensomeness, as they encompass the expectation that significant others cannot be relied on to consistently provide emotional support.

The evidence base relating self-harm to schemas was minimal in comparison to suicidal ideation and was characterized by substantial heterogeneity. The stronger associations with ideation may reflect that suicidal ideation typically emerges as part of a larger network of nega-

tive cognitions, as per the Schematic Appraisal Model ([Johnson et al., 2008](#); [Johnson et al., 2010](#); [Panagioti et al., 2015](#)). Several of Young's schemas may be present within a larger network, and this network may be idiosyncratic to each person, as per William and Teasdale's differential activation theory ([Williams et al., 2008](#)).

It is also possible that the correlations with behavioral outcomes were smaller and less consistent because behavior may be more closely related to coping responses and schema modes, than schemas. Schemas represent trait-like vulnerabilities, while schema modes are affective, cognitive, and behavioral states that occur when schemas are activated. Therefore, modes may be more proximal predictors of self-harm. For example, ([Young et al., 2003](#)) and [Farrell et al. \(2012\)](#) suggested that self-harm behavior could be driven by various modes with different functions, including the Punitive Parent mode (to punish the child modes), the Detached Protector mode (to feel something), the Impulsive Child mode (to get attention from others), or the Abandoned Child mode (to escape unbearable loneliness). This warrants increased attention, as few empirical investigations (e.g., [Leppanen et al., 2016](#); [Saldias et al., 2013](#)) have examined these clinically important associations. Further research into modes is also consistent with [Chu et al.'s \(2017\)](#) calls for studies evaluating short-term (i.e., over hours or days) risk factors for suicide.

Overall, the findings highlight that schemas relating to unmet needs for belonging, acceptance, autonomy, competence, and healthy expression of emotions are associated with suicidal ideation and self-harm. From a clinical perspective, identification of the schemas correlated with suicide-related outcomes has utility in case formulation and risk assessment ([Lewis et al., 2015](#)). [Dutra et al. \(2008\)](#) advocated for routinely assessing schemas (i.e., administering the YSQ) to screen for suicide risk. Asking clients about the extent to which they feel like they do not belong or are unlovable, in addition to asking directly about suicidal behaviors, could provide important insights into the specific beliefs underpinning the client's suicidality. Treatment can then be tailored to focus on healing these schemas, and the underlying experiences of childhood trauma and adversity ([Khosravani et al., 2019](#); [Lawrence et al., 2010](#); [Leppanen et al., 2016](#)).

The impact of early interactions with attachment figures, early adverse experiences, and the development of schemas and their associations with suicidal ideation and self-harm may provide insights into clinical interventions to best target chronic suicidality ([Langhinrichsen-Rohling et al., 2017](#)). Schema Therapy directly targets schemas originating from early adversity and unmet needs via the therapeutic relationship (i.e., limited reparenting), as well as cognitive, behavioral, and emotion-focused techniques ([Farrell et al., 2012](#); [Nordahl et al., 2005](#)). For example, healing the Social Isolation schema might involve encouraging the client to focus on the similarities they share with others, processing childhood experiences of isolation or social rejection, and providing a supportive and accepting therapeutic relationship ([Castille et al., 2007](#)). In support of the use of schema therapy to reduce suicidal ideation and self-harm, a randomized controlled trial ([Giesen-Bloo et al., 2006](#)) comparing schema therapy to transference-focused psychodynamic therapy in individuals with BPD ($N = 86$) demonstrated schema therapy was associated with larger reductions on the parasuicidal subscale of the Borderline Personality Disorder Severity Index ([Arntz et al., 2003](#)), which is comprised of items on self-harm, suicide attempts, and suicidal ideation and plans. Further research is needed to ascertain whether schema therapy can reduce suicide risk.

Schemas are also modifiable via corrective experiences outside of the therapeutic context, such as positive social experiences ([Cruwys et al., 2008](#)). Therefore, as recommended by [Chu et al. \(2017\)](#) and consistent with Klonsky and May's (2015) Three Step Model, enhancing social connections and engaging in social activities may reduce or prevent suicidal ideation and subsequent behavior. However, social connection in and of itself is not sufficient for schema-healing. Novel experiences that counter the individual's specific schemas and associated maladaptive coping styles are needed to facilitate schema modification. Relational experiences that challenge the person's maladaptive schemas (e.g., feel-

ing a genuine sense of belonging) can lead them to update their existing mental representations or create new representations to accommodate these divergent experiences (Fraleay, 2019). In contrast, if an individual engages in more social activities but continues to adopt maladaptive coping responses (e.g., overcompensating for the Social Isolation schema by becoming a chameleon to fit in with the group) (Young et al., 2003), the schema will be perpetuated.

4.1. Limitations

Our review is strengthened by a transparent and systematic approach to synthesis that complied with the PRISMA protocol. However, several limitations warrant acknowledgment, including lack of pre-registration, the reliance on a small number of cross-sectional studies, and neglecting to contact authors to obtain bivariate data if adjusted associations were reported ($k = 4$). The primary concern is our low confidence in the pooled effect size estimates for several schemas, due to inconsistent findings, a lack of primary studies, and small sample sizes. None of the meta-analyses included a pooled sample size greater than 2000. The presence of high heterogeneity across several of the meta-analyses lowers our certainty in the estimates and subgroup analyses could not be completed to investigate plausible explanations for this inconsistency. For example, it is possible that the magnitude of the effect sizes is moderated by YSQ version, sample characteristics, or other methodological differences. Studies with participants from diverse clinical settings were combined with samples of university students, but the possibility that sample type (clinical versus non-clinical) is a moderator of the association between schemas and suicidal outcomes warrants consideration.

One potential contributor to heterogeneity is the outcome measure used. Studies varied in how they operationalized suicidal ideation and self-harming behavior. For example, some studies used retrospective measures of life-time self-harm, while others assessed current self-harm behavior (e.g., within the past three months). This was found to be a moderator in a review of childhood maltreatment and non-suicidal self-injury (Liu et al., 2018) and could be a plausible explanation for the variation in the magnitude of the reported effect sizes in the current review. In addition, we collapsed suicidal (e.g., suicide attempts) and non-suicidal self-harm outcomes to increase the power of our analyses, but it is possible that different schemas are associated with self-harm, depending on the intention, function, and type of behavior (e.g., self-poisoning versus self-laceration) (Pitman and Tyrer, 2008).

Second, all the primary studies used cross-sectional designs. Longitudinal studies are needed to establish temporal precedence of schemas. Although schemas are conceptualized as trait-like, bidirectionality is possible, whereby suicidal thoughts and behavior increase the likelihood that someone perceives themselves to be different, unlovable, or a failure (Ahmadpanah et al., 2017). This would be in keeping with the differential activation theory that a mood state-information processing feedback loop can occur (Lau et al., 2004), and the notion that each time the suicide schema network is activated by negative experiences, the network is strengthened (Johnson et al., 2008; Johnson et al., 2010). Studies are needed to identify how cognitions and suicidality change over time.

Finally, our review focused on bivariate associations between each of the 18 schemas and suicidality. It was beyond the scope of this review to examine combinations or profiles of schemas. The Interpersonal Theory of Suicide proposes that it is the interaction between thwarted belongingness, perceived burdensomeness, and hopelessness that potentiates suicide risk (Chu et al., 2017). The Schematic Appraisal Model of Suicide similarly emphasizes a network of schemas, suggesting schemas may have a cumulative effect. Therefore, it could be beneficial for future studies to use latent profile analysis or the pathfinder technique to investigate whether certain schema 'clusters' confer more suicidal risk.

5. Conclusion

Using a systematic approach and meta-analyses, this review identified that suicidal thoughts and self-harm are both associated with feeling isolated, expecting that one's desire for emotional support will not be met, and inhibiting one's feelings. Suicidal ideation was also associated with perceiving one's self as unlovable, fundamentally flawed, and incapable of success or managing daily responsibilities. These findings correspond with the risk factors identified by the Interpersonal Theory of Suicide: thwarted belonging and burdensomeness. Longitudinal studies with larger samples are needed to establish temporal causality and to investigate the potential for schema therapy to ameliorate suicidal ideation and self-harm symptomatology.

Declaration of Competing Interest

No conflicts to declare.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.jadr.2020.100051](https://doi.org/10.1016/j.jadr.2020.100051).

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