

## Review Article

# Early maladaptive schemas and obsessive-compulsive disorder: A systematic review and meta-analysis<sup>☆, ☆ ☆</sup>

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## ABSTRACT

**Background:** Obsessive-compulsive disorder (OCD) is a condition with poor treatment outcomes. Improved understanding of the aetiology can inform prevention and treatment approaches; hence several studies have assessed early maladaptive schemas (EMSs) in OCD. This systematic review and meta-analysis aimed to synthesise the evidence on relationships between the 18 EMSs and OCD.

**Methods:** The study was conducted according to PRISMA guidelines and registered on PROSPERO (CRD42022329337). A systematic search of PubMed, PsycINFO, and CINAHL Complete was conducted on 4 June 2022. Studies in peer-reviewed journal articles were included if they assessed EMSs and OCD (diagnosis or symptom severity) in adults with a mean age of 18 years or older. Studies were excluded if they were not in English, did not include original quantitative data, or reported on case studies. Study details were tabulated and the meta-analysis findings were presented using forest plots. Methodological quality was assessed using the Appraisal tool for Cross-Sectional Studies (AXIS).

**Results:** Based on 22 studies (pooled  $N = 3699$ ), all 18 EMSs were positively correlated with OCD. The largest associations were with the dependence/incompetence ( $r = 0.40$  95 % CI [0.32, 0.47]), vulnerability to harm or illness ( $r = 0.40$  95 % CI [0.32, 0.48]), and negativity/pessimism schemas ( $r = 0.42$  95 % CI [0.22, 0.58]).

**Limitations:** Several meta-analyses showed considerable heterogeneity and publication bias.

**Conclusions:** The findings suggest all EMSs, particularly those relating to disproportionate negative expectations and a perceived inability to cope, are implicated in OCD. Psychological prevention and treatment for OCD may benefit from targeting these schemas.

## 1. Introduction

Obsessive-compulsive disorder (OCD) is a condition characterised by recurring thoughts, urges, or images that are unwanted and distressing (i.e., obsessions), and attempts to alleviate these obsessions by engaging in repetitive behaviours or mental acts (i.e., compulsions; [American Psychiatric Association, 2013](#)). Large epidemiological surveys have identified a lifetime prevalence of approximately 2%–3% ([Kessler et al., 2012](#); [Subramaniam et al., 2012](#)), and longitudinal studies have evidenced the considerable burden of OCD due to its chronicity and impact on functioning ([Eisen et al., 2013](#); [Remmerswaal et al., 2020](#); [Sharma et al., 2014](#)). Despite the effectiveness of current treatment approaches, including exposure and response prevention (ERP; [Ferrando and Selai,](#)

[2021](#)), approximately 50 % of OCD patients who receive treatment do not maintain long-term recovery ([Sharma et al., 2014](#); [van Oppen et al., 2005](#)).

Poor treatment outcomes for OCD have been associated with intrapersonal factors such as core beliefs ([Adams Jr. et al., 2012](#)), and personality disorder traits ([Thiel et al., 2013](#)). This has motivated investigations into therapeutic approaches other than ERP, such as schema therapy, which target cognitive vulnerabilities ([Tenore et al., 2018a](#); [Thiel et al., 2016](#)). Schema therapy was developed by [Young \(1990, 1999\)](#) to treat clients with chronic, entrenched issues by altering underlying schemas. This approach integrates aspects of cognitive, psychodynamic, emotion-focused, and Gestalt therapies ([Young et al., 2003](#)). Preliminary research on schema therapy for OCD has shown

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favourable outcomes, particularly for those who were unresponsive to other treatments (Gross et al., 2012; Thiel et al., 2016). The current study sought to extend this research by increasing our understanding of the schemas most strongly endorsed by individuals with OCD.

The concept of schemas was initially defined by Aaron Beck within a cognitive therapy framework, as mental structures for interpreting and categorising environmental stimuli based on persistent cognitive patterns (Beck, 1967, 1979). Young elaborated Beck's concept of schemas by defining 18 specific early maladaptive schemas (EMSs; Young, 1990, 1999). EMSs<sup>1</sup> are broad, dysfunctional patterns of relating to oneself and others, which encompass cognitions, memories, emotions, and bodily sensations (Young et al., 2003). EMSs are so named as Young theorised that they develop early in life in response to unmet emotional needs, including secure attachment, autonomy, freedom to express emotions, play, and realistic limits (Young et al., 2003).

The 18 EMSs are categorised into five overarching domains corresponding to these emotional needs (see the online supplementary material for detailed definitions of each EMS; Young et al., 2003). The first domain is disconnection and rejection, which encompasses EMSs relating to disrupted attachment early in life (abandonment/instability, mistrust/abuse, emotional deprivation, defectiveness/shame, and social isolation/alienation). EMSs in the second domain, impaired autonomy and performance, may be precipitated by enmeshed, overprotective parenting (dependence/incompetence, vulnerability to harm or illness, enmeshment/undeveloped self, and failure). The third domain, impaired limits, represents EMSs theorised to originate from over-indulgence or permissiveness in childhood (entitlement/grandiosity and insufficient self-control/self-discipline). EMSs in the fourth domain, other-directedness, are thought to develop when a child experiences conditional love from caregivers (subjugation, self-sacrifice, and approval-seeking/recognition-seeking). Finally, the over-vigilance and inhibition domain encompasses EMSs theorised to result from frequent demands, expectations for perfectionism, and hypervigilance toward negative outcomes early in life (negativity/pessimism, emotional inhibition, unrelenting standards/hyper-criticalness, and punitiveness).

Young's schema model posits that EMSs originate from childhood adversity and subsequently become cognitive risk factors for psychopathology (Young et al., 2003). In adulthood, EMSs are activated by experiences perceived as congruent to the schema, triggering intense emotional reactions, cognitive distortions, and maladaptive coping responses (Young et al., 2003). Therefore, EMSs are theorised to contribute to an increased risk of mental health disorders, with specific EMSs associated more strongly with each disorder (Young et al., 2003). This specificity has been supported empirically, with certain EMSs found to have stronger associations with depression (Bishop et al., 2021), anxiety (Tariq et al., 2021), and eating disorders (Maher et al., 2022). Given the relationship between EMSs and mental disorders, it is likely that certain EMSs are more strongly endorsed by individuals with OCD.

Adverse childhood experiences (e.g., abuse and neglect) are associated with an increased risk of OCD symptoms (Destrée et al., 2021; Ou et al., 2021), suggesting that individuals with OCD may be vulnerable to EMSs in the disconnection and rejection domain. Specifically, childhood emotional and sexual abuse have been associated with OCD (Destrée et al., 2021; Ou et al., 2021), suggesting the potential endorsement of mistrust/abuse and emotional deprivation EMSs. OCD has also been associated with shame (Cândeia and Szentagotai-Tătar, 2018), attachment insecurity (van Leeuwen et al., 2020), and social isolation (Grisham et al., 2011), which indicates an increased likelihood of endorsing the defectiveness/shame, abandonment/instability, and social isolation/alienation schemas, respectively.

Several other EMSs align theoretically with an established model for defining the beliefs underlying OCD. The Obsessive Compulsive

Cognitions Working Group (OCCWG, 2005) identified three beliefs that are crucial for the development and maintenance of OCD. The first belief, responsibility/threat estimation, is characterised by a perceived need to prevent harm and feeling responsible when negative consequences occur (OCCWG, 2005). For example, an individual may have an excessive fear of contamination and feel responsible if they become unwell. This belief shares similarities with the negativity/pessimism EMS, which represents an excessive focus on negative outcomes and expectations that things will go wrong (Young et al., 2003). The relationship between unrealistic pessimism and OCD has also been supported empirically (Jelinek et al., 2022; Niemeyer et al., 2013). In addition, the responsibility/threat estimation belief overlaps with the vulnerability to harm or illness EMS since they both represent unrealistic expectations of harm. The relationship between perceived vulnerability to illness and OCD has also been supported empirically within the context of the COVID-19 pandemic (Jelinek et al., 2022). Overall, this suggests an increased likelihood that individuals with OCD will endorse the negativity/pessimism and vulnerability to harm or illness EMSs.

The second belief identified by OCCWG (2005), perfectionism/certainty, involves high standards for oneself and cognitive rigidity. For example, an individual may engage in a compulsion every time they have an intrusive thought with rigidity in the application of this rule. The third belief, importance/control of thoughts, represents a need to remove intrusive thoughts and fusion between thought and action (OCCWG, 2005). For example, an individual may hold the belief that the thought of harming someone is equally as immoral as the act of causing harm. These two beliefs share themes with the unrelenting standards/hyper-criticalness EMS, which represents perfectionism, high standards for oneself, and the application of rigid rules (Young et al., 2003). The theoretical link between OCD and unrelenting standards/hyper-criticalness has also been supported empirically, with associations found between OCD and perfectionism (Limburg et al., 2017; Pinto et al., 2017), and cognitive rigidity (Ramakrishnan et al., 2022). Collectively, this evidence suggests individuals with OCD may be more likely to endorse the unrelenting standards/hyper-criticalness EMS.

Although the OCCWG (2005) provided a valuable contribution to understanding the cognitions underlying OCD, they focused solely on the beliefs that underpin obsessions and compulsions. In addition, numerous cognitive risk factors have been identified and the most potent predictors of OCD remain unclear. Examining Young's EMSs provides an opportunity to explore a broader range of factors that may contribute to OCD aetiology and to treatment response. In addition, it provides an opportunity to identify the beliefs most strongly associated with OCD symptoms.

### 1.1. The current study

The current study aimed to conduct a systematic review and meta-analysis on the relationship between EMSs and OCD symptoms in adults. Empirical evidence on schema therapy for OCD is still emerging, with limited studies and several methodological issues (Peeters et al., 2021). Despite this, literature assessing EMSs in OCD has increased. A meta-analysis to synthesise the research and identify the EMSs with the strongest relationship to OCD was thus timely. This information can improve the understanding of OCD aetiology and guide psychological conceptualisation and treatment. In addition, the findings can identify strengths and limitations of the literature to guide future research directions.

## 2. Methods

A systematic review and meta-analysis on OCD and EMSs was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 (PRISMA 2020) statement (Page et al., 2021). The PRISMA checklists are in the online supplementary material. The review was registered on the PROSPERO register for systematic

<sup>1</sup> Early Maladaptive Schemas has been abbreviated to EMSs throughout this article.

reviews on 30 April 2022 (<https://www.crd.york.ac.uk/prospero/>, registration number CRD42022329337).

### 2.1. Search strategy

A systematic search of the electronic databases PubMed, PsycInfo, and CINAHL Complete was conducted on 4 June 2022 using the search terms “schema\* AND (obsess\* OR compuls\* OR OCD)” anywhere in the full text. The search was limited to peer-reviewed journal articles in English, without publication date limits. For the included studies, a manual search was conducted of the reference lists to identify additional sources, and a forward search was conducted via Scopus to identify papers that cited the studies.

### 2.2. Eligibility criteria

Studies were required to meet the following inclusion criteria: (a) assessed OCD symptom severity using a self-report questionnaire, or assessed OCD diagnosis (e.g., based on clinical interview or medical records); (b) assessed EMS/s using any form of the Young Schema Questionnaire; (c) recruited a sample with a mean age of 18 years or older; and (d) published in a peer-reviewed journal. Studies were excluded if they met any of the following criteria: (a) written in a language other than English; (b) did not include original data; (c) reported qualitative data only; or (d) reported on a single-subject case study.

### 2.3. Data extraction and management

The studies identified in the search were screened by the primary author using an online systematic review program, Rayyan (Ouzzani et al., 2016). The titles and abstracts were screened against the eligibility criteria. Subsequently, the full texts of the remaining articles were screened, and the reasons for exclusion were recorded. Where studies utilised OCD and EMS measures but did not report the required effect sizes, the authors were contacted via email to request the data. Out of the 34 authors contacted, 20 did not respond, 10 provided data, two stated they did not have access to the data, and two stated they were unable to provide the data in a timely manner.

The data from the final articles were extracted into a standardised Microsoft Excel spreadsheet. The extracted data included descriptive characteristics of the sample, recruitment setting, measures used to assess EMSs and OCD, and effect sizes representing the association between any of the 18 EMSs and OCD. This process was conducted independently by both authors, and any discrepancies were resolved by discussion. Decisional hierarchies were utilised to resolve issues during the extraction, which are listed in the online supplementary material.

### 2.4. Quality assessment

The quality of the included studies was assessed independently by both authors using the Appraisal Tool for Cross-Sectional Studies (AXIS; Downes et al., 2016). This tool provided 20 questions to assess the quality of the introduction, methods, results, discussion, and other factors with response options of yes, no, or do not know (see the online supplementary material for the AXIS checklist). The authors ratings were compared, and any discrepancies were resolved by discussion. The ratings were then collated to summarise the overall quality of the literature included in the meta-analyses.

### 2.5. Meta-analyses

Meta-analyses were conducted using Meta-Essentials (Suurmond et al., 2017) to examine whether individuals with OCD symptoms reported higher EMSs. Separate analyses were completed for each of the 18 EMSs. As 15 studies reported correlational data, meta-analyses were conducted to determine the relationship between EMSs and OCD

symptoms using correlation coefficient,  $r$ . The eight studies that reported mean differences of EMSs between OCD and control groups were converted into Pearson's  $r$  using the Practical Meta-Analysis Effect Size Calculator (Wilson, n.d.). The data was judged to be appropriate for conversion since it was comparable in relevant ways (Borenstein et al., 2009), such as the majority of included studies having assessed a clinical sample. The correlations were considered small at 0.10, moderate at 0.30, and large at 0.50 (Cohen, 1992). The results were tabulated and presented as forest plots.

The level of heterogeneity was assessed using the  $I^2$  statistic, with the following descriptors from Cochrane: (1) 0 %–40 %: might not be important; (2) 30 %–60 %: may represent moderate heterogeneity; (3) 50 %–90 %: may represent substantial heterogeneity; and (4) 75 %–100 %: considerable heterogeneity (Deeks et al., 2022). Subgroup analyses were conducted for syntheses with a minimum of 10 studies for meaningful results (Deeks et al., 2022), and a minimum of 5 studies per subgroup (Borenstein et al., 2009). The subgroup analyses were gender (males versus females) and sample type (clinical versus community), to assess whether these factors contributed to heterogeneity in the included studies.

Sensitivity analyses were conducted to examine the influence of outliers in comparison to the pooled effect size. The individual effect sizes were classified as an outlier if the lower bound of the 95 % confidence interval was higher than the upper bound of the pooled effect confidence interval (unusually large effect), or the reverse (unusually small effect; Viechtbauer and Cheung, 2010). Publication bias was assessed using funnel plots and Egger's regression  $p$ -values for meta-analyses with a minimum of 10 effect sizes (Page et al., 2019), with a significant value of  $p \leq 0.05$  indicating likely publication bias (Borenstein et al., 2009). Reporting bias was assessed with item 16 of the AXIS criteria, “Were the results for the analyses described in the methods, presented?” (Downes et al., 2016, p. 4).

A rating was provided on the level of certainty that the true effect was similar to the estimated effect. This was 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). Imprecision was determined if the lower bound of the pooled effect confidence interval was  $< 0.10$ , suggesting the confidence interval did not contain a minimum of a small effect. Inconsistency was determined if  $I^2$  was  $> 60$  %, suggesting substantial to considerable heterogeneity (Deeks et al., 2022). If a meta-analysis was imprecise and inconsistent it was labelled low certainty, suggesting low confidence that the true effect is similar to the estimated effect. If an analysis was either imprecise or inconsistent, it was categorised as moderate certainty. If neither criterion was met, the estimate was categorised as high certainty.

## 3. Results

A total of 1502 records were retrieved via electronic searches. Of these, 139 duplicates were removed, and 96 were considered eligible based on title and abstract. Following full-text screening, 14 studies were included. An additional 8 studies met the eligibility criteria during forward searches and manual searches, resulting in a total of 22 included studies. The screening process is summarised in Fig. 1.

### 3.1. Characteristics of included studies

The characteristics of the included studies are summarised in Table 1. The pooled sample size was 3699 participants, with study samples ranging between 37 and 1418 participants ( $Mdn N = 101$ ). Most studies recruited both genders ( $k = 18$ ), and the remaining recruited females only ( $k = 4$ ). The mean age of participants ranged from 25.5 years ( $SD = 2.3$ ) to 43.8 years ( $SD = 16.5$ ). Most studies recruited OCD patients ( $k = 10$ ), whilst the remaining studies examined OCD symptoms in patients with various mental health diagnoses ( $k = 5$ ), individuals

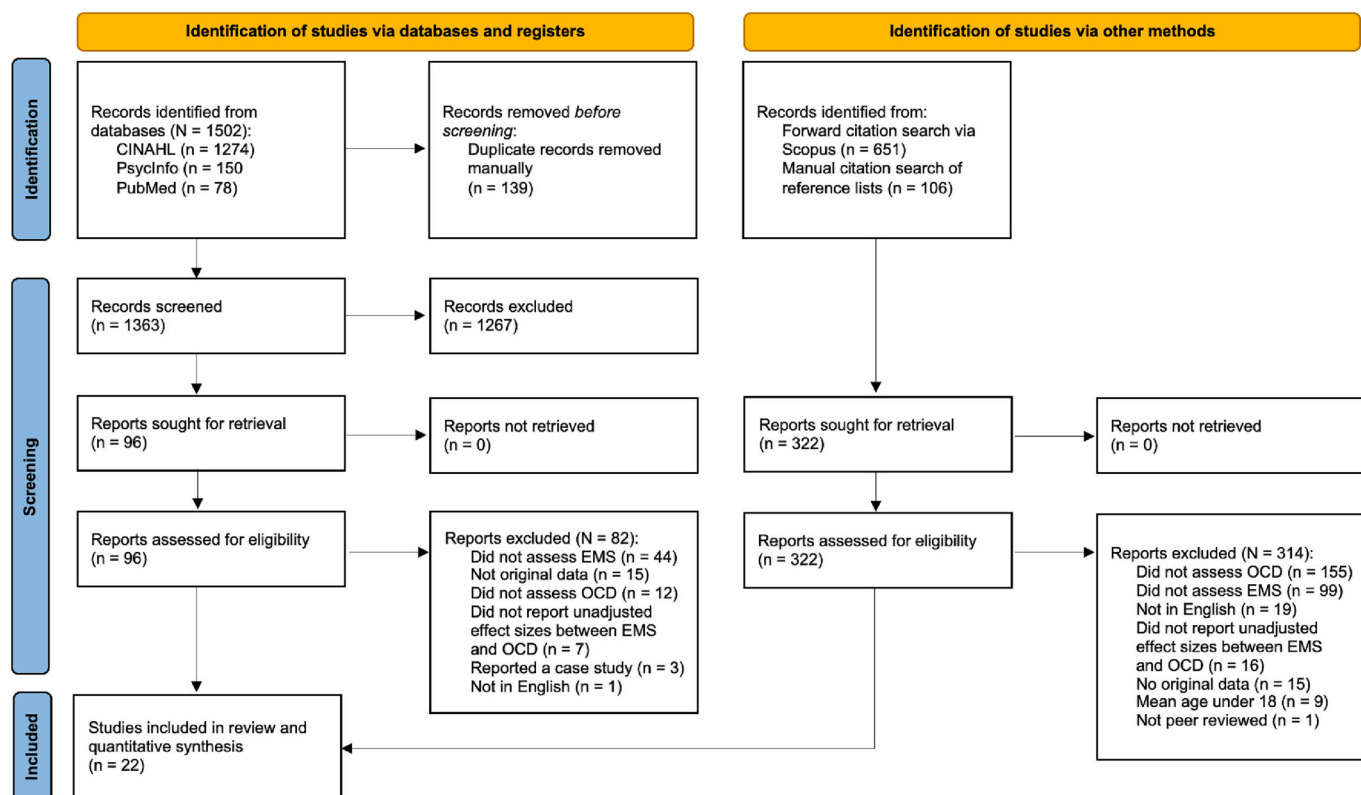


Fig. 1. PRISMA 2020 flow diagram for systematic reviews.

Note. From Page et al. (2021).

from the general population ( $k = 3$ ), pregnant women ( $k = 2$ ), eating disorder patients ( $k = 1$ ), and irritable bowel syndrome patients ( $k = 1$ ). The study locations included Germany ( $k = 3$ ), Iran ( $k = 3$ ), United Kingdom ( $k = 3$ ), Norway ( $k = 2$ ), Turkey ( $k = 2$ ), United States ( $k = 2$ ), Australia ( $k = 1$ ), Canada ( $k = 1$ ), Istanbul ( $k = 1$ ), New Zealand ( $k = 1$ ), Portugal ( $k = 1$ ), South Africa ( $k = 1$ ), and South Korea ( $k = 1$ ).

### 3.2. Quality assessment

A table summarising the methodological quality of the 22 studies based on AXIS criteria is in the online supplementary material. All studies had a clearly defined aim and an appropriate study design. All variables were appropriate for achieving the stated aims and 21 studies used validated measurement tools. Twenty studies clearly defined the target population, but only four studies selected samples from a frame appropriately representing the target population. Only three studies justified their sample size, one study described a randomised selection process, and two studies addressed non-responders and provided evidence against non-response bias. All studies specified their statistical significance level and sufficiently described the method. Nineteen studies presented the statistical analyses outlined in the method, providing evidence against reporting bias. Eighteen studies adequately described basic data and 20 studies were internally consistent. For all studies, the conclusions were justified by the results and the limitations were reported. Ethical approval or consent of participants was attained for 18 studies. A potential conflict of interest was present for one study.

### 3.3. Outcomes of meta-analyses

The meta-analyses are summarised in Table 2, and the individual effect sizes are in the online supplementary material. Based on 20 to 23 effect sizes, there were moderate, positive correlations between OCD and the EMSs mistrust/abuse, social isolation/alienation, defectiveness/

shame, failure, dependence/incompetence, vulnerability to harm or illness, enmeshment/undeveloped self, and subjugation. There was a moderate, positive correlation between OCD and negativity/pessimism based on seven studies. The remaining EMSs (emotional deprivation, abandonment/instability, self-sacrifice, emotional inhibition, unrelenting standards/hyper-criticalness, insufficient self-control/self-discipline, entitlement/grandiosity, approval-seeking/recognition-seeking, and punitiveness) displayed small, positive correlations with OCD. The forest plots are displayed in the online supplementary material.

All meta-analyses demonstrated substantial to considerable heterogeneity, except for abandonment/instability which demonstrated moderate heterogeneity. Based on imprecision and inconsistency ratings, the certainty of the meta-analyses was moderate for 15 EMSs, and high for the remaining three EMSs (abandonment/instability, insufficient self-control/self-discipline, and approval-seeking/recognition-seeking). Subgroup analyses were not conducted, as approval-seeking/recognition-seeking, negativity/pessimism, and punitiveness included <10 studies, and the remaining EMSs had less than five studies per subgroup.

Publication bias was assessed for the 15 meta-analyses that included over 10 effect sizes. There appeared to be publication bias for 10 meta-analyses, with an asymmetrical funnel plot and a significant Egger's regression  $p$ -value of <0.05. Meta-analyses examining abandonment/instability, social isolation/alienation, dependence/incompetence, unrelenting standards/hyper-criticalness, and entitlement/grandiosity EMSs did not show publication bias. The funnel plots are in the online supplementary material.

### 3.4. Sensitivity analyses

Outliers were identified for 15 EMSs as listed in the online supplementary material. Leave-out analyses were conducted by omitting the



**Table 1**  
Characteristics of included studies.

Author and year	Study design	Sample characteristics						EMSs		OCD	
		Sample size	% Female	Age in years, M (SD)	Sample type	Sample description	Location	Measure	Method	Measure	Method
Atalay et al. (2008)	Cross-Sectional	45	68.9 %	32.0 (10.6)	Clinical	Patients with OCD recruited from a hospital outpatient clinic	Istanbul	YSQ-SF	SR	Y-BOCS	CR
Farrow and Blissett (2006)	Longitudinal	99	100.0 %	31.0 (5.7)	General	Pregnant women recruited from a hospital's antenatal clinics	UK	YSQ-SF	SR	BSI (OC subscale)	SR
Farrow and Blissett (2007)	Longitudinal	162	100.0 %	30.0 (5.8)	General	Pregnant women recruited from several antenatal clinics	UK	YSQ-SF	SR	BSI (OC subscale)	SR
Faustino and Vasco (2020)	Cross-sectional	58	77.6 %	18–77	Clinical	Patients with a mental health diagnosis recruited from two hospitals	Portugal	YSQ-S3	SR	BSI (OC subscale)	SR
Haaland et al. (2011)	Longitudinal	88	72.7 %	34.4 (11.5)	Clinical	Patients with OCD recruited from outpatient clinics, GP referrals, and newspaper advertisements	Norway	YSQ-SF	SR	Y-BOCS	CR
Khosravani et al. (2021)	Cross-sectional	180 (120 OCD, 60 HC)	OCD 51.7 % HC 50.0 %	OCD 33.9 (12.6) HC 28.6 (11.1)	Clinical	Patients with OCD recruited from an outpatient clinic and an inpatient clinic; HC recruited from high schools, universities, and workplaces	Iran	YSQ-SF	SR	OCD diagnosis	SCID-I
Kim et al. (2014)	Cross-sectional	127 (57 OCD, 70 HC)	OCD 33.3 % HC 30.0 %	OCD 26.7 (6.3) HC 25.5 (2.3)	Clinical	Patients with OCD recruited from an OCD clinic at a university hospital; HC recruited from a university	South Korea	YSQ-S3	SR	OCD diagnosis	SCID-I
Kizilgac and Cerit (2019)	Cross-sectional	102 (51 OCD, 51 HC)	OCD 68.6 % HC 54.9 %	OCD 26.6 (9.9) HC 27.2 (7.4)	Clinical	Patients with OCD recruited from an outpatient clinic at a university medical centre; HC recruitment unspecified	Turkey	YSQ-S3	SR	OCD diagnosis	Interview
Lawson et al. (2007)	Cross-sectional	43	100.0 %	28.5 (8.7)	Clinical	Patients with an ED recruited from a specialist ED service	New Zealand	YSQ-SF	SR	OCD symptoms (checking/cleaning)	Interview
Lochner et al. (2005)	Cross-sectional	64	100.0 %	35.9 (15.5)	Clinical	Patients with OCD or trichotillomania recruited from an OCD association, GP referrals, and psychiatrist referrals	South Africa	YSQ-SF	SR	Y-BOCS	CR
Paetsch et al. (2022)	Cross-sectional	1418	79.0 %	30.1 (11.5)	General	Non-clinical volunteers recruited online	Germany	YSQ-S3	SR	BSI (OC subscale)	SR
Phillips et al. (2013)	Cross-sectional	133 (72 IBS, 61 HC)	IBS 78.0 % HC 75.0 %	IBS 43.8 (16.5) HC 38.8 (14.2)	Mixed	Patients with IBS and HC recruited from IBS services, gastroenterologists, and universities	Australia	YSQ-SF	SR	SCL-90-R (OC subscale)	SR
Shariatzadeh et al. (2015)	Cross-sectional	96 (38 OCD, 58 HC)	46.1 %	27.2 (NR; range 20–40)	Clinical	Patients with OCD and HC recruited from psychology or psychiatry clinics	Iran	YSQ-SF	SR	OCD diagnosis	SCID-I
Stopa et al. (2001)	Cross-sectional	51	62.0 %	NR	Clinical	Patients with a mental health diagnosis recruited from an outpatient clinic	UK	YSQ-SF	SR	SCL-90-R (OC subscale)	SR
Sunde et al. (2019)	Longitudinal	37–38	77.5 %	18–65	Clinical	Patients with OCD recruited from an outpatient clinic	Norway	YSQ-SF	SR	Y-BOCS	CR
Tenore et al. (2018b)	Cross-sectional	110	68.0 %	36.9 (13.6)	General	Non-clinical volunteers recruited online	USA	YSQ-SF	SR	OCI-R	SR
Thiel et al. (2014)	Longitudinal	70	61.4 %	35.3 (11.1)	Clinical	Patients with OCD recruited from a university medical centre and a hospital	Germany	YSQ-S3	SR	Y-BOCS	CR
Toroslu and Çırakoğlu (2022)	Cross-sectional	290	77.2 %	29.8 (10.0)	General	Non-clinical volunteers in a romantic relationship recruited online	Turkey	YSQ-S3	SR	OCI-R	SR
Voderholzer et al. (2014)	Cross-sectional	202 (60 OCD, 142 HC)	OCD 56.7 %	OCD 35.9 (10.9)	Clinical	Patients with OCD recruited from a university hospital; HC recruited via	Germany	YSQ-S3	SR	OCD diagnosis	SCID-I

(continued on next page)

Table 1 (continued)

Author and year	Study design	Sample characteristics						EMSs		OCD	
		Sample size	% Female	Age in years, M (SD)	Sample type	Sample description	Location	Measure	Method	Measure	Method
Welburn et al. (2002)	Cross-sectional	135	71.8 % 67.0 %	HC 35.5 (13.8) 36.9 (9.3)	Clinical	advertisements and personal contacts Patients with a mental health diagnosis recruited from an outpatient clinic in a hospital	Canada	YSQ-SF	SR	BSI (OC subscale)	SR
Wilhelm et al. (2015)	Longitudinal	36–37	47.0 %	32.7 (10.5)	Clinical	Patients with OCD recruited from a hospital OCD clinic, a university, and the community	USA	YSQ-SF	SR	Y-BOCS	CR
Yoosefi et al. (2016)	Cross-sectional	151 (50 OCD, 50 anxiety, 51 HC)	NR	NR	Mixed	Patients with OCD or anxiety disorders recruited from psychology and psychiatry clinics; HC recruitment unspecified	Iran	YSQ-SF	SR	PI-WSUR	SR

Note. BSI (OC subscale) = Brief Symptom Inventory (Obsessive-Compulsive subscale); CR = clinician-rated; ED = eating disorder; EMSs = early maladaptive schemas; HC = healthy control; IBS = irritable bowel syndrome; NR = not reported; OCD = obsessive-compulsive disorder; OCI-R = Obsessive Compulsive Inventory – Revised; PI-WSUR = Padua Inventory – Washington State University Revision; SCID-I = Structured Clinical Interview for DSM-IV Axis I Disorders; SCL-90-R (OC subscale) = Symptom Checklist-90-Revised (Obsessive-Compulsive subscale); SR = self-reported; Y-BOCS = Yale-Brown Obsessive-Compulsive Scale; YSQ-S3 = Young Schema Questionnaire – Short Form Version 3; YSQ-SF = Young Schema Questionnaire – Short Form.

Table 2  
Pooled effect sizes.

Early maladaptive schemas	k	Pooled N	r [95 % CI]	I <sup>2</sup>	p-Value	Imprecision	Inconsistency	Certainty
Emotional deprivation	21	3487	0.27 [0.18, 0.36]	80.77 %	<0.001		-1	Moderate
Abandonment/instability	19	1789	0.29 [0.22, 0.36]	46.68 %	<0.001			High
Mistrust/abuse	22	3597	0.33 [0.26, 0.41]	71.52 %	<0.001		-1	Moderate
Social isolation/alienation	22	3588	0.37 [0.29, 0.45]	78.40 %	<0.001		-1	Moderate
Defectiveness/shame	21	3487	0.35 [0.26, 0.43]	86.22 %	<0.001		-1	Moderate
Failure	22	3588	0.36 [0.27, 0.45]	84.74 %	<0.001		-1	Moderate
Dependence/incompetence	20	3359	0.40 [0.32, 0.47]	83.12 %	<0.001		-1	Moderate
Vulnerability to harm or illness	22	3648	0.40 [0.32, 0.48]	80.40 %	<0.001		-1	Moderate
Enmeshment/undeveloped self	22	3589	0.30 [0.22, 0.39]	80.80 %	<0.001		-1	Moderate
Subjugation	20	3360	0.39 [0.31, 0.47]	80.90 %	<0.001		-1	Moderate
Self-sacrifice	22	3588	0.21 [0.14, 0.28]	63.75 %	<0.001		-1	Moderate
Emotional inhibition	22	3589	0.27 [0.17, 0.36]	82.04 %	<0.001		-1	Moderate
Unrelenting standards/hyper-criticalness	23	3698	0.25 [0.17, 0.34]	81.01 %	<0.001		-1	Moderate
Insufficient self-control/self-discipline	18	1760	0.28 [0.20, 0.35]	56.15 %	<0.001			High
Entitlement/grandiosity	21	3487	0.21 [0.13, 0.28]	65.77 %	<0.001		-1	Moderate
Approval-seeking/recognition-seeking	6	2083	0.28 [0.15, 0.41]	57.51 %	<0.001			High
Negativity/pessimism	7	2185	0.42 [0.22, 0.58]	86.20 %	<0.001		-1	Moderate
Punitiveness	7	2185	0.28 [0.14, 0.42]	80.17 %	<0.001		-1	Moderate

Note. k = number of effect sizes.

outliers (Viechtbauer and Cheung, 2010). This indicated that the outliers may have influenced the results for abandonment/instability and insufficient self-control/self-discipline, with the strength of the pooled effect sizes reducing from moderate to small. For the remaining EMSs, the strength of the pooled effect sizes did not substantially change. Based on these findings, the synthesised results in Table 2 excluded the outliers for abandonment/instability and insufficient self-control/self-discipline. The original findings with outliers included are in the online supplementary material.

4. Discussion

This systematic review and meta-analysis aimed to synthesise the evidence on the relationship between early maladaptive schemas (EMSs) and obsessive-compulsive disorder (OCD). Meta-analyses containing between six and 23 associations indicated small to moderate, positive correlations between each of the 18 EMSs and OCD symptoms. The strongest associations (r > 0.40) were with dependence/incompetence, vulnerability to harm or illness, and negativity/pessimism. Associations between 0.30 and 0.39 were found for mistrust/abuse, social isolation/

alienation, defectiveness/shame, failure, enmeshment/undeveloped self, and subjugation. The remaining schemas demonstrated small associations between 0.10 and 0.29. These findings support Young’s theory that EMSs are cognitive risk factors for psychopathology (Young et al., 2003), and are consistent with the notion that EMSs are differentially associated with specific mental health presentations (Bishop et al., 2021; Maher et al., 2022; Tariq et al., 2021).

The three EMSs with the strongest associations suggest that individuals with OCD are more likely to feel incapable of coping independently (dependence/incompetence), to worry about experiencing harm or adverse events (vulnerability to harm or illness), and to expect that things will go wrong (negativity/pessimism). These EMSs share a common theme of representing disproportionate expectations of negative events and a perceived inability to cope. These findings are consistent with previous research implicating exaggerated estimations of threat in OCD. For example, OCCWG (2005) formulated that a key belief underlying OCD is responsibility/threat estimation, which has been associated with various OCD symptoms (Brakoulias et al., 2014; Myers et al., 2008; Wheaton et al., 2010). Furthermore, research has identified that individuals with OCD are more likely to overestimate

their risk of experiencing negative events rather than overestimating the risk for others (Jelinek et al., 2022; Moritz and Jelinek, 2009; Zetsche et al., 2015). The three strongest EMSs identified in the current review similarly involve an overestimation of personal threat.

In addition, our findings extend current research by identifying an important secondary factor of perceiving oneself as incompetent and unable to cope with negative events. Previous research has identified that individuals with OCD lack adaptive coping strategies and are more likely to endorse maladaptive coping strategies (Moritz et al., 2018; Renkema et al., 2020; Rosa-Alcázar et al., 2021), and compulsions are defined as a maladaptive coping mechanism for preventing anxiety, distress, or dreaded events (American Psychiatric Association, 2013). Moreover, OCD has been associated with excessive reassurance seeking (Haciomeroglu, 2020; Kobori and Salkovskis, 2013; Smith et al., 2022; Starcevic et al., 2012), which is consistent with a perceived inability to cope independently.

Aside from the three predominant EMSs, moderate relationships were found between OCD and EMSs in the disconnection and rejection domain, including mistrust/abuse, social isolation/alienation, and defectiveness/shame. This suggests that individuals with OCD may believe that they will be abused, humiliated, or taken advantage of, and that they do not belong, are unworthy, or are unlovable (Young et al., 2003). These EMSs are theorised to emerge from developmental trauma and insecure attachment (Young et al., 2003), and have been associated with higher rates of childhood neglect and abuse (Pilkington et al., 2021). Correspondingly, childhood abuse has been associated with OCD symptoms in adulthood (Destrée et al., 2021; Ou et al., 2021). The current review provides further evidence that OCD is associated with maladaptive beliefs related to a lack of attachment, safety, belonging, and nurturance.

The current review also points to potential factors that contribute to OCD aetiology. EMSs are assumed to form in response to unmet needs in early life. The two EMSs most strongly associated with OCD, dependence/incompetence and vulnerability to harm or illness, are assumed to develop within enmeshed, overprotective families where competence and independence are not reinforced (Young et al., 2003). The other prominent EMS in OCD, negativity/pessimism, is theorised to develop from strict, repressed parenting involving hypervigilance toward negative events at the expense of spontaneity and play (Young et al., 2003). In accordance, a previous review identified that parents of OCD patients tend to be overprotective, authoritarian, and demanding, with high expectations and frequent provision of negative feedback (Brakoulias et al., 2018). Additionally, harm avoidance is prevalent in first-degree relatives of people with OCD (Ettelt et al., 2008), suggesting a familial propensity to avoid negative outcomes. These studies support the relationship between certain parental factors and OCD symptoms, and similarly, these parental factors are theorised to contribute to EMS development (Young et al., 2003). Nonetheless, the relationship between unmet emotional needs and EMSs is theoretical, and longitudinal studies are required to establish temporal causality between unmet needs in childhood and the subsequent development of EMSs and OCD symptoms.

#### 4.1. Clinical implications

This study provides important implications for OCD treatment and prevention efforts. The findings suggest that EMSs are important correlates of OCD symptoms, and therefore a therapeutic approach targeting EMSs may prove effective. Currently, there is a lack of randomised controlled trials supporting schema therapy as an effective OCD treatment (Peeters et al., 2021), and further research is required to establish this evidence base. Nonetheless, schema therapy has shown positive outcomes for treatment-resistant OCD in preliminary research (Gross et al., 2012; Thiel et al., 2016), and may be considered for psychological treatment.

Targeting the dependence/incompetence, vulnerability to harm or

illness, and negativity/pessimism EMSs may be particularly effective, with clinicians encouraging the unmet needs of autonomy, competence, spontaneity, and play (Young et al., 2003). For example, schema therapy targeting negativity/pessimism could involve experiential strategies, such as facilitating dialogue between their pessimistic side and optimistic side to identify the emotional impact of each perspective, or behavioural strategies like assisting clients to make predictions and observing how infrequently negative expectations ensue (Young et al., 2003). In addition, this review highlights the importance of treating EMSs in the disconnection and rejection domain, including satisfying the unmet need for secure attachment both within and outside of the therapeutic relationship (Young et al., 2003).

Although schema therapy is the main approach for treating EMSs, clinicians using other treatment modalities for OCD could also benefit from this review by targeting belief systems that represent excessive negative expectations and a perceived inability to cope. In addition, prevention efforts for OCD could address EMS formation by targeting unmet needs during early development. This could include psychoeducation and support for parents on fostering the core emotional needs in their offspring.

#### 4.2. Strengths, limitations, and future directions

This is the first known review to comprehensively meta-analyse the evidence on the relationship between EMSs and OCD. It was conducted according to PRISMA 2020 guidelines (Page et al., 2021), which facilitated transparency, accuracy, and completeness of the findings. However, there are limitations and future research directions to be considered. Firstly, most studies had small sample sizes, which suggests caution with generalising the results. There was moderate to considerable heterogeneity, suggesting a lack of consistency across the included studies and further limiting the generalisability of the results. Moreover, there were an inadequate number of studies to meaningfully conduct subgroup analyses to assess the factors that may have contributed to heterogeneity (Borenstein et al., 2009).

Nonetheless, the heterogeneity could be influenced by several factors. Firstly, it may reflect the diversity of the samples, which included OCD patients, patients with other diagnoses, and the general population. However, both clinical and non-clinical samples were included to increase statistical power. Secondly, the heterogeneity may reflect the diverse measurement tools used, as previous research has found that clinician-rated and self-rated OCD scales each measure unique symptoms (Denys et al., 2004; Rapp et al., 2016). Furthermore, there may be variability in the Young Schema Questionnaire (YSQ) since this was administered in several languages. Factor analyses of selected translated versions of the YSQ resulted in fewer or altered EMSs (Baranoff et al., 2006; Soygüt et al., 2009), cautioning their comparability with the English version.

Notwithstanding these speculations, OCD is recognised as a heterogeneous disorder with varying presentations (Bragdon and Coles, 2017; Cervin et al., 2021; Hasanpour et al., 2017), suggesting heterogeneity may be expected to some degree. Nonetheless, future research should aim to conduct subgroup analyses to identify differences between groups such as gender, sample type, or OCD subtype. Future research may also consider narrowing the eligibility criteria to increase generalisability of the results, such as limiting participants to OCD patients and limiting OCD measures to gold-standard tools (e.g., Y-BOCS; Goodman et al., 1989).

Further to the individual study limitations, there were methodological limitations of the current review. Firstly, effect sizes were converted from mean differences to correlations for eight studies, which may raise concerns regarding the comparability of the data. However, this approach is methodologically sound when studies represent the same outcome (Borenstein et al., 2009; Polanin and Snilstveit, 2016). As six of the converted metrics were based on OCD samples, the data was deemed appropriate and highly relevant for the current analysis. Relevant

articles may have been excluded if they were not in English, although this decision was justified due to the risk of poor translation with automated software (Balk et al., 2013). Finally, the current review did not assess other important schema concepts, including modes and coping styles, which represent behavioural states rather than the trait-like vulnerabilities represented by EMSs (Young et al., 2003). Future research should measure these concepts within OCD since they may align more closely with behavioural symptoms (e.g., compulsions).

## 5. Conclusion

The findings from this meta-analysis enhances our understanding of the relationship between EMSs and OCD. The strongest associations were found for EMSs representing disproportionate negative expectations and a perceived inability to cope with negative events, suggesting that psychological assessment, treatment, and prevention efforts may benefit from targeting these beliefs. Future research should aim to assess EMSs in individuals with an OCD diagnosis to reduce heterogeneity and improve generalisability. Randomised controlled trials on schema therapy for OCD are needed to evaluate the effectiveness of this approach.

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## CRedit authorship contribution statement

Both authors developed the idea for the article and contributed to the design of the review (e.g., inclusion and exclusion criteria). Amy Dostal managed the literature search and meta-analyses. The double data extraction was completed by both authors. The first draft of the manuscript was written by Amy Dostal, and Pam Pilkington provided comments and edited the drafts. Both authors contributed to and approved the final manuscript.

## Declaration of competing interest

The authors declare they have no conflict of interest.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jad.2023.05.053>.

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