Metacognitive strategies and beliefs:

Child correlates and early experiences

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Kit Ying Melissa Chan

School of Health Sciences, Division of Psychology and Mental Health

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Thesis abstract:

The metacognitive model of psychological disorders, also known as the self-regulatory executive function model (S-REF; Wells and Matthews, 1994, 1996), suggests that dysfunctional metacognitions are important vulnerability factors that underlie psychological disorders. Specifically, that metacognitive thought control strategies and metacognitive beliefs are positively associated with psychological disorder symptoms. Whilst their contribution to disorder has been established in adults, less is known about these relationships in the younger population. Furthermore, few studies have explored the early life factors that might influence dysfunctional metacognitive beliefs. As such, the thesis explored the relationship between metacognitive control strategies and symptoms in children and adolescents and the early life factors (e.g. household environment, traumatic events, parenting) that may contribute to dysfunctional metacognitive beliefs.

Paper 1 is a systematic review of the literature on the association between thought control and psychopathological symptoms amongst children and adolescents. The review highlights that elevated use of thought control strategies is positively associated with symptoms of anxiety and post-traumatic stress. Furthermore, individual differences in specific thought control strategies such as worry and punishment showed the most consistent relationships with symptoms of anxiety, trauma and depression. The results support the applicability of the metacognitive model in younger populations.

Paper 2 evaluated if early exposure to adverse environments, traumatic events, and abusive relationships with caregivers were associated with elevated maladaptive metacognitive beliefs. The study found that higher dysfunctional metacognitive beliefs were associated with a lower current age, lower educational status, greater perceived early setbacks and lower perceived success in childhood. Disadvantaged household environments alone did not contribute to dysfunctional metacognitions and relationships with parenting factors were unreliable. Early emotional abuse was the only factor that showed a consistent positive contribution across dysfunctional metacognitions. The results suggest that possible adverse effects of emotional abuse should be recognised in the context of metacognitions and may inform elements of parenting interventions. In addition, perceptions of personal success and parenting factors may be worthwhile areas for future metacognition research. Paper 3 is a critical appraisal of Papers 1 and 2 and offers a wider discussion of the challenges faced in conducting research in this area and the lessons learned about the research process.

In summary, this thesis has highlighted that early emotional abuse is an important correlate of metacognitive beliefs and elevated thought control, specifically that characterised by worry and punishment is positively associated with a range of psychopathological symptoms amongst children and adolescents. Both studies provide evidence that support the applicability of the metacognitive model of psychological disorder in children and adolescents.

Declaration:

No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

Copyright statement:

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I would like to express my heartfelt gratitude to Professor Adrian Wells for his guidance and unfailing support. Thank you for your patience and advice throughout the project. I would also like to thank Dr Lora Capobianco for her guidance in statistical analysis and her presence in the ethics application process. I must also thank my supervisors for being understanding when my research progress has been affected due to personal emergencies.

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Paper 1: Systematic review

A systematic review of the relationship between thought control strategies and psychopathology in children and adolescents

Word count:
170 words (abstract)
15,522 words (full text)
7,635 words (main text without tables and references)

The following study has been prepared for submission to the *Clinical Psychology Review*. The references have been formatted in accordance to the author guidelines.

(Thought control strategies and psychopathology in children)

Abstract

Evidence supports theories that implicate thought control in the development of psychopathology in adults. However, an association between thought control and symptoms has not been systematically explored amongst children and adolescents. This study therefore aims to review the evidence within the younger population to inform future research and treatment development. A systematic search was conducted for articles using self-report thought control measures, measured with the Thought Control Questionnaire and White Bear Suppression Inventory, amongst children under the age of 18. Twenty studies were identified as relevant and included in the review. The results are consistent with the adult literature, that elevated thought control is generally positively associated with disorder symptoms as illustrated by anxiety and trauma amongst children and adolescents. Furthermore, individual differences in specific thought control strategies such as worry and punishment showed the most consistent relationships with different symptoms of psychopathology. The results may well imply the applicability of the metacognitive model of anxiety disorders in the younger population, and implications for use of treatment techniques are discussed.

170 words

1. Introduction

Intrusive thoughts are common phenomena (García-Soriano, Belloch, Morillo, & Clark, 2011; Rachman & de Silva, 1978). They are also a feature of psychological disorders, such as obsessive-compulsive disorder, generalised anxiety, depression, post-traumatic stress and eating disorders (Clark, 2002; García-Soriano, Roncero, Perpiñá, & Belloch, 2014). Individual differences have been identified in the strategies that people use to control unwanted or distressing thoughts. The most widely used measure of such strategies is the Thought Control Questionnaire (TCQ:Wells & Davies, 1994). The investigation of thought control is relevant to understanding psychological disorders and effective coping because attempts to control thoughts through suppression or resistance are features of several psychological disorders. Furthermore, in laboratory studies suppression of thoughts has been found to be an ineffective or counterproductive strategy (Wegner, Erber, & Zanakos, 1993; Wegner, Shortt, Blake, & Page, 1990; Wegner & Gold, 1995) and has been implicated as a process involved in the maintenance of psychopathology (Wells & Matthews, 1994; Purdon, 1999), including GAD, OCD and PTSD (Becker, Rinck, Roth, & Margraf, 1998; Ehlers & Clark, 2000; Roussis & Wells, 2008; Salkovskis, 1996; Smári & Hólmsteinsson, 2001; Wells & Carter, 2001).

Early research on thought suppression suggests that this strategy frequently brings upon the individual paradoxical effects (Jonathan S. Abramowitz, Tolin, & Street, 2001; Wegner & Erber, 1992; Wegner et al., 1993; Wegner, Schneider, Carter, & White, 1987). When participants were asked to suppress a particular thought, the target thought occurred more frequently during the experiment. This immediate effect during suppression is called the ‘enhancement effect’. In contrast, a ‘rebound effect’ has also been identified, which refers to an increase in the frequency

of the target thought that occurs after the attempt to suppress has ended. These phenomena have been accounted for in ironic process theory, which suggests that monitoring for failures in suppression results in constant monitoring for traces of the target thought. This inspection makes individuals more sensitive to cues associated with the target thought which results in the enhancement of the target thought. Moreover, the constant need to search for 'a distracter thought' keeps the search process in consciousness which heightens sensitivity to stimuli related to the unwanted thoughts (Wegner & Erber, 1992). Indeed, a meta-analysis of thought suppression experiments conducted amongst community (i.e. non-clinical) participants revealed that participants could successfully suppress their thoughts over a limited period of time. However, the rebound effect was evident as time progressed or when effort was depleted (Abramowitz et al., 2001). This finding was supported by a subsequent meta-analysis that also implied that thought suppression was counter-effective (Magee, Harden, & Teachman, 2012).

Wells and Davies (1994) drew attention to a limitation of early thought suppression research in its lack of operationalisation of the suppression concept. They argued that 'suppression' refers to a goal or objective of removing or preventing a thought from entering consciousness, but it says little about the way this is achieved. How people suppress or control their thoughts is conceptualised as important in metacognitive theory of psychological disorder (Wells & Matthews, 1994; 1996). To explore this mechanism further, Wells and Davies (1994) developed a questionnaire to measure individual differences in thought control strategies: the Thought Control Questionnaire (TCQ). The TCQ is comprised of five subscales, each representing a different strategy people use to control their thoughts: 1) Distraction (cognitive or behavioural strategies to replace the unwanted thoughts with more pleasurable thoughts or activities); 2)

social control (seeking reassurance from others regarding the troubling thought); 3) punishment (criticising or causing pain to oneself to stop the troubling thought) 4) worry (thinking about other negative thoughts or worries); 5) re-appraisal (analysing the thought rationally). In the metacognitive model of psychological disorders (Wells, 2019; Wells & Matthews, 1996a), worry and punishment strategies are generally considered to be the most unhelpful thought control strategies while other strategies might occasionally be helpful. However, the model also suggests that any strategies may cause problems if they are used as safety behaviours and prevent the discovery that thoughts are benign.

An accumulation of evidence supports the association between specific thought control strategies and psychopathology. In their initial study, Wells & Davies (1994) reported that punishment and worry sub-scales are positively associated with trait-anxiety and trait-worry. The two sub-scales are also frequently used amongst people with GAD, PTSD and OCD (Amir, Cashman, & Foa, 1997; Coles & Heimberg, 2005; Holeva, Tarrier, & Wells, 2001; Wells & Carter, 2009). Moreover, Coles and colleagues (2005) found that greater worry and punishment strategies were associated with lower life satisfaction. People who had road traffic accidents were more prone to developing symptoms of PTSD if they used worry to control their thoughts (Holeva et al., 2001). In a similar study, worry and punishment sub-scales were found to be the mediators between dysfunctional cognitions and PTSD symptoms (Bennett, Beck, & Clapp, 2009). Other than accident survivors, the increased use of worry and punishment strategies amongst survivors of child sexual abuse was found to mediate the relationship between abuse and trauma symptoms (Scarpa, Wilson, Wells, Patriquin, & Tanaka, 2009). Punishment and worry were the only two sub-scales that correlated with symptoms of OCD, even though OCD patients had also reportedly

used reappraisal and social control more often than control groups (Amir et al., 1997). This finding was supported by a later study which also reported a decreased use of punishment strategy following successful treatment of OCD amongst patients (Abramowitz, Whiteside, Kalsy, & Tolin, 2003). Research has also shown that currently depressed individuals, compared with previously depressed individuals and healthy control group, were more likely to use worry and punishment as thought control strategies (Halvorsen et al., 2015). Previously depressed individuals were also more likely to use reappraisal strategies than healthy individuals.

Evidence of an association between the other TCQ subscales and psychopathology is less apparent. The distraction sub-scale was not correlated with measures of anxiety in the initial study (Wells & Davies, 1994). However, Coles (2005) found that people with GAD use less distraction and social control strategies, but higher life satisfaction was associated with greater use of social control and distraction. Similarly, distraction was less likely to be used in patients with OCD (Abramowitz et al., 2003). Amongst road traffic accident survivors, the use of social control and distraction strategies was found to be protective against symptoms of PTSD and trauma cognitions (Bennett, Beck, & Clapp, 2009). Paradoxically, in another study, survivors of road traffic accidents who reported greater use of social control were more likely to develop symptoms of PTSD (Holeva et al., 2001). Thus, relationships between some thought control strategies and psychopathology seem unstable and the direction varies, which may indicate the involvement of other moderator variables as the metacognitive model predicts.

Most of the research conducted on thought control strategies has been within the field of adult psychopathology, with less attention given to thought control in children and adolescents. Studies in young people have used the TCQ or adaptations of TCQ for use in younger age groups

(Gill, Papageorgiou, Gaskell, & Wells, 2013), or have used the White Bear Suppression Inventory (WBSI) to measure thought control (Wegner & Zanakos, 1994). The WBSI is a self-report questionnaire consisting of 15 items assessing for people's general tendency to suppress unwanted thoughts (e.g. "There are things I prefer not to think about"). There is increasing debate regarding the single factorial structure originally proposed by Wegner (1994). Some studies had suggested a two-factor solution where one factor measures the frequency of unwanted intrusive thoughts (e.g. "There are images that come to mind that I cannot erase") and the other factor measures thought suppression (e.g. "I wish I could stop thinking about certain things") (Höping & de Jong-Meyer, 2003; Rassin, 2003; Schmidt et al., 2009). These studies argued that these two constructs had to be differentiated because WBSI's association with psychopathology was inflated by the intrusion items. When the two-factor model is fitted to the data, the association with the thought suppression sub-scale was less apparent or even non-significant.

Aim and hypothesis

To the author's knowledge, the association between self-report thought control strategies and psychopathology in children and adolescents has not yet been systematically explored. Extrapolation from adult studies may not be appropriate because children's experiences of thoughts and metacognitive strategies may still be under development and therefore different from adults (Schneider, 2008; Wells, 2019). This study therefore aims to review the evidence within the younger population, such that it may inform research and treatment development in the future. Based on the literature in the adult population, it is hypothesised that specific thought control strategies, worry and punishment strategies in particular, will be positively associated

with psychopathology (e.g. symptoms of anxiety, depression and trauma) amongst children and adolescents. It is hypothesised that more general thought suppression will also be positively correlated with children and adolescent psychopathology but that the evidence will be weaker given the theoretical importance of distinguishing the maladaptive strategies as advanced by metacognitive theory.

2. Methods

The methods followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement for conducting and reporting systematic reviews (Moher et al., 2009). The study is registered with PROSPERO (Reference: CRD42020163492) (See Appendix A)**.**

2.1. **Search strategy**

A systematic search was conducted for articles published from 1994 to January 2020. A start date of 1994 was selected as the Thought Control Questionnaire and White Bear Suppression Inventory were developed in 1994. Five electronic bibliographic databases were systematically searched: PsychINFO, EMBASE, Ovid MEDLINE, Web of Science and CINAHL. The following keywords and subject terms were used: ("thought control questionnaire/survey/instrument" or *thought control* or "white bear suppression inventory" or *thought suppression)* AND ("children" or "schoolchild" or "adolescent" or "youth" or "teenager" or "paediatrics" or "juvenile" or "youngster" or *children* or *early adolescence* or *student* or *primary school* or *high school*). See Appendix B for detailed search strategy conducted within each database.

2.2. **Inclusion and exclusion criteria**

Studies were eligible if they were published in a peer reviewed journal and met the following inclusion criteria: (1) participants were aged 18 or below; (2) used the Thought Control Questionnaire (TCQ or TCQ-Adolescent version) or White Bear Suppression Inventory[1] (WBSI) as the measure of thought control strategies; (3) used validated and reliable measures of depressive or anxiety symptoms; (4) used a longitudinal cohort design, a case control or cross-sectional study design. Studies with an age range beyond 18 years (e.g. age 15-30) or studies with participants' average age that was above 18 years old were excluded. Studies that include participants with any chronic physical health problems, neurodevelopmental conditions (e.g. Autism or ADHD), substance abuse conditions, eating related disorders, suicidal ideation or self-harm behaviours were also excluded. Systematic reviews, meta-analyses, intervention studies, case studies, qualitative studies, dissertations, or conference abstracts were also excluded. Non-English papers and studies conducted prior to 1994 were excluded.

2.3. **Data extraction**

The first author (MC) conducted the data extraction. The following data were extracted from each study: sample characteristics (sample size; percentage of female; age; recruitment setting), study design (cross-sectional or longitudinal cohort; with or without control group), measures used (TCQ or WBSI), symptom measures, and statistical analysis adopted in the study. Correlations coefficients and other statistical parameters were extracted, synthesised and tabulated.

2.4. **Quality assessment**

[1] Regardless of factor structure

Quality assessments were conducted for eligible studies using an adapted version of the Downs and Black (Downs & Black, 1998) checklist. The tool was adapted such that items only relevant to case control studies, cross-sectional studies and cohort studies were retained. Items relating to interventions delivered, adverse events, loss-to-follow up, treatment representation, blinding allocation, compliance, lengths of follow up and randomisation were deleted. There were 16 items in the assessment tool adapted for this review, assessing the quality of areas in reporting, external validity, internal validity (selection bias and outcome) and power calculation (Appendix C). The items were scored 0 or 1 (0 indicates "no" or "can't determine" and 1 indicates "yes"). A total score was calculated by summing all items, as such total scores ranged from 0 to 17[2], with higher scores indicating higher quality. Quality ratings were applied as follows: poor (score ≤ 8), fair (9-11), good (12-15), excellent (16-17).

[2] One item had three options of 0,1&2

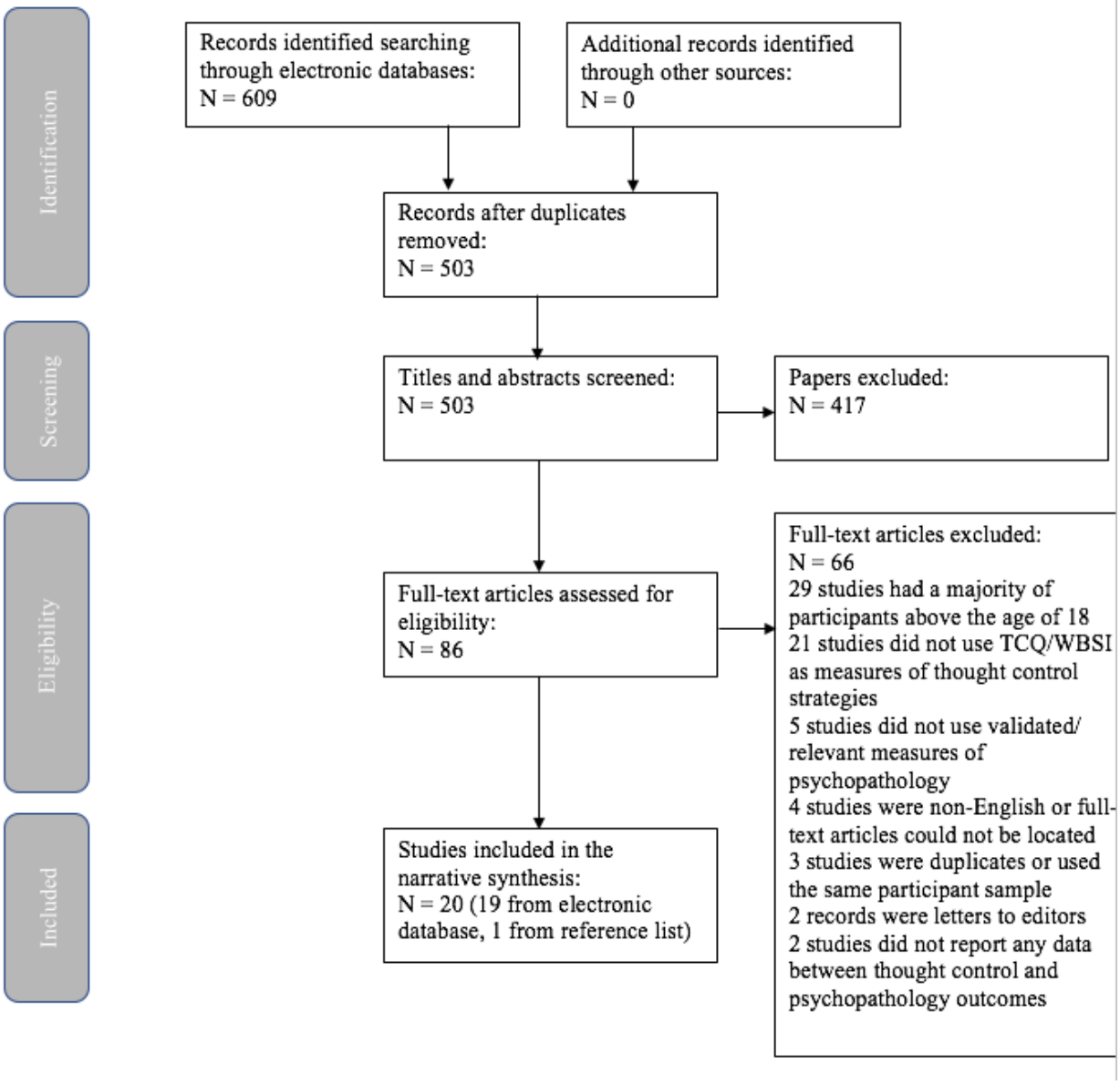
3. Results

3.1. **Literature search results**

The search yielded a total of 609 records. After removing the duplicates across databases, 503 records were eligible for screening. The author (MC) first screened all titles and abstracts and excluded 417 records following the exclusion criteria. Eighty-six full-text articles were downloaded as the author could not judge from the titles and abstracts if these were eligible. After reviewing the full-text articles, sixty-six papers were excluded, and twenty studies remained and were eligible to be included in this review. See Figure 1 for the screening process, reported according to the guidelines in line with the PRISMA statement.

An independent reviewer (ES) reviewed 20% of the screened full-text articles, and the kappa coefficient was calculated to measure the level of agreement. There were two instances of disagreement between the two reviewers that were resolved through discussion. The kappa coefficient was 0.71, which is regarded as sufficient (Landis & Koch, 1977).

Figure 1: PRISMA Diagram



3.2. **Study characteristics**

Twenty studies met inclusion criteria and included a total of 3,665 participants. The study characteristics of each and their study ID is presented in Table 1.

Age of participants

Participants' age ranged from 7 to 19 years old. Two studies (ID 15; 16) included participants of age 19 recruited from two high schools. Whilst the age is above our initial 18 years of age cut-off, the average age of participants in these two studies was 15 years and therefore we decided to retain the two studies in the review. The majority of the studies covered a broad age range, but three studies focused on only primary school aged students (age 7-12) (ID 11; 13; 17), eleven studies focused on only secondary school aged students (age 12-19) (ID 1- 4, 6, 10, 14-16, 18, 19).

Location of studies

Included studies were conducted worldwide including: Australia (n=5; ID 8; 11-13; 17), United States (n=4; ID 6; 7; 16; 19), United Kingdom (n=3; ID 3-5), Spain (n=2; ID 15; 20), Canada (ID 14), Denmark (ID 9), Iran (ID 1), Korea (ID 2), Netherlands (ID 18), and Turkey (ID 10).

Nature of the sample

Ten studies recruited participants with a clinical diagnosis of an anxiety disorder (ID 1; 2; 8; 10; 11- 13) or participants exposed to traumatic events (ID 5; 7; 9), while the remaining studies recruited participants from the community setting. As such, the review is categorized by the nature of the sample (e.g., clinical vs non-clinical) and the measures used in the study (e.g., TCQ vs WBSI).

Thought control measures

(Thought control strategies and psychopathology in children)

Six studies used the TCQ as a measure of thought control strategies amongst adolescent samples (two studies used the adolescent version and four studies used the original version), ages ranged from 10 to 18 years old, with a total of 1,337 participants. (ID 1-6). Seven studies used WBSI as the measure of thought suppression in clinical samples of children and adolescents, age ranging from 8 to 18 years old, with a total of 432 participants (ID 7-13). Seven other studies (ID 14-20) measured thought suppression with WBSI in a community sample of 1,896 children and adolescents, with an age range of 8-19 years old.

3.3. **Quality assessment scores**

Studies were assessed for methodological quality and risk of bias. Of the twenty included studies, two studies were rated as good, fifteen studies were rated as fair and three studies were rated as poor[3]. Studies rated as poor commonly had poor reporting and external validity. Very few studies reported details of power analysis and confounding variables. The representativeness of the recruited participants was unclear in most studies.

[3] Using a total score for quality assessment has been recognised as problematic and this will be elaborated in Paper 3

Table 1 – *Study characteristics*

Study ID	**Sample characteristics**	**Study design** **With or without control group**	**Measures (TCQ/WBSI)**	**Measures (symptoms)**	**Statistical analysis**	**Quality assessment**
(1) (Bahrami & Yousefi, 2011)	N=100 50% female Mean age = 16.4 (range15-18) Diagnosed with GAD Recruited from high schools in Iran	Case-control Comparing TCQ scores between Male & Female group	Thought Control Questionnaire (TCQ)	Diagnostic standards based on DSM-IV – clinical interview	Multivariate analysis of variance (MANOVA)	8/17 (poor)
(2) (Kang et al., 2012)	N=1,461, but only 186 (agreed to individual diagnostic interview) 78% female Mean age = 16 (range 15-17) Mix of clinical and non-clinical population from high schools in Korea	Depressive spectrum disorder group (N=46) Thought-Perception-Sensitivity-Symptoms (TPSS) group (at high risk of psychosis) (N=15) Normal group (N=125)	TCQ	Kiddie Schedule for Affective Disorders and Schizophrenia for School-Aged Children (K-SADS-PL) – to identify depressive disorder group (Korean version) Comprehensive Assessment of At-Risk Mental States (CAARMS) – to identify students with psychosis (Korean version)	ANOVA test	12/17 (good)
(3) (Wilson & Hall, 2012)	N=151 56% female Mean age 15.05 (range 13-16) Non-clinical population Recruited from schools in the UK	Cross-sectional No control group	TCQ	Leyton Obsessional Inventory – Child version (LOI-CV) – assess the frequency of OCD symptoms	Correlations (parametric) Linear regression analysis	11/17 (fair)

(Thought control strategies and psychopathology in children)

(4) (Gill et al., 2013)	N=589 51% female Mean age =14.5 (range 13-17) Non-clinical population Recruited from schools in the UK	Cross-sectional No control group	Thought Control Questionnaire – Adolescent version (TCQ-A 30 items)	The Revised Children's Manifest Anxiety Scale (RCMAS) – 37 item self-report measure of trait anxiety The Short Mood and Feelings Questionnaire (SMFQ) -13 items to measure core symptoms of depression The Leyton Obsessional Inventory-Child version (LOI-CVS) - a 20 item self-report inventory that assess the frequency of obsessive-compulsive symptoms	Pearson's correlations	11/17 (fair)
(5) (Meiser-Stedman et al., 2014)	N = 99 37% female Mean age = 14 (range 10-16) 56.6% Exposed to assault 43.4% Exposed to traffic accident Recruited at A&E following an assault or traffic accident in London, UK	Prospective longitudinal Assessed at T1 = 2 to 4 weeks post-trauma ASD vs Non-ASD group T2 = 6 months post-trauma PTSD vs Non-PTSD group	TCQ (edited by the author to be understood by younger population)	PTSD Schedule of the Anxiety Disorders Interview Schedule for the DSM-IV:Child and Parent version (ADIS-C) – assess for Acute Stress Disorder (ASD) and PTSD Child Revised Impact of Event Scale (CRIES) – 13 items – assess post-traumatic stress symptoms	Mann Whitney statistic Spearman's rho correlation Stepwise linear regression	11/17 (fair)
(6) (Whiting, May, Rudy, & Davis, 2014)	N=212 68% Female	Cross-sectional No control group	TCQ-A	Obsessive Compulsive Inventory-Child version (OCI-CV) – a 21-	Spearman's Rho correlations	10/17 (fair)

	Mean age = 15.53 (range 12-18) Non-clinical population Recruited from high school and undergraduate students in USA			item self-report measure assessing the frequency of OCD symptoms Youth Self-Report Form (YSR) – 112 item self-report scale assessing behavioural and emotional concerns in children – Anxious/depressed subscale; Internalizing problems	Regression analyses	
(7) (Aaron, Zaglul, & Emery, 1999)	N=40 53% female Mean age 13.6 (range 8-17) 100% admitted to children hospital following acute physical trauma in USA (75% involved in motor vehicle accident)	Cross-sectional No control group All participants met the stressor criterion for DSM-IV PTSD diagnosis Assessed at 4 weeks post-trauma	White Bear Suppression Inventory (WBSI) – a 15 item measure of tendency to suppress unwanted thoughts, scores may range from 15 to 75 with higher scores meaning higher tendency to suppress	Reaction Index (RI) – a 20-items child report measure to assess PTSD symptoms following traumatic events Impact of Event Scale (IES) – 15 items measure that assess intrusive imagery and avoidance Child Behaviour Check-list (CBCL)– computed two broad subscales (internalizing and externalizing)	Correlations T-test Multiple regression analyses	11/17 (fair)
(8) (Farrell, Waters, & Zimmer-Gembeck, 2012)	N=46 35% female Mean age 11.3 (range 7-17) Recruited children who were referred for free treatment for	Cross-sectional No control group, but analysis separated the participants by age: child (N=24 age 7-	WBSI	Children's Yale-Brown Obsessive-Compulsive Scale (CY-BOCS) – clinician-rated measure to assess severity of obsessions and compulsions	Correlations	10/17 (fair)

	OCD at an Australian university	11); youth (N=22 age 12-17) 83% with primary diagnosis of OCD				
(9) (Vincken, Meesters, Engelhard, & Schouten, 2012)	N=89 51% female Mean age 13.9 (range 8-18) Recruited from two hospitals' emergency room after having been involved in traffic accident in Denmark	Cross-sectional No control group Assessed at 2 weeks and 2 months post-trauma	WBSI- adapted version replacing "thoughts/images" by "thoughts/images about the accident" (Dutch translation)	Child PTSD Symptom Scale (CPSS) – 17 items measuring PTSD symptoms with 3 subscales (re-experiencing; avoidance/numbing; hyperarousal)	Pearson correlations	10/17 (fair)
(10) (Kadak, Balsak, Besiroglu, & Celik, 2014)	N=48 Parent-adolescent dyads Female % unknown 11th grade students Recruited from high schools in Turkey, followed by diagnostic interview	Case control Clinical (with OCD) vs Non-clinical (control) group (N=20 in each group)	WBSI	Identified students with OCD based on version 2.1 of OCD section of the Composite International Diagnostic Interview (CIDI)	T-test	10/17 (fair)
(11) (Donovan, Holmes, & Farrell, 2016)	N=50 60% female Mean age 9.92 (range 7-12) Self-referred by parents, teacher, GPs, mental health professionals, school officers, media advertisements in public and in schools in Australia	Case-control Clinical (with GAD) vs Non-clinical (control) group 50% met criteria for a primary diagnosis of GAD	WBSI (minor modifications made to 3 items to suit a younger population)	Anxiety Disorders Interview Schedule for Children (ADIS) – plus clinician severity rating	One-way ANOVA	10/17 (fair)

(Thought control strategies and psychopathology in children)

(12) (Hearn, Donovan, Spence, & March, 2017) Hearn 2017a	N=126 60% female Mean age 11.29 (range 8-17) Self-referred from across Australia following advertising for participants with social anxiety	Cross-sectional No control group 100% met DSM-5 criteria for Social Anxiety Disorder (79% comorbid with GAD) diagnosed with ADIS	WBSI – minor wording modifications made to three items (similar to that of Ferrell 2006) to suit younger population	Anxiety Disorders Interview Schedule for Children (ADIS) – plus clinician severity rating (CSR) Children's Global Assessment Scale (CGAS) – to measure overall level of functioning Social Phobia and Anxiety Inventory- 10 – Child and Parent report (SPAI-C/P)– measure the cognitive, somatic and behavioural symptoms of child social anxiety	Bivariate correlations (Pearson product-moment correlation coefficient) Hierarchical multiple regression analysis	10/17 (fair)
(13) (Hearn, Donovan, Spence, March, & Holmes, 2017) Hearn 2017b	N=60 70% female Mean age 9.88 (range 8-12) Self-referred by mental health professionals, and schools in Australia	Case-control 20 with primary diagnosis of GAD, 20 with SAD 20 without anxiety disorder as control group	WBSI (same as above)	Anxiety Disorders Interview Schedule for Children (ADIS) – plus clinician severity rating *Negative problem orientation (NPO) – a 5-item subscale of the Social Problem-Solving Inventory* *Intolerance of uncertainty scale for children (IUS-C) – 27 items*	One-way ANOVA	9/17 (fair)

				scale measuring intolerance of uncertainty		
(14) (Laugesen, Dugas, & Bukowski, 2003)	N=528 49% female Mean age 15.5 (range 14-18) Recruited from public high schools in Canada	Cross-sectional No control group	WBSI (French translation) – one of two subscales (thought suppression) was retained (lack of control over thought was not included)	Penn State Worry Questionnaire for Children (PSWQ-C) - measure of trait worry *Intolerance of Uncertainty (IOU) – a-27 item measure to measure the extent participants find uncertainty unacceptable* *Why Worry (WW-II) – 25-item scale measuring beliefs about worry* *Negative problem orientation (NPO) – a 5-item subscale of the Social Problem-Solving Inventory*	Partial Correlations controlled for gender and somatic anxiety scores Multivariate hierarchical regression	10/17 (fair)
(15) (Fernandez-Berrocal, Alcaide, Extremera, & Pizarro, 2006)	N=250 52% female Mean age 14.7 (range 14-19) Recruited from a high school in Spain	Cross-sectional No control group	WBSI (Spanish version)	Beck Depression Inventory (BDI) – a 21 items measure assessing depressive symptoms State-Trait Anxiety Inventory (STAI) – a 20 items measure	Pearson correlations Hierarchical regression analysis ANOVA	5/17 (poor)

				assessing general and situational anxiety Trait Meta-Mood Scale (TMMS) – 48 items evaluating emotional intelligence with 3 subscales – Attention; Clarity; Repair Piers-Harris Children's Self-Concept Scale (PH scale) – 80 items measuring self-esteem		
(16) (Kennedy, Grossman, & Ehrenreich-May, 2016)	N=261 62% female Mean age 14.7 (range 11-19) Recruited from public schools in USA	Cross-sectional No control group	WBSI – 2 subscales (unwanted intrusive thoughts and thought suppression)	Revised Child Anxiety and Depression Scale (RCADS) – a 47-items self-report measure including 6 subscales assessing symptoms of a range of anxiety disorders and major depressive disorder	Exploratory structural equation modeling	8/16 (poor)
(17) (Donovan, Holmes, Farrell, & Hearn, 2017)	N=114 51% female Mean age 9.87 (range 8-12) Children and one of their parent recruited from the community in Australia (via schools, social media, University research participant pool)	Cross-sectional No control group	WBSI (minor modifications made to 3 items to suit a younger population)	Penn State Worry Questionnaire Children and adult version (PSWQ-C and PSWQ) – a 16 items self-report measure of trait worry *Negative problem orientation (NPO) – a 5-item subscale of the Social Problem-Solving Inventory*	Bivariate correlations Standard multiple regression analysis	9/17 (fair)

				Meta-cognitions questionnaire for children (MCQ-C) – positive metacognitive beliefs (PBW) and negative metacognitive beliefs (NBW) subscales (6 items each) *Intolerance of uncertainty scale for children (IUS-C) – 27 items scale measuring intolerance of uncertainty*		
(18)(Muris et al., 2017)	Sample 1 N=184 54% female Mean age 13.6 (range 12-16) Sample 2 N=157 68% female Mean age 15.33 (range 12-18) Recruited from high schools in the Netherlands	Cross-sectional No control group	WBSI	Youth Self-Report (YSR) – items combined into DSM-oriented scales including – 13 items affective problems; 6 items anxiety problems Youth Anxiety Measure for DSM-5 (YAM-5) – a measure addressing symptoms of the major anxiety disorders Revised Child Anxiety and Depression Scale (RCADS) short version- 25 items measure assessing symptoms of anxiety and depressive disorder	Correlations (corrected for gender) Hierarchical multiple regression	9/17 (fair)

(19) (Dickson & Ciesla, 2018)	N=84 63% female Mean age 17.75 (range 16-18) Recruited through local high school in USA	Cross-sectional No control group	WBSI	Penn State Worry Questionnaire (PSWQ) – a 16 items self-report measure of trait worry Positive and Negative Affect Schedule X: Negative Affect Subscale (PANAS-X NA) – measure to assess affective symptomatology; subset of 12 items selected to create the overall negative affect subscale	Bivariate correlations Fisher r-to-z transformations	12/17 (good)
(20) (Mestre et al., 2019)	N=318 49% female Mean age 11.25 (range 8-16) Recruited from primary and secondary schools in Spain	Cross-sectional No control group	WBSI (Spanish) (also separated into two subscales – suppression and intrusion of thoughts)	The Positive and Negative Affect Schedule for Children (PANAS-C) – assess positive and negative affect (Spanish validation) State-Trait Anxiety Inventory for Children (STAI-C) – assess state and trait anxiety in children	Pearson correlations	10/17 (fair)

The published studies can be grouped into one of two types; 1) those that examined children and adolescents with a diagnosed disorder and 2) those that examined community samples. The studies are grouped on this basis because the metacognitive model suggests the possibility that causal mechanisms do not only exist on a non-pathological continuum, the model suggests there may be structural differences in the organisation of the metacognitive control system (Wells, 2019). Within the first group, three subgroups can be identified depending on: 1) whether the diagnosis is an anxiety disorder or depression or 2) whether the participants were exposed to traumatic events. In the second major group of studies (involving community samples), the studies can be sub-grouped into those that have assessed generic anxiety symptoms and those that have assessed disorder-specific symptoms. This organising structure will be used to summarise the studies in the sections that follow. All statistical parameters are reported in Table 2 (page 39).

3.4. Children and Adolescents with a diagnosis

3.4.1. Anxiety disorders (GAD, SAD, OCD)

Two studies (ID11, 13; N=110) recruited primary school aged children (age 7-12) diagnosed with GAD, the studies compared the differences between GAD and control groups in their reported thought suppression (WBSI) scores. Both studies reported a significantly higher WBSI mean in the GAD group (ID 11: M=55.36, SD=10.93 and ID 13: M=53, SD=12.03) than the control group (ID 11: M=42.12, SD=11.15 and ID 13: M=40.3, SD=8.32).

Two studies (ID11, 12; N=176) explored thought suppression (WBSI) in SAD amongst children and adolescents (age 7-17) and they reported different statistical parameters. One study (ID11) recruited primary school students and reported no significant difference between SAD (M=48.5, SD=14.95) and control group's (M=40.3, SD=8.32) WBSI scores. The other study (ID12) did

not have a control group and reported only correlation coefficients. The association between WBSI and self-reported social anxiety symptoms was moderate (r=0.43). However, the correlation between WBSI and clinician-rated severity and overall functioning was not significant.

Two studies (ID8, 10; N=94) recruited children and adolescents (age 7-17) diagnosed with OCD. These studies explored the association between thought suppression (using WBSI) and OCD symptom severity but they reported different statistical parameters.

One study (ID10) reported that an OCD adolescent group had a higher WBSI score (M=60, SD=14.9) than a control group (M=44.48, SD=12.08), ($t [46] = 3.99$, $p<.001$). The other study (ID8) did not have a control group but they reported a significant and positive correlation between adolescent's WBSI score and OCD severity (r=0.56). However, amongst younger children (age 7-11), the correlation between WBSI and OCD severity was not statistically significant.

3.4.2. Depression disorder

Only one study (ID2, N=186) reported the differences in adolescent (age 15-17) TCQ scores between a depression and control group. The TCQ-total score was not statistically different between the groups. However, there were differences in subscale scores, such that the depression group had higher punishment and worry scores than the control group. This is reported in more detail in Section 3.6.

3.4.3. Traumatised children and adolescents

(Thought control strategies and psychopathology in children)

Three studies (ID 5,7,9; N=228) explored the association between thought control and symptoms of trauma amongst children and adolescents (age 8-18) who experienced road traffic accidents. Two studies (ID 7; 9) used WBSI to measure thought control and the other (ID5) used TCQ. Both WBSI studies (ID 7,9) reported correlations with PTSD symptom total score which ranged from r= 0.44-0.69 (2 to 8 weeks post-trauma), measured with the Child PTSD Symptoms Scale (CPSS) and Reaction Index (RI). The correlation between WBSI and re-experiencing sub-scale ranged from r= 0.49-0.74 (2 to 8 weeks). The correlation between WBSI and avoidance sub-scale ranged from r= 0.41-0.66 (2 to 8 weeks). One study (ID9) assessed the participants' symptoms twice respectively at two weeks and eight weeks post-trauma. When the symptom scores were adjusted at two weeks, the correlation coefficients between WBSI and symptom scores were no longer statistically significant at two months.

One study (ID7) divided the participants into high (above 1 standard deviation) and low suppressors group by the mean of WBSI. The difference in PTSD symptom scores between high suppressor group (M=42.29) and low suppressor group (M=16.18) was statistically significant, $t[38] = 5.81$, $p<.001$. The impact of trauma score was also statistically different for high suppressor group (M=28.00) and low suppressor group (M=10.88), $t[38] = 4.93$, $p<.001$. The high suppressor group (M=10.71 symptoms) also had significantly more PTSD symptoms than the low suppressor group (M=4.09 symptoms, $t[38] = 5.05$, $p<.001$).

The one study using the TCQ (ID 5) explored the differences in adoption of thought control strategies amongst children and adolescents (age 10-16) who experienced assault or road traffic accidents. The associations with the severity of traumatic symptoms were measured in the short (T1: 2-4 weeks) and longer term (T2: 6 months). This study did not report the TCQ total score.

The punishment and re-appraisal subscales were positively correlated with post-traumatic stress symptoms at both T1 (punishment r=0.42; reappraisal r=0.48) and T2 (punishment r=0.40; reappraisal r=0.49). The strength of the correlation between worry subscale and post-traumatic stress symptoms was smaller at T1 (r=0.22) and not significant at T2. The study also reported a correlation between social support subscale and post-traumatic symptoms at T2 (r=0.3) (but not at T1).

The study also reported differences between groups. Clinical and non-clinical groups were categorised as acute stress disorder (ASD) or no acute stress (control) at T1. At T2, it was categorised into post-traumatic stress disorder (PTSD) vs control group. There were no statistical differences in any sub-scale scores between groups at any time point, except a difference for punishment scores at T2 which were higher in the PTSD (Mean=10, SD=2.97, N=8) than the non-PTSD group (mean=7, SD=1.67, N=49).

3.5. Children and Adolescents from the Community

3.5.1. Generic anxiety symptoms

Eight studies (ID 4,6,14,15,17,18,19,20) with 2,252 participants in total reported associations between thought control and symptoms of anxiety in the form of correlation coefficients. Two studies (ID 4, 6; N=801) used TCQ as the measure of thought control strategies and the remaining six studies used WBSI.

Three studies (ID15,18,20; N=725) reported small to moderate correlation coefficients between WBSI and symptoms of anxiety. Two studies (ID15, 20) measured children and adolescent's (age range 8-19) anxiety with the State-Trait Anxiety Inventory (STAI-State) (range of r = 0.23-0.27). While the other study (ID 18) measured adolescent's (age range 12-16) generic anxiety

symptoms with the Revised Child Anxiety and Depression Scale (RCADS-Anxiety), Youth Anxiety Measure for DSM-5 and Youth Self-Report Anxiety (range of r=0.41-0.52).

3.5.2. Association with trait worry and anxiety

Two studies (ID 4, 20) reported associations with trait anxiety. The first study (ID 20) reported a moderate correlation (r=0.48) between WBSI and children and adolescents' (age range 8-16) trait anxiety measured by State-Trait Anxiety Inventory. The other study (ID 4) reported a small association between TCQ-total and trait anxiety (r=0.21), measured by the Revised Children's Manifest Anxiety Scale (RCMAS) amongst adolescents (age range 13-17). At the TCQ sub-scale level, this study also reported moderate correlation coefficients between trait anxiety and the punishment and worry sub-scales. The sub-scale scores are presented in Section 3.6.

Two studies (ID14, 19; N=612) reported small to moderate correlation coefficients between WBSI and adolescents' (age range 14-18) trait worry r = 0.25 and 0.48. In another study (ID 17), the coefficient between WBSI and children's (age range 8-12) trait worry was particularly large (r= 0.62). All three studies measured trait worry with Penn State Worry Questionnaire and it appeared the relationship for children was stronger than that for adolescents.

One study (ID20) reported two subscales of WBSI, which were labelled as intrusion and suppression. Both of which were significantly associated with trait worry (r=0.41-47) and symptoms of anxiety (r=0.23-0.27), measured by STAI (trait and state).

3.5.3. Disorder specific symptoms: Symptoms of OCD

(Thought control strategies and psychopathology in children)

Three studies (ID 3, 4, 6; N=952) explored the association between thought control strategies (measured by TCQ-total) and symptoms of OCD amongst adolescents (age 12-18). All of them reported moderate correlations with symptoms of OCD, range of r's = 0.28-0.50, measured with the Obsessive-Compulsive Inventory (OCI) and Leyton Obsessional Inventory (LOI). The three studies also reported the sub-scale scores and they are reported in Section 3.6.

3.5.4. Symptoms of depression

Three studies (ID 4, 15,18; N=996) reported the associations between thought control measures and symptoms of depression in the form of correlation coefficients amongst adolescents (age 12-19). One study (ID 4) used TCQ as the measure of thought control strategies and the remaining two studies used WBSI. The correlation coefficients were all statistically significant and varied widely from r=0.13- 0.45, measured with different depression measures. One study (ID 18) reported the strongest correlation (r=0.45) between WBSI and the depression scale of RCADS. Another study (ID 4) reported the smallest correlation (r=0.13) between TCQ-total and the Short Mood and Feelings Questionnaire (SMFQ). However, higher TCQ sub-scale associations were evident and are presented in Section 3.6.

Table 2 – *Summarised table reporting associations with symptoms of psychopathology*

Authors & Reference Number	Association with symptoms of psychopathology	Effect Size
Section 3.4.1 Children & adolescents diagnosed with Anxiety Disorders (GAD, SAD, OCD)		
(11) Donovan2016 (primary school aged children)	GAD group's WBSI mean (SD) 55.36 (10.93) Control group's WBSI mean (SD) 42.12 (11.15)	F test 17.98**, p<.001
(13) Hearn2017b (primary school aged children)	GAD group's WBSI mean (SD) 53 (12.03) Control group's WBSI mean (SD) 40.3 (8.32)	Mean difference (SE) = -12.7** (3.82), p=.004
SAD		
(11) Donovan2016 (primary school aged children)	SAD group's WBSI mean (SD) 48.5 (14.95) Control group's WBSI mean (SD) 40.3 (8.32)	NS
	Did not report any correlations	
(12) Hearn2017a	WBSI's correlation with social anxiety symptoms (SPAI-C)	r=0.43**, p<.01
	WBSI's correlation with clinician-rated severity (CSR)	NS
	WBSI's correlation with overall functioning (CGAS)	NS
OCD		
(8) Ferrell2012	Adolescents with OCD's WBSI (age12-17) correlated with adolescents' OCD symptoms (CY-BOCS)	r=0.56**, p=.008
	Child with OCD's WBSI (age 7-11) Not stat sig correlated with child's OCD symptoms (CY-BOCS)	NS
(10) Kadak2014	OCD adolescent group's WBSI mean (SD) 60 (14.9) Control group's WBSI mean (SD) 44.48 (12.08)	t [46] = 3.99, p<.001
	Did not report any correlations	
3.4.3. Traumatised children and adolescents		

(7) Aaron1999	*Correlation coefficients with WBSI at 4 weeks post-trauma*	
	WBSI correlation with PTSD symptoms (RI total scores)	r=0.55***, p<.001
	WBSI correlation with PTSD symptoms (RI re-experiencing scores)	r=0.59***, p<.001
	WBSI correlation with PTSD symptoms (RI avoidance scores)	r=0.66***, p<.001
	WBSI correlation with impact of trauma (IES total scores)	r=0.66***, p<.001
	Not stat sig correlated with internalizing subscale (CBCL)	NS
(9) Vincken2012	*Correlation coefficients with WBSI*	
	WBSI correlation with PTSD symptoms (CPSS – total score)	r=0.69*, p<.05 At 2 weeks r=0.44*, p<.05 at 2 months
	WBSI correlation with PTSD symptoms (CPSS-reexperiencing)	r=0.74*, p<.05 At 2 weeks r=0.49*, p<.05 at 2 months
	WBSI correlation with PTSD symptoms (CPSS – avoidance/numbing)	r=0.52*, p<.05 At 2 weeks r=0.41*, p<.05 at 2 months
	WBSI correlation with PTSD symptoms (CPSS – hyperarousal)	r=0.52*, p<.05 At 2 weeks r=0.30*, p<.05 at 2 months
	At 2 months (adjusted for score at 2 weeks) No longer stat sig correlated with any of the PTSD symptom scores (measured by CPSS – total score; reexperiencing; avoidance/numbing; hyperarousal subscale)	
(5) Meiser-Stedman2014	TCQ-A (Total) not reported in study	
	TCQ-A (Worry) correlations with post-traumatic stress symptoms (CRIES) at T1	r=0.22*, p<.05 (at T1)
	TCQ-A (Worry) correlations with post-traumatic stress symptoms (CRIES) at T2	NS (at T2)
	No stat sig differences between ASD vs Non-ASD group at T1	
	No stat sig differences between PTSD vs Non-PTSD group at T2	
	TCQ-A (Punishment) correlations with post-traumatic stress symptoms (CRIES) at T1	r=0.42**, p<.01 (at T1)
	TCQ-A (Punishment) correlations with post-traumatic stress symptoms (CRIES) at T2	r=0.40**, p<.01 (at T2)
	No stat sig differences between ASD vs Non-ASD group at T1	

	PTSD group's TCQ-A (Punishment) mean (SD) 10 (2.97) at T2 Non-PTSD group's mean (SD) 7 (1.67) at T2	Z-score 2.09*, p<.05
	TCQ-A (Distraction) correlations with post-traumatic stress symptoms (CRIES) at T1 TCQ-A (Distraction) correlations with post-traumatic stress symptoms (CRIES) at T2 No stat sig differences between ASD vs Non-ASD group at T1 No stat sig differences between PTSD vs Non-PTSD group at T2	NS (at T1) NS (at T2)
	TCQ-A (Social Support) correlations with post-traumatic stress symptoms (CRIES) at T1 TCQ-A (Social Support) correlations with post-traumatic stress symptoms (CRIES) at T2 No stat sig differences between ASD vs Non-ASD group at T1 No stat sig differences between PTSD vs Non-PTSD group at T2	NS (at T1) r=0.30*, p<.05 (at T2)
	TCQ-A (Reappraisal) correlations with post-traumatic stress symptoms (CRIES) at T1 TCQ-A (Reappraisal) correlations with post-traumatic stress symptoms (CRIES) at T2 No stat sig differences between ASD vs Non-ASD group at T1 No stat sig differences between PTSD vs Non-PTSD group at T2	r=0.48**, p<.01 (at T1) r=0.49**, p<.01 (at T2)
Section 3.5.1 & 3.5.2 Association with generic anxiety symptoms and trait worry (Children and Adolescents from the Community)		
(15) Fernandez-Berrocal2006	WBSI's correlation with anxiety symptoms (STAI)	r=0.27***, p<.001
(18) Muris2017	WBSI's correlation with anxiety symptoms (YSR anxiety problems) (sample 1) WBSI's correlation with anxiety symptoms (YAM-5) (sample 2) WBSI's correlation with anxiety symptoms (RCADS anxiety) (sample 2)	r=0.41***, p<.001 r=0.52***, p<.001 r=0.45***, p<.001
(20) Mestre2019	WBSI (total) correlation with anxiety symptoms STAI (state) *WBSI (suppression subscale) correlation with anxiety symptoms STAI (state)* *WBSI (intrusion subscale) correlation with anxiety symptoms STAI (state)*	r=0.26**, p<.01 *r=0.23**, p<.01* *r=0.27**, p<.01*

	WBSI (total) correlation with anxiety symptoms STAI (trait)	r =0.48**, p<.01
	WBSI (suppression subscale) correlation with anxiety symptoms STAI (trait)	r *=0.41**, p<.01*
	WBSI (intrusion subscale) correlation with anxiety symptoms STAI (trait)	*r=0.47**, p<.01*
(4) Gill2013	TCQ (total) correlation with anxiety (RCMAS – trait anxiety)	r=0.21**, p<.01
(14) Laugesen2003	WBSI's correlation with trait worry (PSWQ-C)	r=0.25***, p<.001
(17) Donovan2017 (primary school aged children)		r =0.62**, p<.01
(19) Dickson-Ciesla2018		r =0.48***, p<.001
Section 3.5.3 Association with symptoms of OCD (Adolescents from the Community)		
(3) Wilson2012	TCQ (total) correlation with OCD symptoms (OCI-CV, LOI-CVS)	r=0.38**, p<.01
(4) Gill2013		r=0.28**, p<.01
(6) Whiting2014		r=0.50**, p<.01
Section 3.5.4 Association with symptoms of depression (Adolescents from the Community)		
(15) Fernandez-Berrocal2006	WBSI correlation with depression symptoms (BDI)	r=0.21***, p<.001
(18) Muris2017	WBSI correlation with depression symptoms (RCADS depression) (Sample 2)	r=0.45***, p<.001
(4) Gill2013	TCQ (total) correlation with depressive symptoms (SMFQ)	r=0.13**, p<.01

WBSI= White Bear Suppression Inventory; SPAI-C = Social Phobia & Anxiety Inventory (Child report); CGAS =Children's Global Assessment Scale; CY-BOCS=Children's Yale-Brown Obsessive-Compulsive Scale; RI = Reaction Index; IES =Impact of Event Scale; CBCL=Child Behaviour Checklist; CPSS=Child PTSD Symptom Scale; TCQ-A=Thought Control Questionnaire (Adolescent version); CRIES= Child Revised Impact of Event Scale; STAI=State-Trait Anxiety Inventory; YSR = Youth Self-report; YAM-5=Youth Anxiety Measure for DSM-V; RCADS=Revised Child Anxiety and Depression Scale; RCMAS= The Revised Children's Manifest Anxiety Scale; PSWQ-C= Penn State Worry Questionnaire (child version); OCI-CV= Obsessive Compulsive Inventory (child version); LOI-CV= Leyton Obsessional Inventory – Child version; BDI=Beck Depression Inventory; SMFQ= The Short Mood and Feelings Questionnaire

3.6. TCQ sub-scale associations with psychopathology

Because of the theoretical importance of examining different thought control strategies, studies that report TCQ sub-scales are summarised here. More specifically, worry and punishment are considered to be the major common maladaptive strategies that contribute to psychological vulnerabilities. Thus, we would expect that among the five TCQ strategy subscales, punishment and worry strategies will show the most robust and reliable positive associations with anxiety, depression and trauma symptoms. In contrast, the other strategies will show little or no relationship with symptoms. In some instances the relationship may be negative (e.g. distraction and social control/support might buffer against symptoms). Five studies (ID 2-6) reported the associations between individual thought control strategies and psychopathological symptoms. The magnitude of associations are summarised in Table 3. Three studies were based on community samples and two studies were based on traumatised, depressed or at risk of psychosis samples.

3.6.1. Worry sub-scale

Amongst the community sample, all three studies (ID3; 4; 6) reported moderate associations between the worry subscale and symptoms of OCD amongst adolescents (age 12-18). The range of r's=0.30-0.49.

Two studies (ID4; 6) also reported moderate associations with anxiety and depressive symptoms, range of r = 0.31-0.42.

Following children and adolescents after road traffic accidents (ID5), the association between the worry subscale and post-traumatic stress symptoms was only significant at Time 1 (2-4 weeks

post-trauma) (r=0.22) but not at Time 2. There were no statistical differences between ASD, PTSD and control group at T1 or T2 for this subscale.

In the clinical study comparing depressed, high risk psychosis and control groups (ID2), the depressed group had a significantly higher worry (M=12.63, SD=3.93) subscale score than the control group (M=10.37, SD=3.72), $p<.05$. The high-risk psychosis group also had a significantly higher worry score (M=13.67, SD=5.29) than the same control group, $p<.05$.

3.6.2. Punishment sub-scale

Amongst the community sample, all three studies (ID3; 4; 6) reported moderate associations between symptoms of OCD and the punishment subscale, range of r's=0.41-0.51.

Two studies (ID4; 6) also reported moderate associations with anxiety and depressive symptoms, range of r's = 0.43-0.53.

Following participants after road traffic accidents (ID5), the association between punishment and post-traumatic stress symptoms at Time 1 (2-4 weeks post-trauma) and Time 2 (6 months post-trauma) were both significant with r=0.42 and 0.40 respectively. There were no statistical differences between acute stress disorder (ASD) and non-ASD groups at T1, but a statistical difference between punishment scores was found between PTSD (M=10, SD=2.97) and the non-PTSD group (M=7, SD=1.67) at T2.

In the clinical study comparing depressed, high risk psychosis and control group (ID2), the depressed group had a higher punishment (M=12.07, SD=4.30) subscale score than the control group (M=10.01, SD=3.05), $p<.05$. There was no difference between high risk psychosis and the control group.

3.6.3. Distraction sub-scale

Amongst the community samples, out of the three studies (ID 3; 4; 6) that reported symptoms of OCD, one study (ID 6) reported a small association (r=0.22) whilst the other two studies reported no significant association.

The association between distraction and symptoms of anxiety and depression was mixed. One study (ID 6) reported a small association with symptoms of mixed anxiety and depression (r = 0.20), but the other study (ID 4) reported a small but *negative* association with depressive symptoms (r=-0.17).

In the clinical study comparing depressed, high risk psychosis and control group (ID2), as well as the study following participants after traffic accidents (ID 5), there were no significant correlations or differences between clinical and control group on distraction sub-scale scores.

3.6.4. Social control sub-scale

The association between the social control subscale and psychopathology seems mixed. One study (ID6) reported a small association (r=0.16) with symptoms of OCD but the other two studies did not find significance. One study (ID4) reported very small but negative associations with symptoms of anxiety (r=-0.09) and depression (r=-0.1).

In the study following participants after road traffic accidents (ID5), the social control subscale was associated with post-traumatic stress symptoms at T2 (6 months post-trauma) (r=0.3) but not at T1 (2-4 weeks post-trauma). However, there were no differences between ASD, PTSD, and control group at any time point. There were also no differences between depressed, high risk psychosis and control group on this subscale (ID2).

3.6.5. Re-appraisal sub-scale

All three community studies (ID3; 4; 6) reported small to moderate associations with symptoms of OCD, range of r=0.18-0.35. Two studies (ID4; 6) reported small associations with anxiety and depressive symptoms, range of r = 0.10-0.16. But one study (ID4) reported no association with depressive symptoms.

In the study following participants after road traffic accidents (ID5), the association between reappraisal subscale and post-traumatic stress symptoms at Time 1 and Time 2 were both significant with r=0.48 and 0.49 respectively (ID5). However, there were no statistical differences between ASD, PTSD and control groups at T1 and T2 respectively.

There were also no differences between depressed, high risk psychosis and control group on reappraisal subscale in the study (ID2).

Table 3 – *Associations between individual thought control strategies and psychopathological symptoms*

	Clinical sample		**Children and adolescents from the community**		
	Exposed to traumatic events (ID 5) Meiser-Stedman2014	Depressive VS at risk of psychosis VS control group (ID 2) Kang2012	(ID 6) Whiting2014	(ID 3) Wilson2012	(ID 4) Gill2013
Section 3.6.1 TCQ-A (Worry)	r=0.22*, p<.05 (at T1) r=0.21, not stat sig (at T2) with post-traumatic stress symptoms (CRIES)	Stat sig difference between depressive group (Mean=12.63, SD=3.93) vs control group (Mean=10.37, SD=3.72), p<.05*	r=0.42**, p<.01 With mixed anxious & depressed symptoms (YSR)		r=0.34**, p<.01 with anxiety (RCMAS) r=0.31**, p<.01 With depression (SMFQ)
	No stat sig differences between ASD vs Non-ASD group at T1 No stat sig differences between PTSD vs Non-PTSD group at T2	Stat sig difference between high risk psychosis group (Mean=13.67, SD=5.29) vs control group (Mean=10.37, SD=3.72), p<.05*	r=0.49**, p<.01 With OCD symptoms (OCI-CV)	r=0.46**, p<.01 With OCD symptoms (LOI-CV)	r=0.30**, p<.01 With OCD symptoms (LOI-CV)
Section 3.6.2 TCQ-A (Punishment)	r=0.42**, p<.01 (at T1) r=0.40**, p<.01 (at T2) with post-traumatic stress symptoms (CRIES)	Stat sig difference between depressive group (Mean=12.07, SD=4.30) vs control group (Mean=10.01, SD=3.05), p<.05*	r=0.51**, p<.01 With mixed anxious & depressed symptoms (YSR)		r=0.43**, p<.01 with anxiety (RCMAS) r=0.46**, p<.01 with depression (SMFQ)
	No stat sig differences between ASD vs Non-ASD group at T1 Stat sig differences between PTSD (M=10, SD=2.97) vs Non-PTSD group (M=7, SD=1.67) at T2, Z-score 2.09*, p<.05	No stat sig difference between high risk psychosis group and control group	r=0.51**, p<.01 With OCD symptoms (OCI-CV)	r=0.41**, p<.01 With OCD symptoms (LOI-CV)	r=0.41**, p<.01 With OCD symptoms (LOI-CV)

Section 3.6.3 TCQ-A (Distraction)	No stat sig correlations with post-traumatic stress symptoms (CRIES) at T1 nor T2	No stat sig difference between depressive spectrum disorder group vs High risk psychosis vs control group	r=0.20**, p<.01 With mixed anxious & depressed symptoms (YSR)		Not stat sig with anxiety (RCMAS) r=-0.17**, p<.01 With depression (SMFQ)
	No stat sig differences between ASD vs Non-ASD group at T1 No stat sig differences between PTSD vs Non-PTSD group at T2		r=0.22**, p<.01 With OCD symptoms (OCI-CV)	Not stat sig With OCD symptoms (LOI-CV)	Not stat sig With OCD symptoms (LOI-CV)
Section 3.6.4 TCQ-A (Social control)	r=0.17, not stat sig (at T1) r=0.30*, p<.05 (at T2) with post-traumatic stress symptoms (CRIES)	No stat sig difference between depressive spectrum disorder group vs High risk psychosis vs control group	Not stat sig With mixed anxious & depressed symptoms (YSR)		r=-0.09*, p<.05 with anxiety (RCMAS) r=-0.1*, p<.05 With depression (SMFQ)
	No stat sig differences between ASD vs Non-ASD group at T1 No stat sig differences between PTSD vs Non-PTSD group at T2		r=0.16*, p<.05 With OCD symptoms (OCI-CV)	Not stat sig With OCD symptoms (LOI-CV)	Not stat sig With OCD symptoms (LOI-CV)
Section 3.6.5 TCQ-A (Reappraisal)	r=0.48**, p<.01 (at T1) r=0.49**, p<.01 (at T2) with post-traumatic stress symptoms (CRIES)	No stat sig difference between depressive spectrum disorder group vs High risk psychosis vs control group	r=0.16*, p<.05 With mixed anxious & depressed symptoms (YSR)		r=0.10*, p<.05 with anxiety (RCMAS) Not stat sig With depression (SMFQ)

	No stat sig differences between ASD vs Non-ASD group at T1 No stat sig differences between PTSD vs Non-PTSD group at T2	r=0.34**, p<.01 With OCD symptoms (OCI-CV)	r=0.35**, p<.01 With OCD symptoms (LOI-CV)	r=0.18**, p<.01 With OCD symptoms (LOI-CV)

YSR = Youth Self-report; LOI-CV= Leyton Obsessional Inventory – Child version; RCMAS= The Revised Children's Manifest Anxiety Scale- trait anxiety; SMFQ= The Short Mood and Feelings Questionnaire; CRIES = Child Revised Impact of Event Scale; ASD = Acute Stress Disorder; PTSD = Post-Traumatic Stress Disorder

3.7. Do thought control strategies make a unique contribution to symptoms

3.7.1. Studies using the WBSI

3.7.1.1. Clinical population

Two studies (ID 7,12) conducted regression analyses to evaluate the unique contribution of thought suppression in predicting symptoms of trauma and social anxiety. Age and gender were controlled for in one study (ID 12) and the other study (ID 7) controlled for internalizing symptoms in the regression model. Results are summarised in Table 4.

In the study following children and adolescents after traumatic events, thought suppression was entered together with another psychological variable (peri-traumatic fear). Thought suppression was a significant predictor of symptoms of trauma (β=0.42) and intrusive imagery and avoidance experience (β=0.56). Peri-traumatic fear was also a significant predictor (β=0.39).

Amongst children and adolescents diagnosed with SAD, thought suppression was entered together with other psychological variables (negative problem orientation, intolerance of uncertainty, negative metacognitive belief and trait worry), predicting symptoms of social anxiety. However, thought suppression was not a significant contributor to social anxiety (clinician-rated or self-report).

3.7.1.2. Community samples

Four studies (ID 14, 15, 17, 18) conducted regression analysis to evaluate the contribution of thought suppression, together with a range of other variables, in predicting symptoms of anxiety and depression. Results are summarised in Table 4.

Out of the four studies, only two studies (ID 15, 17) reported thought suppression as a significant predictor of trait worry and symptoms of anxiety (β=0.19, 0.20 respectively) amongst children and adolescents (age 8-19). Thought suppression was entered together with other psychological variables (negative problem orientation, intolerance of uncertainty, negative metacognitive belief and positive metacognitive belief) to predict trait worry (ID 17). This study reported that thought suppression (β=0.19) and negative metacognitive belief (β=0.39) were statistically significant predictors. The other study (ID15) explored predictors of symptoms of anxiety. Controlling for self-esteem at Step 1, thought suppression was entered at Step 2, and measures of emotional intelligence (e.g. attention paid to emotions, clarify emotions, repair and regulate own emotions) were entered in the final step. Significant predictors included thought suppression (β=0.20), self-esteem (β= -0.53), emotional clarity (β= -0.18) and emotional regulation (β= -0.42). But this need to be interpreted with caution as this study was rated as poor in quality.

Two studies (ID 14,18) reported that thought suppression was not a predictor of trait worry and symptoms of anxiety. Controlling for gender and somatic symptoms (ID 14), thought suppression was entered together with other psychological variables (negative problem orientation, intolerance of uncertainty, beliefs about worry) to predict trait worry. But it was not

a significant predictor. In the other study predicting symptoms of anxiety (ID 18), thought suppression was entered with other psychological variables (mindfulness, self-worth, self-efficacy, psychological inflexibility). But it was not a statistically significant predictor.

Two studies (ID 15,18) found that WBSI was not a significant predictor of symptoms of depression. Thought suppression was entered with other psychological variables (attention paid to emotions, clarify emotions, repair and regulate own emotions; mindfulness, self-worth, self-efficacy, psychological inflexibility), but it did not make a significant contribution.

Table 4 – *WBSI as a predictor of symptoms of psychopathology*

Study	Clinical/community study	Outcome (Measure)	Factors Controlled for in the first step of the regression model	R_2 (full model)	WBSI Predictor of outcome β	Other predictors β in full model
(7) Aaron1999	Clinical	PTSD (RI)	Internalizing subscale of CBCL	0.50*** F=11.93	0.42**	Peritraumatic fear β = 0.39** Internalizing subscale of CBCL β NS
		PTSD (IES)	Internalizing subscale of CBCL	0.56*** F=15.01	0.56***	Peritraumatic fear β = 0.37** Internalizing subscale of CBCL β NS
(12) Hearn2017a	Clinical	Social Anxiety (CSR)	Age, Gender	0.16** F(7,109)=2.95	NS	Negative problem orientation β = 0.39*** Intolerance of uncertainty β NS Negative metacognitive belief β NS Worry (PSWQ) β NS
		Social Anxiety (SPAI-C)	Age, Gender	0.49*** F(7,109)=14.34	NS	Negative problem orientation β = 0.29*** Intolerance of uncertainty β = 0.28** Negative metacognitive belief β NS Worry (PSWQ) β = 0.25*
(14) Laugesen 2003	Community	Trait worry (PSWQ-C)	Gender, somatic symptoms of anxiety	0.27***	NS	Beliefs about worry t =2.66** Negative problem orientation t=5.68*** Intolerance of uncertainty t=7.7***
(17) Donovan2017	Community	Trait worry (PSWQ-C)	Did not specify	0.59*** F (5,107)=32.9	0.19*	Negative problem orientation β NS Intolerance of uncertainty β NS Negative metacognitive belief β = 0.39*** Positive metacognitive belief β NS
(15) Fernandez-Berrocal2006	Community	Anxiety (STAI)	Self-esteem	0.54*** F=26.78	0.20**	Self-esteem β = -0.53*** Emotional Clarity β = -0.18** Emotional regulation β = -0.42*** Emotional attention β NS

		Depression (BDI)	Self-esteem	0.29*** F=8.81	NS	Self-esteem β = -0.40*** Emotional Clarity β NS Emotional regulation β = -0.37*** Emotional attention β NS
(18) Muris2017	Community	Anxiety (RCADS)	None	0.36* F=4.28	NS	Mindfulness (CAMM) β NS Self-worth (SPPC) β NS Self-efficacy (SEQ-C) β = -0.31*** Psychological inflexibility β = 0.18*
		Depression (RCADS)	None	0.44* F=4.51	NS	Mindfulness (CAMM) β = -0.27* Self-worth (SPPC) β = -0.25* Self-efficacy (SEQ-C) β = -0.16* Psychological inflexibility β = 0.17*

***p<.001, **p<.01, *p<.05; RI = Reaction Index; IES = Impact of Event Scale; CBCL= Child Behaviour Checklist; CSR = ADIS-Clinician Severity Rating; CGAS= Children's Global Assessment Scale; SPAI= Social Phobia and Anxiety Inventory C=children rated; P=parent rated; PSWQ-C= Penn State Worry Questionnaire for Children; STAI= State-Trait Anxiety Inventory; BDI = Beck Depression Inventory; RCADS=Revised Children Anxiety and Depression Scale; CAMM= Child and Adolescent Mindfulness Measure; S-SCS-A= Shortened Self-Compassion Scale for Adolescents; SPPC = Self-Perception Profile for Children (self-worth); SEQ-C = Self-Efficacy Questionnaire for Children

3.7.2. Studies using the TCQ

Three studies (ID 3,5, 6) conducted regression analysis to evaluate the unique contribution of each subscale of the TCQ in predicting symptoms of OCD and symptoms of trauma. The details of the regression can be found in Table 5. Note that these studies did not control for age and gender as covariates.

Two studies (ID3;6) conducted amongst adolescents in the community explored how much variance the TCQ subscales accounted for in predicting symptoms of OCD. Both studies concluded worry ($t=2.87$, ID 3; $\beta=0.26$, ID 6) and punishment subscales ($t=2.11$, ID 3; $\beta=0.42$, ID 6) were significant predictors of OCD symptoms. One (ID 6), but not the other, found that re-appraisal ($\beta=0.15$, ID 6) was also a significant predictor.

Regression analysis was conducted in one study (ID5) to investigate TCQ subscales' contributions to post-traumatic symptoms at T1 (2-4weeks post-trauma) and T2 (6 months post-trauma) amongst children and adolescents who experienced traffic accidents. At T1, only re-appraisal ($\beta=0.37$) and punishment ($\beta=0.25$) were significant predictors in the model. A similar result was found at T2, re-appraisal ($\beta=0.42$) and punishment ($\beta=0.29$) were predictors of trauma symptoms at T2. However, when post-traumatic stress symptom score at T1 was controlled for, re-appraisal and punishment lost its significance as predictors at T2, this may be due to low levels of change in symptoms over time.

Table 5 - *TCQ as a predictor of symptoms of psychopathology*

Study	Clinical/non-clinical sample	Outcome (Measure)	Factors Controlled for in the first step of the regression model	R_2 (full model)	TCQ Predictor of outcome					Other predictors β in full model
					Distraction (β)	Re-appraisal (β)	Social (β)	Worry (β)	Punishment (β)	
(ID 3) Wilson 2012	Non-clinical	OCD (LOI-CV)	None	0.22*** F(5,145)=8.02				t=2.87***	t=2.11*	none
(ID 6) Whiting 2014	Non-clinical	OCD (OCI-CV)	Did not specify	0.39** F(5,201)=24.83		0.15*		0.26**	0.42**	none
(ID 5) Meiser-Stedman2014	Clinical	Trauma symptoms (CRIES at 2-4 weeks post trauma)	None	0.28*** F(2, 85) =16.35		0.37*			0.25*	none
		Trauma symptoms (CRIES at 6 months post trauma)	None	0.32*** F(2, 56) =13.03		0.42*			0.29*	none
		Trauma symptoms (CRIES at 6 months post trauma)	T1 PTSS	0.73*** F(2, 53) =71.41	-	No longer sig	-	-	No longer sig	T1 CRIES β = 0.48** T2 trauma related Rumination β = 0.44**

***=p<.001; **= p<.01; *p=.05; OCI-CV= Obsessive Compulsive Inventory-Child version; LOI-CV= Leyton Obsessional Inventory – Child version; CRIES= Child Revised Impact of Event Scale; PTSS=post-traumatic stress

3.8. Narrative review

Two studies (ID 1, 16) that could not be summarised together with the above studies are presented here in a narrative manner. This was because Study ID 1 focused on the differences between male and female's TCQ subscale scores and reported no association with psychopathology. Study ID 16 factor analysed WBSI into two subscales and used a structural equation model to predict symptoms. Bahrami (2011, ID1; N=500) explored the cognitive factors that distinguish the differences between adolescent boys and girls diagnosed with GAD in Iran. The TCQ was used as one of the cognitive measures. This study reported that adolescent girls with GAD used punishment ($F(1,58) = 14.7$, $p=.001$) and worry ($F(1,58) = 19.45$, $p=.000$) as thought control strategies more so than boys diagnosed with GAD. There were no statistical differences between girls and boys on other thought control strategies (distraction, social control, reappraisal).

Kennedy (2016, ID16; N=261) examined the psychometric properties of WBSI in a community sample of adolescents. A two-factor model was a better fit than a single-factor model. The two subscales (intrusion of unwanted thoughts and thought suppression) were used to predict five symptom domains (RCADS symptom measures). The overall model fit the data well ($\chi_2(150) = 231.07$, $p<.001$, RMSEA=.046, CFI=.97, TLI=.96). When the relationship between thought suppression and all other symptom domains were controlled for, thought suppression *negatively* predicted GAD symptoms ($\beta=-0.13$, $p<.05$), but thought suppression was not associated with other domains of social anxiety, panic, OCD, or major depressive disorder. Unwanted intrusive thoughts, however, significantly predicted GAD ($\beta=0.59$, $p<.001$), panic ($\beta=0.52$, $p<.001$), social anxiety ($\beta=0.25$, $p<.05$), OCD ($\beta=0.54$, $p<.001$) and major depressive disorder ($\beta=0.64$, $p<.001$).

4. Discussion

This review aimed to examine the association between thought control (measured with TCQ and WBSI), and psychopathology in children and adolescents. Amongst the twenty included studies, three studies reported associations with symptoms of trauma, four studies reported associations with depressive symptoms, and the remaining studies reported associations with symptoms of anxiety and specific anxiety disorders (note they are not mutually exclusive). The results are consistent with our initial predictions, that thought control strategies are generally positively associated with symptoms as illustrated by anxiety and trauma, and that strategies involving worry and punishment show the most consistent relationships. Few studies have explored relationships with depression symptoms.

The majority of studies used the WBSI and show small to large positive relationships between this measure and markers of psychopathology. The WBSI also appears to distinguish groups of children diagnosed with GAD and adolescents diagnosed with OCD. There is a moderate to large association between WBSI and symptoms of trauma, range of r's=0.44-0.69; a moderate association with OCD symptoms (r=0.56); a moderate to large association with anxiety, range of r's =0.23-0.62; and a small to moderate association with depressive symptoms, range of r's=0.21-0.45.

When the two-factor WBSI is used, the respective relationship between thought suppression and anxiety, and the relationship between intrusion and anxiety, appear weaker than correlations with total WBSI score. Furthermore, the intrusion factor of the WBSI significantly predicted anxiety and depressive disorders but thought suppression factor did not. The results with the WBSI are difficult to interpret because some of the items that constitute the scale refer to the frequency of

intrusive thoughts, whilst other items appear to refer to the appraisal of intrusions. Thus, the measure may be sensitive to factors other than suppression such as frequency and fear associated with intrusive thoughts. The effect of this could conflate and over-estimate the relationships observed between suppression and psychopathology.

In the studies that controlled for other variables when testing the relationship between WBSI and symptoms, the relationship with suppression was weaker or non-significant. Thought suppression may not be the main contributor to anxiety because its association with generic anxiety symptom measures appears less robust, or even non-significant when other psychological variables were controlled for in regression analysis.

Specifically, associations with social anxiety symptoms were non-significant. Associations with trait worry and state anxiety were non-significant or weaker when psychological variables such as negative problem orientation, intolerance of uncertainty, negative metacognitive beliefs, and low self-esteem were controlled for.

Fewer studies have utilised the TCQ. Some have examined TCQ total score as well as subscales. Use of the total score may introduce interpretation difficulties because some subscales are intended to represent reliable maladaptive strategies whilst other may be adaptive in some circumstances. Thus, a total score runs the risk of combining strategies that have opposing relationships with symptoms and weakening the overall relationship. Examining the subscales of the TCQ showed that worry and punishment appear to have the most consistent relationships with symptoms. Both subscales showed significant positive relationships with symptoms of anxiety, symptoms of trauma and depressive symptoms. The use of punishment strategies also

distinguished PTSD from a control group at follow up. Both sub-scales were moderately correlated with internalizing symptoms (mixed depression and anxiety) and they were both predictive of OCD symptoms. The re-appraisal sub-scale also had a small correlation with internalizing symptoms, in addition to its association with symptoms of OCD and symptoms of trauma.

The evidence around distraction and social control and their association with psychopathology symptoms was inconsistent in the reviewed literature. Some studies found positive associations and others found negative associations. The associations were often small or non-significant based only on a single study. Nevertheless, distraction was reported to be the most frequently used thought control strategies in two studies (Meiser-Stedman et al., 2014; Wilson & Hall, 2012).

Among the studies reviewed, little evidence could be found that had compared children of different ages, therefore little is known about the effect of age on self-reported thought control or on the relationship with symptoms. This area should be investigated in future studies. It is unclear if the relationship between thought control and symptoms is stronger, or if the pattern of findings are different within community compared with patient samples. Most of the studies with participants diagnosed with a clinical disorder were case control studies and they did not report correlations; whereas most of the studies recruiting community participants were cross-sectional studies that reported correlation coefficients. Therefore, no direct comparisons can be made. There are insufficient studies to examine definitively the relative pattern or strength of relationships across different psychopathology symptom measures or across disorder groups.

More studies have been conducted on relationships with OCD symptom than any other individual symptom type. Five studies reported associations between thought control strategies and symptoms of OCD and all of them have consistently reported significant and moderate associations or group differences. Specific thought control strategies (punishment, worry) were also positive predictors of OCD symptoms. Three studies reported associations between thought control and symptoms of trauma, all of them reported moderate to large correlation coefficients. Thought suppression and specific strategies (punishment and re-appraisal) were positive predictors of trauma symptoms.

Symptom measures

Judging from the magnitude of correlation coefficients, it appears the relationship between thought control and trait worry (r=0.25-0.48) (Penn State Worry Questionnaire) or trait anxiety (r=0.21-0.48) (State-Trait Anxiety Inventory-Trait), is more varied and potentially larger than its association with state anxiety (STAI-State) (r=0.23-0.27).

One study reported relatively larger associations between thought suppression and anxiety measured with Revised Child Anxiety and Depression Scale (r=0.45), Youth Anxiety Measure for DSM-5 (r=0.52) and Youth Self-Report-Anxiety problems (r=0.41). These are measures that capture the symptoms on a wider anxiety disorder spectrum.

In conclusion, the present review found evidence of predominantly positive associations between self-report thought control strategies (measured with the WBSI and TCQ) and psychopathology symptoms in children and adolescents. These results are consistent with findings in the adult literature. Therefore, this supports the continued analysis of adult theories of thought control and psychopathology within the child and adolescent population. The quality of studies was

generally fair and a small number of studies controlled for other psychological variables. Confidence around studies that used the WBSI must be tempered because of: 1) the debate that surrounds the factor structure of the WBSI and 2) the specificity of test items to assessing thought control as opposed to intrusion frequency and appraisal of thoughts. The review revealed twelve studies that adopted the single factor approach and two studies used a two-factor model (ID 16, 20). Both of which concluded the intrusion sub-scale has a larger association with psychopathology than the 'thought suppression' sub-scale. This is consistent with the findings from a number of previous studies (Schmidt et al., 2009). The results suggest that the relatively robust association between WBSI and psychopathology may be a consequence of items that capture the frequency of intrusive thoughts, a common symptom, less so by thought suppression as a thought control strategy. An inability to distinguish the two may present a limitation of the single-factor WBSI.

However, the results obtained using the TCQ subscales lends support to the existence of substantive associations between thought control and symptoms of psychopathology. Furthermore, the associations appear to be consistent with theoretical distinctions between generally maladaptive and other strategies made in metacognitive theory (Wells, 2019).

Maladaptive coping strategies involving sustained negative thinking are a feature of the cognitive-attentional syndrome (CAS) in the metacognitive model (Wells & Matthews, 1996a). The results of this review are consistent with the adult literature, suggesting that punishment and worry, which are features of the CAS, are the thought control strategies associated most consistently with a range of psychopathology markers amongst children and adolescents. This

may well imply the applicability of the metacognitive model of anxiety disorders in children and adolescents (Reinholdt-Dunne et al., 2019) and inform treatment techniques. For instance, evidence supports adapting metacognitive therapy for the treatment of GAD and PTSD amongst children and adolescents (Esbjørn, Normann, & Reinholdt-Dunne, 2015; Simons & Kursawe, 2019). These interventions aim to reduce unhelpful coping strategies by conducting worry postponement exercises (Wells, 2009), introduce adaptive strategies and deal with intrusive thoughts by giving up suppression attempts (Wells, 2005).

This review has several limitations. Firstly, a majority of the studies were cross-sectional studies and only four studies included control groups. Without further control group studies, whether maladaptive thought control strategies can differentiate clinical from non-clinical groups remains unclear. Secondly, conclusions in this study are largely drawn from correlational analysis in which there is limited control for confounding or competing variables that might account for associations between thought control and symptoms. Whilst a small number of studies conducted regression analysis, potential confounds such as age and gender were not routinely controlled for nor reported. This limits the amount of information that can be extracted and the examination of potential moderators (e.g. age) on the relationships cannot be observed. Thirdly, quality assessment revealed that most studies were only rated as fair and the external validity of these studies were questionable.

The present review identifies major gaps in the literature on self-report thought control in children. Future research may look into parental influence on children's thought control strategies and whether this is different in clinical and nonclinical samples. For instance, amongst

children diagnosed with OCD, parental thought suppression scores were associated with children's thought suppression scores, but this association was not found in the control group (Farrell et al., 2012; Kadak et al., 2014). Furthermore, mother's thought suppression scores were associated with younger children's OCD symptoms but not with adolescents' symptom scores. This may imply early parental intervention may be explored to prevent the development of maladaptive thought control strategies amongst young children.

To conclude, this review suggests that an elevated use of thought control strategies is generally positively associated with symptoms of anxiety. More specifically, strategies such as worry and punishment showed the most robust positive relationship with symptoms of anxiety and depression, OCD and post-traumatic stress. This finding is consistent with the adult literature on thought control. However, there were not enough studies to explore the effect of age or the strength of relationship across symptoms of psychopathology, which may warrant recommendations for future research. The findings may inform treatment techniques based on the metacognitive model, supporting the application of these methods to children and adolescents.

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Paper 2: Empirical study

Unhelpful metacognitions: do negative early experiences and parental involvement play a role?

Word count:
231 words (abstract)
12,602 words (full text)
6,548 words (main text without tables and references)

The following study has been prepared for submission to the *Journal of Affective Disorder*. The references have been formatted in accordance to the author guidelines.

Abstract

Background: There is well-established evidence suggesting that unhelpful metacognitions are important vulnerability factors that underlie psychological disorders. However, very few studies have looked into the factors contributing to unhelpful metacognitions. Early exposure to adverse environments, victimisation and poor quality parenting are associated with poor mental health. These factors may therefore contribute to unhelpful metacognitions.

Method: An exploratory approach was adopted using a cross-sectional study design, recruiting adult participants to complete an online questionnaire, which included the Metacognitions Questionnaire (MCQ-30), Early Trauma Inventory (ETI), Measure of Parenting Style (MOPS) and demographic survey asking about early household environments. T-tests, bivariate Pearson inter-correlations and hierarchical multiple regressions were performed to explore differences between groups, associations and unique contributing factors to unhelpful metacognitions.

Results: Overall metacognition score (MCQ-total) was associated with a lower current age, lower educational status, greater perceived setbacks and lower perceived success. Disadvantaged household environments alone did not contribute to unhelpful metacognitions and some parenting factors might be correlated. Controlling for confounds, early emotional abuse was the only factor that showed a consistent positive contribution across unhelpful metacognitions.

Limitations: The exploratory, cross-sectional design cannot account for the reversibility issue and the direction of relationships cannot be established.

Conclusions: The adverse effect of emotional abuse should not be under recognised and the results may inform elements of parenting interventions. Perception of personal success and parenting may be worthwhile for future metacognition research.

(231 words)

Keywords: metacognitions; metacognitive beliefs; metacognitions questionnaire; early trauma; parenting

1. Introduction

The self-regulatory executive function model (SREF: Wells, 1994; Wells and Matthews, 1996), proposes that psychological distress is maintained by a maladaptive thinking pattern called cognitive attentional syndrome (CAS). The CAS is characterised by worry, rumination, threat monitoring, self-focused attention, as well as unhelpful coping strategies such as thought suppression and avoidance. The CAS is driven in part by individual's metacognitive beliefs. Metacognitive beliefs can be divided into positive and negative metacognitive beliefs (Wells and Matthews, 1996). Positive metacognitive beliefs refer to the belief that worry is useful, while negative metacognitive beliefs refer to the belief that worry is uncontrollable, harmful or cognition is deficient.

There is substantial evidence suggesting that dysfunctional metacognitive beliefs are important vulnerability factors that underlie psychological disorders. Metacognitive beliefs have been associated with anxiety and depression (Halvorsen et al., 2015; Hjemdal, Stiles, & Wells, 2013; Ryum et al., 2017; Yilmaz, Gencoz, Wells, Gençöz, & Wells, 2011). Recently, Sun and colleagues (Sun, Zhu, & So, 2017) conducted a meta-analysis that evaluated the role of metacognitions across psychopathologies and explored the similarities in metacognitive profiles across disorders. They found that negative metacognitive beliefs regarding the uncontrollability and dangerousness of worry and beliefs about the need to control thoughts were more prevalent amongst people with psychological vulnerabilities and highlighted that these maladaptive metacognitive beliefs may be transdiagnostic factors underlying psychological disorders. In order to inform better treatment and the prevention of psychiatric problems, it is important to understand what contributes to unhelpful metacognitions.

Despite evidence supporting the association between metacognitive beliefs and

psychological distress, little research has evaluated the development or antecedents of negative metacognitive beliefs. Myers and Wells (2015) conducted a cross-sectional study that evaluated the association between early childhood experiences, negative metacognitions and psychological distress. They found that early negative experiences, particularly emotional abuse was positively associated with negative metacognitions and psychological distress. The authors also found an association between negative metacognitions and anxious attachment. This implies factors such as early childhood experiences and parental involvement could be important elements contributing to negative metacognitions.

Early exposure to negative experiences is shown to have lasting detrimental effects on children's mental health. Childhood victimisation such as experiences of physical, sexual and emotional abuse is associated with higher risks of depression and antisocial behaviours in children and young adults (Chapman et al., 2004; Turner, Finkelhor, & Ormrod, 2006). Turner and colleagues (2006) showed that children who experienced victimisation are more likely to have grown up under adverse environments. For instance, growing up in a low income, single parent or stepped family household are also linked with depression, anxiety, aggression and possibly suicidal behaviour in children (Barrett & Turner, 2005; Goodman & Goodman, 2012; Schilling, Aseltine, & Gore, 2007; Yang & Clum, 1996). Other early experiences such as a poor sense of competence in environments such as school and extra-curricular activities also increase the risk of poor mental health (Masten & Coatsworth, 1998).

Other than early negative experiences, one of the factors that may play a significant role is parenting. Parenting can be conceptualised in terms of parenting practices and parenting styles. According to Darling and colleagues (Darling & Steinberg, 1993), parenting practice refers to the content and frequency of specific parenting behaviours (e.g. discipline) and parenting style

refers to the quality and context of these behaviours (e.g. warmth or hostility). In the current study, parenting refers to parenting style as this is more relevant to children's emotional development. Studies conducted amongst children and adolescents provide initial evidence to support an indirect relationship between parenting and anxiety via metacognitions (Gallagher & Cartwright-Hatton, 2008; Lønfeldt, Marin, Silverman, Reinholdt-Dunne, & Esbjørn, 2017). In particular, Lonfeldt (2017) found that their participants' (aged 9-17) metacognitions mediated the relationship between perceived maternal psychological control and anxiety symptoms. Perceived maternal psychological control was positively associated with participants' positive beliefs about worry and cognitive self-consciousness. Furthermore, metacognition and cognitive errors respectively mediated the relationship between over-reactive parenting and trait anxiety in adolescents aged 16-17 (Gallagher & Cartwright-Hatton, 2008). These results suggest that particular parenting styles may be associated with specific metacognitive beliefs.

Poor quality parenting may exacerbate the impact of trauma on children's mental health. Following a natural disaster, changes in parenting practices (e.g. becoming more protective, less autonomy granting, communicating sense of danger) was associated with children's symptoms of posttraumatic stress (Cobham & Mcdermott, 2014). In the face of domestic violence, mother's symptoms of PTSD partially mediated the relationship between inconsistent discipline and children's internalizing and externalizing behaviours (Symes, McFarlane, Fredland, Maddoux, & Zhou, 2016). It is therefore possible that poor parenting, in addition to trauma, further contributes to unhelpful metacognitive beliefs.

As little is known about the factors that contribute to unhelpful metacognitive beliefs, the current study aimed to evaluate the role of environmental factors (i.e. socioeconomic background, single parent household), negative early life experiences (i.e. trauma and early life

setbacks) and parenting in contributing to negative metacognitions. The approach taken was largely exploratory and examined the possible independent predictors of overall metacognition score and of selected subscales. The importance of testing using overall metacognition factor as well as subscales is indicated by a recent research (Fergus & Bardeen, 2017). The research has revealed a bi-factor model of metacognition consisting of a general factor and individual factors as assessed by the measure used in the current study. The two individual factors explored will be uncontrollability and danger and need for control. These two factors have been found to be most consistently associated with psychological vulnerabilities (Sun et al., 2017) and therefore have highest clinical relevance. Given the early stage of research on the antecedents of negative metacognitions, this study adopted an exploratory rather than hypothesis testing approach to analysis to facilitate future theory building. This approach also avoided excluding potentially important predictive variables at this formative research stage.

2. Methods

2.1. Participants

Participants were recruited from social media advertisements (i.e. Twitter, LinkedIn, Facebook) and from the University of Manchester via posters (Appendix D) which included a QR code to the survey website (SelectSurvey.Net) and mailing lists. Participants had the opportunity to enter a prize draw winning 1 of 10 Amazon £50 vouchers. The study was approved by the University of Manchester Research Ethics Committee (Ref 2019-5465-9975) (Appendix E).

2.2. Measures

2.2.1. Primary Dependent Variable

Metacognitions Questionnaire 30 (Wells & Cartwright-Hatton, 2004). The MCQ-30 is a 30-item measure that assesses metacognitive beliefs and processes that are hypothesised to maintain maladaptive thinking patterns. The MCQ-30 has five subscales: (1) negative metacognitive beliefs regarding uncontrollability and dangerousness of thoughts (MCQ-UD) (e.g. "When I start worrying I cannot stop"); (2) need for control (MCQ-NTC) (e.g. "I should be in control of my thoughts all of the time"); (3) cognitive confidence (MCQ-CC) (e.g. "I have a poor memory"); (4) cognitive self-consciousness (MCQ-CSC) (e.g. "pay close attention to the way my mind works"); (5) positive beliefs about worry (MCQ-PBW) (e.g. "I need to worry in order to remain organised"). Items are rated on a four-point likert scale ranging from 1 ('do not agree') to 4 ('agree very much'), with higher scores indicates greater dysfunctional metacognitive beliefs. The scale has good convergent validity and test-retest reliability (Cartwright-Hatton et al., 2004; Spada et al., 2012). The scale also demonstrates good internal consistency in our sample: MCQ-total (Cronbach's $\alpha = 0.91$), negative beliefs about dangerousness and uncontrollability of

thoughts (Cronbach's α = 0.90), need to control (Cronbach's α = 0.76), cognitive confidence (Cronbach's α = 0.86), cognitive self-consciousness (Cronbach's α = 0.86), and positive beliefs about worry (Cronbach's α = 0.89).

2.2.2. Predictor Variables

A 15-item demographic questionnaire was developed to capture the basic demographic variables (age, sex, marital status, education and employment status), history of mental health and physical health problems. Variables that are hypothesised to be associated with negative metacognitions include early household environment factors and perception of early achievements/setbacks. Early household environment factors refer to whether the participant grew up in a single parent household, whether they were adopted or fostered, participants' perceived household income (low, medium, high). An adjunct to parental bonding is captured by the perceived emotional closeness or inconsistency with their identified primary caregiver (rated on a Likert scale ranging from 1 (extreme disagreement) to 7 (agreement). Perception of early achievements explored participants' perception regarding the frequency of early success (e.g. winning competitions etc.) or setbacks (e.g. failing an audition etc.) and were rated on a Likert scale from 1(never happened) to 4 (often).

Early Trauma Inventory – Short Form (ETI; Bremner et al., 2007). The ETI is a 27-item self-report questionnaire assessing childhood trauma. The ETI has four subscales: physical abuse (ETI-PA) (e.g., "were you ever punched or kicked"); emotional abuse (ETI-EA) (e.g., "were you often put down or ridiculed"); sexual abuse (ETI-SA) (e.g., "did you ever experience someone rubbing their genitals against you?"); general trauma (ETI-GT) which included trauma happened to oneself, family, witnessed violence towards others and family mental health (e.g., "were you

involved in a traffic accident?"). The ETI also has two items that evaluate the emotional impact of the events. All items are answered on a yes/no scale, with scores created by summing the items in each domain, whereby higher scores indicate a higher frequency of trauma's experienced. The ETI has good internal consistency and validity (correlated with clinical administered PTSD scale) (Bremner et al., 2007). Our sample also demonstrated good reliability: ETI-PA (Cronbach's α =0.72); ETI-EA (Cronbach's α =0.82); ET-SA (Cronbach's α =0.84); ETI-Total (Cronbach's α =0.83) and ETI-GT had an acceptable reliability (Cronbach's α =0.61). Items regarding emotional impact were not included in our study, as previous research has found that summing the items was as valid as including additional information regarding the emotional impact (Bremner et al., 2007).

Measure of Parenting Style (MOPS; Parker et al., 1997). The MOPS is a 15-item questionnaire exploring parenting styles of indifference, abuse, and over-control. There are three subscales: 1) indifference (e.g. "my mother/father ignored me"); 2) overcontrol (e.g. "my mother/father was overcontrolling of me"); 3) abuse (e.g. "my mother/father made me feel in danger"). Participants rated the extent to which each statement was true with reference to their primary caregiver (e.g. mother) and secondary caregiver (e.g. father) on a Likert scale of 0 (not true at all) to 3 (extremely true). Each subscale score is calculated by summing the items in each subscale and a higher score implies a more negative perceived parenting style. The scale was internally valid (Harlaar et al., 2008) and all subscales were internally consistent in our sample: Mother indifference (M-IN) (Cronbach's α = 0.90); Mother abuse (M-AB) (Cronbach's α =0.88); Mother overcontrolling (M-OC) (Cronbach's α =0.73); Father indifference (F-IN) (Cronbach's α =0.93); Father abuse (F-AB) (Cronbach's α =0.91); Father overcontrolling (F-OC) (Cronbach's α =0.72).

2.3. Procedure

Participants interested in the study were provided with a link to the survey website, which contained the participant information sheet and consent form (Appendix F). As the study asked about participants' traumatic experiences, resources for support were included in the information sheet as well as the debrief sheet. In addition, a list of support services was included throughout the questionnaire before and after potentially distressing questionnaires. Participants were also given the option to save their answers and complete it within the next seven days if they felt distressed. After providing consent, participants were directed to the questionnaire. At the end of the survey, participants had the option of entering a prize draw. The email addresses were removed from the data file immediately such that the dataset for analysis would not contain any personal identifiable information.

2.4. Data Analysis Plan

All variables except the sexual abuse subscale (ETI) and the abusive mother and father subscales (MOPS) had skewness < 2 and all variables had items for kurtosis < 4 which is deemed acceptable with a large sample size (Kim, 2013; West, Finch, & Curran, 1995). Moreover, the three aforementioned variables (ETI-SA; MOPS-M-AB; MOPS-F-AB) had over ten outliers. As such, the three variables were transformed using square root and logarithmic transformations. The transformations normalised the distribution and removed the outliers for ETI-SA. However, three outliers continued to remain after the log transformed MOPS-M-AB and MOPS-F-AB and were kept in the dataset.

Bivariate Pearson inter-correlations were conducted to evaluate the associations between predictor variables (early trauma, perception of early setbacks/achievements, parenting factors)

and between predictors and metacognitive beliefs. T-tests and one-way analysis of variance (ANOVA) evaluated if there were any differences between metacognitive beliefs and early household environment factors (e.g., single parent household or not (1 or 0); adopted or not (1 or 0); perceived household income (low-3, medium-2, high-1). Since the purpose of correlations and t-tests was exploratory and descriptive, no correction for multiple tests was undertaken. The aim was to examine the potential predictors of metacognitions that could be controlled and entered in the subsequent regression analyses.

To test the contribution of the factors identified as correlates of negative metacognitions, hierarchical multiple regressions were performed. In each analysis demographic variables that correlated with metacognitions were controlled, next the early trauma subscales were force entered as a block to examine the variance accounted for and to control for covariance. On the final block parental style variables were selected and forward selection specified in order to choose on a data-driven basis the largest additional predictors. The last step was also repeated using backward-elimination in order to test the reliability of the predictors on the final step. First, we explored total MCQ score as the outcome variable. This was followed by exploring the predictors of the MCQ subscales: uncontrollability and danger (MCQ-UD) and need for control (MCQ-NTC).

3. Results

3.1. Descriptive Statistics

Eight hundred and eighty-three participants agreed to take part in the study. Fifty-eight participants were removed from the dataset for the following reasons: did not provide any data after consenting to the study (n = 37); did not provide any data after completing the demographic

survey (n = 17); did not complete the MCQ (n = 2); below 18 years old (n = 1); answers on questionnaires deemed to be unreliable (n = 1). This resulted in a total of 825 participants for data analysis. As there was less than 10% of data missing, missing data was handled by imputing the means for the missing items for continuous variables.

A summary of participant characteristics is detailed in Table 6. The average age of the participants was 36.7 (SD = 14.4) and ranged from 18 to 82 years old. The majority of the sample were not married (57.5%), attained at least an undergraduate degree or above level of education (74.1%) and were currently employed (48.5%). In addition, 39.2% of the participants indicated they had sought treatment or had been diagnosed for a mental health disorder and 30.2% of all participants reported having experienced a serious physical illness.

Table 6 – *Study characteristics and descriptive statistics*

	N = 825
Age – Mean (SD)	36.71 (14.35)
	N (%)
Sex	
Male	394 (48.1%)
Female	417 (50.9%)
Other	8 (1.0%)
Marital status	
Never married	473 (57.5%)
Married	287 (34.9%)
Divorced	48 (5.8%)
Separated/widowed	15 (1.8%)
Education attainment	
High school or below	143 (17.4%)
Vocational/foundation degree	71 (8.6%)
Undergraduate degree	231 (28.1%)
Masters/ postgraduate degree or qualification	310 (37.7%)
Doctorate/PhD	68 (8.3%)
Employment	
Full time/part time education	221 (26.8%)
Full time/part time paid employment	400 (48.5%)
Self-employed/ volunteering	61 (7.4%)
Unemployed	21 (2.5%)
Homemaker	21 (2.5%)
Long term disability/ sick	23 (2.8%)
Retired	64 (7.8%)
Other	13 (1.6%)
Health history	
Ever been diagnosed with or sought treatment for a mental health disorder	
Yes	317 (39.2%)
No	491 (60.8%)
Ever had a serious physical illness or difficulty	
Yes	244 (30.2%)
No	564 (69.8%)
Early household environment	
Single parent household	
Yes	160 (19.8%)
No	650 (80.2%)
Adopted/fostered	
Yes	25 (3.1%)
No	794 (96.9%)
Perceived household income at the age of 12	
Low	282 (34.8%)
Medium	457 (56.4%)
High	71 (8.8%)

Perception of early achievements	
Perceived success (e.g. winning in sports, music, awards of recognition etc)	
Never happened to me	105 (12.7%)
Rarely	283 (34.3%)
Sometimes	327 (39.6%)
Often	110 (13.3%)
Perceived setbacks (e.g. failing an interview, not being picked to participate in school team etc)	
Never happened to me	50 (6.1%)
Rarely	268 (32.5%)
Sometimes	376 (45.6%)
Often	131 (15.9%)
Early Trauma Inventory (before the age of 18)	
General trauma	
None	148 (19.4%)
Yes for 1 or more items	615 (80.6%)
Physical abuse	
None	275 (35.3%)
Yes for 1 or more items	504 (64.7%)
Emotional abuse	
None	287 (37%)
Yes for 1 or more items	488 (63%)
Sexual abuse	
None	532 (68.6%)
Yes for 1 or more items	244 (31.4%)
Subtypes of general trauma (not mutually exclusive)	N=763
Trauma happened to oneself	309 (40.5%)
Trauma happened to family or friends	331 (43.4%)
Witness of violence towards others	253 (33.2%)
Family mental health	348 (45.6%)
Information relating to bonding with parent or primary caregiver	
Primary caregiver	
Mother	704 (85.6%)
Father	51 (6.2%)
Other	52 (6.3%)
Non-parent	15 (1.8%)
Perceived emotional closeness with primary caregiver	
Disagree	128 (15.5%)
Neutral	61 (7.4%)
Agree	636 (77.1%)
Perceived primary caregiver being emotionally inconsistent	
Disagree	539 (65.3%)
Neutral	48 (5.8%)
Agree	238 (28.8%)

Table 7 – *Means and standard deviations of main outcome and predictor measures*

	M (SD)	95% CI
Meta-cognitions Questionnaire (MCQ-30) - Total	60.17 (14.45)	59.39-61.51
Uncontrollability and dangerousness of thoughts (UD)	12.22 (4.93)	11.91-12.62
Need to control (NTC)	10.76 (3.66)	10.55-11.09
Lack of cognitive confidence (CC)	11.29 (4.24)	11.05-11.67
Cognitive self-consciousness (CSC)	15.63(4.49)	15.36-16.01
Positive beliefs about worry (PBW)	10.34 (3.99)	10.03-10.61
Early Trauma Inventory (ETI) - Total	6.45 (4.68)	6.11-6.79
General trauma (GT)	2.33 (1.94)	2.20-2.48
Physical abuse (PA)	1.58 (1.52)	1.49-1.71
Emotional abuse (EA)	1.77 (1.79)	1.66-1.92
Sexual abuse (SA)	0.71 (1.38)	0.63-0.83
Measure of Parenting Style (MOPS)		
Mother – indifference (M-IN)	2.22 (3.63)	2.01-2.53
Mother – abuse (M-AB)	1.61 (3.01)	1.45-1.89
Mother – overcontrol (M-OC)	3.65 (3.09)	3.46-3.91
Father – indifference (F-IN)	3.43 (4.90)	3.18-3.89
Father – abuse (F-AB)	1.93 (3.48)	1.69-2.19
Father – overcontrol (F-OC)	2.44 (2.77)	2.31-2.72

M=Mean; SD=Standard deviation

3.2. Differences in unhelpful metacognitions between early household environments

In order to evaluate if there were any differences between early household environment factors (single parent household; adopted/fostered; perceived early household income) and negative metacognitions, independent t-tests and one-way ANOVA were conducted. These results are summarized in Table 8 and Table 9.

Independent t-tests were conducted to explore if participants who grew up in a single parent household had higher scores for negative metacognitions when compared to those who were raised in dual parent household. Inspecting the box-plots showed there were no significant outliers that would affect the results given the large sample size. Homogeneity of variances were assumed for most subscales except MCQ-CSC and MCQ-UD. The results show that compared to those participants raised in a dual parent household, those raised by a single parent reported significantly higher metacognitions on all five MCQ-30 subscales.

Next, independent t-test was conducted to explore if participants who were adopted or fostered had higher scores for negative metacognition subscales when compared to those who were not adopted or fostered. Inspecting the box-plots showed there were no significant outliers that would affect the results given the large sample size. Homogeneity of variances were assumed for most subscales except MCQ-Total. Those who were adopted had a significantly lower cognitive confidence (MCQ-CC) score than those who were not adopted. There were no other statistically significant differences among the other subscales.

One-way ANOVA was conducted to explore if there were any differences in negative metacognitions between participants who grew up in low, medium and high-income groups. Inspecting the boxplots showed there were no significant outliers. Homogeneity of variances

were assumed for all subscales. The results of the analysis are presented in Table 9. There were no significant differences between the income groups on any of the MCQ-30 subscales.

Table 8 - *Mean of MCQ subscales and differences between groups (early household environment)*

	Grew up in single parent household		**T-test (p-values)**	**Adopted or fostered**		**T-test (p-values)**
	Yes (N=160)	**No (N=650)**		**Yes (N=25)**	**No (N=794)**	
MCQ-Total	63.88 ± 15.06	59.51 ± 13.99	-3.49, p = .001	61.24±10.71	60.25±14.43	0.45*, p=.66
MCQ-UD	13.00 ± 5.18	12.05 ± 4.71	-2.11*, p = .036	11.84 ± 4.46	12.24 ± 4.85	-0.41, p=.68
MCQ-NTC	11.34 ± 3.94	10.63 ± 3.51	-2.22, p = .026	10.92 ± 3.25	10.76 ± 3.62	0.22, p=.82
MCQ-CC	11.95 ± 4.36	11.21 ± 4.08	-2.02, p = .044	13.12 ± 4.87	11.27 ± 4.12	2.21, p=.03
MCQ-CSC	16.44 ± 3.93	15.42 ± 4.49	-2.87*, p = .004	15.12 ± 4.74	15.61 ± 4.40	-0.55, p=.59
MCQ-PB	11.16 ± 4.15	10.20 ± 3.86	-2.78, p = .006	10.24 ± 3.66	10.38 ± 3.94	-0.17, p=.86

*Levene's Test for Equality of Variances violated

Table 9 - *Mean of MCQ subscales and differences between perceived income groups*

	Perceived household income at the age of 12			
	Low (N=282)	**Medium (N=457)**	**High (N=71)**	**F-test (p-values)**
MCQ-Total	59.83 ± 14.13	60.82 ± 14.79	59.39 ± 12.37	0.59, p=.56
MCQ-UD	12.26 ± 4.99	12.35 ± 4.83	11.65 ± 4.47	0.64, p=.53
MCQ-NTC	10.65 ± 3.51	10.93 ± 3.75	10.39 ± 2.99	1.01, p=.37
MCQ-CC	11.30 ± 4.04	11.34 ± 4.25	11.18 ± 3.92	0.05, p=.95
MCQ-CSC	15.39 ± 4.29	15.71 ± 4.48	15.80 ± 4.19	0.55, p=.58
MCQ-PB	10.24 ± 3.73	10.49 ± 4.10	10.37 ± 3.77	0.36, p=.70

3.3. Perception of early life achievements and setbacks and its association with unhelpful metacognitions

In order to evaluate the associations between predictor (continuous) variables and metacognitive beliefs, Pearson's correlations were conducted. Inspecting the scatter plots showed there were no significant outliers and linear relationships between the continuous variables were observed. A summary of correlations is found in Table 10. Correlational analyses showed a small and significant positive association between perceived setbacks and MCQ-Total (r=.18, p <.001), indicating participants who recalled more early setbacks had a higher overall metacognition score. Participants who perceived more success had a lower overall metacognition score as indicated by a small but negative correlation with MCQ-Total (r= -.08, p =.021).

At the MCQ subscale level, perceived setback had small and significant positive correlations with all subscales except positive metacognitive belief (MCQ-PBW). It was most highly correlated with negative metacognitive belief (MCQ-UD) and lack of cognitive confidence (MCQ-CC) (both r=.16, p <.001). It was also correlated with cognitive self-consciousness (MCQ-CSC) and need to control (MCQ-NTC) (refer to Table 10 for correlations).

Perceived success had a small but negative correlation with lack of cognitive confidence (MCQ-CC) (r=-.11, p=.002) and negative metacognitive belief (MCQ-UD) (r=-.10, p =.003). It was not correlated with the other subscales (MCQ-NTC, MCQ-CSC, MCQ-PBW).

3.4. Early trauma and its association with unhelpful metacognitions

Inspection of the correlations between MCQ-total and early trauma (ETI-total) in Table 10 shows a significant but small positive relationship (r=.26, p<.001). Thus, as trauma exposure increases

so does the level of overall metacognitions. At an MCQ subscale level, total trauma scale (ETI-total) correlated most highly with lack of cognitive confidence (MCQ-CC) and need to control (MCQ-NTC) (both r =.23, p<.001). Total trauma level was also correlated with negative metacognitive belief (MCQ-UD), cognitive self-consciousness (MCQ-CSC) and positive metacognitive belief (MCQ-PBW). Amongst the ETI subscales the highest set of correlations with MCQ total score can be seen for the emotional abuse subscale (r=.29, p<.001), followed by physical abuse, sexual abuse and general trauma (refer to Table 10 for correlations).

3.5. Poor quality parenting and its association with unhelpful metacognitions

Inspection of the correlations between parenting styles (MOPS) subscales and MCQ (see Table 10) showed that all MOPS subscales correlated positively and significantly with MCQ total score but the magnitude of relationships was small (r= .19-28). The highest correlation (r=.28, p<.001) was between MCQ total and MOPS overcontrolling mother. MCQ total was also positively correlated with perceived emotional inconsistency (r=.22, p<.001) and negatively correlated with perceived emotional closeness with caregiver (r= -.08, p=.025). This indicates poor quality parenting is associated with a higher score on overall unhelpful metacognitions. At an MCQ subscale level, MCQ positive beliefs (MCQ-PBW) and cognitive self-consciousness (MCQ-CSC) showed the least consistent associations with the range of MOPS subscales. In contrast, the other MCQ subscales correlated with all of the MOPS subscales suggesting that several dimensions of parenting style might be related to negative metacognitive beliefs regarding uncontrollability and danger, need for control, and cognitive confidence.

Table 10- *Inter-correlations between MCQ subscales and independent continuous variables*

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. MCQ-Total	**.78**	**.58**	**.78**	**.68**	**.59**	**.12**	**.15**	**.29**	**.14**	**.26**	**.19**	**.23**	**.28**	**.21**	**.22**	**.22**	**-.08**	**.22**	**-.08**	**.18**
2. MCQ- UD		**.31**	**.54**	**.43**	**.32**	**.09**	.07	**.23**	**.14**	**.19**	**.11**	**.16**	**.22**	**.16**	**.19**	**.16**	-.01	**.15**	**-.10**	**.16**
3. MCQ- CC			**.37**	**.16**	**.17**	**.11**	**.11**	**.26**	**.15**	**.23**	**.22**	**.24**	**.23**	**.19**	**.15**	**.14**	**-.16**	**.27**	**-.11**	**.16**
4. MCQ- NTC				**.46**	**.33**	**.09**	**.19**	**.22**	**.12**	**.23**	**.16**	**.17**	**.18**	**.16**	**.19**	**.18**	-.05	**.14**	-.06	**.09**
5. MCQ- CSC					**.24**	**.11**	**.08**	**.18**	.05	**.16**	.09	**.15**	**.19**	**.13**	**.10**	**.15**	-.06	**.11**	-.02	**.14**
6. MCQ- PBW						.00	**.09**	**.10**	.02	**.08**	.07	**.08**	**.14**	**.11**	**.12**	**.11**	.02	**.08**	.02	.05
7. ETI – GT							**.31**	**.36**	**.26**	**.74**	**.31**	**.28**	**.15**	**.35**	**.41**	**.28**	**-.13**	**.28**	-.07	**.21**
8. ETI-PA								**.44**	**.25**	**.70**	**.29**	**.30**	**.23**	**.23**	**.35**	**.11**	**-.15**	**.27**	-.12	**.19**
9. ETI-EA									**.25**	**.75**	**.56**	**.52**	**.45**	**.50**	**.53**	**.23**	**-.40**	**.57**	**-.19**	**.31**
10. ETI-SA (sqrt)										**.57**	**.26**	**.28**	**.20**	**.18**	**.21**	**.18**	-.11	**.23**	-.01	**.12**
11. ETI-Total											**.53**	**.51**	**.37**	**.48**	**.56**	**.41**	**-.28**	**.50**	**-.15**	**.30**
12. MOPS-M-IN												**.67**	**.41**	**.49**	**.44**	**.30**	**-.45**	**.62**	**-.12**	**.15**
13.MOPS-M-AB (log)													**.67**	**.37**	**.38**	**.29**	**-.40**	**.62**	**-.12**	**.15**
14. MOPS-M-OC														**.24**	**.28**	**.35**	**-.28**	**.43**	-.07	**.14**
15. MOPS-F-IN															**.59**	**.33**	**-.24**	**.40**	**-.16**	**.16**
16. MOPS-F-AB (log)																**.62**	**-.25**	**.40**	**-.13**	**.20**
17. MOPS-F-OC																-	**-.12**	**.25**	-.09	**.17**
18. PEmoClose																		**-.58**	**.13**	-.08
19. PEmoInc																			**-.16**	**.21**
20. Psuccess																				**-.15**
21. Psetbacks																				-

Note: bold = p < .05; MCQ-Total = Metacognitions Questionnaire-30; MCQ-CSC = Cognitive Self Consciousness; MCQ-UD = Negative Metacognitive Beliefs Regarding Uncontrollability and Danger; MCQ-CC = Cognitive Confidence; MCQ-NC = Need for Control; MCQ-PBW = Positive Metacognitive Beliefs about worry; ETI-GT = Early Trauma Inventory – General Trauma; ETI-PA= Physical Abuse; ETI-EA= Emotional Abuse; ETI–SA = Sexual Abuse; MOPS = Measure of Parenting Style; M= Mother/F=Father; IN= Indifference; AB = abuse; OC = overcontrolling; PEmoClose = Perceived emotional closeness; PEmoInc = Perceived emotional inconsistency; Psuccess = Perceived early success; Psetbacks = Perceived early setbacks

3.6. Predictors of unhelpful metacognitions

Hierarchical regression models were used to test if negative early life experiences (household environment, perception of early setbacks), early trauma, and poor parenting are predictive of unhelpful metacognitions. MCQ-Total was entered as the dependent variable, controlling for demographic factors (selected based on Pearson's correlations).

At step 1, age, sex and education level were entered using force entry. Although, previous mental health diagnosis was correlated with MCQ-Total ($r=.25$ $p<.001$), it was not entered as a covariate on step 1 as we were interested in the factors contributing to unhelpful metacognitions amongst participants with and without mental health diagnosis. As such, controlling for this variable in Step 1 may constrain factors such that the results are only relevant for those without a mental health diagnosis. At step 2, single parent household, perceived early success and setbacks were entered using force entry because they were correlated with MCQ-Total. At step 3, all the correlated ETI subscales were force entered as a block to explore each trauma type's unique contribution to unhelpful metacognitions. In order to explore the effect of poor parenting in addition to traumatic experiences, all variables relating to parenting that were correlated with MCQ-total (i.e. all MOPS subscales, perceived emotional closeness and inconsistency) were entered using forward entry in the final block. Pearson correlations showed conceptual overlaps between ETI and MOPS as MOPS assessed relationships that could be seen as traumatic. Therefore, ETI subscales were force entered so that the traumatic experience could be controlled for and any additional variance that might be explained by the addition of parenting was tested using forward selection. Forward selection was adopted to determine the largest additional independent contributors to the model (Field, 2018) and the results are presented in

Table 11. Backward elimination was also run to test the reliability of any variables that entered in the final steps. It should be noted that none of the parenting variables remained in the model, which indicated the reliability of the final steps resulting for forward selection is questionable. Tests examining multi-collinearity indicated that this was not a concern as VIF values ranged from 1.05 to 1.89 which were below the recommended value of 10 (Bowerman & O'Connell, 2000). Durbin-Watson statistic of 1.96 (Durbin & Watson, 1950) indicated no autocorrelation was detected hence the assumption of independence of residuals was not violated. The assumption of linearity and homoscedasticity were confirmed and checked by examining the relevant scatter plots.

The results of the first regression model testing predictors of MCQ-Total were as follows. There was a significant regression equation regression on the final step, $F(1,671) = 3.93$, $p = .048$, with an $R_2 = 0.20$. Age (B=-0.24, p<.001), education level (B=-3.43, p=.003), perceived setbacks (B=1.43, p=.024), emotional abuse (B=0.97, p=.009), overcontrolling mother (B = 0.95, p <.001), abusive father (B = 3.26, p = .048) were significant predictors of overall metacognitions (MCQ-Total).

Table 11 - *Predictors of overall metacognitions (MCQ-Total)*

Variable		**β**	**t**	**p**
Step 1				
Sex		-0.024	-0.602	.547
Age		-0.228	-5.806	<.001
Education		-0.145	-3.869	<.001
R^2 change	.067			
F change	16.23			<.001
Step 2				
Sex		-0.029	-0.744	.457
Age		-0.237	-6.101	<.001
Education		-0.133	-3.623	<.001
Perceived setbacks		0.157	4.262	<.001
Perceived success		-0.067	-1.802	.072
Single Parent household		0.077	2.098	.036
R^2 change	.039			
F change	9.73			<.001
Step 3				
Sex		-0.055	-1.392	.165
Age		-0.260	-6.738	<.001
Education		-0.098	-2.705	.007
Perceived setbacks		0.087	2.341	.020
Perceived success		-0.031	-0.840	.401
Single Parent household		0.059	1.604	.109
ETI GT		0.002	0.043	.966
ETI PA		0.006	0.157	.875
ETI EA		0.242	5.707	<.001
ETI SA (sqrt)		0.054	1.404	.161
R^2 change	.064			
F change	12.13			<.001
Step 4				
Sex		-0.062	-1.595	.111
Age		-0.247	-6.529	<.001
Education		-0.106	-2.991	.003
Perceived setbacks		0.084	2.297	.022
Perceived success		-0.033	-0.939	.348
Single Parent household		0.059	1.633	.103
ETI GT		0.004	0.102	.919
ETI PA		-0.005	-0.116	.908
ETI EA		0.156	3.488	.001
ETI SA (sqrt)		0.033	0.868	.386
MOPS-Overcontrolling mother		0.209	5.342	<.001
R^2 change	.034			
F change	28.53			<.001
Step 5				
Sex		-0.067	-1.706	.089
Age		-0.246	-6.516	<.001
Education		-0.107	-3.014	.003
Perceived setbacks		0.082	2.256	.024
Perceived success		-0.029	-0.822	.412
Single Parent household		0.064	1.767	.078
ETI GT		-0.017	-0.398	.691

ETI PA		-0.013	-0.326	.744
ETI EA		0.124	2.624	.009
ETI SA (sqrt)		0.032	0.838	.402
MOPS-Overcontrolling mother		0.206	5.259	<.001
MOPS-Abusive father (log)		0.085	1.982	.048
R_2 change	.005			
F change	3.93			.048

Note: ETI-GT = Early Trauma Inventory – General Trauma; ETI-PA= Physical Abuse; ETI-EA= Emotional Abuse; ETI–SA = Sexual Abuse (square root transformed); MOPS = Measure of Parenting Style

3.7. Predictors of negative metacognitive beliefs concerning uncontrollability and dangerousness

The same procedures above were adopted to explore predictors at the subscale level. Hierarchical regression models were used to test if negative early life experiences (household environment, perception of early setbacks), early trauma, and poor parenting are predictive of negative metacognitive belief. MCQ-UD was entered as the dependent variable, controlling for demographic factors (selected based on Pearson's correlations).

At step 1, age, sex and education level were entered using force entry. Although, previous mental health diagnosis was correlated with MCQ-UD ($r=.31$, $p<.001$) it was not entered as a covariate on step 1 as we are interested in the factors contributing to unhelpful metacognitions amongst participants with and without mental health diagnosis. As such, controlling for this variable in Step 1 may constrain factors such that the results are only relevant for those without a mental health diagnosis. At step 2, single parent household and perceived early success and setbacks were entered using force entry because they were correlated with MCQ-UD. At step 3, all the correlated ETI subscales were force entered as a block to explore each trauma type's unique contribution to negative metacognitive belief. In order to explore the effect of poor parenting in addition to traumatic experiences, all variables relating to parenting that were correlated with

MCQ-UD (i.e. all MOPS subscales, perceived emotional inconsistency) were entered using forward entry in the final block. Pearson correlations showed conceptual overlaps between ETI and MOPS as MOPS assessed relationships that could be seen as traumatic. Therefore, ETI subscales were force entered so that the traumatic experience could be controlled for and any additional variance that might be explained by the addition of parenting was tested using forward selection. Forward selection was adopted to determine the largest additional independent contributors to the model and the results are presented in Table 12. Backward elimination was also run to test the reliability of any variables that entered in the final steps. It should be noted that none of the parenting variables remained in the model, which indicated the reliability of the final steps resulting from forward selection is questionable. Tests examining collinearity indicated that multi-collinearity was not a concern as VIF values ranged from 1.01 to 2.06 which were below the recommended value of 10. Durbin-Watson statistic of 1.92 indicated no autocorrelation was detected hence the assumption of independence of residuals was not violated. The assumption of linearity and homoscedasticity were confirmed and checked by examining the relevant scatter plots.

The results of the first regression model testing predictors of MCQ-UD were as follows. There was a significant regression equation regression on the final step, $F(1,674) = 4.81$, $p = .029$, with an $R_2 = 0.17$. As shown in Table 12, age ($B=-0.07$, $p<.001$), education level ($B=-1.44$, $p<.001$), perceived success ($B= -0.48$, $p=.019$), perceived setbacks ($B=0.56$, $p=.014$), emotional abuse ($B=0.29$, $p=.037$), overcontrolling mother ($B = 0.25$, $p <.001$), abusive father ($B = 1.53$, $p = .01$) and indifferent mother ($B = -0.14$, $p = .029$) were significant predictors of MCQ-UD.

Table 12 – *Predictors of negative metacognitive beliefs concerning uncontrollability and dangerousness of worries (MCQ-UD)*

Variable		**β**	**t**	**p**
Step 1				
Sex		0.112	2.840	.005
Age		-0.173	-4.424	<.001
Education		-0.155	-4.179	<.001
R_2 change	.071			
F change	17.44			<.001
Step 2				
Sex		0.110	2.846	.005
Age		-0.189	-4.875	<.001
Education		-0.141	-3.839	<.001
Perceived setbacks		0.144	3.933	<.001
Perceived success		-0.107	-2.903	.004
Single Parent household		0.037	1.002	.317
R_2 change	.038			
F change	9.64			<.001
Step 3				
Sex		0.074	1.844	.066
Age		-0.209	-5.353	<.001
Education		-0.120	-3.279	.001
Perceived setbacks		0.101	2.667	.008
Perceived success		-0.085	-2.301	.022
Single Parent household		0.022	0.601	.548
ETI GT		0.017	0.406	.685
ETI PA		-0.056	-1.343	.180
ETI EA		0.169	3.927	<.001
ETI SA (sqrt)		0.074	1.895	.058
R_2 change	.031			
F change	6.06			<.001
Step 4				
Sex		0.070	1.739	.082
Age		-0.201	-5.174	<.001
Education		-0.125	-3.455	.001
Perceived setbacks		0.099	2.633	.009
Perceived success		-0.087	-2.376	.018
Single Parent household		0.023	0.619	.536
ETI GT		0.019	0.451	.652
ETI PA		-0.064	-1.538	.124
ETI EA		0.110	2.398	.017
ETI SA (sqrt)		0.060	1.555	.120
MOPS-Overcontrolling mother		0.142	3.536	<.001
R_2 change	.016			
F change	12.51			<.001
Step 5				
Sex		0.064	1.611	.108
Age		-0.200	-5.162	<.001
Education		-0.126	-3.483	.001
Perceived setbacks		0.097	2.588	.010
Perceived success		-0.082	-2.247	.025
Single Parent household		0.029	0.783	.434

ETI GT		-0.005	-0.129	.897
ETI PA		-0.074	-1.778	.076
ETI EA		0.073	1.508	.132
ETI SA (sqrt)		0.060	1.539	.124
MOPS-Overcontrolling mother		0.137	3.426	.001
MOPS-Abusive father (log)		0.099	2.261	.024
R_2 change	.006			
F change	5.11			.024
Step 6				
Sex		0.073	1.825	.068
Age		-0.191	-4.933	<.001
Education		-0.128	-3.558	<.001
Perceived setbacks		0.092	2.461	.014
Perceived success		-0.086	-2.359	.019
Single Parent household		0.030	0.818	.414
ETI GT		0.001	0.023	.982
ETI PA		-0.070	-1.687	.092
ETI EA		0.106	2.093	.037
ETI SA (sqrt)		0.064	1.651	.099
MOPS-Overcontrolling mother		0.156	3.813	<.001
MOPS-Abusive father (log)		0.115	2.591	.010
MOPS-Indifferent mother		-0.099	-2.192	.029
R_2 change	.006			
F change	4.81			.029

Note: ETI-GT = Early Trauma Inventory – General Trauma; ETI-PA= Physical Abuse; ETI-EA= Emotional Abuse; ETI–SA = Sexual Abuse (square root transformed); MOPS = Measure of Parenting Style

3.8. Predictors of unhelpful metacognitions regarding the need to control

Hierarchical regression models were used to test if negative early life experiences (household environment, perception of early setbacks), early trauma, and poor parenting are predictive of the unhelpful metacognitions about the need to control. MCQ-NTC was entered as the dependent variable, controlling for demographic factors (selected based on Pearson's correlations).

At step 1, age, sex and education level were entered using force entry. Although, previous mental health diagnosis was correlated with MCQ-NTC ($r = .13$, $p < .001$) it was not entered as a covariate on step 1 as we are interested in the factors contributing to unhelpful metacognitions amongst participants with and without mental health diagnosis. As such, controlling for this variable in Step 1 may constrain factors such that the results are only relevant for those without a

mental health diagnosis. At step 2, single parent household and perceived early setbacks were entered using force entry because they were correlated with MCQ-NTC. At step 3, all the correlated ETI subscales were force entered as a block to explore each trauma type's unique contribution to unhelpful metacognitions. In order to explore the effect of poor parenting in addition to traumatic experiences, all variables relating to parenting that were correlated with MCQ-NTC (i.e. all MOPS subscales, perceived emotional inconsistency) were entered using forward entry in the final block. Pearson correlations showed conceptual overlaps between ETI and MOPS as MOPS assessed relationships that could be seen as traumatic. Therefore, ETI subscales were force entered so that the traumatic experience could be controlled for and any additional variance that might be explained by the addition of parenting was tested using forward selection. Forward selection was adopted to determine the largest additional independent contributors to the model and the results are presented in Table 13. Backward elimination was also run to test the reliability of any variables that entered in the final steps. It should be noted that none of the parenting variables remained in the model, which indicated the reliability of the final steps resulting from forward selection is questionable. Tests examining multi-collinearity indicated that this was not a concern as VIF values ranged from 1.05 to 1.58 and were below the recommended value of 10. Durbin-Watson statistic of 1.94 indicated no autocorrelation was detected hence the assumption of independence of residuals was not violated. The assumption of linearity and homoscedasticity were confirmed and checked by examining the relevant scatter plots.

The results of the first regression model testing predictors of MCQ-NTC were as follows. There was a significant regression equation regression on the final step, $F(1,672) = 9.36$, $p = .002$, with an $R_2 = 0.17$. Referring to Table 13, age ($B=-0.07$, $p<.001$), sex ($B=-1.27$, $p<.001$),

education level (B=-1.07, p<.001), emotional abuse (B=0.24, p=.007) and overcontrolling father (B = 0.16, p = .002) were significant predictors of metacognitive beliefs concerning the need to control (MCQ-NTC).

Table 13 - *Predictors of metacognitive beliefs relating to the need to control (MCQ-NTC)*

Variable		**β**	**t**	**p**
Step 1				
Sex		-0.152	-3.895	<.001
Age		-0.259	-6.679	<.001
Education		-0.164	-4.445	<.001
R_2 change	.092			
F change	23.01			<.001
Step 2				
Sex		-0.156	-4.003	<.001
Age		-0.262	-6.716	<.001
Education		-0.161	-4.369	<.001
Single Parent household		0.026	0.703	.482
Perceived setbacks		0.074	2.030	.043
R_2 change	.006			
F change	2.35			.096
Step 3				
Sex		-0.168	-4.197	<.001
Age		-0.291	-7.489	<.001
Education		-0.125	-3.443	.001
Single Parent household		-0.002	-0.049	.961
Perceived setbacks		0.002	0.050	.960
ETI GT		0.031	0.757	.449
ETI PA		0.078	1.879	.061
ETI EA		0.162	3.829	<.001
ETI SA (sqrt)		0.075	1.933	.054
R_2 change	.056			
F change	11.24			<.001
Step 4				
Sex		-0.176	-4.413	<.001
Age		-0.283	-7.310	<.001
Education		-0.130	-3.600	<.001
Single Parent household		0.015	0.414	.679
Perceived setbacks		-0.002	-0.057	.954
ETI GT		0.010	0.228	.820
ETI PA		0.071	1.729	.084
ETI EA		0.120	2.712	.007
ETI SA (sqrt)		0.070	1.830	.068
MOPS-Overcontrolling father		0.123	3.059	.002
R_2 change	.012			
F change	9.36			.002

Note: ETI-GT = Early Trauma Inventory – General Trauma; ETI-PA= Physical Abuse; ETI-EA= Emotional Abuse; ETI–SA = Sexual Abuse (square root transformed); MOPS = Measure of Parenting Style

4. Discussion

The study aimed to evaluate if early household environment, negative early life experiences and parenting quality were associated with metacognitive beliefs and which factors might explain variation in maladaptive metacognitive beliefs.

Overall metacognition score (MCQ-total) was associated with a lower current age, lower educational status, reports of greater setbacks in early life and lower success experiences. Among the early trauma variables, emotional abuse contributed individually to metacognition score. On the exploratory steps using forward entry, two further variables entered: having an overcontrolling mother and additionally an abusive father. However, these two latter predictors did not enter the model using backward elimination, suggesting they may not be reliable independent correlates of metacognition. The pattern of results was similar when predicting MCQ-UD, but it differed with entry of an indifferent mother on the final step. But once again the parenting variable was not supported using backward elimination. The pattern of predictors for MCQ-NTC was slightly different. Here, sex, age, education level, and emotional abuse entered the equation, with a possible (but unconfirmed by backward elimination) contribution from overcontrolling father. In this model (unlike the others) sex emerged as a correlate, suggesting that being male was associated with higher NTC metacognition score.

Taken together these results showed a consistent individual contribution across unhelpful metacognitions of early emotional abuse. These results are consistent with those obtained in the study by Myers and Wells (2015). They also extend those results by controlling for a wider range of developmental factors, namely education level, early set-backs, successes and being raised in a single-parent household. It therefore appears that emotional abuse is a consistent and likely predictor of maladaptive metacognitions. Of further interest, the current results suggest that

educational level, early setbacks, and perceived successes may contribute to particular dimensions of maladaptive metacognitions for the first time. Thus, a variety of learning experiences, including those outside of the area of emotional abuse may have an impact on unhelpful metacognitions. The finding that setbacks and perceived successes have independent (albeit opposing) relationships with metacognitions suggests a potentially novel and worthwhile avenue for future research. The result sowed that perceptions of personal success correlated negatively with dysfunctional metacognition, this might imply that these types of experiences might be protective and contribute to resilience.

The contribution of emotional abuse to metacognitions is reliable and it is the only abuse subscale that independently emerged. This might mean that other forms of abuse are just not as relevant to maladaptive metacognitions, or the result reflects measurement or sampling issues (such as relatively low levels of some abuse types or limited variation in measurement). However, if this result is substantive it might be explained by the metacognitive model. For example, Wells has argued (Wells, 2019): "We might hypothesise that it is possible to identify *proto-metacognitive* states and stages that track the transition from early attention fixation and limited control through to acquired attention flexibility and the later development of higher order knowledge of control…." (p.12). The way emotions are processed and regulated may be important in the transition and development of proto-metacognitive states. This determines whether the individual develops a healthy metacognitive control system. Emotional abuse as measured by the ETI contains items such as "Were you often put down or ridiculed? Were you often ignored or made to feel that you didn't count? Were you often told you were no good?". These types of experiences may restrict opportunities to effectively regulate and gain social

feedback about emotions and this may be a building block in the development of metacognitive control.

Spinhoven and colleagues (Spinhoven et al., 2010) found that the association between child abuse (emotional neglect in particular) and affective disorders is larger than the association between negative life events (e.g. accidents) and affective disorders. Not only does emotional abuse contribute to poor mental health, an emotionally abusive environment also exacerbates the effects of other co-occurring abuses (Edwards, Holden, Felitti, & Anda, 2003). A meta-analysis has shown that emotional abuse, as opposed to physical or sexual abuse, has the strongest association with affective disorders (Mandelli, Petrelli, & Serretti, 2015). It might be, as suggested by the current results, that the relationship between emotional abuse and psychological disorder is a function of the impact that such abuse has on the development of the individual's metacognitive control system.

It appears that other early household environment factors did not have a clear role in contributing to unhelpful metacognitions. Participants who grew up in different socioeconomic backgrounds did not differ in any of their metacognition scores. There were no significant differences between adopted versus non-adopted individuals on unhelpful metacognitions. Participants who were raised in single parent household, compared with those raised in dual parent household, had higher scores on all domains of metacognitions. Nonetheless, this factor lost its significance as a predictor of unhelpful metacognitions after trauma and parenting factors were added to the respective regression models. These findings suggest that some aspects of disadvantaged household environments alone do not contribute to unhelpful metacognitions. This result is echoed in studies that show an indirect effect of environment on children's mental health. Impoverished household environments are only toxic to children's mental wellbeing via

exposure to abuse (Turner et al., 2006), via parents' perception of life stressors (McKelvey, Fitzgerald, Schiffman, & Von Eye, 2002), and via parenting stress (Ritchie & Holden, 1998). For instance, being fostered or adopted may eventually decrease exposure to abusive biological parents. Parents from low-income households may model resilience for their children.

Our results tentatively suggested that some parenting factors might be associated with unhelpful metacognitions. Participants raised by an abusive or overcontrolling father or overcontrolling mother reported higher specific unhelpful metacognitions. But these contributions seemed unstable and were dependent on the variable selection strategy used. It is therefore important to examine the possible contribution of these factors in future studies to assess whether or not they can reliably explain variation in metacognitions. The possible contribution of an overcontrolling mother or father appears to fit with developmental theories, that suggest the sense of lack of control gives rise to the development of anxiety in young children (Chorpita & Barlow, 1998; Wood, McLeod, Sigman, Hwang, & Chu, 2003). This is in line with the findings of a meta-analysis, which concluded high parental control is more predictive of children's anxiety than parental indifference or rejection (McLeod, Weisz, & Wood, 2007). However, in the current regressions parental control did not contribute over and above emotional abuse (which might capture parental indifference). Chorpita's conceptual model posits that high parental protection reduces children's sense of control over external events that give rise to anxiety and avoidance behaviours. Overcontrolling parental style may therefore reduce children's sense of control over *internal* events as well. Under stressful situations, overcontrolling parents may take over and help their children solve the problems. This may reduce children's sense of mastery, which may create cognitive biases believing events and thoughts are out of one's control. Indeed, traumatised children with parents who were

overprotective, granting limited autonomy, presented with more symptoms of post-traumatic stress (Cobham & Mcdermott, 2014; Lima et al., 2014). Abusive father was also a predictor of unhelpful metacognitions.

Precautions need to be taken when interpreting the findings relating to parenting style, because forward selection and backward elimination indicated different results. Backward elimination indicated none of the MOPS subscales added variance to the model. This implies the findings regarding parental style may not be reliable in this study. A limitation of this study may be the conceptual overlap between early trauma (ETI-Total) and MOPS subscales, although the correlation coefficients are only modest (range of r = .37-.56). It might be that the emotional abuse subscale has already captured indifferent and abusive treatment by caregivers, so these subscales did not add additional variance to the model. A more detailed reflection regarding the overlap of constructs will be elaborated in Paper 3.

This study has several other limitations. All the factors explored were based on self-report, including early trauma, which may be subject to recall bias. Parenting style and bonding were also based on participant's perception and this could be subjective (Holden & Edwards, 1989). Moreover, the cross-sectional study design cannot account for the reversibility issue. This means it is possible that people who hold maladaptive metacognitive beliefs are more likely to perceive setbacks, recall early trauma and rate their parents poorly. In addition, our study did not control for a *current* diagnosis of mental health problems, because we did not want to rule-out vulnerability. This may mean that the relationship we found between predictors and metacognitions is an artefact of being mentally ill. Without structural equation modelling and prospective study designs, the causal mechanisms and direction of relationships cannot be established. Finally, the univariate correlations between predictors and metacognitive beliefs are

relatively small (no more than r=0.3) and the factors explored in this study only accounted for a small amount of variance in unhelpful metacognitions. This imposes a limitation to the conclusion our results can draw and implies that other factors contributing to unhelpful metacognitions remain largely unexplained.

Implications

The association between psychological vulnerability and unhelpful metacognitions is well established. Thus, modifying predictors of unhelpful metacognitions may improve mental well-being. Compared with physical and sexual abuse, the adverse effects of emotional abuse may have been previously under-recognised. Given parenting appears to play a role in unhelpful metacognitions, recognition of what constitutes emotional abuse and psychoeducation regarding the adverse effects of emotional abuse should be covered in parenting programs. Parents can also be encouraged to facilitate more adaptive response to failures and setbacks children face in their early years. For example, reframing the experiences as learning opportunities rather than labelling them as failures may help build resilience. Parents should also refrain from overprotecting their child and facilitate a sense of autonomy and mastery in problem solving when their child faces challenges.

The role parenting plays in maladaptive metacognition must be further explored. Recent research has shown that parenting style influence children's executive functions whereby parent's autonomy granting and sensitivity were associated with better executive functioning (Bernier, Carlson, & Whipple, 2010; Meuwissen & Carlson, 2015). Recent research has also demonstrated an association between decreased executive functioning and negative metacognitive beliefs concerning uncontrollability and dangerousness as well as the need to

control (Kraft, Jonassen, Stiles, & Landrø, 2017), concluding the inability to shift mental sets was associated with negative metacognitions. Therefore, future research may explore the relationship between parenting, unhelpful metacognitions and executive functioning.

In conclusion, after controlling for confounds, early emotional abuse was the only factor that contributed consistently across negative metacognitions. This lends support to previous findings about the adverse effect of emotional abuse. Impoverished household environment alone did not contribute to maladaptive metacognition in our study. A higher maladaptive metacognition score was associated with a lower current age, lower educational status, greater perceived setbacks and lower perceived success. Parenting factors might be correlated but conceptual overlap between parenting scales and abuse measures might obscure specific effects. Perception of personal success on the other-hand may be a new avenue of metacognition research.

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Paper 3: Critical Appraisal

Word count: 5,437 words (excluding references)

Introduction

This paper will cover a critical appraisal of the systematic review and the empirical paper conducted as part of the DClinPsyc thesis. This will include the rationale for conducting the respective studies, method of implementation, the analysis, limitations and future recommendations. Reflections upon each stage will be outlined in the respective sections.

Metacognition has been given centre stage in the self-regulatory executive function model (S-REF), a psychological theory of mental disorders (Wells, A., Matthews, 1994; Wells & Matthews, 1996b). Metacognition refers to the psychological content and processes that appraise, monitor and control cognition (Flavell, 1979). Two aspects of metacognition that are important in the S-REF model are metacognitive thought control strategies and metacognitive beliefs. The model proposes that psychological vulnerability and psychological disorder maintenance is associated with the deployment of maladaptive mental regulation strategies and beliefs. Such strategies usually involve prolonged negative thinking such as worry, rumination or self-punishment. The continued use of maladaptive self-regulatory strategies is linked to the presence of underlying metacognitive beliefs, especially those concerned with the uncontrollability and harmfulness of thoughts and the need to control thinking. There is considerable support for the role of maladaptive negative metacognitive beliefs as transdiagnostic factors associated with psychopathology (Sun et al., 2017).

Despite the importance assigned to metacognitions, especially thought control strategies and beliefs, there has been less research on these factors in child mental health. An important question is whether the results found in the adult literature that demonstrate a relationship between thought control and psychopathology also exist in child and adolescent populations.

Furthermore, a gap in the S-REF model concerns the potential origins and early life influences on the development of thought control strategies and metacognitive beliefs. Initial research showed that childhood trauma, emotional abuse in particular, contributed to maladaptive metacognitive beliefs (Myers & Wells, 2015) and this is an area that requires further research. The studies in this thesis set out to bridge the gap in the literature by examining the relationship between thought control and psychopathology in children and adolescents (paper 1) and to explore relationships between early childhood experiences and maladaptive metacognitive beliefs endorsed by adults (paper 2).

1. Reflection of Paper 1 – Systematic review

1.1. Scoping and topic rationale

Inspired by the research conducted by Myers and Wells (2015), the trainee originally wanted to explore the relationship between childhood attachment and negative metacognitions. Negative metacognitions involve beliefs about attention control, which in the S-REF model influences the activation and maintenance of unhelpful thinking patterns. Therefore, it seemed possible that an association might exist between attachment and attention control. The scoping search identified studies that have established a relationship between attention control and childhood attachment (Bosmans, De Raedt, & Braet, 2007; Muris & Dietvorst, 2006). According to these studies, insecurely attached children were more likely to report poor attention control.

However, the initial scoping search combined both children and adult studies. When the search was limited to children under the age of 18, the number of eligible studies dropped by more than half. Even when the search expanded to include parenting and attention control, it did not add much to the evidence base. There were not enough studies (less than 10) for

conducting a systematic review and the trainee had to change the review topic at a rather late stage. The trainee explored other topics such as parenting and children's metacognitive beliefs, parenting and children's attention control or attention biases but there were not enough studies judging from the scoping search.

The focus then shifted towards maladaptive coping strategies that are key features of the S-REF model and the examination of them in children and adolescents. Thought control strategies are associated with psychopathology in adults and are central in the S-REF model, but this have not been systematically examined in the children's literature. Therefore reviewing the evidence systematically would add value and potentially extend adult theory to this population. A scoping search came up with at least 15 studies that were eligible which was considered appropriate for a systematic review. The process of coming up with a feasible topic was however, more challenging than the trainee expected.

The trainee believed the challenge was due to the fact that attention control was not frequently researched in children and the adolescent population. Self-report measures of attention control tap into the beliefs one has regarding attentional control and this requires thinking at the metacognitive level and this capacity may not be fully developed until people reach adolescence (Flavell, Green, & Flavell, 1998). This may have limited the number of research studies conducted in this area.

1.2. Search terms

The development of search terms was based on primarily the measurement scales used to measure thought control. This included the Thought Control Questionnaire (TCQ) (Wells & Davies, 1994) and the White Bear Suppression Inventory (WBSI) (Wegner & Zanakos,

1994). The WBSI is a widely used measure to capture thought suppression. The TCQ measures different strategies people use to deal with their unwanted and distressing thoughts. The trainee consulted the expert at the library team and constructed variations of keyword search strategies using wildcards or truncations. Subject terms or Medical Subject Headings (MeSH) terms were used to capture the concept of thought control and thought suppression. This search aimed to capture all studies that had adopted TCQ or WBSI.

This was followed by constructing the child and adolescent search terms. References for children related search terms were taken from previous systematic reviews and NICE guidelines conducted amongst children and adolescents. Adding this search to the above would filter the studies down to less than one thousand papers for sifting.

The trainee considered creating further search terms that would capture symptoms of psychopathology. However, given the evidence base generated from the above searches was manageable for sifting, it was decided adding a further filter might be too specific which might run the risk of missing studies (Lefebvre et al., 2019).

1.3. Inclusion and exclusion criteria

Any studies that used TCQ or WBSI to measure thought control strategies amongst children and adolescents were included. Study participants had to be under the age of 18. Studies whereby the participants' age range overlapped (e.g. 15-29 years old) were only included if the average age of the study participants was 18 or below.

Another questionnaire that measures thought control strategies, the Cognitive Avoidance Questionnaire (CAQ) was not reviewed in our study because the scale was developed in

French (Gosselin et al., 2002). The psychometric properties and validation could not be verified as the paper was described in a French journal.

The review included only studies published in the year of 1994 and later because TCQ and WBSI were both developed in 1994.

1.4. Quality assessment

Without quality assessment, systematic reviews may draw conclusions that inflate the overall effect size (Deeks et al., 2003; Katikireddi, Egan, & Petticrew, 2015). As the present review is not exclusive to a particular type of study design, an assessment tool that can rate studies with or without a control group was necessary. Downs and Black (1998)'s checklist for Measuring Quality was adopted in this study. Some items in the Downs and Black checklist had to be removed because questions relating to intervention or treatment were not applicable. Compared with the checklists from the Critical Appraisal Skills Programme (CASP), Downs and Black's checklist had a scoring system, which made interpretation relatively easier. However, it has also been recognised that using a total score for quality assessment is problematic (Jüni, Witschi, Bloch, & Egger, 1999; O'Connor et al., 2015). For example, questions assessing methodological quality and quality of reporting should not be given the same weighting in the scoring system. Studies with poor methodological quality but good reporting standards may be given a high-quality score, this may inflate the risk of drawing inappropriate conclusions about findings. As a reflection, there were specific CASP checklists assessing the quality for case control (CASP 2018) and cohort design studies (CASP 2018) in a qualitative manner which might have fitted this review better. Nonetheless, it has been recognised that quality assessment tools for non-intervention studies are of varying quality and there is no one best tool for assessment (Jarde, Losilla, & Vives, 2012).

1.5. Method of synthesis

Due to the varied nature and population of the included studies, a meta-analysis was deemed to be not feasible early on. Following the principles outlined by the Cochrane Handbook (McKenzie et al., 2019), the studies were organised first by population (clinical and non-clinical) and then by symptoms of psychopathology. Children and adolescents diagnosed with a disorder were grouped and synthesised together. Within this clinical group, three subgroups were identified by diagnosis of an anxiety disorder or depression or exposure to trauma.

This was followed by grouping the studies conducted in the community (non-clinical) together, and subgroups were organised by generic anxiety symptoms and disorder-specific symptoms. Grouping by population made sense from a theoretical as well as a methodological perspective. Most of the clinical studies were case-control studies whereas non-clinical studies were cross-sectional studies. Most case-control studies reported statistical parameters reflecting between group differences. As a result, the findings could not be compared with correlation coefficients that were commonly reported in cross-sectional studies. This became a limitation because we are unsure if the magnitude of association between psychopathology and thought control strategies is larger amongst the clinical group.

1.6. Analysis and limitations

Even though a combined average correlation coefficient can be calculated for the relationship between thought control and anxiety symptoms, the meaning of the pooled figure is subject to question. The wide variation in the correlation coefficients between thought control and generic anxiety, particularly amongst studies using WBSI, implied there may be moderators

affecting the associations. There were not enough studies to explore if age or diagnosis were possible moderators, and therefore my analysis turned to specific symptoms and thought control measures. The relationships appeared to show consistent positive and moderate associations with symptoms of OCD, despite the difference in symptom measures (e.g. OCI-CV and CY-BOCS). This was similar for studies looking at symptoms of trauma (e.g. RI, CRIES etc). However, the association between thought control and symptoms of generic anxiety seemed to vary (r=0.21-0.52). Breaking down the symptom measures into trait and state anxiety revealed the association with state anxiety seems smaller (r=0.23-0.27, K=2) than that with trait anxiety (r=0.25-0.48, K=3). This echoes the findings reported by studies reporting a moderate association between WBSI and trait anxiety (Höping & de Jong-Meyer, 2003; Schmidt et al., 2009; Wegner & Zanakos, 1994).

The trainee reflected on the WBSI as a thought control measure and questioned whether the association reported by the single factor WBSI studies (Wegner and many others), were inflated by items measuring the frequency of intrusive thoughts. Several studies (Höping & de Jong-Meyer, 2003; Rassin, 2003; Schmidt et al., 2009) argued a two-factor structure (intrusive thoughts and thought suppression) is more appropriate. The intrusive thoughts factor contains items such as “I have thoughts that I cannot stop”, “There are images that come to mind that I cannot erase”. The thought suppression factor contains “There are things I prefer not to think about”, “I always try to put problems out of my mind” etc. A review of the WBSI studies (Schmidt et al., 2009) revealed a mixed picture of which factor drives the association with psychopathology, some studies concluded intrusive thoughts was a significant driver and thought suppression was not, other studies concluded the opposite. This may explain the wider variation of correlation coefficients in the WBSI studies than observed in the TCQ studies. It also made the trainee reflect whether WBSI scores can be compared in parallel to the TCQ total score and indeed whether it is useful to use a total TCQ score when

not all of the subscales are considered maladaptive. Using the WBSI to measure thought suppression as a thought control strategy may therefore be limited by the uncertain factor structure of this scale. The single factor WBSI scale may have captured the frequency of intrusive thoughts, rather than the tendency to suppress thoughts.

1.7. Clinical implications

Consistent with the adult evidence base, the results of the review suggested that use of punishment and worry strategies are positively associated with symptoms of psychopathology in children and adolescents. The implication is that the S-REF model and metacognitive therapy techniques that aim to correct maladaptive thought control strategies in the treatment of anxiety and depression might be applicable with children and adolescents.

1.8. Future direction

A large majority of the studies explored thought control strategies amongst adolescents and there were only few studies targeting primary school aged children. Future research may look into parental influence on children's thought control strategies. Some studies suggested mother's thought suppression was associated with younger children's OCD symptoms but not adolescents' (Farrell et al., 2012; Kadak et al., 2014). The transmission of thought control strategies from one generation to the next might also be an area for further exploration.

2. Reflection of Paper 2 – Empirical paper

2.1. Topic selection

There is well-established evidence suggesting negative metacognitive beliefs are important vulnerability factors that underlie psychological vulnerability. However, few studies have looked into the factors contributing to such metacognitions. Early exposure to negative experiences are associated with poor mental health, therefore linking early exposure with metacognition became the focus of the study. Compared with the study in its final form, the empirical study in its earliest form had a slightly different focus regarding parental influence. Inspired by the research conducted by Myers and Wells (2015), the trainee originally wanted to further explore the relationship between attachment and unhelpful metacognitions. Childhood attachment was of particular interest because some studies have initially established the relationship between anxious attachment and poorer attention control. Children with insecure attachments have more trouble shifting their attention (Bosmans et al., 2007), which may mean they will encounter more difficulties disengaging from unhelpful thinking patterns. However, upon discussion with supervisors, it was decided that there was no appropriate self-report scale to accurately measure childhood attachment in a cross-sectional study. One study (Salzman, Kunzendorf, Saunders, & Hulihan, 2013) developed the Primary Attachment Style Questionnaire to measure childhood attachment before the age of twelve, but it was considered inappropriate because the psychometric properties were tested in only one population. Measures of adult attachment (e.g. Relationship Questionnaire: Bartholomew & Horowitz, 1991) were considered inappropriate as attachment classifications can change over time, particularly for those who had experienced negative life events (Waters & Merrick, 2000). As a result, measures of attachment had to be dropped and could not be explored in the current study. Instead of attachment relationships, parenting style and bonding was explored instead.

2.2. Measures

Demographic survey

In order to conduct the study it was necessary to generate a demographic survey tool that included basic information such as gender, age, marital status, employment and education. Additional items for this tool were derived together with the research team. There is initial evidence to support the links between early negative experiences and unhelpful metacognitions (Myers & Wells 2015). Therefore, factors that may expose children to adverse experiences may contribute to the unhelpful metacognitions. For instance, growing up in poverty, single parent or stepped family household are more likely to be exposed to childhood victimisation (Schilling et al., 2007; Turner et al., 2006). Therefore, a list of early environmental factors including household structure (intact, single parent, adopted or fostered etc.) and perceived household income (low, medium, high) were included in the demographic survey. Potential confounds that are associated with metacognitions such as history of mental health and physical health problems were also included. The wording of the above questions had taken reference from public surveys such as Census, Health Survey for England, and Community Mental Health Service User Survey. Absolute figures of household income options were considered at the beginning, however, knowing the survey might reach a wide range of participants (different age and different countries), it would be difficult to come up with a standardized scale that account for different standards of living. Furthermore, perceived deprivation, as opposed to absolute poverty, more strongly predicts harsh or unresponsive parenting and children's emotional development (Gershoff, Aber, Raver, & Lennon, 2007). Hence, participants were asked to rate their perceived household income instead.

Additional early life experiences such as perceived setbacks or successes and perceived emotional bonding with caregivers were also included in the demographic survey. Perceived setbacks or successes may be linked to the concept of resilience, which has been found to be associated with metacognitive beliefs (Capobianco, Morris, & Wells, 2018). People who are resilient may pay more attention to the positive stimuli in early life and the opposite applies. Given no measures of attachment were considered as appropriate, two questions were created to tap into the perceived emotional closeness and inconsistencies with the primary caregiver. This proxy measure for attachment may be associated with maladaptive metacognitions. Due to concerns for participant burden, items detailing the timing of mental health diagnosis (whether it's lifetime or current) and ongoing recipient of mental health treatment were combined into one item. Items asking about parent's mental health and parent's exposure to accidents were also deleted.

Measure of Parenting Style (MOPS) (Parker et al., 1997)

The MOPS measures parenting styles of indifference, abuse, and over-control. Participants need to complete 15 items regarding their mother's and father's style respectively. The wording was adjusted to include also "primary or secondary caregiver" in the case that mother or father was not present. The participants rated the accuracy of each item on a Likert Scale of 0 to 3 (0 – not true at all to 3 – extremely true) on these factors: "indifference" include items such as "ignored me; uncaring of me; rejecting of me; would forget about me etc"; "abuse" include items such as "verbally abusive of me; made me feel in unsafe; made me feel in danger"; "over-control" include items such as "over protective of me; over controlling of me; sought to make me feel guilty etc". The MOPS was developed as a modified version of the widely used measure, the Parental Bonding Instrument (PBI) (Parker, Tupling, & Brown, 1979), that aimed to capture perceived parental care and protection up to the age of 16. The PBI was adopted in large scale national studies (Enns, Cox, & Clara, 2002)

and was considered to be psychometrically valid, reliable and stable (Ravitz, Maunder, Hunter, Sthankiya, & Lancee, 2010; Wilhelm, Niven, Parker, & Hadzi-Pavlovic, 2005). The MOPS was chosen because it adds an additional dimension of parental abuse to the PBI, which was thought to supplement the PBI. Moreover, the MOPS has fewer items and the items are worded directly without any double negative sentences. The MOPS was considered to be a valid and reliable instrument overall (α = 0.76-0.92) (Parker et al., 1997; Harlaar et al., 2008). MOPS's 'indifference' subscale was negatively correlated with PBI's 'care' subscale (r = -0.76 to -0.79), whereas MOPS's 'overcontrol' subscale was positively correlated (r = 0.71 to 0.73) with PBI's 'protection' subscale.

Early Trauma Inventory Self-Report Short Form (ETI-SF) (Bremner et al., 2007)

This scale was shared with another trainee whose project looks at the relationship between early trauma and psychological vulnerability mediated by metacognitions. The ETI is a 27-items self-report questionnaire assessing childhood trauma. The ETI has four subscales: physical abuse, emotional abuse, sexual abuse and general trauma. The ETI has good reliability and validity (Cronbach's α =0.70-0.87). The ETI was adopted because it has been used in a previous study with a similar study design targeting non-clinical population (Myers & Wells, 2015). Other measures were considered but regarded as inappropriate. The Childhood Trauma Questionnaire (CTQ: Bernstein et al., 2003) was not freely available and the Trauma History Questionnaire (THQ; Green, 1997) did not contain measures for emotional abuse.

Metacognitions questionnaire - 30 items (MCQ-30) (Wells & Cartwright-Hatton, 2004)

This scale was also shared with the collaborating trainee. The MCQ-30 is a 30-items measure that assesses metacognitive beliefs and processes that maintain maladaptive thinking patterns. The scale has good test-retest reliability and internal validity (Cronbach's α =0.76-0.91)

(Cartwright-Hatton et al., 2004; Spada et al., 2012). It is a widely used measure for metacognitive beliefs.

Upon reflection, the trainee has come to realise the MOPS might not be an appropriate scale to measure parenting style. Firstly, the modest correlation between emotional abuse (ETI-EA) and all MOPS subscales (r range from 0.42 to 0.56) was unexpected. This raised questions as to whether they were measuring similar constructs. For instance, ETI-EA included items such as "were you often put down or ridiculed; were you often ignored or made to feel that you didn't count; were you often told you were no good etc". These items appeared to be worded quite similarly with the indifference and abuse subscales in MOPS, which implied the possibility of overlapping constructs. Arguably, the ETI items were not directed specifically at parents/caregivers (could be referring to teachers or peers as well). Nevertheless, it is very possible that ETI-EA and MOP subscales captured similar negative experiences in childhood. The problem with overlapping constructs also has statistical implications which will be discussed in a later section. Secondly, some MOPS sub-scales were relatively skewed in our data showing 46.6% scored zero on the indifferent mother (M-IN) subscale and 57.3% scored zero on the abusive mother subscale[4]. This proportion was similar to that reported in the original study (42% and 54% respectively). This might mean the MOPS scale did not capture common parenting experiences received, and such skewness would have implications for the robustness of the regression analysis (Bland & Altman, 1996).

2.3. Survey set up and recruitment

[4] The abusive subscales have been transformed in our data analysis

It was decided early on this would be a joint data-collection project with another trainee, but with each trainee analysing different measures. This meant collaboration in setting up the survey, combining our research budget to maximise the incentives for recruitment and sharing the data cleaning process. A cross-sectional survey was considered an appropriate study design given the limited scope and time of a DClinPsyc project. Online survey was also considered the most appropriate method to maximise recruitment and several survey-hosting platforms were considered (e.g. Google forms, Typeforms etc). The trainee consulted the IT technician for advice and Select Survey was chosen to be the platform hosting the survey. This platform was a secure platform approved by the University. Prior to creating the survey online, the trainees consulted the Community Liaison Group (CLG) for service user's feedback regarding the content of the survey, the Participant Information Sheet (PIS), consent form and the debrief form. CLG representatives reminded the trainees to provide information regarding emotional support services (e.g. Samaritans) throughout the survey, instead of placing the information in the final page. After finalising the survey items and the relevant forms, the trainees completed the University Research Ethics Committee (UREC) application and obtained the approval according to schedule.

The survey was piloted online with feedback suggesting the survey should be accessed with a computer or laptop rather than a smartphone, due to the alignment issues of some of the survey items. Otherwise, the survey was completed smoothly within 20-30 minutes. Both trainees took part in recruitment and a variety of methods were used. Flyers were printed and posted in University Libraries, public notice boards within the University campus. The study was also promoted across several social media platforms (e.g. Facebook, Instagram, Twitter, LinkedIn), in accordance to the Guidance on the Use of Social Media by the British Psychological Society (2012). Social media are considered to be effective platforms to recruit

participants for mental health related research (Kayrouz, Dear, Karin, & Titov, 2016). Furthermore, recruitment information was posted in public online forums such as Reddit and popular mental health websites (e.g. Mad America & UK). Information was also sent to mailing lists of mental health charities for promotion. A video was made and broadcasted on YouTube by the collaborating trainee, which had also helped with engagement.

A relatively large sample size was recruited which exceeded the trainees' expectation. The target number of 300 participants was reached within two months of commencement and the trainee believed the proactive recruitment approach was the main reason our study reached a large audience. The pooling of research budget gave an attractive incentive (i.e. prize draw) which might be another reason for the good response rate.

2.4. Data analysis

Both trainees shared the data cleaning process, this included cleaning the measures together and respective checks were performed to ensure the process was completed with accuracy. Missing data was less than 10% for each continuous variable item and it was decided to impute the item mean for the missing data (Peng, Harwell, Liou, & Ehman, 2006). Multiple imputation was considered initially but it was not utilised as it was not compatible with the PROCESS moderation tool the trainee initially planned to run.

Research shows parenting factors (perceived parenting stress, parental care etc) can moderate the effect of abuse on children (Levendosky & Graham-Bermann, 1998; Nixon, Tutty, Radtke, Ateah, & Ursel, 2017). Therefore, the trainee was initially interested in conducting a moderation analysis to explore if parenting quality affects the association between early trauma and unhelpful metacognitions. However, the trainee later realised this could not be

done due to two main reasons: 1) overlapping constructs between ETI-EA and MOPS subscales and 2) MOPS scale being an inappropriate measure for parenting in our study.

The overlapping constructs, as indicated by the modest correlations between ETI-EA and MOP subscales, implied there may be a multicollinearity problem. Moderation analysis requires the creation of an interaction term (i.e. early trauma x parenting) but the two factors in the interaction term cannot be inter-related. Furthermore, it was not conceptually possible to create a single composite parenting score based on the six sub-scales of MOPS (Bifulco, Bernazzani, Moran, & Jacobs, 2005).

In hindsight, the PBI may have been a better measure than the MOPS. Originally, the MOPS was chosen over PBI because the author claimed that the MOPS was a modified (presumably better) and updated version of the PBI. Given the PBI was popular, the trainee believed the MOPS would then be even better at measuring parenting style. However, the trainee has realised, the question "which is a better measure" should be decided in the wider context of the other measures in the study. The trainee has overlooked the similarity of the wording of the items of ETI-EA and MOPS subscales. The MOPS subscales were all worded negatively which means it may capture negative early experiences just as the ETI-EA did. Given the similarity, there is no reason to choose MOPS over PBI, as the ETI-EA might already capture parental abusive experience. The PBI may be a better measure when it is used in the context of trauma measures. The PBI has two subscales (care and overprotection) and the items are worded both positively and negatively (e.g. Care construct includes "was affectionate to me", "frequently smiled at me", "made me feel I wasn't wanted" etc). This may lower the possibility of overlapping constructs if trauma and parenting are to be looked at together. Furthermore, the PBI was normally distributed in more studies (Enns et al., 2002; Parker et

al., 1997; Spada et al., 2012) which means it captures more commonly experienced parenting. Adopting the PBI may also benefit from its scale scores being associated with attachment classification measured by the Adult Attachment Interview (Manassis, Owens, Adam, West, & Sheldon-Keller, 1999), this may imply the PBI can be used as a proxy measure for attachment. If the PBI had been used, moderation analysis could have been conducted to explore if parental care attenuates the association between early trauma and maladaptive metacognitions.

The overlapping construct led the trainee to ponder upon a question "is poor quality parenting regarded as a form of emotional abuse?"

It is recognised from the social care and child protection point of view that distinguishing emotional maltreatment from dysfunctional parenting is not easy (Azar, Lauretti, & Loding, 1998; Budd, 2001). Researchers have broadly accepted that care (i.e. responsiveness) and autonomy granting are the most important dimensions in building parent-child relationship (Baumrind, 1978; Parker et al., 1979). Failing that, the parent is negligent, unresponsive, controlling and demanding.

Persistent emotional maltreatment of a child when severe and impacting on the child's emotional development is the definition of "emotional abuse" in the UK's safeguarding policy (Department of Education, 2018). Both guidelines in the UK and US state that emotional abuse may involve conveying to a child that they are "worthless or unloved, inadequate, or valued only insofar as they meet the needs of another person." The policy in the UK also regards "interactions that are beyond a child's developmental capability, as well as overprotection and limitation of exploration and learning" as emotional abuse. Unreliable

or inconsistent parenting is classified as one of the emotional maltreatment subtypes, according to the American Academy of Pediatrics (Kairys & Johnson 2002).

These reflections from the trainee's perspective inspired the trainee to question whether self-report scales could realistically represent the nature of participants' receipt of parenting experiences. To distinguish the differences between dysfunctional parenting and emotional abuse, it is most likely observations and interviews are required. If resources are available, research in parenting or attachment is best supplemented with both objective and subjective measures.

2.5. Limitations

The key variables (early trauma, parenting) explored in this study were based on self-report, which may be subject to recall bias (Schacter et al., 1995). Furthermore, the cross-sectional design could not account for the reversibility issue. On reflection, the inappropriate choice of parenting measures might also have eliminated the possibility of running further moderation analysis.

2.6. Future directions

Perception of personal success and parenting may be worthwhile for future metacognition research. Despite our inconsistent findings regarding parenting, the role parenting possibly plays in negative metacognition should not be eliminated. Recent research has shown that parenting style influences children's executive functions whereby parent's autonomy granting and sensitivity were associated with better executive functioning (Bernier et al., 2010; Meuwissen & Carlson, 2015). Recent research has also demonstrated an association between decreased executive functioning and negative metacognitive beliefs concerning

uncontrollability and dangerousness as well as the need to control thoughts (Kraft et al., 2017). Therefore, future research may explore the relationship between parenting, maladaptive metacognitions and executive functioning.

3. Personal reflections

Despite prior experience in conducting systematic reviews, the trainee felt that this experience has been more challenging than expected. Upon reflection, the challenge lies in setting a review question that can be addressed by an appropriate volume of studies that add value to the literature. The trainee has realised that the nature of conducting a non-intervention related systematic review was more complex than expected.

Taking it all together and for future reference, the trainee has learnt the importance of critical appraisal of the validity of the measurement scales used in research and the value of carefully examining the wording of the survey items. In the systematic review, critically appraising the factor structure of the WBSI is important because it questions whether the WBSI is solely measuring thought suppression. If the WBSI is two-factored capturing another construct i.e. the frequency of intrusive thoughts, which is also correlated with psychopathology, the associations found may be inflated. This affects the confidence in the conclusion we can draw. In the empirical paper, overlooking the similar items between measurement scales lead to the issue of overlapping constructs in our study. This issue limited the possible statistical analysis conducted and the trainee felt that the ideas put forward originally for the empirical paper did not come to fruition. Exploratory ideas or concepts for research have to be complemented with appropriate measures that are feasible within the limit of time and resources. Otherwise, the analysis cannot maximise the utility of a large sample size. In the future, decisions on which scale (that measure the same construct) to use should be made in

consideration of the other scales in the survey. The benefit and convenience of adopting a shorter scale may come with a cost if it does not match well with other scales.

Despite the measurement limitations, the learning experience has been a fruitful one. Writing this reflective piece has also generated ideas for further analysis that overcomes the limitation of overlapping constructs. For example, to look at whether MOPS subscales mediate the association between childhood exposure to accidents or serious illness (measured by the general trauma subscale) and unhelpful metacognitions. This project has also given the opportunity for the trainee to formulate research questions, which is the most important part of conducting research from the trainee's current learning perspective. This learning experience will definitely benefit the trainee in preparation for a career as a scientific-practitioner.

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Appendix A - PROSPERO

PROSPERO
International prospective register of systematic reviews

NHS
National Institute for Health Research

UNIVERSITY of York
Centre for Reviews and Dissemination

Systematic review

1. * Review title.

Give the working title of the review, for example the one used for obtaining funding. Ideally the title should state succinctly the interventions or exposures being reviewed and the associated health or social problems. Where appropriate, the title should use the PI(E)COS structure to contain information on the Participants, Intervention (or Exposure) and Comparison groups, the Outcomes to be measured and Study designs to be included.

A systematic review of the relationship between thought control strategies and psychopathology in children and adolescents

2. Original language title.

For reviews in languages other than English, this field should be used to enter the title in the language of the review. This will be displayed together with the English language title.

3. * Anticipated or actual start date.

Give the date when the systematic review commenced, or is expected to commence.

01/01/2020

4. * Anticipated completion date.

Give the date by which the review is expected to be completed.

03/04/2020

5. * Stage of review at time of this submission.

Indicate the stage of progress of the review by ticking the relevant Started and Completed boxes. Additional information may be added in the free text box provided.
Please note: Reviews that have progressed beyond the point of completing data extraction at the time of initial registration are not eligible for inclusion in PROSPERO. Should evidence of incorrect status and/or completion date being supplied at the time of submission come to light, the content of the PROSPERO record will be removed leaving only the title and named contact details and a statement that inaccuracies in the stage of the review date had been identified.
This field should be updated when any amendments are made to a published record and on completion and publication of the review. If this field was pre-populated from the initial screening questions then you are not able to edit it until the record is published.

The review has not yet started: No

Review stage	Started	Completed
Preliminary searches	Yes	No
Piloting of the study selection process	Yes	No
Formal screening of search results against eligibility criteria	No	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

Provide any other relevant information about the stage of the review here (e.g. Funded proposal, protocol not yet finalised).

6. * Named contact.

The named contact acts as the guarantor for the accuracy of the information presented in the register record.

Melissa Chan

Email salutation (e.g. "Dr Smith" or "Joanne") for correspondence:

Ms Chan

7. * Named contact email.

Give the electronic mail address of the named contact.

melissa.chan@postgrad.manchester.ac.uk

8. Named contact address

Give the full postal address for the named contact.

Division of Psychology and Mental Health, Faculty of Biology, Medicine and Mental Health, The University of Manchester, 2nd Floor Zochonis Building, Brunswick Street, Manchester, M13 9PL

9. Named contact phone number.

Give the telephone number for the named contact, including international dialling code.

+44 (0) 161 306 0401

10. * Organisational affiliation of the review.

Full title of the organisational affiliations for this review and website address if available. This field may be completed as 'None' if the review is not affiliated to any organisation.

University of Manchester

Organisation web address:

11. * Review team members and their organisational affiliations.

Give the title, first name, last name and the organisational affiliations of each member of the review team. Affiliation refers to groups or organisations to which review team members belong.

Ms Melissa Chan. University of Manchester
Ms Emily Smeaton. University of Manchester
Professor Adrian Wells. University of Manchester
Dr Lora Capobianco. University of Manchester

12. * Funding sources/sponsors.

Give details of the individuals, organizations, groups or other legal entities who take responsibility for initiating, managing, sponsoring and/or financing the review. Include any unique identification numbers assigned to the review by the individuals or bodies listed.

The review is not affiliated with any external funding.

13. * Conflicts of interest.

List any conditions that could lead to actual or perceived undue influence on judgements concerning the main topic investigated in the review.

None

14. Collaborators.

Give the name and affiliation of any individuals or organisations who are working on the review but who are not listed as review team members.

15. * Review question.

State the question(s) to be addressed by the review, clearly and precisely. Review questions may be specific or broad. It may be appropriate to break very broad questions down into a series of related more specific questions. Questions may be framed or refined using PI(E)COS where relevant.

Is greater use of thought control strategies positively associated with psychopathology (e.g. symptoms of depression, anxiety, post-traumatic stress) amongst children and adolescents? Are these associations specific to thought control strategies (e.g. worry, punishment) and specific symptoms/disorders (e.g. anxiety or depression)? Amongst children and adolescents who were exposed to traumatic events (e.g. accident), is there an association between thought control and depression or anxiety severity?

16. * Searches.

State the sources that will be searched. Give the search dates, and any restrictions (e.g. language or publication period). Do NOT enter the full search strategy (it may be provided as a link or attachment.)

The following electronic bibliographic databases will be systematically searched: PsycINFO, EMBASE, OVID MEDLINE, Web of Science and CINAHL.

The following search terms will be utilised as a mixture of subject headings and keywords depending on the data-base:

child* or pediat* or paediat* or schoolchild* or adolescen* or juvenile* or youth* or teenage* or youngster*

AND

Thought$ control questionnaire or thought$ control survey or thought$ control instrument or white bear$ suppress* inventory or white-bear$ suppress* inventory or thought$ control or Thought$ suppress*

The reference lists of key papers will be scanned for additional relevant papers (backward searching). The grey literature will also be searched.

Update as follow*

Search dates: The search will be conducted for studies conducted and published since the development of the White Bear Suppression Inventory – WBSI (i.e. 1994) and Thought Control Questionnaire -TCQ (i.e. 1994)

Publication period: 1994 to Jan 2020

Restrictions: Only studies published in English will be included

17. URL to search strategy.

Give a link to a published pdf/word document detailing either the search strategy or an example of a search strategy for a specific database if available (including the keywords that will be used in the search strategies), or upload your search strategy.Do NOT provide links to your search results.

Alternatively, upload your search strategy to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

Do not make this file publicly available until the review is complete

18. * Condition or domain being studied.

Give a short description of the disease, condition or healthcare domain being studied. This could include health and wellbeing outcomes.

Any thought control strategies as measured by White Bear Suppression Inventory (WBSI) or Thought Control Questionnaire (TCQ)

19. * Participants/population.

Give summary criteria for the participants or populations being studied by the review. The preferred format includes details of both inclusion and exclusion criteria.

Inclusion: age 18 or below

• And completed measures of depressive or anxiety or post-traumatic stress symptoms

Exclusion:

• anyone above the age of 18

• Children and adolescents not reporting symptoms of depression and/or anxiety

20. * Intervention(s), exposure(s).

Give full and clear descriptions or definitions of the nature of the interventions or the exposures to be reviewed.

Children and adolescents completing a validated questionnaire measuring the use of thought control strategy(ies)

21. * Comparator(s)/control.

Where relevant, give details of the alternatives against which the main subject/topic of the review will be compared (e.g. another intervention or a non-exposed control group). The preferred format includes details of both inclusion and exclusion criteria.

Studies with or without a comparator will be included

22. * Types of study to be included.

Give details of the types of study (study designs) eligible for inclusion in the review. If there are no restrictions on the types of study design eligible for inclusion, or certain study types are excluded, this should be stated. The preferred format includes details of both inclusion and exclusion criteria.

Prospective and retrospective observational studies, meta-analyses, book chapters, conference presentations, qualitative studies, case series, case studies and dissertations.

23. Context.

Give summary details of the setting and other relevant characteristics which help define the inclusion or exclusion criteria.

24. * Main outcome(s).

Give the pre-specified main (most important) outcomes of the review, including details of how the outcome is defined and measured and when these measurement are made, if these are part of the review inclusion criteria.

• The association between thought control strategy scores (depressive or anxiety symptoms)

• The magnitude of mean differences between clinical vs non-clinical group (if applicable)

*Update as follow:

The primary outcome will be the association between self-report thought control strategies and validated measures of depressive and anxiety symptoms (e.g. Revised Child Anxiety and Depression Scale and depressive symptoms score measured by Beck Depression Inventory; Regression coefficient of TCQ score predicting anxiety symptoms score as measured by State-Trait Anxiety Inventory; Magnitude of mean differences between clinical vs non-clinical group)

The search will not be limited to specific depressive or anxiety measures, as long as it is a validated and reliable measure. Studies not reporting any symptoms of depression or anxiety will be excluded (e.g. reporting only symptoms of psychosis)

Timing and effect measures

Not applicable

25. * Additional outcome(s).

List the pre-specified additional outcomes of the review, with a similar level of detail to that required for main outcomes. Where there are no additional outcomes please state 'None' or 'Not applicable' as appropriate to the review

Not applicable

Timing and effect measures

Not applicable

26. * Data extraction (selection and coding).

Describe how studies will be selected for inclusion. State what data will be extracted or obtained. State how this will be done and recorded.

The titles and abstracts of studies identified using the search strategy above will be screened against the inclusion and exclusion criteria.

Inclusion:

• Children and adolescents age 18 or below

• Children and adolescents who have completed a validated measure of thought control

• Studies using a validated measure to measure symptoms of psychopathology (e.g. symptoms of depression, anxiety, post-traumatic stress etc)

Exclusion:

• Adults (above the age of 18)

• Studies with an overlapping age group (e.g. 14-30 years old) or studies with participants' average age is above 18

• Children and adolescents with chronic physical health problems; developmental or neurodevelopmental disorder (e.g. ASD, ADHD); eating disorder related symptoms

• Studies not using a validated measure of thought control strategy or psychopathology

• Neuroimaging studies; Intervention studies

• Non-English paper

The full text of the potentially eligible studies will be obtained and independently assessed for eligibility by the main reviewer. A second reviewer will screen 20% of the papers.

A standardised piloted form will be used to extract key information from the eligible studies. This will include

• Participant information (age, sex, clinical or non-clinical population, recruitment setting),

• Study design and control conditions (eg. prospective study or cross-sectional) (eg. clinical vs non-clinical or community only),

• Measure of thought control strategy (e.g. Thought control questionnaire, White Bear Suppression Inventory),

• Measure of psychopathology (i.e. symptoms of depression/anxiety/post-traumatic stress)

• Study outcomes & statistical analysis (association measured by Pearson's correlation; magnitude of mean differences measured by effect sizes; predictive value measured by regression coefficients)

• Information for assessment of the risk of bias.

The main reviewer will extract the data independently. A second reviewer will extract data for 20% of the papers. Any discrepancies will be discussed with a third reviewer.

27. * Risk of bias (quality) assessment.

Describe the method of assessing risk of bias or quality assessment. State which characteristics of the studies will be assessed and any formal risk of bias tools that will be used.

The main reviewer will independently assess the risk of bias in included studies. A second reviewer will assess bias in 20% of papers.

A quality assessment tool will be used to assess the quality of the included studies. The assessment will evaluate the sample description, sample size calculation, methodology and analysis.

Disagreements will be resolved by discussion between the two reviewers, if there is no consensus, the reviewer will consult their supervisor for advice to reach a consensus.

The quality assessment will be conducted at the study level and will be based on several criteria adapted from the checklist developed by Downs & Black 1998 for non-randomised studies: 1) how well has the study reported information to allow an unbiased assessment of the findings (eg. Are the main outcomes reported in the methods section? Have the study reported clearly the participants' characteristics? Are the main findings clearly reported?); 2) the external validity of the study (eg. How did the study recruit their participants? Were they recruited from a representative population?) ; 3) are there any biases in the measurement of the outcome of the study (eg. are the main outcome measures internally valid and reliable?); 4) have the

confounds be adjusted appropriately? (eg. adequate adjustment of confounding variables?); 5) does the study have enough statistical power (eg. sample size calculation)?

28. * Strategy for data synthesis.

Provide details of the planned synthesis including a rationale for the methods selected. This **must not be generic text** but should be **specific to your review** and describe how the proposed analysis will be applied to your data.

We will provide a narrative synthesis of the findings from the included studies. The synthesis will focus on the association between thought control strategies and symptom scores.

We will provide a narrative synthesis of the findings from the included studies. The formal narrative synthesis will focus on summarising the measures of association between thought control strategies and depressive/anxiety symptom scores, expressed as correlations or regression coefficients.

The review will first group the studies using TCQ together and the studies using WBSI together. Then, studies with a clinical population (i.e. participants with a clinical diagnosis of depression or anxiety) will be analysed separately from studies with non-clinical participants.

Therefore, four separate groups of studies will be as follow: TCQ & clinical population; TCQ & non-clinical population; WBSI & clinical population; WBSI & non-clinical population

A narrative synthesis will be conducted for each group and the reviewer will summarise 1) the association of thought control measure and symptoms of anxiety (e.g. STAI, Revised Children's Anxiety and Depression Scale etc) and 2) association of thought control measure and symptoms of depression respectively (eg. BDI, RCADS etc), as measured by different statistical parameters such as Pearson's correlations or regression coefficients. Studies comparing thought control measures between clinical and non-clinical group will be synthesised narratively summarising the magnitude of mean differences between groups.

29. * Analysis of subgroups or subsets.

State any planned investigation of 'subgroups'. Be clear and specific about which type of study or participant will be included in each group or covariate investigated. State the planned analytic approach.

Subgroups related to the clinical diagnosis and age of participants (primary school vs secondary school) might be identified and a narrative synthesis will highlight these findings.

30. * Type and method of review.

Select the type of review and the review method from the lists below. Select the health area(s) of interest for your review.

Type of review

Cost effectiveness
No

Diagnostic
No

Epidemiologic
No

Individual patient data (IPD) meta-analysis
No

Intervention
No

Meta-analysis
No

Methodology
No

Narrative synthesis
Yes

Network meta-analysis
No

Pre-clinical
No

Prevention
No

Prognostic
No

Prospective meta-analysis (PMA)
No

Review of reviews
No

Service delivery
No

Synthesis of qualitative studies
No

Systematic review
Yes

Other
No

Health area of the review

Alcohol/substance misuse/abuse
No

Blood and immune system
No

Cancer
No

Cardiovascular
No

Care of the elderly
No

Child health
No

Complementary therapies
No

Crime and justice
No

Dental
No

Digestive system
No

Ear, nose and throat
No

Education
No

Endocrine and metabolic disorders
No

Eye disorders
No

General interest
No

Genetics
No

Health inequalities/health equity
No

Infections and infestations
No

International development
No

Mental health and behavioural conditions
Yes

Musculoskeletal
No

Neurological
No

Nursing
No

Obstetrics and gynaecology
No

Oral health
No

Palliative care
No

Perioperative care
No

Physiotherapy
No

Pregnancy and childbirth
No

Public health (including social determinants of health)
No

Rehabilitation
No

Respiratory disorders
No

Service delivery

No

Skin disorders
No

Social care
No

Surgery
No

Tropical Medicine
No

Urological
No

Wounds, injuries and accidents
No

Violence and abuse
No

31. Language.

Select each language individually to add it to the list below, use the bin icon to remove any added in error.
English

There is not an English language summary

32. * Country.

Select the country in which the review is being carried out from the drop down list. For multi-national collaborations select all the countries involved.

England

33. Other registration details.

Give the name of any organisation where the systematic review title or protocol is registered (such as with The Campbell Collaboration, or The Joanna Briggs Institute) together with any unique identification number assigned. (N.B. Registration details for Cochrane protocols will be automatically entered). If extracted data will be stored and made available through a repository such as the Systematic Review Data Repository (SRDR), details and a link should be included here. If none, leave blank.

34. Reference and/or URL for published protocol.

Give the citation and link for the published protocol, if there is one

Give the link to the published protocol.

Alternatively, upload your published protocol to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

No I do not make this file publicly available until the review is complete

Please note that the information required in the PROSPERO registration form must be completed in full even if access to a protocol is given.

35. Dissemination plans.

Give brief details of plans for communicating essential messages from the review to the appropriate audiences.

Do you intend to publish the review on completion?

No

36. Keywords.

Give words or phrases that best describe the review. Separate keywords with a semicolon or new line. Keywords will help users find the review in the Register (the words do not appear in the public record but are included in searches). Be as specific and precise as possible. Avoid acronyms and abbreviations unless these are in wide use.

37. Details of any existing review of the same topic by the same authors.

Give details of earlier versions of the systematic review if an update of an existing review is being registered, including full bibliographic reference if possible.

38. * Current review status.

Review status should be updated when the review is completed and when it is published. For newregistrations the review must be Ongoing.
Please provide anticipated publication date

Review_Ongoing

39. Any additional information.

Provide any other information the review team feel is relevant to the registration of the review.

40. Details of final report/publication(s).

This field should be left empty until details of the completed review are available.

Give the link to the published review.

Appendix B - Detailed search strategy

PSYCINFO – 19012020	PSYCINFO	MEDLINE – 19012020	MEDLINE	EMBASE – 19012020	EMBASE
(Thought$ control questionnaire or thought$ control survey or thought$ control instrument).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	204		16		56
Thought control.mp.	443		130		249
(white bear$ suppress* inventory or white-bear$ suppress* inventory).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	423		37		79
white-bear$ suppress*.mp.	429		38		81
Thought$ suppress*.mp.	986		329		491
1 or 2 or 3 or 4 or 5	1501		453		724
(child* or pediat* or paediat* or schoolchild* or adolescen* or juvenile* or youth* or teenage* or youngster*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	1090414		3379837		3516273
exp early adolescence/ or exp adolescent development/ or exp children/ or exp child development/ or exp childhood/ or exp disabled student/ or exp elementary student/ or exp high school student/ or exp high school/ or exp middle school student/ or exp middle school/ or exp primary school/ or exp puberty disorders/ or exp school/ or exp student/	90289	Child/ or Psychology, Child/ or Adolescent/ed, gd, px, th [Education, Growth & Development, Psychology, Therapy]	1658391	Same as psycinfo	3034721
6 or 7	1113466		3379837		4381877
8 and 9	309		189		183
Limit to 1994 to 2020	300	Limit to 1994 to 2020	186	Limit to 1994 to 2020	180

(exported to RIS)		(exported to RIS)		(exported to RIS)	
After identifying duplicates	300	After identifying duplicates	185	After identifying duplicates	178

CINAHL PLUS @ EBSCO – 20012020		Web of science – 20012020	
(Thought$ control questionnaire or thought$ control survey or thought$ control instrument) OR (Thought control.mp) OR (white bear$ suppress* inventory or white-bear$ suppress* inventory) OR white-bear$ suppress* OR Thought$ suppress*	238	**TOPIC:** ("Thought$ control questionnaire" or "thought$ control survey" or "thought$ control instrument") *OR* **TOPIC:** ("thought control") *OR* **TOPIC:** ("white bear$ suppress* inventory" or "white-bear$ suppress* inventory") *OR* **TOPIC:** ("white-bear$ suppress*") *OR* **TOPIC:** ("Thought$ suppress*") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=1994-2020*	1391
child* or pediat* or paediat* or schoolchild* or adolescen* or juvenile* or youth* or teenage* or youngster* OR (MH "Adolescence") or (MH "Child Development")	1,043,427	**TOPIC:** (child* or pediat* or paediat* or schoolchild* or adolescen* or juvenile* or youth* or teenage* or youngster*) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=1994-2020*	2,056,432
S1 and S2 (exported to RIS)	63	Limit to 1994 to 2020 (exported to bib)	135
After identifying duplicates	63	After identifying duplicates	134

Appendix C – Downs and Black quality assessment checklist & ratings

Quality Assessment Tool
Adapted from Downs & Black

Reporting

1. Is the hypothesis/aim/objective of the study clearly described?

   Yes= 1
   No=0

2. Are the main outcomes to be measured clearly described in the Introduction or Methods section? *If the main outcomes are first mentioned in the Result section, the question should be answered no.*

   Yes= 1
   No=0

3. Are the characteristics of the patients included in the study clearly described? *Inclusion and exclusion criteria should be given.*

   Yes= 1
   No=0

4. Are the distributions of principal confounders in each group of subjects to be compared clearly described? A list of principal confounders is provided?

   Yes= 2
   Partially=1
   No=0
   N/A

5. Are the main findings of the study clearly described? *Simple outcome data should be reported for all major findings so that the reader can check the major analyses and conclusions. (This question does not cover statistical tests).*

   Yes= 1
   No=0

6. Does the study provide estimates of the random variability in the data for the main outcomes? *In non normally distributed data the interquartile range of results should be reported. In normally distributed data the standard error, standard deviation or confidence intervals should be reported. If the distribution of data is not described, it must be assumed that the estimates used were appropriate and the question should be answered yes.*

   Yes= 1
   No=0

7. Have actual probability values been reported (e.g 0.035 rather than <0.05) the main outcomes except where the probability value is less than 0.001?

   Yes= 1
   No=0

External Validity

8. Were the subjects asked to participate in the study representative of the entire population from which they were recruited? *The study must identify the source population for patients and describe how the patients were selected. Patients would be representative if they comprised the entire source population, an unselected sample of consecutive patients or a random sample. Random sampling is only feasible where a list of all members of the relevant population exists. When a study does not report the proportion of the source population from which the patients derived the question should be answered as unable to determine.*

   Yes= 1
   No=0
   Unable to determine=0

9. Were those subjects who were prepared to participate representative of the entire population from which they were recruited. *The proportion of those who agreed should be stated. Validation that the sample was representative would include demonstrating that the distribution of the main confounding factors was the same in the study sample and the source population.*

   Yes= 1
   No=0
   Unable to determine=0

Internal Validity - Bias

10. If any of the results of the study were based on 'data dredging' was this made clear? *Any analyses that had not been planned at the outset of the study should be clearly indicated. If no retrospective unplanned subgroup analyses were reported, then answer yes.*

    Yes= 1
    No=0
    Unable to determine=0

11. Were the statistical tests used to assess the main outcomes appropriate? *The statistical techniques used must be appropriate to the data. For example non parametric methods should be used for small sample sizes. Where little statistical analysis has been undertaken but where there is no evidence of bias, the question should be answered yes. If the distribution of the data is not described it must be assumed that the estimates used were appropriate and the question should be answered yes.*

    Yes= 1
    No=0
    Unable to determine=0

12. Were the main outcome measures used accurate (valid and reliable)? *For studies where the outcome measures are clearly described, the question should be answered yes. For studies which refer to other work or that demonstrates the outcomes measures are accurate, the questions should be answered yes.*

    Yes= 1
    No=0
    Unable to determine=0

Internal Validity - Confounding (Selection Bias)

13. Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population? *For example patients for all comparison groups should be selected from the same hospital. The question should be answered unable to determine for cohort and case control studies where there is no information concerning the source of patients included in the study,*

    Yes= 1
    No=0
    Unable to determine=0

14. Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time. *For a study that doesn't specify the time period the question should be answered unable to determine.*

    Yes= 1
    No=0
    Unable to determine=0

15. Was there adequate adjustment for confounding in the analyses from which the main findings were drawn? *This question should be answered no for trials if the distribution of known confounders in the different treatment groups were not described, or the distribution of known confounders differed between the treatment groups but was not taken into account in the analyses. In non randomised studies if the effect of the main confounders was not investigated or confounding was demonstrated but no adjustment was made in the final analysis the question should be answered as no.*

    Yes= 1
    No=0
    Unable to determine=0

Power

16. Did the study report sufficient power to detect a clinically important effect?

    Yes = 1
    No = 0

    Total = out of 17

Quality ratings

TCQ	Bahrami2011	Gill2013	Kang2012	Meiser-Stedman2014	Whiting2014	Wilson2012
Reporting						
1. Hypothesis	1	1	0	1	1	1
2. Main outcome	0	1	0	1	1	1
3. Participants characteristics (Inc/exc criteria)	1	1	1	1	1	1
4. Distribution of principal confounders	0	0	2	0	1	0
5. main findings	0	1	1	1	1	1
6. Non random variability	0	1	1	1	1	1
7. Actual probability values	1	1	1	0	0	1
External validity						
8. Recruitment representation	1	0	0	1	0	0
9. Participants representation	0	0	1	0	0	0
Internal validity - bias						
10. Made clear no data dredging	0	1	0	1	1	0
11. Stat test	1	1	1	1	1	1
12. Main outcome measures	1	1	1	1	1	1
Internal validity – confounding (selection bias)						
13. Recruit from same population	1	1	1	1	0	1
14. Recruit from same time	1	1	1	1	0	1

15. Adjustment for confounding	0	0	1	0	0	0
16.Power	0	0	0	0	1	1
	8/17 (poor)	11/17 (fair)	12/17 (good)	11/17 (fair)	10/17 (fair)	11/17 (fair)
Main limitations	Did not explore if they were any potential confounds Unsure if the statistical tests used was appropriate	Unsure how representative was the sample	There was no clear hypothesis	Modest sample size and high drop out rate	Sample recruited from different settings, resulting in a small sample Poor internal consistency of "punishment" subscale	Did not explore if they were any potential confounds
TCQ's cronbach's alpha	Did not report	0.72 to 0.82	Did not report	Range 0.64 to 0.68 except social support =0.45	0.75	0.63 to 0.79

Community WBSI	Dickson2018	Donovan2017	Fernandez-Berrocal2006	Kennedy2016	Laugesen2003	Mestre2019	Muris2017
Reporting							
1. Hypothesis	1	1	1	1	1	1	1
2. Main outcome	1	1	0	1	1	1	1
3. Participants characteristics (Inc/exc criteria)	0	0	0	0	0	0	0
4. Distribution of principal confounders	1	1	0	N/A	1	1	0
5. main findings	1	1	1	1	1	1	1
6. Non random variability	1	1	0	1	1	1	1
7. Actual probability values	1	1	0	0	1	0	0
External validity							
8. Recruitment representation	0	0	0	0	0	1	1
9. Participants representation	0	0	0	0	0	0	0

Internal validity - bias							
10. Made clear no data dredging	1	1	0	1	1	1	1
11. Stat test	1	1	1	1	1	1	1
12. Main outcome measures	1	1	1	1	1	1	1
Internal validity – confounding (selection bias)							
13. Recruit from same population	1	0	1	0	0	0	1
14. Recruit from same time	0	0	0	0	0	0	0
15. Adjustment for confounding	1	0	0	1	1	1	0
16.Power	0	0	0	0	0	0	0
	12/17 (good)	9/17 (fair)	5/17 (poor)	8/16 (poor)	10/17 (fair)	10/17 (fair)	9/17 (fair)
Main limitations	Cross-sectional data; self-report	Recruited participants from multiple sources	Did not control for confounds in regression	No follow up, unable to examine test-retest reliability	Cross-sectional data; 2/3 of participants' first language wasn't English	The study did not report WBSI's Cronbach's alpha	Did not control for confounds in regression
WBSI's cronbach's alpha	0.91	0.93 for children 0.91 or adolescents	0.89	0.87 for intrusion subscale 0.77 for suppression subscale	0.77	Did not report	0.91 for sample 1 0.92 for sample 2

Clinical WBSI	Aaron1999	Donovan2016	Ferrell2012	Hearn2017a	Hearn2017b	Kadak2014	Vincken2012
Reporting							
1. Hypothesis	1	1	1	1	1	1	1
2. Main outcome	1	1	1	1	1	1	1
3. Participants characteristics (Inc/exc criteria)	1	1	1	1	1	1	1
4. Distribution of principal confounders	1	0	0	1	0	1	1
5. main findings	1	1	1	1	1	1	1
6. Non random variability	1	1	1	0	1	1	1
7. Actual probability values	0	1	1	1	1	1	0

External validity							
8. Recruitment representation	0	0	1	0	0	1	0
9. Participants representation	1	0	0	0	0	0	0
Internal validity - bias							
10. Made clear no data dredging	1	1	1	1	1	1	1
11. Stat test	0-1	1	0	1	1	0	1
12. Main outcome measures	1	1	1	1	1	0	1
Internal validity – confounding (selection bias)							
13. Recruit from same population	0	0	1	0	0	1	0
14. Recruit from same time	0	0	0	0	0	0	0
15. Adjustment for confounding	0	0	0	1	0	0	1
16.Power	1	0	0	0	0	0	0
	11/17 (fair)	10/17 (fair)	10/17 (fair)	10/17 (fair)	9/17 (fair)	10/17 (fair)	10/17 (fair)
Main limitations	No follow up to explore whether symptoms persisted; relatively small sample size	Relative homogeneity of the sample & lack of generalisability of the findings	Small sample size	Cross sectional design	No power analysis	Small sample size	Only correlation analysis is conducted
WBSI's cronbach's alpha	0.89	0.91	0.89 for children 0.96 for adolescents 0.95 for mothers	0.92	0.92	Did not report	0.85

Appendix D – Recruitment poster

MANCHESTER 1824
The University of Manchester

Version 4; Date 15/03/19

Are You Interested in Psychology Research?

We are evaluating the beliefs we have about our thinking.

But what influences the development of these beliefs and what impact do they have on our emotional wellbeing?

Take part in this online questionnaire to help us better understand metacognitive beliefs. It will take about 30 minutes & you can be entered into a prize draw to win 1 of 10 Amazon vouchers.

Please take a link to the online survey or scan the QR code.

This project has been approved by the University of Manchester research ethics committee.

For more information contact
emily.smeaton-2@postgrad.manchester.ac.uk or
melissa.chan@postgrad.manchester.ac.uk
(Trainee Clinical Psychologists)

Scan me

https://apps.mhs.manchester.ac.uk/surveys/TakeSurvey.aspx?SurveyID=92KH85I5M

https://apps.mhs.manchester.ac.uk/surveys/TakeSurvey.aspx?SurveyID=92KH85I5M
https://apps.mhs.manchester.ac.uk/surveys/TakeSurvey.aspx?SurveyID=92KH85I5M
https://apps.mhs.manchester.ac.uk/surveys/TakeSurvey.aspx?SurveyID=92KH85I5M
https://apps.mhs.manchester.ac.uk/surveys/TakeSurvey.aspx?SurveyID=92KH85I5M
https://apps.mhs.manchester.ac.uk/surveys/TakeSurvey.aspx?SurveyID=92KH85I5M
https://apps.mhs.manchester.ac.uk/surveys/TakeSurvey.aspx?SurveyID=92KH85I5M
https://apps.mhs.manchester.ac.uk/surveys/TakeSurvey.aspx?SurveyID=92KH85I5M
https://apps.mhs.manchester.ac.uk/surveys/TakeSurvey.aspx?SurveyID=92KH85I5M

Appendix E – Ethics Committee Approval

MANCHESTER 1824
The University of Manchester

Ref: 2019-5465-9975

01/04/2019

Dear Miss Emily Smeaton, Prof Adrian Wells, Dr Lora Capobianco,

Study Title: The development and impact of metacognitive beliefs.
University Research Ethics Committee 1

I write to thank you for submitting the final version of your documents for your project to the Committee on 29/03/2019 15:43 . I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form and supporting documentation as submitted and approved by the Committee.
Please see below for a table of the title, version numbers and dates of all the final approved documents for your project:

Document Type	File Name	Date	Version
Additional docs	Data Management Plan Review (1)	01/02/2019	1
Data Management Plan	Data Management Plan	03/02/2019	1
Additional docs	RSC-Melissa_Chan_approval_letter	06/02/2019	1
Additional docs	Research_subcommittee_approval_ESMEATON	06/02/2019	1
Additional docs	Letter from ethics committee- 8 Mar	08/03/2019	1
Advertisement	SONA Advert V2 090319	09/03/2019	2
Distress Protocol/Debrief Sheet	Debrief sheet V3 090319	09/03/2019	3
Advertisement	Research advert student population V4 150319	15/03/2019	4
Advertisement	Reserch advert general population V4 150319	15/03/2019	4
Default	Select Survey Questionnaire Items V2 220319	22/03/2019	2
Advertisement	Social Media Posts V6 220319	22/03/2019	6
Participant Information Sheet	PIS V6 220319	22/03/2019	6

Additional docs	Revisions to Ethics Application Emily Smeaton V3 220319 (1)	22/03/2019	3

This approval is effective for a period of five years however please note that it is only valid for the specifications of the research project as outlined in the approved documentation set. If the project continues beyond the 5 year period or if you wish to propose any changes to the methodology or any other specifics within the project, an application to seek an amendment must be submitted for review. Failure to do so could invalidate the insurance and constitute research misconduct.

You are reminded that, in accordance with University policy, any data carrying personal identifiers must be encrypted when not held on a secure university computer or kept securely as a hard copy in a location which is accessible only to those involved with the research.

Reporting Requirements:

You are required to report to us the following:

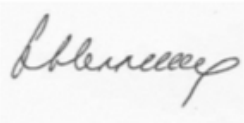
1. Amendments: Guidance on what constitutes an amendment
2. Amendments: How to submit an amendment in the ERM system
3. Ethics Breaches and adverse events
4. Data breaches
5. Notification of progress/end of the study

Feedback

It is our aim to provide a timely and efficient service that ensures transparent, professional and proportionate ethical review of research with consistent outcomes, which is supported by clear, accessible guidance and training for applicants and committees. In order to assist us with our aim, we would be grateful if you would give your view of the service that you have received from us by completing a **UREC Feedback Form**. Instructions for completing this can be found in your approval email.

We wish you every success with the research.

Yours sincerely,



Ms Kate Hennessy
Secretary to University Research Ethics Committee 1

Appendix F – Participant Information Sheet and Consent Form

MANCHESTER 1824
The University of Manchester

Participant Information Sheet

The Development and Impact of Metacognitive Beliefs

This PIS should be read in conjunction with The University privacy notice

You are being invited to take part in a research study as part of a Clinical Psychology Doctorate. Before you decide whether to take part, it is important for you to understand why the research is being conducted and what it will involve.

Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for taking the time to read this.

Who will conduct the research?
The research will be carried out by Emily Smeaton and Melissa Chan who are Trainee Clinical Psychologists at the University of Manchester. The research is supervised by Professor Adrian Wells (Clinical Psychologist and Professor of Clinical and Experimental Psychopathology) and Dr Lora Capobianco (PhD Clinical Psychology). Please find their contact details at the end of this sheet.

What is the purpose of the research?
Metacognitive beliefs are beliefs we have about our thoughts. For example, some people might believe that they don't think clearly or believe that they have a poor memory. Research suggests that these kinds of beliefs impact how we experience events. This study is interested in what influences the development of these beliefs and what impact they have on emotional wellbeing.

Why have I been chosen?
You have been invited to take part because you are over the age of 18. You also understand the English language well enough to understand and complete the questionnaire. You might have seen an advert for this study on Facebook, Twitter, LinkedIn or YouTube. You might have also seen it advertised on a poster at the University of Manchester or a local community or health centre. We will be recruiting at least 300 people to take part in this research.

What would I be asked to do if I took part?
If you agree to take part in this study, you will be directed to an online questionnaire. After reading the consent form you will be asked to complete eight questionnaires. We expect that completing the questionnaires will take 30 minutes.

The questionnaire includes demographic questions about you and the people who looked after you the most as a child (primary caregivers). For example, it includes questions about mental and physical health; your experience of successes and failures; and your experience of trauma before the age of 18 years. This includes questions about your experience of the death of a parent, sibling or friend; your experience of life-threatening accidents and injuries and if you have witnessed violence or murder. The demographic questionnaire will also ask you about some traumatic experiences that your primary caregivers might have experienced and if they had any difficulties with drugs or alcohol.

The questionnaire will ask you about your experiences of sexual, emotional and physical abuse and trauma before the age of 18 years; your views of your parents' behaviour towards you; and your beliefs about your thoughts, attentional control and emotional wellbeing. It is possible that some of the questions might make you feel distressed. Examples of these questions are 'Were you ever punched or kicked?', 'Were you often ignored or made to feel that you didn't count?' and 'Did anyone ever have genital sex with you against your will?'.

If you feel distressed whilst completing the questionnaire please feel free to stop or give yourself a break. There is a list of supportive services that you can contact at the end of this Participant Information Sheet; at the beginning of each potentially distressing questionnaire; and at the end of the online questionnaire.

It is possible to save your answers and complete the questionnaire at another time within the next seven days. If you complete the questionnaire you have the option to provide your email address. You can choose to be entered into a prize draw to win 1 of 10 £50 Amazon vouchers, receive research credits (University of Manchester students only), receive research updates relating to this study or receive information about future research. Your email address will not be used for any other purposes.

Will I be paid for participating in the research?
There will be no financial reimbursement for taking part in this research. However, you can choose to be entered into a prize draw to win 1 of 10 £50 Amazon vouchers. If you are a University of Manchester student you can receive two research credits.

You will need to provide your email address at the end of the questionnaire and select 'prize draw' and/or 'research credits'.

What is the duration of the research?
The study involves the completion of eight online questionnaires. We expect the online survey to take around 30 minutes to complete.

Where will the research be conducted?
The research is being conducted via an online questionnaire. Therefore, you can complete the questionnaire at a time and venue that suits you. We would recommend that you complete the questionnaire at a time when you are unlikely to be distracted.

Will the outcomes of the research be published?
The outcomes of the research will be included in a report that will be submitted for examination by the University of Manchester. The results may also be published in an academic journal and may be presented at conferences. No personal information will be included in any of the reports or presentations. Participants will be informed of the outcomes if they have opted to receive research updates. Research updates will be advertised on social media sites.

What will happen to my personal information?
In order to undertake the research project we will need to collect the following personal information/data about you:

- Gender
- Age
- Marital status
- Employment status
- Education
- Experience of mental or physical ill-health
- Experience of traumatic life events
- Information about the person who looked after you the most when you were growing up
- Your experience of your parents' behaviour towards you
- Your beliefs about your thoughts, attentional control and emotional wellbeing

Only the research team will have regular access to this information. However, the University of Manchester's audit department and regulatory authorities might also have access. This might be for auditing and monitoring purposes, or in the event of an incident. All individuals involved in auditing and monitoring will have a strict duty of confidentiality to you as a research participant.

We are collecting and storing this personal information in accordance with the General Data Protection Regulation (GDPR) and Data Protection Act 2018 which legislate to protect your personal information. The legal basis upon which we are using your personal information is "public interest task" and "for research purposes" if sensitive information is collected. For more information about the way we process your personal information and comply with data protection law please see our Privacy Notice for Research Participants.

The University of Manchester, as Data Controller for this project, takes responsibility for the protection of the personal information that this study is collecting about you. In order to comply with the legal obligations to protect your personal data the University has

safeguards in place such as policies and procedures. All researchers are appropriately trained and your data will be looked after in the following way:

The data collected during the study will be held securely in Select Survey until November 2019. It will then be downloaded onto the University of Manchester's secure servers and deleted from Select Survey. Data files stored on the computer will be password protected. No names or addresses will be collected and participants will be identified only by numbers. Only the researchers will have access to the data, unless it is required for auditing and monitoring purposes as described above. The data you provide will be kept anonymously for a maximum of 5 years on the University of Manchester's secure server. It will then be permanently deleted.

If you provide your email address so you can be entered into the prize draw; receive research credits; receive research updates; or details of future research, it will be kept in a secure password protected file. The researchers will remove email addresses from the rest of the data when it is downloaded from Select Survey. Email addresses will be stored separately to the rest of the research data. Your data will not be linked to your email address. You can opt out of receiving research updates at any time by contacting the research team. The research team will stop contacting you about future research if they have not received a response from you after two years. Your email address will be permanently deleted upon completion of the study, unless you have opted to receive information about future research.

You have a number of rights under data protection law regarding your personal information. For example, you can request a copy of the information we hold about you. This is known as a Subject Access Request. If you would like to know more about your different rights, please consult our privacy notice for research. If you wish to contact us about your data protection rights, please email dataprotection@manchester.ac.uk. You can also write to: The Information Governance Office, Christie Building, University of Manchester, Oxford Road, M13 9PL, at the University and we will guide you through the process of exercising your rights.

You also have a right to complain to the Information Commissioner's Office, Tel 0303 123 1113

Will my participation in the study be confidential?
Your participation in the study will be kept confidential to the study team. As outlined above, the University of Manchester's audit department and regulatory authorities might also have access. No names or addresses are being collected and participants will only be identified by numbers. If you provide your email address it will be stored separately to the rest of the research data.

What happens if I do not want to take part or if I change my mind?
It is up to you to decide whether or not to take part. If you do decide to take part you will be asked to read and sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason and without detriment to yourself. You will be asked to create a unique identification number at the beginning of the questionnaire.

This will enable you to contact the researchers and ask to have your data removed if you decide you no longer want to take part in the research. However, it will not be possible to remove your data from the project after November 2019. This does not affect your data protection rights.

Will my data be used for future research?
When you are completing the consent form you will be asked if you consent to your anonymised data (i.e. no identifiable information) to be used again by researchers in future research studies. This is optional and will not affect your ability to take part in this study. If you consent your data might be provided to researchers running other ethically approved research in similar areas. The future research will not be incompatible with this research project and will concern metacognitive beliefs. These organisations may be universities, NHS organisations or companies involved in specific relevant research in this country or abroad. Where your information relates to your health and care it will only be used by organisations and researchers to conduct research in accordance with the UK Policy Framework for Health and Social Care Research.

This information will not identify you. It will not be combined with other information in a way that could identify you. The information will only be used for the purpose of health and care research. It cannot be used to contact you regarding any other matter or to affect your care. It will not be used to make decisions about future services available to you.

Who has reviewed the research project?
The project has been reviewed by the University of Manchester Research Ethics Committee (01/04/2019).

What if I want to make a complaint?
Minor complaints
If you have a minor complaint then you need to contact the researcher(s) in the first instance.

Names: Emily Smeaton and Melissa Chan
Role: Chief Investigators and Trainee Clinical Psychologists
Address: Faculty of Biology, Medicine and Health; Division of Psychology and Mental Health; 2nd Floor, Zochonis Building, the University of Manchester, Brunswick Street, M13 9PL
Email: emily.smeaton-2@postgrad.manchester.ac.uk and melissa.chan@postgrad.manchester.ac.uk
Tel No: 0161 306 0400

Names: Professor Adrian Wells and Dr Lora Capobianco
Role: Academic Supervisors
Address: University of Manchester, Rawnsley Building, Manchester Royal Infirmary, Oxford Road, Manchester M13 9WL
Email: adrian.wells@manchester.ac.uk and lora.capobianco@manchester.ac.uk
Tel No: 0161 276 5399

Formal Complaints

If you wish to make a formal complaint or if you are not satisfied with the response you have gained from the researchers in the first instance, then please contact:

Name: The Research Governance and Integrity Manager
Address: Research Office, Christie Building, University of Manchester, Oxford Road, Manchester, M13 9PL
Email: research.complaints@manchester.ac.uk
Tel No: 0161 275 2674

What Do I Do Now?

If you have any questions then please contact the Chief Investigators, Emily and Melissa (see contact details above). If you are happy to proceed, then please continue to the consent form.

Support services

The following is a list of services you may contact for support, advice, or in emergency:

Turn2me.org This is a web space for people to share, discuss and offload personal problems, find support and get useful information. www.turn2me.org	**Sane Line** 0300 304 7000. Offering specialist mental health emotional support 4.30-10.30pm every day. You can also email through their website. www.sane.org.uk
Rethink 0300 5000 927 Open Mon-Fri 9:30am - 4pm. Rethink provide support, advice and signposting for carers. http://www.rethink.org/	**University of Manchester Counselling Service** 0161 275 2864 Open from 9am - 4pm, Monday to Friday. Offer counselling appointments for students. http://www.counsellingservice.manchester.ac.uk/get-help/
Samaritans 116 123 Open 24 hours a day. They offer confidential emotional support by telephone, email, text, letter and face to face. jo@samaritans.org	**NHS Direct** 111 Open 24 hours a day. They provide health advice and information.

This Project Has Been Approved by the University of Manchester's Research Ethics Committee [Ref 2019-5465-9975**]**

MANCHESTER 1824
The University of Manchester

CONSENT FORM

Study Title: The Development and Impact of Metacognitive Beliefs
Chief Investigators: Emily Smeaton and Melissa Chan

If you are happy to participate, please complete the consent form below:

	Statements	Tick
1	I confirm that I have read and understood the Participant Information Sheet for the above study. I confirm that I have had the opportunity to consider the information and ask questions and have had these answered satisfactorily.	
2	I confirm that I am over the age of 18.	
3	I understand that my participation in the study is voluntary and that I am free to withdraw at any time up until November 2019, without giving a reason and without detriment to myself. I understand that it will not be possible to remove my data from the project once it has been anonymised and prepared for data analysis. Data can be removed from the project up until November 2019. I agree to take part on this basis	
4	I understand that information I give in the online questionnaire will be kept for 5 years after the current study. I understand that no information that could identify me will be shared or published.	
5	I will have the option to provide my email address for the researchers to enter me into a prize draw, provide student research credits, send me research updates or details about future research. I understand that if I provide my email address, the researchers will use it solely for the above purposes and it will be kept separately from the rest of the data collected.	
6	I understand that data collected during the study may be looked at by University of Manchester's audit department or regulatory authorities for monitoring purposes. I give permission for these individuals to have access to this data.	
7	I agree that any data collected may be published in anonymous form in academic reports, journals and presentations.	
8	I give consent for my anonymised data (i.e. no identifiable information) to be used again by researchers in future research studies. This is optional and will not affect your ability to take part in this study.	

9	I agree to take part in the above study.	

Data Protection

The personal information we collect and use to conduct this research will be processed in accordance with data protection law as explained in the Participant Information Sheet and the Privacy Notice for Research Participants.

Appendix G – Survey items

Demographics

1	Which of the following options best describes your gender identity?	Male Female Other
2	How old are you? The value must be between 0 and 100, inclusive.	
3	What is your legal marital status or same sex civil partnership status?	Never married Married Separated Divorced Widowed
4	Which of these applies to what you were doing last week?	Education Full time Part time Paid employment Full time Part time Self-employment Full time Part time Volunteering Full time Part time Unemployed, looking for paid work Looking after home or family Long-term sick or disabled Retired (whether receiving a pension or not) Others ___specify____
5	What is your highest level of educational attainment to date?	Doctorate Masters Other postgraduate degree or professional qualification An undergraduate or first degree A foundation degree Vocational degree or diploma High school or equivalent Below high school
6	Apart from academic successes, how often did you experience success	Never happened to me Rarely

	before the age of 18 years? (e.g. winning in sports/music/art competition? Receiving awards of recognition? Holding a leadership position in a club etc.)	Sometimes Often
7	Apart from academic setbacks, how often did you experience setbacks before the age of 18 years? (e.g. not being picked to be in the school team, failing an interview, not getting the part-time job etc.)	Never happened to me Rarely Sometimes Often
8	Have you ever been diagnosed with or sought treatment for a mental health difficulty?	Yes No
9	Have you ever had a serious physical illness or difficulty?	Yes No
10	Were you raised in a single parent household?	Yes No
11	Who had the most responsibility for your care when you were growing up? Also known as your primary care giver.	Mother Father Others (please specify) _____
12	Were you adopted or did you live with a foster parent prior to the age of 18?	Yes Adopted Foster care No
13	To what extent do you agree with this statement, I remember being emotionally close to my primary caregiver before the age of 18	7 – Agree strongly 6 5 4 – Neutral/mixed 3 2 1 – Disagree strongly
14	To what extent do you agree with this statement, I remember my primary caregiver was emotionally unavailable or inconsistent in my care before the age of 18	7 – Agree strongly 6 5 4 – Neutral/mixed 3 2 1 – Disagree strongly
15	Which option best describes your primary caregiver's household income when you were 12 years old?	Low Middle High

Metacognitions Questionnaire- 30

This questionnaire is concerned with beliefs people have about their thinking. Listed below are a number of beliefs that people have expressed. Please read each item and say how much you generally agree with it by circling the appropriate number. Please respond to all the items, there are not right or wrong answers. If there are any questions you are uncomfortable answering please feel free to leave that question blank.

1 = Do not agree 2 = Agree slightly 3 = Agree moderately 4 = Agree very much

		Do not agree	Agree slightly	Agree moderately	Agree very much
1.	Worrying helps me to avoid problems in the future				
2.	My worrying is dangerous for me				
3.	I think a lot about my thoughts				
4.	I could make myself sick with worrying				
5.	I am aware of the way my mind works when I am thinking through a problem				
6.	If I did not control a worrying thought, and then it happened, it would be my fault				
7.	I need to worry in order to remain organised				
8.	I have little confidence in my memory for words and names				
9.	My worrying thoughts persist, no matter how I try to stop them				
10.	Worrying helps me to get things sorted out in my mind				
11.	I cannot ignore my worrying thoughts				
12.	I monitor my thoughts				
13.	I should be in control of my thoughts all of the time				
14.	My memory can mislead me at times				
15.	My worrying could make me go mad				
16.	I am constantly aware of my thinking				
17.	I have a poor memory				
18.	I pay close attention to the way my mind works				
19.	Worrying helps me cope				
20.	Not being able to control my thoughts is a sign of weakness				

21.	When I start worrying I cannot stop				
22.	I will be punished for not controlling certain thoughts				
23.	Worrying help me to solve problems				
24.	I have little confidence in my memory for places				
25.	It is bad to think certain thoughts				
26.	I do not trust my memory				
27.	If I could not control my thoughts, I would not be able to function				
28.	I need to worry, in order to work well				
29.	I have little confidence in my memory for actions				
30.	I constantly examine my thoughts				

Early Trauma Inventory Self Report Short Form

If you feel distressed you can contact The Samaritans on 116 123 at any time or visit their website: https://www.samaritans.org/

Part 1. General Traumas. Before the age of 18		
1	Were you ever exposed to a life-threatening natural disaster?	Yes No
2	Were you involved in a serious accident?	Yes No
3	Did you ever suffer a serious personal injury or illness?	Yes No
4	Did you ever experience the death or serious illness or a parent or primary caretaker?	Yes No
5	Did you experience the divorce or separation of your parents?	Yes No
6	Did you experience the death or serious injury of a sibling?	Yes No
7	Did you ever experience the death or serious injury of a friend?	Yes No
8	Did you ever witness violence towards others, including family members?	Yes No
9	Did anyone in your family ever suffer from mental or psychiatric illness or have a “breakdown”?	Yes No
10	Did your parents or primary caretaker have a problem with alcoholism or drug or drug abuse?	Yes No
11	Did you ever see someone murdered?	Yes No
Part 2. Physical Punishment. Before the age of 18		
1	Were you ever slapped in the face with an open hand?	Yes No
2	Were you ever burned with hot water, a cigarette or something else?	Yes No
3	Were you ever punched or kicked?	Yes No
4	Were you ever hit with an object that was thrown at you?	Yes No
5	Were you ever pushed or shoved?	Yes No

Part 3. Emotional Abuse. <u>Before the age of 18</u>		
1	Were you often put down or ridiculed?	Yes No
2	Were you often ignored or made to feel that you didn't count?	Yes No
3	Were you often told you were no good?	Yes No
4	Most of the time you were treated in a cold, uncaring way or made to feel like you were not loved?	Yes No
5	Did your parents or caretakers often fail to understand you or your needs?	Yes No
Part 4. Sexual Events. <u>Before the age of 18.</u>		
1	Were you ever touched in an intimate or private part of your body (e.g. breast, thighs, genital) in a way that surprised you or made you feel uncomfortable?	Yes No
2	Did you ever experience someone rubbing their genitals against you?	Yes No
3	Were you ever forced or coerced to touch another person in an intimate or private part of their body?	Yes No
4	Did anyone ever have genital sex with you against your will?	Yes No
5	Were you ever forced or coerced to perform oral sex on someone against your will?	Yes No
6	Were you ever forced or coerced to kiss someone in a sexual rather than an affectionate way?	Yes No
If you responded "YES" for any of the above events, answer the following for the one that has had the greatest impact on your life. In answering consider how you felt <u>at the time of the event.</u>		
1	Did you experience emotions of intense fear, horror or helplessness?	Yes No
2	Did you feel out-of-your-body or if you were in a dream?	Yes No

if you feel distressed you can contact The Samaritans on 116 123 at any time or visit their website: https://www.samaritans.org/

<u>Measure of Parental Style (MOPS)</u>

During your first 16 years how 'true' are the following statements about your primary caregiver's (e.g. **<u>MOTHER's</u>**) behaviour towards you. Rate each statement either as: 0 – not true at all 1 – slightly true 2 – moderately true 3 – extremely true		During your first 16 years how 'true' are the following statements about your secondary caregiver's (e.g. **<u>FATHER's)</u>** behaviour towards you. Rate each statement either as: 0 – not true at all 1 – slightly true 2 – moderately true 3 – extremely true	
1.	Over protective of me 0 1 2 3	1.	Over protective of me 0 1 2 3

2.	Verbally abusive of me 0 1 2 3	2.	Verbally abusive of me 0 1 2 3
3.	Over controlling of me 0 1 2 3	3.	Over controlling of me 0 1 2 3
4.	Sought to make me feel guilty 0 1 2 3	4.	Sought to make me feel guilty 0 1 2 3
5.	Ignored me 0 1 2 3	5.	Ignored me 0 1 2 3
6.	Critical of me 0 1 2 3	6.	Critical of me 0 1 2 3
7.	Unpredictable towards me 0 1 2 3	7.	Unpredictable towards me 0 1 2 3
8.	Uncaring of me 0 1 2 3	8.	Uncaring of me 0 1 2 3
9.	Physically violent or abusive of me 0 1 2 3	9.	Physically violent or abusive of me 0 1 2 3
10.	Rejecting of me 0 1 2 3	10.	Rejecting of me 0 1 2 3
11.	Left me on my own a lot 0 1 2 3	11.	Left me on my own a lot 0 1 2 3
12.	Would forget about me 0 1 2 3	12.	Would forget about me 0 1 2 3
13.	Was uninterested in me 0 1 2 3	13.	Was uninterested in me 0 1 2 3
14.	Made me feel in danger 0 1 2 3	14.	Made me feel in danger 0 1 2 3
15.	Made me feel unsafe 0 1 2 3	15.	Made me feel unsafe 0 1 2 3

--End of thesis--