Edinburgh Research Explorer

Relationship between early maladaptive schemas and anxiety in adolescence and young adulthood

Relationship between Early Maladaptive Schemas and Anxiety in Adolescence and Young Adulthood: a systematic review and meta-analysis

Asnea Tariq[1], Ethel Quayle[1], Stephen M Lawrie[2], Corinne Reid[3] and Stella W. Y. Chan[4]

[1]School of Health in Social Science, University of Edinburgh

[2]Division of Psychiatry, University of Edinburgh

[3]Victoria University, Australia

[4] School of Psychology & Clinical Language Sciences, University of Reading

Author Note

Correspondence concerning this article should be addressed to: Asnea Tariq, School of Health in Social Science, University of Edinburgh, Doorway 6 Medical Quad, Teviot Place, Edinburgh, EH8 9AG. Email: a.tariq-6@sms.ed.ac.uk

Total Word Count: 250 words

Total Word Count abstract: 5180 words

Highlights

- Early maladaptive schemas play a significant role in developing and maintaining psychological distress, including anxiety symptoms.

- Disconnection/Rejection, Impaired autonomy/performance and other-directed schema domains are salient precursors of anxiety symptoms among Adolescents and Young adults.

- Females are likely to have significantly predominant EMS and schema content related to other-directed and hypervigilance schema domains compared to males.

- Better understanding of these potentially underlying factors can help devise targeted management and intervention plan based on the specific needs of each individual.

Relationship between Early Maladaptive Schemas and Anxiety in Adolescence and

Young Adulthood: a systematic review and meta-analysis

Abstract

Background

Early maladaptive schemas (EMS) are self-perpetuating dysfunctional cognitive structures that have been linked with youth psychological health and play a significant role in developing and maintaining psychological distress, including anxiety symptoms.

Method

The present meta-analysis synthesises the existing literature to evaluate the strength of association between EMS and anxiety symptoms among adolescents and young adults (aged 10-29 years). The systematic literature search was carried out in October 2019 using six different databases.

Results

Our systematic search has identified 15 studies, comprising of 9515 participants (Mean age = 18.95, SD = 5.30). All the studies assessed were either cross-sectional or longitudinally designed. The random effect estimate for overall EMS with anxiety was $r = 0.59$ (95% Cl = 0.50 to 0.68, Z = 9.69, p < 0.0001), indicating a strong association between EMS and anxiety. When different schema domains were investigated separately, anxiety was shown to have significantly stronger associations with the schema domains of disconnection/rejection ($r = 0.50$), impaired autonomy/performance ($r = 0.47$) and other-directedness ($r = 0.49$). Further, females were found to have higher schemas of hypervigilance and other-directedness and associated anxiety symptoms compared to males.

Limitations

Meta-analytical results were limited to articles published in peer-reviewed journals in English language, inducing an upward publication bias and limiting the generalizability of the findings.

Conclusions

The findings highlight schemas related to disconnection/rejection, impaired autonomy/performance and other-directedness as particularly salient precursors of anxiety symptoms, providing evidence for clinicians to target these particular schemas during prevention, intervention, and management of anxiety disorder.

Relationship between Early Maladaptive Schemas and Anxiety in Adolescence and Young Adulthood: a systematic review and meta-analysis

Introduction

Anxiety in Adolescence and Young Adulthood

Anxiety disorder is an umbrella term used for many different anxiety problems, including panic disorder, social anxiety, specific phobias, separation anxiety and generalized anxiety. Anxiety disorders vary in terms of the different objects or situations that induce them, but share similar symptoms such as excessive worry, anxious thoughts, physiological symptoms and related behavioral disturbances such as avoidance and distress (American Psychiatric Association, 2013). Collectively, they are one of the most frequently occurring psychiatric conditions, with an estimated 32% life-time prevalence rate (Doering et al., 2019; Kessler et al., 2012). Indeed, up to 1 in 3 adolescents (31.95%) are estimated to have an anxiety condition by the age of 18 years (National Institute of Mental Health, 2017).

Anxiety disorders have been recognized as the 9th leading cause of illness and disability among adolescents (WHO, 2020) and young adulthood (Global Burden of Disease Study (GBD), 2015; Gustavson et al., 2018). They typically onset during childhood and early adolescence, run a chronic course, and exhibit comorbidly with other psychiatric conditions such as depression, substance use disorder and suicidal ideations and behaviour (Doering et al., 2019; Pine et al., 1998; Garber & Weersing, 2010). Furthermore, they adversely impact upon many aspects of functioning and increase the risk of adverse social family functioning, lack of life satisfaction, adjustment issues in working environment and educational underachievement during emerging adulthood (Woodward & Fergusson, 2001; Essau et al., 2014).

Aetiology of Anxiety Disorders

Symptoms of anxiety are often ascribed to genetic predispositions (Gottschalk & Domschke, 2017; Goldman, 2001; Leib et al., 2000), different temperamental styles such as behavioral inhibition, shyness, withdrawal or avoidant coping mechanisms (Spence & Rapee, 2016; Rapee, 2012), early maladaptive parent-child relationship and authoritative, over-protective parenting environment (McLeod et al., 2007; Hudson et al., 2008), modelling and learning influences from social environmental experiences (Murthy, 2007; Mineka & Zinbarg, 2006), and stressful life events and aversive situations (Edwards et al., 2010).

Female gender is a risk factor, with girls about twice as likely to acquire a diagnosis of anxiety disorders compared to boys throughout their lifetime (Costello et al., 2003; Rapee, Schniering & Hudson, 2009). One possible explanation for this sex difference are cognitive vulnerability factors (MacLeod & Mathews, 2011; Haegen & Etinenne, 2016). Early maladaptive schemas (EMS) have been particularly highlighted as a salient underlying contributing factor towards the development of anxiety disorders and other mental illnesses (Young et al., 2003).

Early Maladaptive Schemas (EMS)

Early maladaptive schemas are defined as self-perpetuating dysfunctional cognitive structures that play a direct impactful role in shaping individual's thought, emotion, behavior and feelings (Young et al., 2003). EMS are thought to develop during childhood and adolescence, based on dysfunctional childhood experiences with significant figures and stressful environmental situations. However, they are considered to exist and continue developing throughout the lifespan (Gong & Chan, 2018).

Maladaptive schemas may exist in all individuals as significant core beliefs that direct an individual's future assumptions about the self and world. These schemas can continue to exist dormant, unless activated by a stressor or aversive situation. The presence of activated

maladaptive schemas can then directly influence future behavioral responses and interpersonal associations, thereby increasing an individual's risk for psychopathology (Young, 1999). Eighteen different maladaptive schemas have been identified and classified in a group of five different schema domains as follows: (i) disconnection/rejection, (ii) impaired autonomy/performance, (iii) other directedness, (iv) impaired limits and (v) hyper-vigilance (Young et al., 2003).

The *disconnection/rejection schemas* usually involve fear of disconnection and inadequacy from significant figures, an expectation of insecure and unstable relationships with excessive feelings of isolation and inferiority. *Impaired autonomy/performance* schemas involve schema content associated with feelings of incompetence, failure and greater vulnerability to harm and catastrophic situations. Finally, the *other-directed* schemas involve beliefs associated with excessive sacrifice and compromise for others at the expense of one's own needs and happiness. The other two schemas of *hypervigilance* and *impaired limits* involve over-perfectionism, rigid expectations from self and inability to meet their set goals (Young et al., 2003).

Early Maladaptive Schemas and Anxiety Disorder

Previous literature has recognized the presence of predominately active EMS among individuals with higher anxiety scores. Research evidence has found significantly activated EMS in clinical populations of individuals with social phobia (Pinto-Gouveia et al. 2006), panic disorder with agoraphobia (Hedley et al., 2001), generalized anxiety (Shorey et al., 2016), and generalised anxiety disorder (Delattre et al., 2004; Hawke & Provencher, 2011). Significant associations have also been identified between EMS and general anxiety symptoms among non-clinical student samples (Schmidt et al., 1995; Schmidt & Joiner, 2003; Yan et al., 2018; Calvete et al., 2005) and young adults (Cui et al., 2010; Rhein & Sukawatana, 2015; Saggino et al., 2018). However, findings have been mixed possibly due to

different schemas being associated with different anxiety symptomology. Further, the cross-sectional design of these studies made it difficult to identify aetiological pathways.

Schema Domains as predictors of Anxiety

Patients with increased anxiety symptoms are likely to score higher on all schema domains compared to healthy cohorts (Hawke & Provencher, 2011). In clinical samples, schema domains of *disconnection/rejection, impaired performance/autonomy and other-directedness schemas* were found to have significantly stronger associations with general anxiety symptoms (Glaser et al., 2002; Halford et al, 2002; Hawke & Provencher, 2011; McGinn et al., 2005; Welburn et al., 2002). However, these findings were limited to clinically diagnosed anxiety patients and could not be generalized to sub-clinically anxious youth populations.

In adolescent student sample, the schema domains of *impaired autonomy/ performance* and *hypervigilance* (Schmidt et al. 1995) and *Impaired autonomy/performance, disconnection/rejection and other-directedness* were found to be significant predictors of anxiety symptoms among undergraduate university students (Cui et al., 2010). Similar findings have been found in a sample of young adult's university students, with *impaired autonomy and performance* schemas significantly predicting increase in anxiety symptoms (Calvete & Camara, 2012). Nevertheless, these researches were limited to community student samples and included only certain specific schema domains making it difficult to analyze the associations for overall EMS, all schema domains and anxiety symptoms among clinically anxious youth populations.

Aims of the current Meta-analysis

Taken together, while the associations between different EMS and anxiety symptoms have been widely explored, the strength of this associations among adolescents and young adults has not been systematically investigated. EMS during this transitional phase is

considered fluctuating and changeable (Rijkeboer & De Boo, 2010), such that earlier identification of EMS's could help clinicians and practitioners to target maladaptive schemas before they become rigid and permanent. The aim of the current meta-analysis is therefore to assess the overall relationship of EMS, and five schema domains in particular, with anxiety symptoms among adolescents and young adults, with specific research questions as follows:

1. What is the strength of the association between EMS and anxiety among adolescents and young adults?

2. What is the strength of relationship between each of the schema domains and anxiety symptoms among adolescents and young adults?

3. Do age and gender moderate the association between schema domains and anxiety?

This meta-analysis on anxiety was conducted in conjunction with another meta-analysis on depression (Tariq et al., 2021); the joint protocol was registered on PROSPERO: CRD42019135911

Method

Literature Search

The current meta-analysis was carried out in October 2019 following the Preferred Reporting for Systematic Review and Meta-analysis (PRISMA; Moher et al. 2009) guidelines. Six different databases were used to carry out the systematic search including: Embase. CINAHL, Medline, ASSIA, Psych INFO, Scopus and, Web of Science. The search terms used for the systematic search were: "Early maladaptive schemas" OR "Young schema" OR "EMS" AND "Anxiety" OR "Anxiety symptoms" OR "Anxiety disorders" OR "Anxious". Along with using Boolean characters 'AND' or 'OR', the searches were further refined and enhanced using truncations (* and $). Google Scholar and reference lists of relevant articles were further scanned to include grey literature that was unavailable through

the databases. The systematic searches were repeated in December 2020 to validate the included literature and to identify newly published literature.
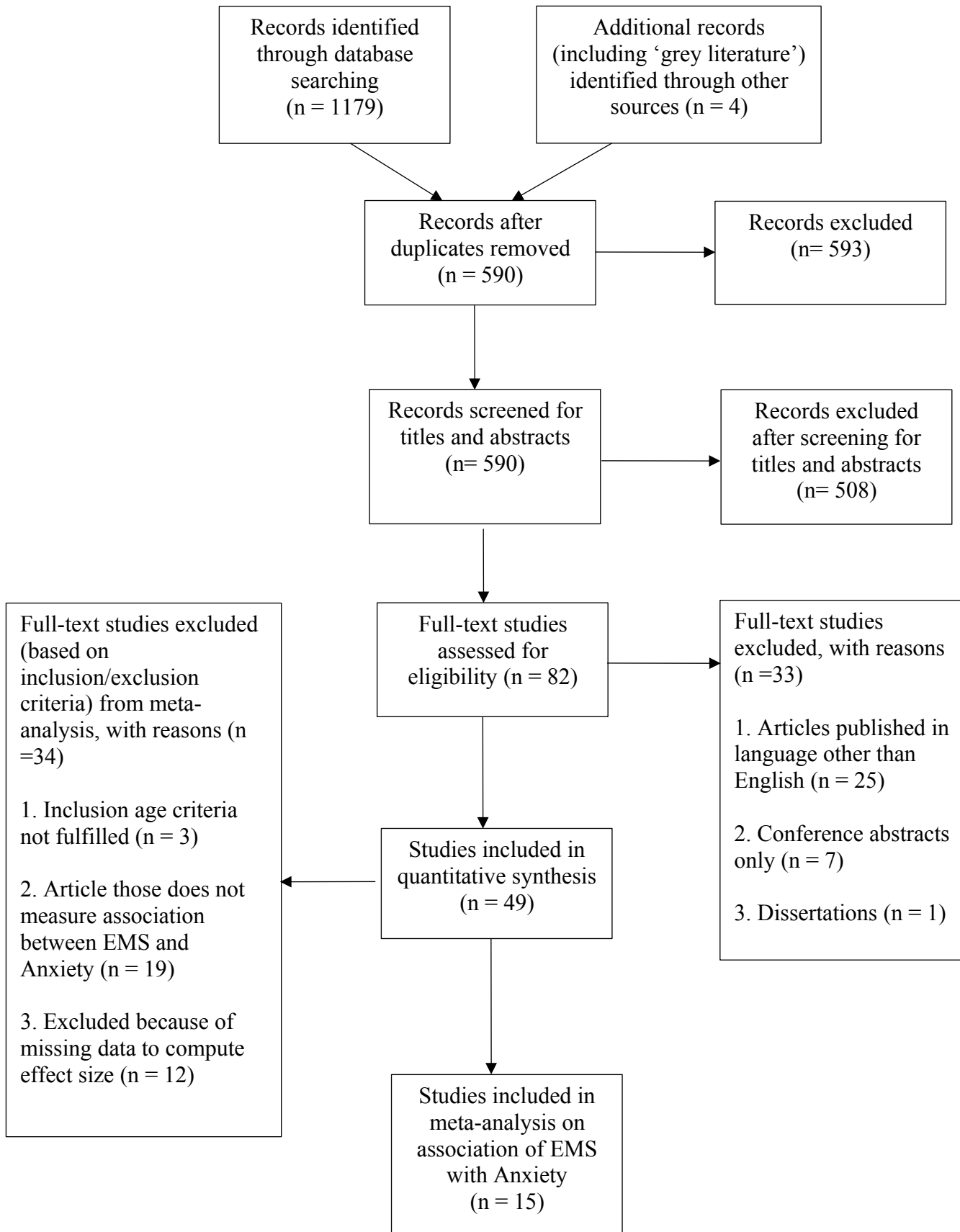
Inclusion / Exclusion Criteria

Searches were limited to articles published in the English language in peer-reviewed journals. Studies were included in this review if they fulfilled the following criteria: (i) reported effect sizes of the relationship between EMS and anxiety or contained the information necessary to analyze effect sizes; (ii) the primary outcomes were measured using standardized and validated measures of early maladaptive schemas and anxiety; (iii) participants were adolescents and young adults with a mean age between 10-29 years; (iv) studies measuring beliefs, cognitive biases, or other constructs that were not explicitly associated with Young's concept of early maladaptive schemas were excluded; (v) case reports, book chapters, qualitative studies, dissertations, conference proceedings, theoretical papers, and reviews were also excluded. The Prisma Diagram (Moher et al., 2009) in Fig. 1 shows the results of the systematic search and selection process conducted for the present review.

Sample of Studies

The initial search resulted in 1183 studies (Embase = 194, ASSIA = 170, CINHAL = 116, Medline = 182, Psych INFO = 275, Scopus = 164, Web of Science = 78 and Grey Literature = 04) prior to de-duplication. The primary reviewer screened the titles and abstracts of each article retrieved through the initial search of databases. The eligibility of each article based on title and abstract was assessed against the inclusion and exclusion criteria described above. Full texts of potentially eligible articles were checked to confirm their eligibility. A second reviewer independently carried out an additional screening of the

full-text articles to assess eligibility. Few minor disagreements were resolved through

discussion between the two reviewers. Following the implementation of the search scheme

```
┌─────────────────────┐     ┌─────────────────────────┐
│ Records identified  │     │  Additional records     │
│ through database    │     │ (including 'grey         │
│ searching           │     │ literature') identified  │
│ (n = 1179)          │     │ through other            │
│                     │     │ sources (n = 4)          │
└─────────────────────┘     └─────────────────────────┘
```

```
            ┌──────────────────┐          ┌──────────────────┐
            │ Records after    │          │ Records excluded │
            │ duplicates       │ ───────> │ (n= 593)         │
            │ removed          │          │                  │
            │ (n = 590)        │          └──────────────────┘
            └──────────────────┘
```

```
            ┌──────────────────┐          ┌──────────────────┐
            │ Records screened │          │ Records excluded │
            │ for titles and   │ ───────> │ after screening  │
            │ abstracts        │          │ for titles and   │
            │ (n= 590)         │          │ abstracts        │
            │                  │          │ (n= 508)         │
            └──────────────────┘          └──────────────────┘
```

```
┌──────────────────────┐  ┌──────────────────┐  ┌──────────────────────┐
│ Full-text studies    │  │ Full-text        │  │ Full-text studies    │
│ excluded (based on   │  │ studies          │  │ excluded, with       │
│ inclusion/exclusion  │  │ assessed for     │  │ reasons (n =33)      │
│ criteria) from meta- │  │ eligibility      │  │                      │
│ analysis, with       │  │ (n = 82)         │  │ 1. Articles          │
│ reasons (n =34)      │  │                  │  │ published in         │
│                      │  │                  │  │ language other than  │
│ 1. Inclusion age     │  │                  │  │ English (n = 25)     │
│ criteria not         │  │                  │  │                      │
│ fulfilled (n = 3)    │  │                  │  │ 2. Conference        │
│                      │  │                  │  │ abstracts only       │
│ 2. Article those     │  │                  │  │ (n = 7)              │
│ does not measure     │  │                  │  │                      │
│ association between  │  │                  │  │ 3. Dissertations     │
│ EMS and Anxiety      │  │                  │  │ (n = 1)              │
│ (n = 19)             │  │                  │  │                      │
│                      │  │                  │  └──────────────────────┘
│ 3. Excluded because  │  │                  │
│ of missing data to   │  │                  │
│ compute effect size  │  │                  │
│ (n = 12)             │  │                  │
└──────────────────────┘  └──────────────────┘
```

```
            ┌──────────────────────┐
            │ Studies included in  │
            │ quantitative         │
            │ synthesis            │
            │ (n = 49)             │
            └──────────────────────┘
```

```
            ┌──────────────────────┐
            │ Studies included in  │
            │ meta-analysis on     │
            │ association of EMS   │
            │ with Anxiety         │
            │ (n = 15)             │
            └──────────────────────┘
```

Fig. 1 Systematic search and selection process (PRISMA; Moher et al. 2009) and inclusion/exclusion criteria, 15 studies representing 15 samples (N = 9515) were found eligible to be included in the current meta-analysis (See Table. 1). All included studies were reported from peer-reviewed articles, published between 2002 and 2018.

Data Extraction

The primary reviewer used a pre-determined form to carry out data extraction from the included studies. The following information was extracted: study setting/design, participants' demographics such as age mean, SD and range, gender ratio, sample size, measures employed to assess early maladaptive schemas and depression. Table 1 provides a summary of study characteristics extracted from the 15 included studies.

Measurement of Early Maladaptive Schemas

All studies included in the quantitative synthesis used one of the four early maladaptive schema measures based on Young's schema theory (Young et al., 2003). Specifically, the 90-item Young Schema Questionnaire-Short form version 3 (YSQ-S3; Young. 2005) was the most commonly used version, having been used in 10 of the included studies. The 75-item Young Schema Questionnaire- Short form (YSQ-SF; Young, 1998) was used in two studies, while its adolescent version (YSQ-A; Van Vlierberghe et al., 2010) was used in one study. The longest version (i.e., the 232-item Young Schema Questionnaire- Long form version 3; YSQ-L3) was used in two studies.

All the above measures assess five different schema domains. However, the reviewed articles mostly employed three major schema domains, i.e., Disconnection and rejection, Impaired autonomy, and Other-directedness schema, which have schema content considered to be linked with symptoms of anxiety.

Measurement of Anxiety Symptoms

        All studies included in the current meta-analysis employed a standardized measure of

anxiety symptoms. Four studies measured social anxiety symptoms specifically using the

Table 1. Characteristics of the studies included in the meta-analysis (n = 15)

Study	Sample size	EMS measure	Anxiety measure	Participants	Study Design	Age: Mean; SD; Range	Gender (M/F)	Country
Orue, Calvete & Padilla (2014)	1170	YSQ-S3	SAS-A	High School Students	Longitudinal	13.44; 1.30; 13-17	632/538	Spain
Camara et al. (2012)	510	YSQ-SF	SCL-A	1st/2nd year college students	Longitudinal	19.16; 1.69; not reported	179/331	Spain
Calvete, Orue & Hankin (2015)	1281	YSQ-S3	SAS-A	High School Students	Longitudinal	13.61; 1.41; 13-17	688/593	Spain
Calvete, Orue & Hankin (2013)	1187	YSQ-S3	SAS-A	High School Students	Longitudinal	13.42; 1.30; 13-17	642/545	Spain
Gong et al. (2018)	1102	YSQ-S3	ZSAS	University Students	Cross-sectional	20.46; 1.13; not reported	296/806	China
Calvete, E. (2013)	1052	YSQ-S3	SAS-A	High School Students	Longitudinal	13.61; 1.41; 13-17	553/499	Spain
Sartitas-Atalar et al. (2018)	266	YSQ-S3	STAI-T	University Students	Cross-sectional	21.89; 0.43; 18-27	78/188	Turkey
Parsons et al. (2017)	235	YSQ-S3	SPS/SIAS	University Students	Cross-sectional	18.84; 1.14; not reported	69/166	USA
Muris P. (2006)	173	YSQ-A	PQY-5	Secondary School students	Cross-sectional	13.32; 0.95; 12-15	87/86	Netherland
Mairet et al. (2014)	360	YSQ-S3	SPS/SIAS	University students	Cross-sectional	20.68; 5.7; 17-25	105/255	Australia
Gonzalez-Diez et al. (2015)	471	YSQ-S3	SAQ	School and University students	Longitudinal	17.81; 3.19; 16-25	231/240	Spain
Glaser et al. (2002)	141	YSQ-SF	SCL-A	Clinical out-patients	Cross-sectional	28.95; 7.8; 18-52	42/99	Greece
Yigit et al. (2018)	325	YSQ-S3	STAI	Clinical / Non-clinical adolescents	Cross-sectional	15.29; 1.14; 13-18	102/223	Turkey
Carlucci et al. (2018)	461	YSQ-L3	STICSA	Students/Community young adults	Cross-sectional	23.93; 6.9; 18-38	207/254	Italy
Saggino et al. (2018)	918	YSQ-L3	STICSA	Non-clinical community	Cross-sectional	29.85; 12.56; 18-89	396/522	Italy

Table 1 notes: SAS-A = Social Anxiety Scale for Adolescents (La Greca & Lopez, 1998); SCL-A = Symptom Checklist Anxiety sub-scale (Derogatis, 1994); ZSAS = Zung Self Rating Anxiety Scale (Zung, 1971); STAI-T = State-Trait Anxiety Inventory -Trait Form (Spielberger et al. 1970); PQY-5 = Psychopathology Questionnaire for Youths (Hartman et al., 2001); SPS = Social Phobia Scale (Mattick & Clarke, 1998); SIAS = Social Interaction and Anxiety Scale (Mattick & Clarke, 1998); SAQ = The Social Anxiety Questionnaire for Adults (Caballo et al., 2010); STICSA = State Trait Inventory of Cognitive and Somatic Anxiety (Ree et al., 2008)

Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez, 1998). The State-Trait

Anxiety Inventory (STAI; Spielberger et al., 1970) was further used to measure symptoms of

general anxiety in four studies. Two of the included studies used the Symptom Checklist's

Anxiety subscale (SCL-A; Derogatis, 1994) while another two studies utilized the Social

Phobia scale (SPS; Mattick & Clarke, 1998) and Social Interaction and Anxiety Scale (SIAS;

Mattick & Clarke, 1998) to generate overall anxiety scores among adolescent and young

adult samples. In addition, the Zung Self-report Anxiety scale (ZSAS; Zung, 1971),

Psychopathology Questionnaire for Youth (PQY; Hartman et al., 2001) and the Social

Anxiety Questionnaire for Adults (SAQ; Caballo et al., 2010) were used in three separate

studies to measure anxiety symptoms.

Risk of Bias Assessment

To assess and appraise the quality of eligible studies, the risk of bias assessment was

carried out independently by two reviewers using a bespoke quality assessment tool adapted

by Marsh et al (2018). The tool comprises of 11 items to be rated qualitatively by answering

"Yes", "No", "Partially", or "Cannot Tell". Furthermore, the numerical scores were assigned

to the qualitative ratings to help generate a total quality score for each study: "Yes" = 2,

"Partially" = 1, "No" = 0, "Cannot Tell" = 0. No numerical value was assigned where the

items did not meet the criteria for the study. The total score for each study was calculated by

summing the numerical values and was then expressed as percentage based on the number of

items assigned a numerical rating. Inter-rater reliability (Cohen's kappa) was found to be 0.86

between two independent reviewers, indicating high level of agreement (McHugh, 2012) (See

Table. 2).

Table. 2 Risk of bias (Ratings assessed using the adapted AHRQ tool)

Authors	Unbias. selection	Min. Baseline differ.	Sample Size Cal.	Cohort Descrp	EMS measure	Depress. Measur	Blinded outcome assessment	Adequate Follow-up	Missing drop-out	Analysis control for confound	Approp. Analysis	Total score	Quality %age
Orue et al. (2014)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	Yes (2)	Partially (1)	Partially (1)	Yes (2)	14	78%
Camara et al. (2012)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	Yes (2)	Yes (2)	Partially (1)	Yes (2)	15	83%
Calvete, Orue & Hankin (2015)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	Yes (2)	Yes (2)	Partially (1)	Yes (2)	15	83%
Calvete, Orue & Hankin (2013)	Yes (2)	N/A	No (0)	Yes 2)	Yes (2)	Yes (2)	N/A	Yes (2)	Yes (2)	Yes (2)	Yes (2)	16	89%
Gong et al. (2018)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	Partially (1)	Yes (2)	Yes (2)	13	81%
Calvete, E. (2013)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	Yes (2)	Partially (1)	Partially (1)	Yes (2)	14	78%
Sartitas-Atalar et al. (2018)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	Partially (1)	Yes (2)	Yes (2)	13	81%
Parsons et al. (2017)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	Yes (2)	Yes (2)	Yes (2)	13	81%
Muris P. (2006)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	Yes (2)	Yes (2)	Yes (2)	14	88%
Mairet et al. (2014)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	Yes (2)	No (0)	Partial (1)	11	69%
Gonzalez-Diez et al. (2015)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	Yes (2)	Yes (2)	Yes (2)	Yes (2)	16	89%
Glaser et al. (2002)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	Partially (1)	Yes (2)	Yes (2)	13	81%
Yigit et al. (2018)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	N/A	Yes (2)	Partially (1)	Yes (2)	13	81%
Carlucci et al. (2018)	Yes (2)	N/A	No (0)	Partial (1)	Yes (2)	Yes (2)	N/A	Yes (2)	Yes (2)	Yes (2)	Yes (2)	15	83%
Saggino et al. (2018)	Yes (2)	N/A	No (0)	Yes (2)	Yes (2)	Yes (2)	N/A	Partially (1)	Yes (2)	Yes (2)	Yes (2)	15	83%

Table 2 notes: Quality ratings of included based on percentages, High quality = 80-100% category; Moderate quality = 60-79% category; Low quality = 50% or below.

Analytic Procedure

Effect Sizes

The correlation coefficient 'r' values were extracted as an effect size measure for the association between schema domains and anxiety. Where separate correlation coefficients were reported to describe the association between separate schemas with anxiety, Fischer z transformation was carried out to compute an average effect size estimate for each schema domain. According to Corey, Dunlap and Burke (2010), averaging the correlation coefficient could lead to an underestimation as a sampling distribution for correlation coefficients is always considered to be skewed; the recommended method was to convert the correlations to Fischer z and calculate a weighted mean using sample size for each study. After obtaining weighted means, Fischer z values were converted back to the correlation 'r'.

Meta-analytical Model

Results for meta-analysis were generated in RStudio (Version 1.2.5001) using "metaphor" (Viechtbauer, 2010), "robumeta" (Fisher and Tipton, 2015) and "MAc" (Del Re and Hoyt, 2010) package developed to facilitate reviewers by the R Development Core Team (2015). A random effect model was used to synthesize quantitative results considering the heterogenous nature of the study sample. Correlation 'r' to Fischer z transformations were employed to compute the meta-analytic results. Fischer z's were then converted back to correlation 'r' to report the effect size estimates. Q-statistic was calculated to estimate the true heterogeneity of effect sizes. Higgins et al. (2003) suggested that a statistically significant Q-statistic indicates the presence of heterogeneity, i.e., the presence of true between-studies variation. I^2 statistic was calculated to provide a percentage of the actual variance between studies presenting the real differences between effect sizes, with 25%, 50% and 75% representing the estimation of low, medium and high levels of heterogeneity (Higgins et al., 2003). Although Q and I^2 statistics are considered reliable tests to ascertain

heterogeneity, they do not specify the studies which are more likely to influence heterogeneity. Baujat et al. (2002) have developed "Baujat plots" to identify the contribution of each study in overall results of heterogeneity with studies falling in the top quadrant of the plot contributing the most.

Publication Bias

The funnel plots for each study are generated with effect sizes plotted on the horizontal axis and corresponding sample size (standard error) on the vertical axis. Studies with large standard errors tend to gather around the mean effect size, while those having smaller errors are more dispersed around the plot. The asymmetrical distribution of studies (indicated by individual dots) on both sides of the vertical line on funnel plot usually represents the presence of publication bias. However, Funnel plots are usually considered as a subjective measure of potential publication bias (Quintana, 2015).

Rank of Correlation test (Begg and Mazumadar, 1994) and Egger's test (Egger et al., 1997) were additionally employed as an objective method of assessing publication bias. A significant Rank of correlation and Egger's test represents the presence of potential publication bias.

Quality Assessment

Table 2 shows the risk of bias assessment for the included studies with almost all studies falling in the moderate to high quality ratings classification. Three of the included studies fall in moderate quality rating between 60-79% quality ratings, inducing a moderate risk of bias for the meta-analytical results while thirteen studies were of high quality between 80-100% quality category, indicating a minimal risk of bias. All included studies employed appropriate and standardized measures to assess EMS and Anxiety symptoms. Further, they all provided adequate description about the included sample and selection process, however, only one of the included studies had provided partial description about the characteristics of

the sample (Carlucci et al., 2018). Six of the studies were based on longitudinal research design with an adequate follow up period. However, one of the studies (Saggino et al., 2013) used a 1 month follow up which was comparatively shorter than other included studies, and the number of participants completing the follow-up measures was smaller. None of the included studies reported an appropriate power calculation to estimate the sample size, raising concerns as to whether the sample was sufficiently powered.

Results

The meta-analytical results were generated using a total sample of 9515 people (Mean age = 18.95, SD = 5.30) from 15 studies. The results were computed to explore the associations between overall scores of early maladaptive schemas with anxiety as well the effect size associations between five schema domains with anxiety. Summary statistics for meta-analytical models are presented in Table. 3.

Effect Size reporting for association between EMS and Anxiety

The uncorrected random effect estimate for overall EMS with anxiety was r = 0.59 (95% Cl = 0.50 to 0.68, Z = 9.69, p < 0.0001), indicating a significant association with a larger effect size between EMS and anxiety among adolescents and young adults. See forest plot in Fig. 2.

On meta-regression, the mean age of sample showed no significant associations, indicating that age did not moderate the overall effect size estimates nor contribute towards the study variance [Q (1) = 3.78, p = 0.21]. Gender however significantly affected the associations between EMS and anxiety, showing stronger associations among adolescent girls and young females [Q (1) = 7.03, p = 0.008].

The heterogeneity estimates showed significant heterogeneity (Q = 765.00 (p < 0.0001) and I^2 = 97.79 %). Baujat plots were constructed to identify the studies that contributed most towards the overall estimate of heterogeneity. In Fig 3., Study 3 (i.e., Calvete, Orue & Hankin, 2015) is lying in the top quadrant, indicating the highest contribution to heterogeneity results. The results were non-significant for rank of correlation test (0.23) and Egger's regression tests (0.08), indicating that the present findings were not affected by publication bias. Fig 4. represents the symmetrical distribution of studies on the vertical line of funnel plot further supporting the non-significant results of publication bias.

Table. 3 Meta-analytic results of association between early maladaptive schemas and anxiety

	Summary statistics				Homogeneity statistics		Moderator analysis		Publication bias analysis	
	k	N	r	95% Cl	Q	I^2	Mean age of the sample-Q-value	Gender Q-value	Rank of Correlation Kendall's tau	Egger's Test z-value
Total Early Maladaptive Schemas	15	9515	0.59	0.50, 0.68	765.00***	97.79%	3.78	7.03**	-0.23	-1.74
Disconnection & Rejection	15	9515	0.50	0.42, 0.59	360.74***	95.69%	1.58	3.54	-0.15	-1.56
Impaired Autonomy/Performance	14	9157	0.47	0.39, 0.54	235.45***	94.62%	0.07	1.48	-0.22	-0.74
Other-Directedness	11	8056	0.49	0.35, 0.60	597.74***	98.14%	3.49	23.06***	-0.29	-1.97
Impaired Limits	7	3532	0.35	0.24, 0.44	71.48***	90.39%	0.37	0.04	0.14	0.29
Hypervigilance	6	3266	0.38	0.26, 0.48	86.72***	91.76%	0.02	6.58*	0.07	0.30

Table 3 Notes. k = Number of studies, N = Total number of participants, r = average uncorrected correlation, 95% Cl = Confidence interval, * p < 0.05, ** p < 0.01, *** p < 0.001
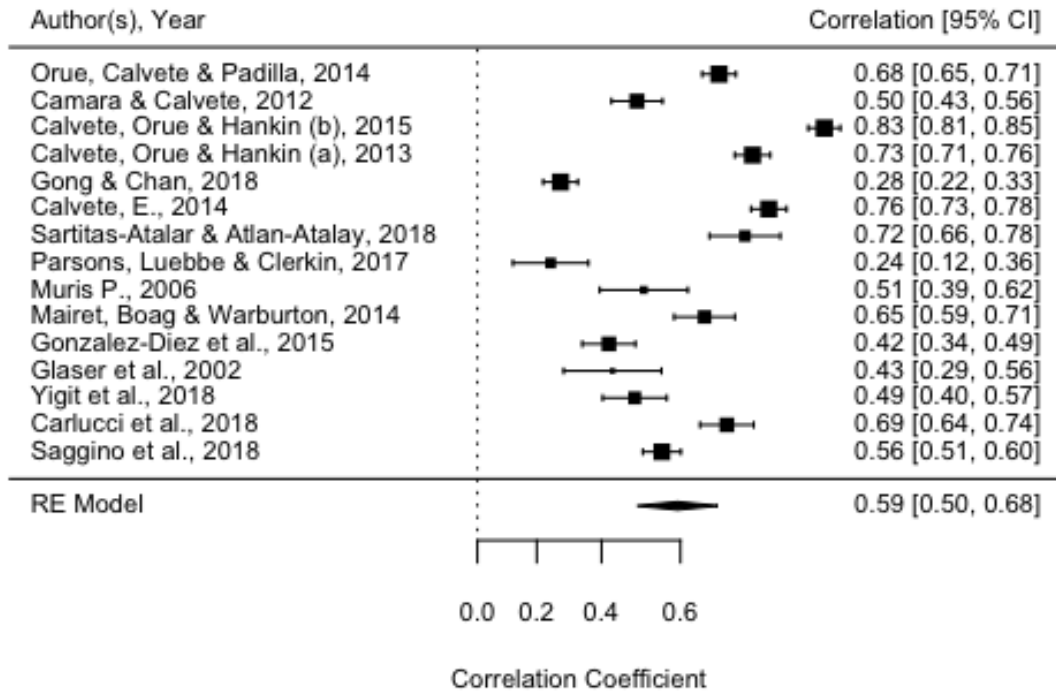
Fig. 2 Forest plot of EMS and Anxiety Meta-analysis
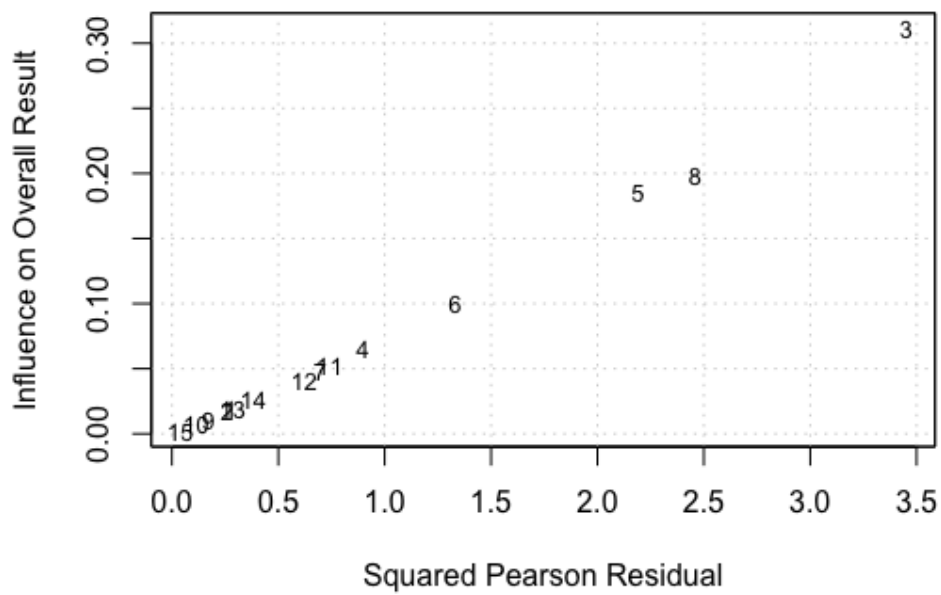
Fig. 3 Baujat plot for EMS scores and Anxiety Meta-analysis
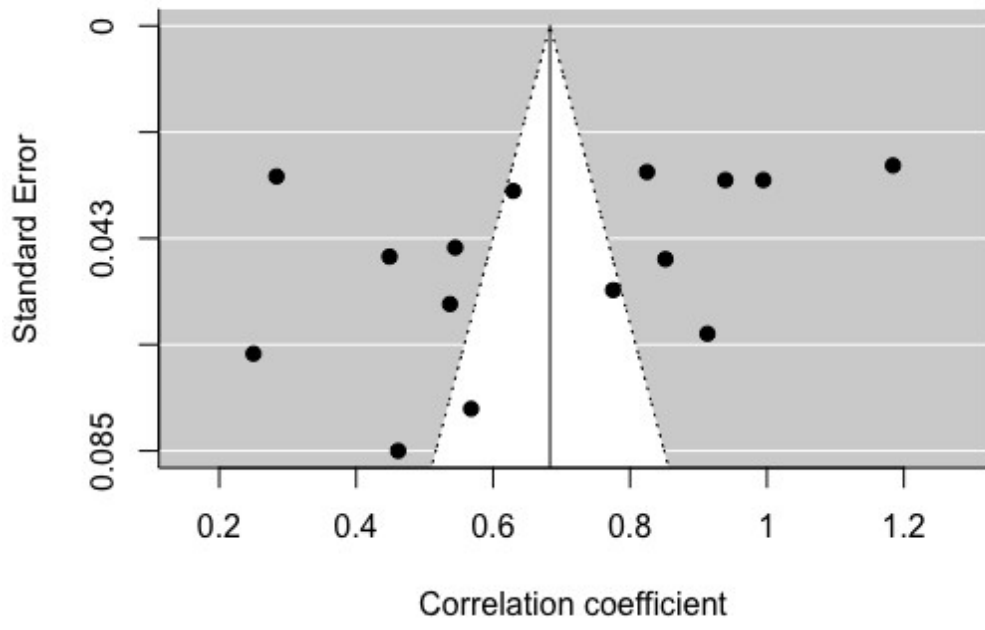
Fig. 4 Funnel plot for EMS scores and Anxiety Meta-analysis

Effect size reporting between Disconnection/Rejection schemas and Anxiety

The random effect model based on 15 studies estimated the association between disconnection/rejection schemas and anxiety as r = 0.50 (95% Cl = 0.42 to 0.57, Z = 10.75, p < 0.0001). The large effect size indicates the presence of more disconnection/ rejection related schemas among adolescents and young adults with increased anxiety symptoms. The heterogeneity statistics suggests the presence of a significant heterogenous sample (Q =360.74, p <0.0001), with 96% of the effect size variance contributed by actual differences occurring between the included studies. Fig 5. below shows the contribution of each study along with an overall meta-analytical estimate. In Fig 6. the funnel plot exhibits symmetrical distribution of studies indicating that the results were not influenced by publication bias. The non-significant results of rank test of correlation (0.43) and Egger's tests (0.12) also suggested the absence of publication bias. The meta-regression results further suggest no significant relationship of mean age [Q (1) = 1.58, p = 0.21 and gender [Q (1) = 3.54, p = 0.06] with the overall effect size estimate.
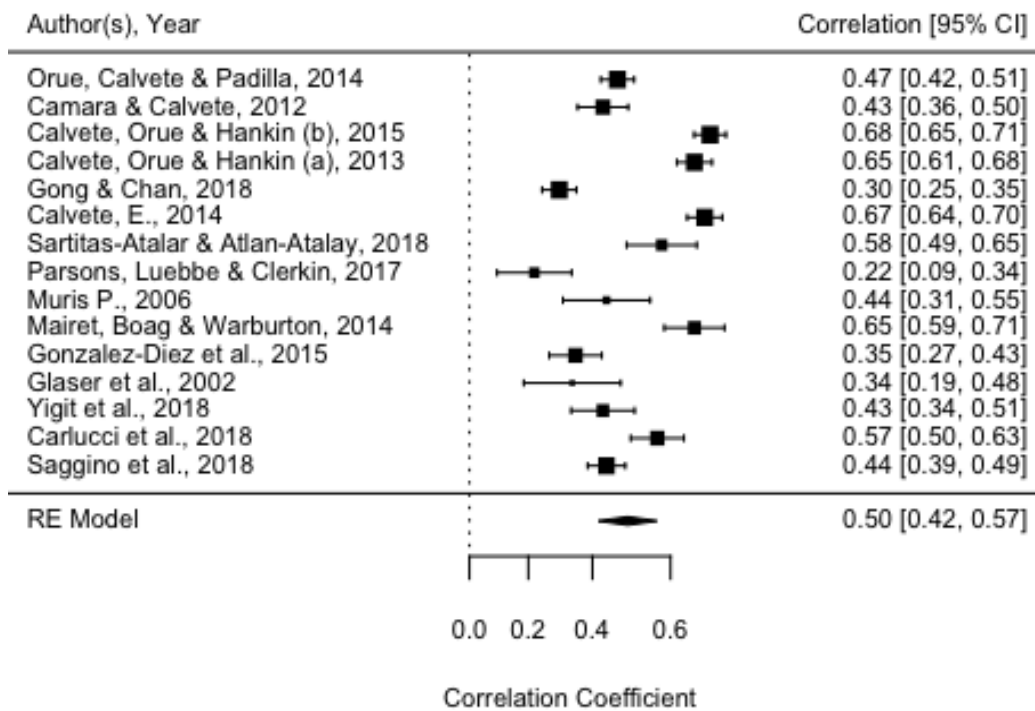
Fig. 5 Forest plot of Disconnection/Rejection and Depression Meta-analysis
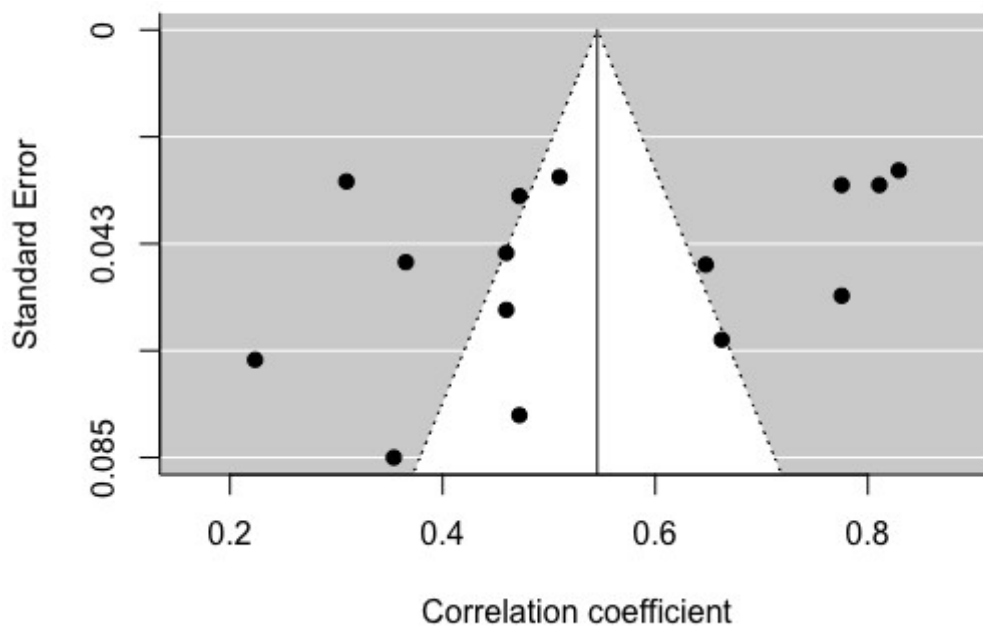
Fig. 6 Funnel plot providing details of Publication bias for the results of

Disconnection/Rejection and Anxiety Meta-analysis

Effect size association between Impaired Autonomy/ Performance schemas and Anxiety

Based on 14 studies, a random effect meta-analytical model found a moderate effect size association between impaired autonomy/performance schemas with anxiety symptoms (r= 0.47, 95% Cl = 0.39 to 0.54, Z = 10.89, p < 0.0001). Findings of the meta-analytical model are presented in Fig 7 below.
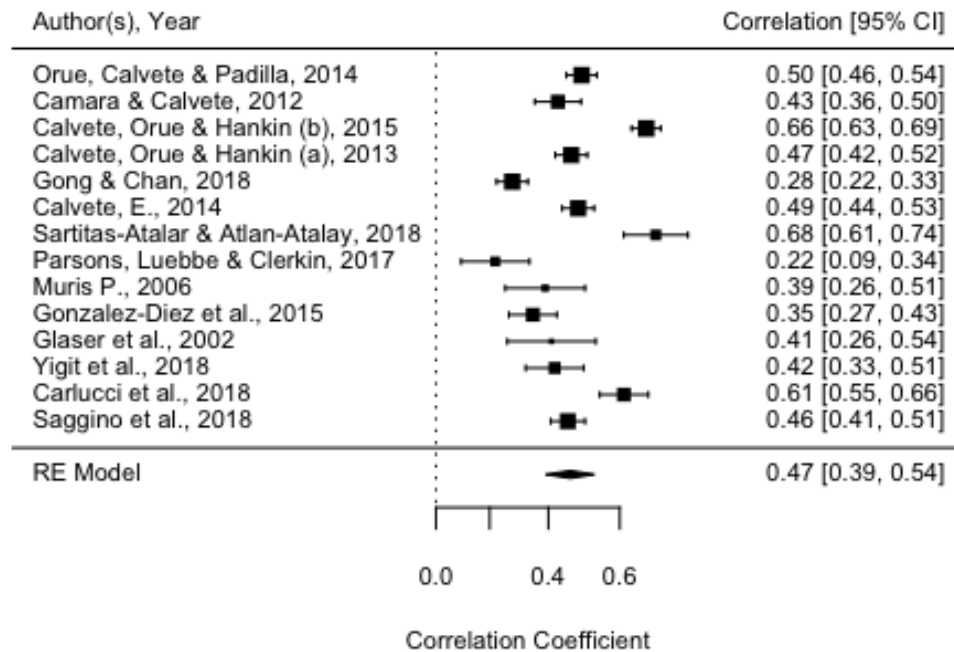
Fig. 7 Forest plot of Impaired autonomy/performance and Anxiety Meta-analysis

The overall sample was found to be highly heterogenous (Q =235.45, p <0.0001), with 95% of effect size variance occurring due to potential differences between the included studies. The rank of correlation (p= 0.27) and Egger's tests (0.46) were not significant while the funnel plot shown in Fig 8 also supports that the meta-analytical results were not influenced by the presence of publication bias. Additionally, results for meta-regression suggested that neither age [Q (1) = 0.00, p = 0.93] nor gender [Q (1) = 1.48, p = 0.22] moderated the effect on the current meta-analytical association.
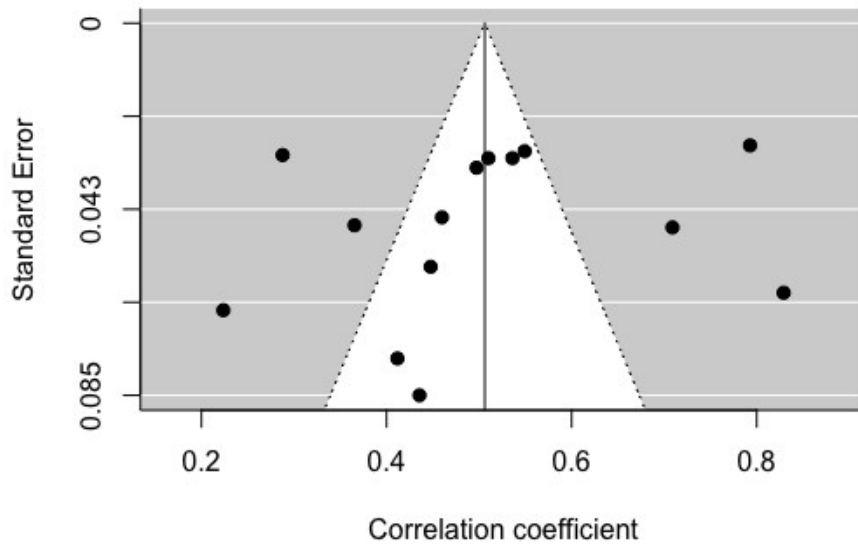
Fig. 8 Funnel plot providing details of Publication bias for the results of Impaired Autonomy and Anxiety Meta-analysis

Effect Size estimate of association between Other-directedness schemas and Anxiety

The meta-analytical estimate from 11 studies found a medium effect size association, $r = 0.49$ (95% Cl = 0.35 to 0.60, Z = 6.37, p < 0.0001) between other-directness schemas and anxiety symptoms (See Fig 9 below).
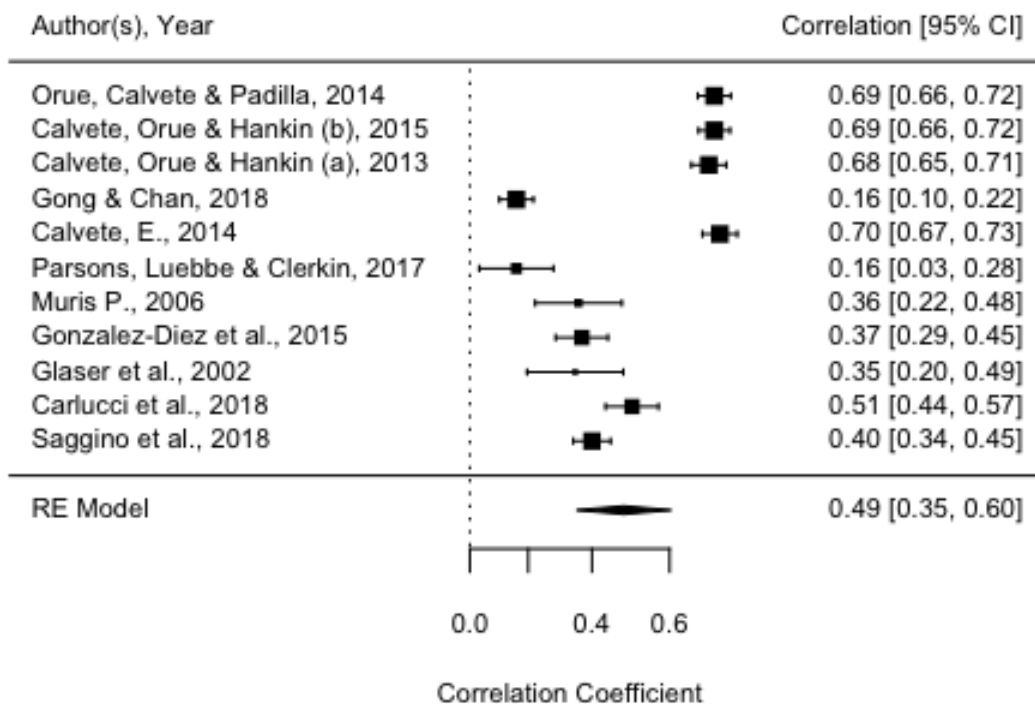
Fig. 9 Forest plot of Other-directedness and Anxiety Meta-analysis

The overall sample estimate showed that the included sample was highly heterogenous (Q = 597.73, p < 0.0001) with an I^2 statistic of 98%. Furthermore, no statistically significant publication bias was found using rank of correlation (0.21) and Egger's regression test (0.06). Fig 10 shows a symmetrical funnel plot with equal number of studies lying on both sides of the vertical line. Moderator analysis showed no significant association of age with other-directedness and anxiety [Q (1) = 3.49, p = 0.06]. However, the results of meta-regression showed female sex significantly influencing the association between other-directedness schemas and anxiety [Q (1) = 23.06, p < 0.0001].
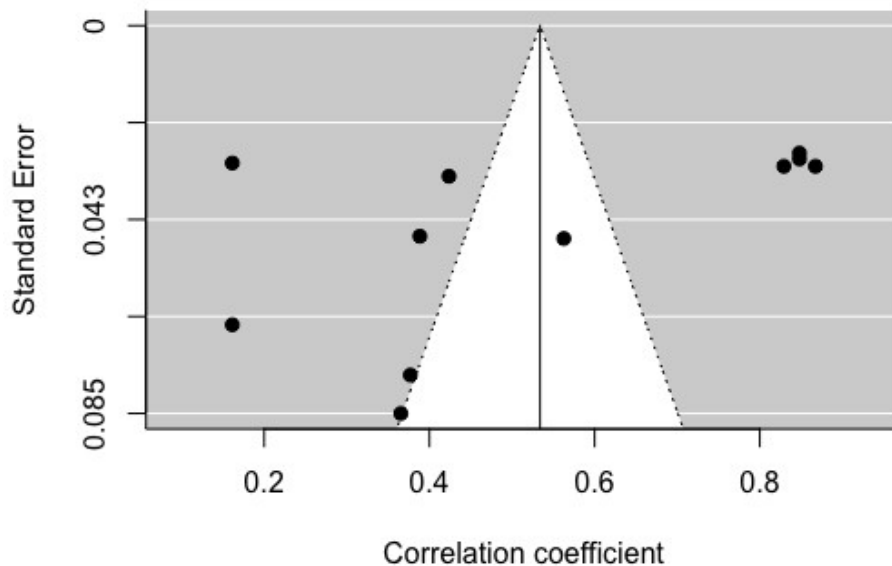
Fig. 10 Funnel plot providing details of Publication bias for the results of Other-directedness and Anxiety Meta-analysis

Effect Size estimate of association between Impaired Limit domain and Anxiety

As shown in Fig. 11, an overall medium effect size of r =0.35 (95% Cl = 0.24 to 0.44, Z = 6.24, p < 0.0001) from 7 studies was found between impaired limit schemas and anxiety, albeit in a highly significantly heterogenous sample (Q =71.48, p < 0.0001). 90% of effect size variance was attributed to actual variance occurring between studies.
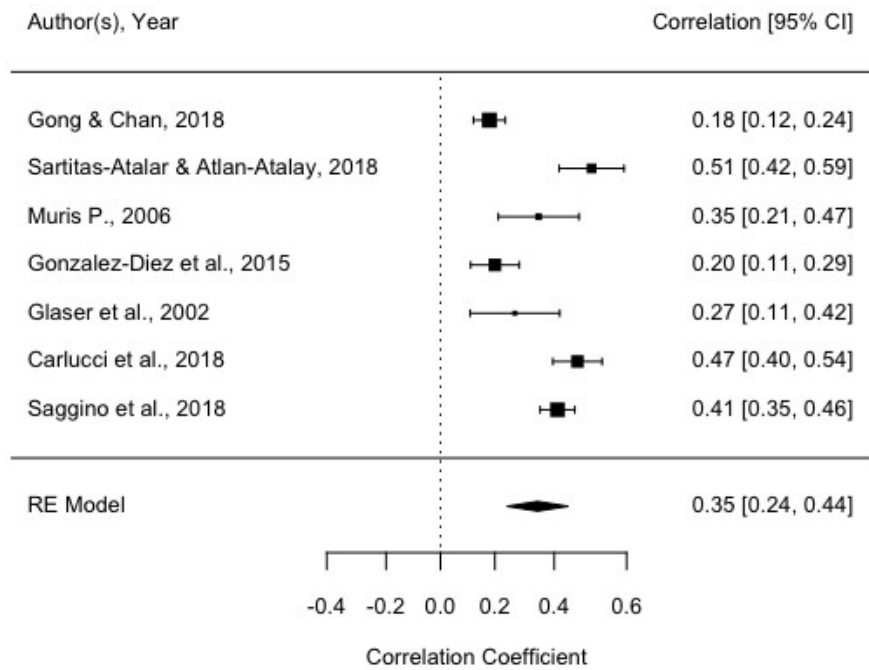
Fig. 11 Forest plot of Impaired limits and Anxiety Meta-analysis

The results for rank of correlation (p = 0.77) and Egger's test (0.76) were non-significant suggesting that the present results were not influenced by notable publication bias which is further evident through the symmetrically distributed studies on funnel plot presented in Fig 12. Neither age [Q (1) = 0.37, p = 0.54] nor gender [Q (1) = 0.04, p = 0.85] was found to moderate the relationship between impaired limit schemas and anxiety symptoms.
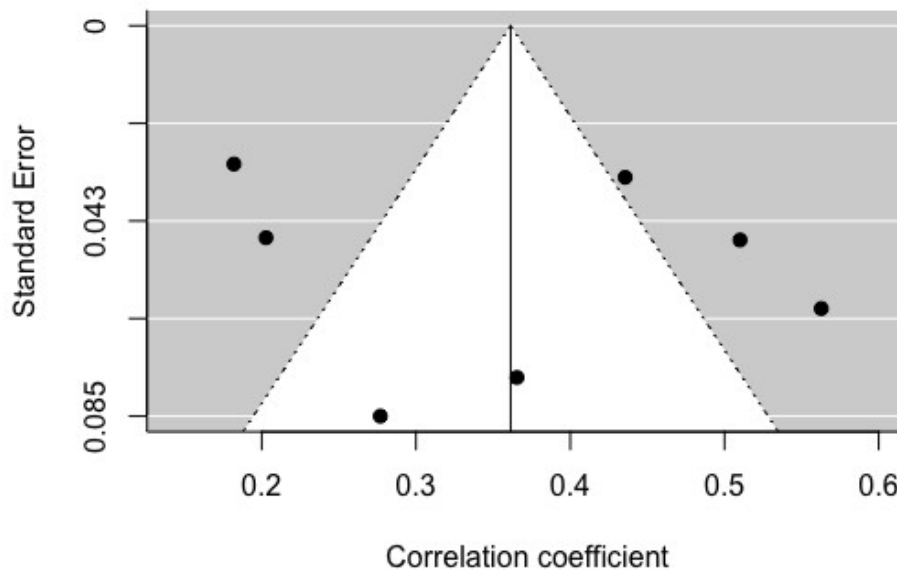
Fig. 12 Funnel plot providing details of Publication bias for the results of Impaired Limits and Anxiety Meta-analysis

Effect Size estimate of association between Hypervigilance schemas and Anxiety

A random effect meta-analytical model generated from 6 studies found a significant medium effect size association between hypervigilance schemas and anxiety symptoms ($r = 0.38$; 95% Cl = 0.26 to 0.48, $Z = 6.07$, $p < 0.0001$; See Fig 13 for details).
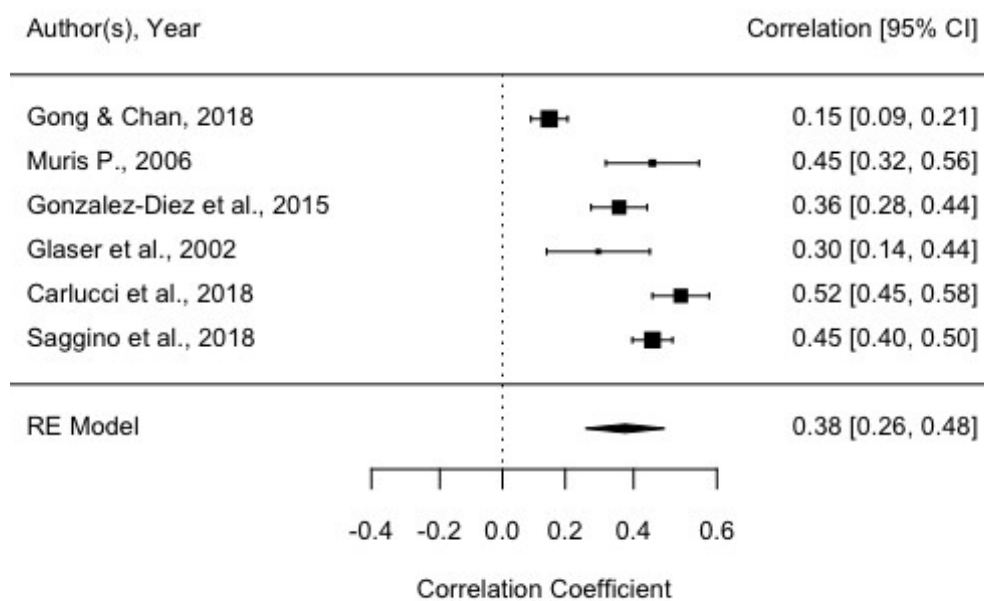
Fig. 13 Forest plot of Hyper-vigilance and Anxiety Meta-analysis

The included studies were found to be highly heterogenous (Q = 86.72, p < 0.0001) with 92% of effect size variance accredited to actual sample variance between the included studies. The findings were not influenced by the presence of publication bias (Egger's test p= 0.77, Rank correlation test p= 1.00; See Fig 14 for funnel plot. Meta-regression results suggested that age [Q (1) = 0.02, p = 0.89] did not moderate the associations. However, gender [Q (1) = 6.58, p = 0.01] was a significant moderator, in that females with hypervigilance schemas experienced more EMS and associated anxiety symptoms.
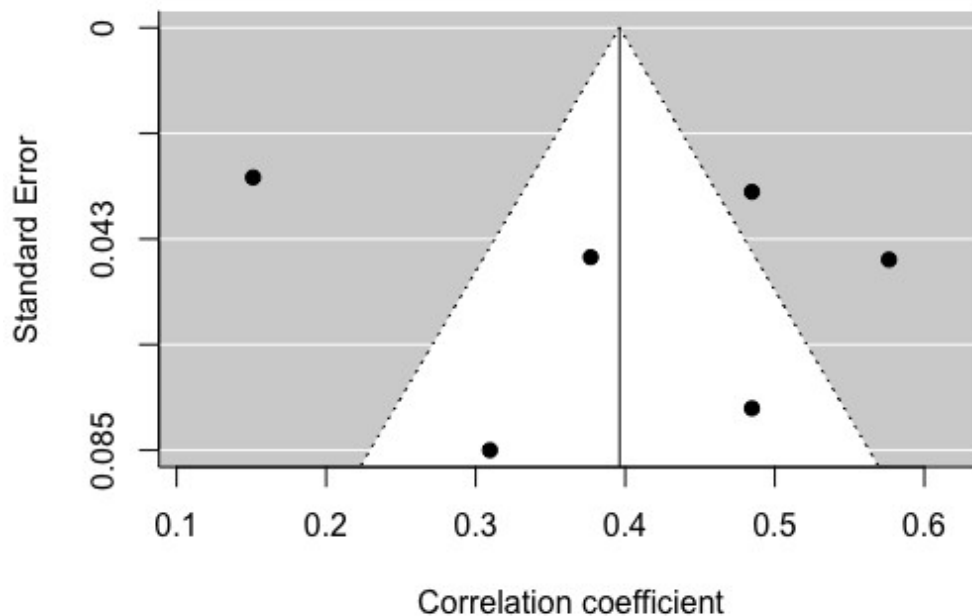
Fig. 14 Funnel plot providing details of Publication bias for the results of hyper-vigilance and Anxiety Meta-analysis

Discussion

A systematic search of the literature has identified six to fifteen different studies contributing effect sizes to estimate the meta-analytical associations between different EMS schema domains and anxiety symptoms among adolescents and young adults. This meta-analysis examined the associations between five different schema domains and anxiety symptoms. We found a strong association between EMS and anxiety symptoms in general, suggesting a stronger relationship between predominately active EMS among adolescents and

young adults with significant anxiety symptoms. The findings are consistent with Young's

schema theory (1999; 1990) and previous empirical evidence found in adolescents (Schmidt

et al., 1995; Calvete & Camara, 2012) and adults (Gewelt et al., 2017; Ansari et al., 2016;

Glaser et al., 2002). Research evidence from a Chinese adolescent sample found EMS

accounting for 31% of total variance for anxiety symptoms (Yan et al., 2018) while they

accounted for 34% variance among young adults (Glaser et al., 2002). In addition, similar

findings have been reported in a psychiatric outpatient's group where EMS accounted for

52% variance for anxiety symptoms (Welburn et al., 2002).

The results generated for separate schema domains suggest substantially stronger

associations between schemas of *disconnection/rejection, impaired autonomy/performance*

and other directedness, in that these three schema domains were found to have larger effect

size estimates compared to schema domains of *hypervigilance and impaired limits*. These

findings are in keeping with Young's theory. The three significant schemas domains found

associated with anxiety symptoms include maladaptive beliefs and fears related to inability to

form secure stable relationships, lack of independent functioning, dependency, vulnerability

to harm, and placing excessive importance on other's needs (Young et al., 2003). Based on

the schema content, it is likely that anxious adolescents and young adults have prominent

anxious thoughts and feelings revolving around their relationships and daily life stressors

which stimulates worry, panic, fear and excessive overthinking among individuals. This is

consistent with previous research that suggests the relationship between daily environmental

stressors and occurrence of anxiety symptoms among adolescents and young adults

(Hamilton et al., 2013; Schrami, et al., 2011). Eley and Stevenson (2000) identified that youth

with anxiety disorders are likely to experience threat related life stressors such as fear of

losing significant figures, vulnerability for traumatic events, physical and psychological

threats. Individuals with predominantly active schemas consider catastrophic and dangerous

situations as imminent and the inability to cope tends to increase the feelings of worry and anxiousness (Camara & Calvete, 2012).

In addition, our findings for schema domains are partly consistent with previous findings reported in a clinically diagnosed anxiety patients, where schema domains of *other-directedness* and *impaired autonomy/performance* correlated significantly with anxiety symptoms (McGinn et al., 2005). Moreover, all five schema domains were found significant predictors of trait anxiety in a non-clinical sample (Trip, 2006). Our results support Young's suggestion that different schemas associated with different psychopathologies need to be identified and targeted in psychological interventions to enhance the outcome of an intervention program (Young et al., 2003).

The measures of statistical heterogeneity (Q and I^2 statistics) shows that the meta-analytical results had significant heterogeneity between included studies. The results were generated using random effect model keeping in consideration the heterogenous nature of included studies. Further, the results are indicative of methodological differences between different studies such as the difference of study designs, use of different assessment measures to evaluate outcome measures and the diverse nature of participants and sample. Most of the included studies were cross-sectionally designed (k = 9) with rest based on longitudinal design. In addition, the studies used different versions of Young's schema measures as well as outcome measures of anxiety symptoms which can also contribute towards the existing higher heterogeneities.

The results of moderator analysis suggest that age did not moderate the associations between EMS, schema domains and anxiety symptoms among adolescents and young adults. The findings therefore provide additional support for considering adolescence and young adulthood as a broad transitional developmental phase. There is however comparatively little direct research evidence exploring and comparing the role of EMS across the 15 years or so

of adolescence and young adulthood. Future research could therefore focus on comparing the prevalence and impact of different schemas in, for example, pubescence, late teenage years, and the early twenties.

Gender was found to significantly moderate the associations between overall EMS, other-directedness, and hypervigilance domains with anxiety symptoms. The results highlight that female are likely to have significantly predominant EMS and schema content related to other-directed and hypervigilance schema domains compared to males. The findings are consistent with previous research evidence that suggests the presence of significant gender differences in experiencing activated EMS among clinically diagnosed anxiety patients, with females scoring higher in schemas falling in other-directedness and hypervigilance schema domains (Shorey et al., 2013).

In addition, Welburn et al (2002) has also identified gender differences with females experiencing higher schemas related to other-directed domain compared to their male counterparts. Claudia (2016) reported the presence of significant hypervigilant schemas among women compared to men. The schema content of other-directed and hypervigilance schema domains usually involves feelings and beliefs related to emotional inhibition, excessive negativism, self-sacrifice and approval seeking. These are relational aspects that are typically more important for females compared to males. Social roles and cultural expectations might influence such gender differences, as females are in general more prone to sacrificing their personal needs for their significant others.

Limitations

The present meta-analysis has several limitations to consider. The literature search was limited to peer-reviewed journal articles and did not include grey literature such as unpublished theses, abstracts and conference proceedings. As a result, publication bias may

have impacted on our current findings. Although we did not find any evidence of publication bias in our analysis, these were low power tests.

Further, a large number of studies (n= 25) were published in languages other than English that we could not include in our meta-analysis. This could limit the generalizability of our findings. In addition, some relevant studies (k = 2) could not be included in current meta-analysis because of the lack of effect size data required for meta-analytical results.

Clinical Implications

Adolescence and early adulthood are usually described as distinct transitional phases marked with approximately identical biological, cognitive, psychosocial and psychological development (IOM & NRC, 2014). An estimated 75% of mental health conditions have been identified to develop or have their onset during this time period (Singh et al., 2005), making it a critical and vulnerable life phase for the development of anxiety and related disorder. There is an urgent need to explore the development of mental health conditions during adolescence and young adulthood, to increase understanding of mental health issues with a view to designing effective early strategies or interventions (McGorry & Mei, 2018). Our current findings and those from another meta-analysis we recently carried out on depression (Tariq et al., 2021) suggest that it would be helpful for clinicians to consider maladaptive schemas contributing to anxiety and depression symptoms. Similar schema domains of disconnection/rejection, impaired autonomy/performance and other-directedness have been identified as precursors of both depression and anxiety symptoms. These overlapping schema domains suggests that individuals with depressive tendencies can be at risk of developing anxiety symptoms and vice versa. A better understanding of these potentially underlying factors could help devise targeted management and intervention plan based on the specific needs of each individual. Future interventions targeting vulnerability due to early maladaptive schemas would be of value and in fact the research team is currently piloting a self-help

manual on young adults. Our findings here further suggest that these might most effectively focus on schemas of disconnection/rejection, impaired autonomy/performance and other-directedness in anxious adolescents and young adults. Earlier identification and management of mental health issues at this time of life could help clinicians to reduce future distress and societal cost (Arango et al., 2018).

References

Ansari, P., Sharafi, M., Daneshvarian, K., Ahmadi, Z., Taseiri, K., Yaghoubian, M., 2016. Study of early maladaptive schemas in depressed, anxious and obsessive patients and non-clinical group. Biomedical and Pharmacology Journal, 9(3), 1161-1170. doi: http://dx.doi.org/10.13005/bpj/1064

American Psychiatric Association, 2013. Anxiety Disorders. In Diagnostic and statistical manual of mental disorders (5th ed.). Retrieved from: https://doi.org/10.1176/appi.books.9780890425596.dsm05

Arango, C., Díaz-Caneja, C. M., McGorry, P. D., Rapoport, J., Sommer, I. E., Vorstman, J. A., . . . Carpenter, W, 2018. Prevention strategies for mental health. The Lancet (Psychiatry), 5(7), 591-604. doi: https://doi.org/10.1016/S2215-0366(18)30057-9

Baujat, B., Mah, C. D., Pignon, J.-P., Hill, C., 2002. A graphical method for exploring heterogeneity in meta-analyses: application to a meta-analysis of 65 trials. Statistics in Medicine, 21, 2641–2652. doi: 10.1002/sim.1221

Begg, C. B., Mazumdar, M., 1994. Operating characteristics of a rank correlation test for publication bias. Biometrics 50(4), 1088–1101. doi: 10.2307/2533446

Calvete, E., Estevez, A., De Arroyabe, E. L., Ruiz, P., 2005. The schema questionnaire – Short form - Structure and relationship with automatic thoughts and symptoms of affective disorders. European Journal of Psychological Assessment, 21(2), 90-99. doi: 10.1027/10155759.21.2.90

Calvete, E., Orue, I., Hankin, B. L., 2013. Early maladaptive schemas and social anxiety in adolescents: The mediating role of anxious automatic thoughts. Journal of Anxiety Disorders, 27(3), 278-288. doi: http://dx.doi.org/10.1016/j.janxdis.2013.02.011

Calvete, E., 2014. Emotional abuse as a predictor of early maladaptive schemas in adolescents: Contributions to the development of depressive and social anxiety symptoms. Child Abuse & Neglect, 38(4), 735-746. doi: http://dx.doi.org/10.1016/j.chiabu.2013.10.014

Calvete, E., Orue, I., Hankin, B., 2015. A longitudinal test of the vulnerability-stress model with early maladaptive schemas for depressive and social anxiety symptoms in adolescents. Journal of Psychopathology and Behavioral Assessment, 37(1), 85-99. doi: http://dx.doi.org/10.1007/s10862-014-9438-x

Camara, M., Calvete, E., 2012. Early maladaptive schemas as moderators of the impact of stressful events on anxiety and depression in university students. Journal of Psychopathology and Behavioral Assessment, 34(1), 58-68. doi: http://dx.doi.org/10.1007/s10862-011-9261-6

Carlucci, L., D'Ambrosio, I., Innamorati, M., Saggino, A., Balsamo, M., 2018. Co-rumination, anxiety, and maladaptive cognitive schemas: When friendship can hurt. Psychology Research and Behavior Management, 11, 133-144. doi: http://dx.doi.org/10.2147/PRBM.S144907

Corey, D. M., Dunlap, W. P., Burke, M. J., 2010. Averaging correlations: Expected values and bias in combined pearsons rs and fisher's z transformations. The Journal of General Psychology, 125(3), 245-261. doi: https://doi.org/10.1080/00221309809595548

Costello, E. J., Mustillo, S., Erkanli, A., Keeler, G., Angold A., 2003. Prevalence and development of psychiatric disorders in childhood and adolescence. Archives of General Psychiatry, 60(8), 837-44. doi: 10.1001/archpsyc.60.8.837

Cui, L., Lin, W. Oei, T.P.S., 2011. Factor structure and psychometric properties of the Young schema questionnaire (short form) in Chinese undergraduate students. International Journal of Mental Health and Addiction, 9, 645–655. doi: https://doi.org/10.1007/s11469-010-9283-4

Delattre, V., Servant, D., Rusinek, S., Lorette, C., Parquet, P. J., Goudemand, M., Hautekeete, M., 2004. The early maladaptive schemas: a study in adult patients with anxiety disorders. Encephale, 30(3), 255-8. doi: 10.1016/s0013-7006(04)95437-1

Del Re, A. C., Hoyt, W. T., 2010. MAc: Meta-analysis with Correlations. R Package Version 1.0. 5. Computer Software. Available at: http://CRAN.R-project.org/package=MAc

Doering, S., Lichtenstein, P., Gillberg, C., NTR., Middeldrop, C. M., Bartels, M., . . . Lundstrom, S., 2019. Anxiety at age 15 predicts psychiatric diagnoses and suicidal ideation in late adolescence and young adulthood: results from two longitudinal studies. BMC Psychiatry, 19, 363. doi: https://doi.org/10.1186/s12888-019-2349-3

Edwards, S. L., Rapee, R. M., Kennedy, S., 2010. Prediction of anxiety symptoms in preschool-aged children: examination of maternal and paternal perspectives. Journal of Child Psychology and Psychiatry, 51(3), 313-21. doi: 10.1111/j.1469-7610.2009.02160.x

Egger, M., Smith, G. D., Schneider, M., Minder, C., 1997. Bias in meta-analysis detected by a simple, graphical test. *BMJ, 315*, 629–634. doi: https://doi.org/10.1136/bmj.315.7109.629

Eley, C., Stevenson, J., 2000. Specific life events and chronic experiences differentially

associated with depression and anxiety in young twins. Journal of Abnormal Child Psychology,28, 383-394. doi: 10.1023/A:1005173127117

Essau, C. A., Lewinsohn, P. M., Olaya, B., Seeley, J. R., 2014. Anxiety disorders in adolescents and psychosocial outcomes at age 30. Journal of Affective Disorder, 163, 125-132. doi: https://doi.org/10.1016/j.jad.2013.12.033.

Fisher, Z., Tipton, E., 2015. Robumeta: Robust Variance Meta-regression. R Package Version 1.6. Available at: http://CRAN.R-project.org/package=robumeta

Garber, J., Weersing, V. R., 2010. Comorbidity of anxiety and depression in youth: Implications for treatment and prevention. Clinical psychology: a publication of the Division of Clinical Psychology of the American Psychological Association, *17*(4), 293–306. doi: https://doi.org/10.1111/j.1468-2850.2010.01221.x

Gewelt, S. E., 2017. Early Maladaptive Schemas in Anxiety Disorders - An Investigation of Schemas' Relation to Symptoms in a Complex Sample (Doctoral dissertation), University of Oslo, Norway. Retrieved from: https://www.duo.uio.no/bitstream/handle/10852/56266/Cand--psychol--thesis-Silje-Engedal-Gewelt.pdf?isAllowed=y&sequence=17

Glaser, B. A., Campbell, L. F., Calhoun, G. B., Bates, J. M., Petrocelli, J. V., 2002. The early maladaptive schema questionnaire-short form: A construct validity study. *Measurement and Evaluation in Counselling and Development, 35*(1), 2–13. doi: https://doi.org/10.1080/07481756.2002.12069043

Gong, J., Chan, R. C., 2018. Early maladaptive schemas as mediators between childhood maltreatment and later psychological distress among Chinese college students. Psychiatry Research, 259, 493-500. doi: http://dx.doi.org/10.1016/j.psychres.2017.11.019

Gonzalez-Diez, Z., Calvete, E., Riskind, J. H., Orue, I., 2015. Test of a hypothesized structural model of the relationships between cognitive style and social anxiety: A 12-month prospective study. Journal of Anxiety Disorders, 30, 59-65. doi: http://dx.doi.org/10.1016/j.janxdis.2014.12.014

Gottschalk, M. G., Domschke, K., 2017. Genetics of generalized anxiety disorder and related traits. Dialogues in clinical neuroscience, 19(2), 159–168. doi: https://doi.org/10.31887/DCNS.2017.19.2/kdomschke

Gustavson, K., Knudsen, A. K., Nesvåg, R., Knudsen, G. P., Vollset, S. E., Reichborn-Kjennerud. T., 2018. Prevalence and stability of mental disorders among young adults: findings from a longitudinal study. BMC Psychiatry 18, 65.

doi: https://doi.org/10.1186/s12888-018-1647-5

Halford, W. K., Bernoth-Doolan, S., Eadie, K., 2002. Schemata as moderators of clinical
effectiveness of a comprehensive cognitive behavioral program for patients with
depression or anxiety disorders. Behaviour Modification, 26(5), 571-93. doi:
10.1177/014544502236651

Haegen, M. V., Etienne, A. M., 2016. Cognitive processes across anxiety
disorders related to intolerance of uncertainty: Clinical review. Cogent Psychology,
3(1), 1-22, doi: 10.1080/23311908.2016.1215773

Hamilton, J. L., Shapero, B. G., Stange, J. P., Hamlat, E. J., Abramson, L. Y., Alloy, L. B.,
2013. Emotional maltreatment, peer victimization, and depressive versus anxiety
symptoms during adolescence: hopelessness as a mediator. Journal of clinical child
and Adolescent Psychology, 53, 42(3), 332–347.
doi: https://doi.org/10.1080/15374416.2013.777916

Hawke, L. D., Provencher, M. D., 2011. Schema theory and schema therapy in mood and
anxiety disorders: A review. Journal of Cognitive Psychotherapy, 25(4):257–276.
doi: 10.1891/0889-8391.25.4.257

Hedley, L. M., Hoffart, A., Sexton, H., 2001. Early maladaptive schemas in patients with
panic disorder with agoraphobia. Journal of Cognitive Psychotherapy, 15(2), 131–142.
doi: 10.1891/0889-8391.15.2.131

Higgins, J. P. T., Thompson, S. G., Deeks, J. J., Altman, D. G., 2003. Measuring
inconsistency in meta-analyses. BMJ, 327, 557–560. doi:
https://doi.org/10.1136/bmj.327.7414.557

Hudson, J. L., Comer, J. S., Kendall, P. C., 2008. Parental responses to positive and
negative emotions in anxious and non-anxious children. Journal of Clinical Child and
Adolescent Psychology, 37(2), 303–313.
doi: https://doi.org/10.1080/15374410801955839

Institute of Medicine, & National Research Council., 2014. Investing in the health and well-
being of young adults. Washington (DC): National Academies Press (US). Retrieved
from: https://www.ncbi.nlm.nih.gov/books/NBK284782/

Kessler, R. C., Petukhova, M., Sampson, N. A., Zaslavsky, A. M., Wittchen, H. U., 2012.
Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood
disorders in the United States. International Journal of Methods in Psychiatric
Research, 21(3), 169–84. doi: https://doi.org/10.1002/mpr.1359

Lieb, R., Wittchen, H. U., Höfler, M., Fuetsch, M., Stein, M. B., Merikangas, K. R., 2000.

Parental psychopathology, parenting styles, and the risk of social phobia in offspring: A prospective-longitudinal community study. Archives of General Psychiatry, 57(9), 859–866. doi: https://doi.org/10.1001/archpsyc.57.9.859

Mairet, K., Boag, S., Warburton, W., 2014. How important is temperament? The relationship between coping styles, early maladaptive schemas and social anxiety. International Journal of Psychology & Psychological Therapy, 14(2), 171-189. Retrieved from: https://psycnet.apa.org/record/2014-28671-003

Marsh, I. C., Chan, S.W.Y., MacBeth., 2018. A self-compassion and psychological distress in adolescents—a meta-analysis. Mindfulness 9, 1011–1027. doi: https://doi.org/10.1007/s12671-017-0850-7

MacLeod, C., Mathews, A., 2012. Cognitive bias modification approaches to anxiety. Annual Review of Clinical Psychology, 8, 189-217. doi: 10.1146/annurev-clinpsy-032511-143052.

McHugh M. L. (2012). Interrater reliability: the kappa statistic. Biochemia Medica, 22(3), 276–282. Retrieved from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3900052/

McGinn, L. K., Cukor, D., Sanderson, W. C., 2005. The Relationship Between Parenting Style, Cognitive Style, and Anxiety and Depression: Does Increased Early Adversity Influence Symptom Severity Through the Mediating Role of Cognitive Style? Cognitive Therapy and Research, 29(2), 219–242. doi: https://doi.org/10.1007/s10608-005-3166-1

McGorry, P. D., Mei, C., 2018. Early intervention in youth mental health: progress and future directions. Evidence Based Mental Health, 21(4):182-184. doi: 10.1136/ebmental-2018-300060

McLeod, B. D., Wood, J. J., Weisz, J. R., 2007. Examining the association between parenting and childhood anxiety: a meta-analysis. Clinical Psychology Review, 27(2), 155-72. doi: 10.1016/j.cpr.2006.09.002

Mineka, S., Zinbarg, R., 2006. A contemporary learning theory perspective on the etiology of anxiety disorders: It's not what you thought it was. The American Psychologist, 61(1), 10–26. doi: 10.1037/0003-066X.61.1.10

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., 2009. PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS, 6(7). doi: 10.1371/journal.pmed.1000097.

Muris, P., 2006. Maladaptive Schemas in Non-Clinical Adolescents: Relations to Perceived Parental Rearing Behaviours, Big Five Personality Factors and Psychopathological Symptoms. Clinical Psychology & Psychotherapy, 13(6), 405-413. doi:http://dx.doi.org/10.1002/cpp.506

Murthy, R. (2007). Mass violence and mental health--recent epidemiological findings. International Review of Psychiatry 19(3), 183–92. doi: 10.1080/09540260701365460

National Institute of Mental Health (2017). Any Anxiety Disorder. U.S. Department of Health and Human Services. Retrieved from: https://www.nimh.nih.gov/health/statistics/any-anxiety-disorder.shtml

Orue, I., Calvete, E., Padilla, P., 2014. Brooding rumination as a mediator in the relation between early maladaptive schemas and symptoms of depression and social anxiety in adolescents. Journal of Adolescence, 37(8), 1281-1291. doi: http://dx.doi.org/10.1016/j.adolescence.2014.09.004

Parsons, E. M., Luebbe, A. M., Clerkin, E. M., 2017. Testing the Relationship Between Social Anxiety Schemas, Mindfulness Facets, and State and Trait Social Anxiety Symptoms. Mindfulness, 8(6), 1634-1643. doi:10.1007/s12671-017-0738-6

Pine, D. S., Cohen, P., Gurley, D., Brook, J., Ma, Y., 1998. The risk for early-adulthood anxiety and depressive disorders in adolescents with anxiety and depressive disorders. Archives of General Psychiatry, 55(1), 56–64. doi:10.1001/archpsyc.55.1.56

Pinto-Gouveia, J., Castilho, P., Galhardo, A., Cunha, M., 2006. Early Maladaptive Schemas and Social Phobia. Cognitive Therapy and Research, 30(5), 571–584. doi: https://doi.org/10.1007/s10608-006-9027-8

Rapee, R. M., 2012. Family factors in development and management of anxiety disorders. Clinical Child and Family Psychology Review, 15, 69-80. doi: 10.1007/s10567-011-0106-3

Rapee, R. M., Schniering, C. A., Hudson, J. L., 2009. Anxiety disorders during childhood and adolescence: origins and treatment. Annual Review of Clinical Psychology, 5, 311-41. doi: 10.1146/annurev.clinpsy.032408.153628

Remes, O., Brayne, C., Van der Linde, R., Lafortune, L., 2016. A systematic review of reviews on the prevalence of anxiety disorders in adult populations. Brain and behavior, 6(7), e00497. https://doi.org/10.1002/brb3.497

Rhein, D., Sukawatana, P., 2015. Thai university student schemas and anxiety symptomology. International Education Studies, 8(7), 108-126. doi: doi:10.5539/ies.v8n7p108

Rijkeboer, M. M., De Boo G. M., 2010. Early maladaptive schemas in children:

development and validation of the Schema Inventory for Children. Journal of
Behaviour Therapy and Experimental Psychiatry, 41(2), 102-9. doi:
https://doi.org/10.1016/j.jbtep.2009.11.001

Saggino, A., Balsamo, M., Carlucci, L., Cavalletti, V., Sergi, M. R., da Fermo, G., Dèttore, D.,
Marsigli, N., Petruccelli, I., Pizzo, S., Tommasi, M., 2018. Psychometric Properties of the
Italian Version of the Young Schema Questionnaire L-3: Preliminary Results. Frontiers in
psychology, 9, 312. doi: https://doi.org/10.3389/fpsyg.2018.00312

Saritas-Atalar, D., Altan-Atalay, A., 2018. Differential roles of early maladaptive schema
domains on the link between perceived parenting behaviors and depression, anxiety, and
anger. Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological
Issues, No Pagination Specified. doi: http://dx.doi.org/10.1007/s12144-018-9852-4

Schrami, K., Perski, A., Grossi, G., Simonsson-Sarnecki, M., 2011. Stress symptoms
among adolescents: the role of subjective psychosocial conditions, lifestyle, and self-
esteem. Journal of Adolescence, 34(5), 987-96. doi:10.1016/j.adolescence.2010.11.010

Schmidt, N. B., Joiner, T. E., Young, J. E., Telch, M. J., 1995. The Schema
Questionnaire: Investigation of psychometric properties and the hierarchical structure
of a measure of maladaptive schemas. Cognitive Therapy and Research, 19(3), 295–
321. doi: https://doi.org/10.1007/BF02230402

Schmidt, N. B., Joiner Jr, T. E., 2004. Global maladaptive schemas, negative life
events, and psychological distress. Journal of Psychopathology and Behavioral
Assessment, 26(1), 65-72. doi: 10.1023/B:JOBA.0000007457.95008.d2

Shorey, R. C., Stuart, G. L., Anderson, S., 2013. Differences in early maladaptive
schemas in a sample of alcohol and opioid dependent women: Do schemas vary
across disorders? Addiction Research and Theory, 21(2), 132-140. doi:
10.3109/16066359.2012.703266.

Shorey, R. C., Elmquist, J., Anderson, S., Stuart, G. L., 2015. The Relationship Between
Early Maladaptive Schemas, Depression, and Generalized Anxiety among Adults
Seeking Residential Treatment for Substance Use Disorders. Journal of Psychoactive
Drugs, 47(3), 230–238. https://doi.org/10.1080/02791072.2015.1050133

Singh, S., Evans, N., Sireling, L., Stuart, H., 2005. Mind the gap: The interface between
child and adult mental health services. Psychiatric Bulletin, 29(8), 292-294.
doi:10.1192/pb.29.8.292

Spence, S. H., Rapee, R. M., 2016. The etiology of social anxiety disorder: An evidence-
based model. Behaviour Research and Therapy, 86, 50-67. doi:

10.1016/j.brat.2016.06.007.

Tariq, A., Reid, C., Chan, S. W. Y., 2021. A meta-analysis of the relationship between early maladaptive schemas and depression in adolescence and young adulthood. Psychological Medicine, 1-16. doi:10.1017/S0033291721001458.

Trip, S., 2006. The Romanian version of Young Schema Questionnaire-short form 3 (YSQ-s3). Journal of Cognitive and Behavioral Psychotherapies, 6(2), 173–181. Retrieved from: http://jebp.psychotherapy.ro/vol6no2/the-romanian-version-of-young-schema-questionnaire-short-form-3-ysq-s3/

Van Vlierberghe, L., Braet, C., Bosmans, G., Rosseel, Y., Bögels, S., 2010. Maladaptive schemas and psychopathology in adolescence: On the utility of young's schema theory in youth. Cognitive Therapy and Research, 34(4), 316–332. doi: https://doi.org/10.1007/s10608-009-9283-5

Viechtbauer, W., 2010. Conducting meta-analyses in R with the metafor package. Journal of Statistical Software, 36(3), 1–43. doi: 10.18637/jss.v036.i03

Welburn, K., Coristine, M., Dagg, P., Pontefract, A., Jordan, S., 2002. The Schema Questionnaire-Short Form: Factor analysis and relationship between schemas and symptoms. Cognitive Therapy and Research, 26(4), 519–530. doi: https://doi.org/10.1023/A:1016231902020

Woodward, L. J., Fergusson, D. M., 2001. Life course outcomes of young people with anxiety disorders in adolescence. Journal of American Academy of Child Adolescence Psychiatry, 40(9), 1086-93. doi: 10.1097/00004583-200109000-00018

World Health Organization (WHO), 2020. Adolescent Mental Health. Fact sheet. Available online at: https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health

Yan, Y. L., Wang, J. P., Yu, W., He, L., Oei, T. P. S., 2018. Young Schema Questionnaire: Factor structure and specificity in relation to anxiety in Chinese adolescents. Psychiatry Investigation,15, 41-48. doi: https://doi.org/10.4306/pi.2018.15.1.41

Yigit, I., Kilic, H., Guzey Yigit, M., Celik, C., 2018. Emotional and physical maltreatment, early maladaptive schemas, and internalizing disorders in adolescents: A multi-group path model of clinical and non-clinical samples. Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues, No Pagination Specified. doi: http://dx.doi.org/10.1007/s12144-018-0068-4

Young, J. E., 1990. Schema-focused cognitive therapy for personality disorders: A schema focused approach. Sarasota, FL: Professional Resource Exchange

Young, J. E., 1999. Cognitive therapy for personality disorders: A schema-focused
approach (Rev ed.). Sarasota, FL: Professional Resources Press.

Young, J. E., Klosko, J. S., Weishaar, M. E., 2003. Schema therapy: A practitioner's
guide. New York: The Guilford Press. Retrieved from:
http://www.schematherapy.com/id201.htm