

**BECK'S COGNITIVE THEORY AND THE ROLE OF SCHEMATA IN  
DEPRESSION.**

**VOLUME I**

**By**

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## **Overview**

This thesis has been submitted in partial fulfilment for the qualification of Doctorate in Clinical Psychology from the University of Birmingham. Two volumes are included.

Volume I includes a literature review and an empirical paper. Volume II includes five clinical practice reports, each pertaining to a different clinical placement.

### **Volume I**

Volume I includes three chapters. The first chapter is a systematic literature review which synthesises and evaluates research testing the role of early maladaptive schemas in major depressive disorder or depressive symptoms. This chapter was prepared for submission to the journal *Clinical Psychology Review*.

The second chapter contains an empirical paper which tests the role of early maladaptive schemas in the relationship between stress and major depressive episodes or depressive symptoms in a population with either Type 1 or Type 2 diabetes mellitus. This chapter was prepared for submission to the journal *Behavior Research and Therapy*.

The third and final chapter is an executive summary of the systematic literature review and the empirical paper.

### **Volume II**

Volume II includes four Clinical Practice Reports (CPR) and an abstract for the fifth CPR, an oral presentation. The first CPR is the psychological models CPR. This describes the case of

a 54 year old woman who was referred for assessment and treatment for Obsessive Compulsive Disorder (OCD). The CPR describes the assessment process and the subsequent cognitive-behavioural and psychodynamic formulations of the OCD.

The second CPR is the single case experimental design CPR. This describes the case of a 22 year old woman who was referred for assessment and treatment for Body Dysmorphic Disorder (BDD). This describes the assessment process and a cognitive-behaviour formulation of the BDD. The cognitive-behavioural intervention is described as is the AB design used to evaluate the intervention.

The third CPR is the Service Evaluation CPR. This describes an audit of compliance to National Institute for Health and Clinical Excellence guidelines for depression in the context of a psychiatric liaison team.

The fourth CPR is the case study CPR. This describes the case of a 15 year old male who was referred for assessment and treatment for OCD. The assessment process was described followed by a cognitive-behavioural formulation. The cognitive-behavioural intervention is described as well as the methods used to evaluate this intervention.

The fifth CPR was an oral case study. This describes the case of a 59 year old man with a traumatic brain injury and social anxiety. The cognitive behavioural and neuropsychological assessment was described as was the neuropsychologically informed cognitive behavioural formulation. The cognitive-behavioural intervention and the evaluation of this intervention was described.

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I am extremely grateful to the patients of the three clinics who took part in this research. I am also thankful for the staff working at these clinics for all their support throughout the data collection process.

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**CHAPTER ONE - LITERATURE REVIEW: BECK'S COGNITIVE THEORY AND  
THE ROLE OF SCHEMATA IN DEPRESSION: A SYSTEMATIC LITERATURE  
REVIEW.**

**Abstract**

**Background.** Cognitive theory posits that core beliefs or early maladaptive schemas and stress are important constructs in the development of major depressive disorder. **Aims.** This systematic literature review aimed to retrieve, synthesise and evaluate research testing the role of early maladaptive schemas and stress in major depressive disorder or depressive symptoms. **Method.** MEDLINE, PsycInfo and Web of Science were searched using keywords related to depression, cognitive theory, early maladaptive schemas and core beliefs. Only research including an identifiable group with major depressive disorder was included. All research was subjected to a systematic assessment of quality. **Results.** The Impaired Autonomy/Performance and Disconnection and Rejection domains were most consistently associated with major depressive disorder status. All early maladaptive schemas were associated with depressive symptoms. There was very limited research testing the role of early maladaptive schemas in predicting either major depressive disorder or depressive symptoms. There was little consistency regarding the moderating and mediating role of early maladaptive schemas in the relationship between stress and depressive symptoms.

**Conclusion.** The findings neither prove nor disprove the role of early maladaptive schemas in major depressive disorder or depressive symptoms. More prospective longitudinal research is needed.

### **Depression**

The American Psychological Association's (APA) diagnostic criteria for depression (APA, 2003) must include low mood and/or loss of interest or pleasure in activities and, over two weeks, at least five of the following associated with functional impairment: reduced or increased sleep, agitation or slowed down movements, loss of energy, feelings of worthlessness and guilt, difficulties with thinking, concentration or decision making, and thoughts of death or suicidal ideation, intent or plan. Symptoms should not: be better explained by mania or bereavement, the physiological result of either substance abuse or a general medical condition (APA, 2003). The point prevalence of depression in the general population in the UK is 2.6% (Singleton, Bumpstead, O'Brien, Lee & Meltzer, 2001) rising to 5-10% in primary care (Boland, Diaz, Lamdan, Ramchandani & McCartney, 1996).

### **Cognitive Theory**

Beck's cognitive theory (see Figure 1 for a summary) suggests that early childhood experiences lead to the development of early maladaptive schemas and related assumptions about ourselves, the world and the future (Beck 1976). Following a critical incident, typically a stressor or life event, early maladaptive schemas and dysfunctional assumptions are activated, which results in negative automatic thoughts and the behavioural, motivational, affective, cognitive and somatic symptoms of depression (Beck, 1976). Critical incidents are "an event which is appraised as a total, irreversible depletion of one's personal domain" (Beck, 1976, pp.108), which can include chronic or discrete events. Such events do not always result in depression –that it is the meaning attached to such events, informed by early experiences and beliefs about the world, which determine whether or not they result in depression (Beck, 1976). Without early maladaptive schemas, cognitive theory predicts that

the presence of stressors would not result in depression. Linked in to the cognitive model of depression, Cognitive Behavioural Therapy (CBT) is the recommended psychological intervention for those with depression (National Institute for Health and Clinical Excellence [NICE], 2009).

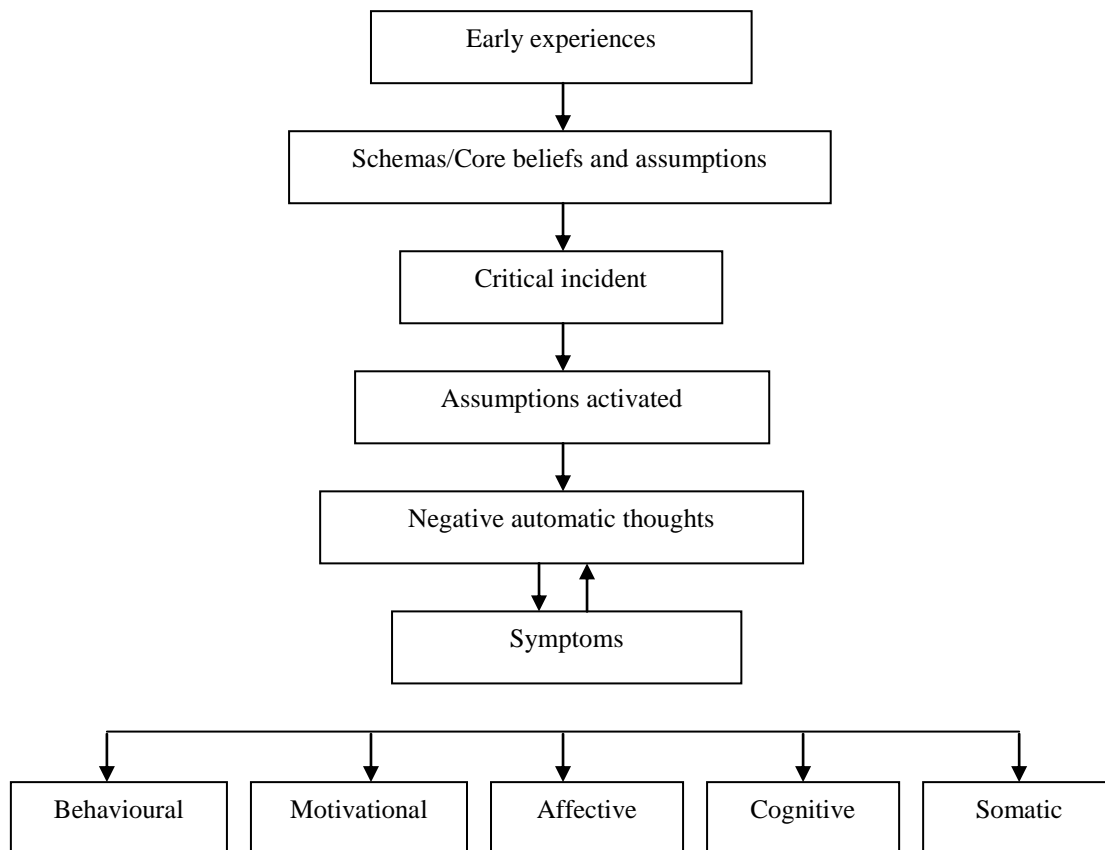


Figure 1. *A summary of longitudinal formulation based on Beck's (1976) work.*

### **Early maladaptive schema and the cognitive model of depression**

Beck defines early maladaptive schemas as “stable cognitive patterns” which allow “the regularity of interpretations of a particular set of situations” (Beck 1979, pp.12), providing a “conceptual framework” (Beck, 1967, pp282-284). These allow people to “categorize and interpret experiences in a meaningful way” (Harvey, Hunt, & Schroder, 1961 as cited in Beck, 1967). Early maladaptive schemas may remain inactive for years, activated

in the presence of stressors comparable to the situation in which the early maladaptive schema was developed (Beck, 1967; 1979). Once activated, early maladaptive schemas result in cognitions (Beck, 1967). These early maladaptive schemas increasingly become activated by more incongruous stimuli, known as “stimulus generalization” (Beck, 1967, p.286). It is this “hyperactivity” (Beck, 1967, p.285) of early maladaptive schemas that structure external stimuli into the cognitive distortions characteristic of depression. “Instead of a schema being selected to fit the external details, the details are selectively extracted and molded to fit the schema” (Beck, 1967, p.286). As early maladaptive schemas are typically more vivid than healthier schemas, they are more powerful and evoked more often (Beck, 1967).

Young, Klosko and Weishaar (2003, p.5) developed Schema Therapy as an extension of CBT including psychoanalytic and Gestalt elements with a focus on those with characterological disorders and “treatment failures”. Schema Therapy focuses on early maladaptive schemas which are defined as “a broad, pervasive theme or pattern” about the self and relationships, developed through childhood and adolescence, built upon over a lifetime and are significantly dysfunctional (Young et al., 2003). Young et al. (2003) describe five EMS domains each containing individual schemas (see Appendix 1). The Young Schema Questionnaire measures these schema domains and sub-scales (Young, 2005).

### **The Empirical Basis for Early Maladaptive Schemas and the Cognitive Model of Depression**

Despite the popularity of Beck’s cognitive model of depression and the effectiveness of CBT for depression (NICE, 2009), the empirical basis for the role of early maladaptive schemas in the development of depression has only been explored in one literature review.



## Literature Review

Hawke and Provencher (2011) conducted a literature review of 30 papers up to August 2010 testing Young's schema theory and schema therapy in depression, alongside other mood and anxiety disorders. This review concluded that there was evidence for early maladaptive schemas, and therefore support for schema therapy in mood and anxiety disorders (Hawke & Provencher, 2011). There were however a number of limitations with this review paper which this systematic literature review aimed to address. Firstly, whilst Beck (1996) proposes a distinction between schemas (defined as cognitive structures or modes, for example, an unworthiness schema) and core beliefs (with more specific content, for example, I am unworthy), Sanders and Wills (2005) note that the terms are often used interchangeably. Hawke and Provencher (2011) used schema but not core beliefs as search terms thus inadvertently excluded relevant papers. Secondly, a number papers have been published since 2010 looking at the role of early maladaptive schemas in depression. Third, the review lacks the transparency and systematic nature of a true systematic review excluding details on the number of papers located and the full search strategy was not published. Fourth, wide range of disorders are included but details, including on recruitment, are lacking in places. This limits the applicability of conclusion's to clinical populations. Fifth, the review lacks integration of critical appraisal and the conclusions may be overstated given the overreliance on cross-sectional data. In order to address these limitations, this systematic literature the following was done: (1) both schemas and core beliefs were used as the basis for search terms, (2) papers published until February 2013 were included, (3) the full search strategy and the number of papers at each stage in the review were included, (4) only studies including participants with depression were included in order to provide a detailed analysis of the data, and (5) critical appraisal will be integrated into the review and longitudinal data will be given

## Literature Review

more weighting in the analysis. As such, the current literature review aims to act as a more transparent and systematic approach to the question of the role of early maladaptive schemas in depression.

### **Aims**

The current systematic review aimed to retrieve, evaluate and synthesise all research published in English describing the role of early maladaptive schemas in depression. The primary research question was: do early maladaptive schemas play a role in depression? Four secondary questions were used: (1) Is there a statistically significant relationship between early maladaptive schemas and depressive symptoms or depressive episode/disorder? (2) Do early maladaptive schemas significantly predict depressive symptoms or depressive episode/disorder? (3) What factors moderate the relationship between early maladaptive schemas and depressive symptoms or depressive episode/disorder? (4) Do early maladaptive schemas act as a mediator in the development of depressive symptoms or depressive episode/disorder?

### **Method**

Searches were conducted on three databases using a combination of the following concepts: cognitive theory, schemas or core beliefs, and depression. These will be discussed further in the following section.

**Search Strategy.** All databases were searched in February 2013, restricted to 1990 onwards (as this was the date when the Young Schema Questionnaire (YSQ), a major measure of early maladaptive schemas, was developed). The following search of MEDLINE

## Literature Review

resulted in 1529 papers: (exp Cognition/ or exp Cognitive Therapy/ or cognitive.mp. or exp Cognition Disorders/) AND ((exp Self Concept/ or core belief.mp.) OR schema.mp.) AND (exp Depression/ or depression.mp.). The following search of PsycInfo resulted in 1642 papers: (exp Cognitive Behavior Therapy/ or cognitive.mp. or exp Cognitive Processes/ or exp Cognitive Therapy/ or exp Cognitive Mediation/ or exp Cognitive Psychology) ((schema.mp. or exp Schema/) OR exp Cognitions/ or core belief.mp.) AND (depression.mp. or exp Endogenous Depression/ or exp Reactive Depression/ or exp Spreading Depression/ or exp "Depression (Emotion)"/ or exp Recurrent Depression/ or exp "Long-term Depression (Neuronal)"/ or exp Atypical Depression/ or exp Treatment Resistant Depression/ or exp Major Depression/). The following search of Web of Science resulted in 466 papers: (ts=cognit\* OR ti=cognit\* OR FT=cognit\*) AND (ts=schema\* OR ts= core belief\* OR ti=schema\* OR ti=core belief\* OR ft=schema\* OR ft=core belief) AND (ts=depressi\* OR ti=depressi\* OR ft=depressi\*).

Following the application of the inclusion and exclusion criteria, the bibliographies of all included papers were searched. In addition, the forward citation function on Medline was used to locate additional papers. Finally, the author names of all included papers were searched in Medline. This cycle was repeated until the literature was exhausted.

**Inclusion criteria.** Research was included if it: included a distinct clinical population with major depressive episode/disorder or seeking help for depressive symptoms or those who were seeking help through specialist social care services (such as domestic violence shelters), measured early maladaptive schemas or core beliefs and was published in English in a peer-reviewed journal.

**Exclusion criteria.** Research was excluded if it included: non-empirical research, qualitative research, experimental designs which only manipulate mood or test for cognitive bias, was published in a language other than English or in a non journal publication, recruited from only non-clinical or specialist (e.g., those with physical health issues or identified co-morbidity in order to ensure the findings were not a result of physical health issues) populations, or those with conditions other than Major Depressive Disorder/Depressive Episode as a primary diagnosis.

### **Quality Assessment**

Included references were all subjected to quality assessment. Jarde, Losilla and Vives (2012) conducted a literature review of measures designed to assess the quality of research and recommended Downs and Black's (1998) framework because it demonstrates acceptable to good inter-rater reliability, allows for assessment of intervention and non-intervention studies and was identified by Jarde, et al. (2012) as particularly helpful for assessing cross-sectional research when compared to other English language frameworks. Downs and Black (1998) recommend relying on a subjective appraisal guided by the framework. Given that some items were inappropriate based on the design of the study and in order to make direct comparisons between studies, a percentage of the total eligible score was calculated.

### **Data extraction**

To provide structure to the review, data were tabulated based on the four aims previously identified..

## **Findings**

After applying the inclusion and exclusion criteria, a total of 16 papers were included in this review (see Figure 2 for the breakdown of search results).

## **Description of Included Studies**

The majority of the included papers (n=15) used Young's Schema Questionnaire (Young & Brown, 1990; 1994; Young, 2003) to measure early maladaptive schemas, and one paper used the Janoff-Bulman's (1989) World Assumptions Scale (n=1). All included a cross-sectional design, two included analysis of interventions (Atalay et al., 2011; Renner et al., 2012), and two included a longitudinal design (Halvorsen et al., 2010; Wang et al., 2010). On the critical appraisal framework (see Appendix 2 for a summary) it emerged that many papers failed to report exact *p* values, it was not possible to determine if the sample recruited was representative of the population, or if the study had an appropriate level of power. The findings of this critical appraisal will be expanded on and discussed throughout the text and within summary tables throughout the literature review. The findings relevant to the four main research aims will be discussed in turn.

### **1. Is there a statistically significant relationship between early maladaptive schemas and depressive symptoms or major depressive disorder/episode?**

Fifteen studies (see Table 1 for a summary) examined the association between early maladaptive schemas domains or schema sub-scales (see Table 2 for a summary of findings) with depressive symptoms, major depressive disorder or major depressive episode status. Research describing the association between early maladaptive schema domains or sub-scales with major depressive disorder or episode status provide better quality evidence than research

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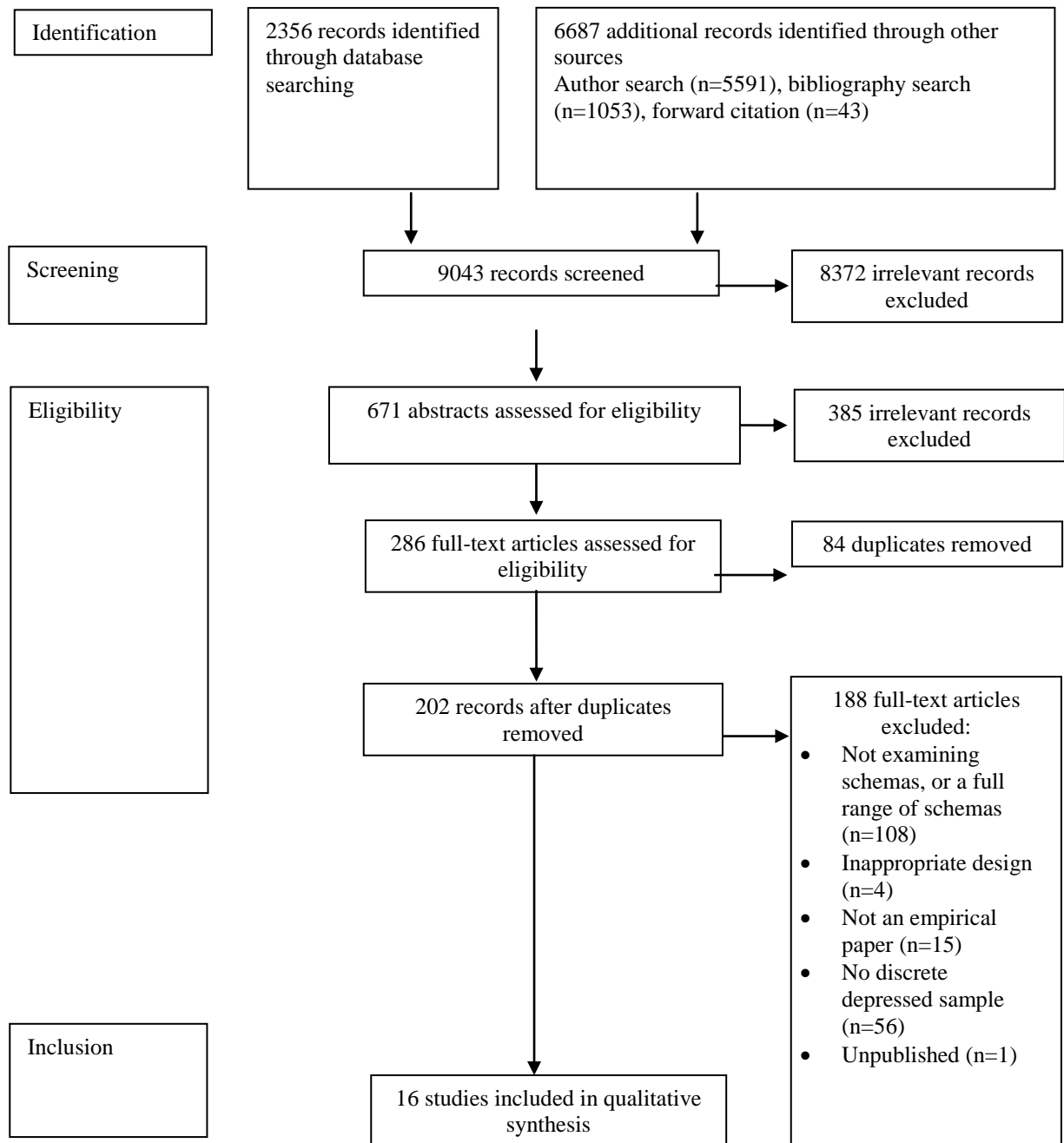


Figure 2. A summary of the screening process adapted from Moher et al. (2009)

describing the relationship between early maladaptive schema domains or sub-scales and depressive symptoms. This is because the former group of research papers describe a clinical sample, not simply a sample of people reporting low mood who may not meet diagnostic

**Table 1. A summary of studies addressing the question: Is there a statistically significant relationship between early maladaptive schemas and depressive symptoms or depressive episode/disorder?**

First Author, date  Country  Design (quality score /100)	Aims of study	Sample	Findings	Limitations	Method by which depression was assessed
Atalay, 2011  Finland  Cross-sectional (56) Intervention	Are EMS sub-scales associated with MDD vs. PAD/C?  Do SSRI's significantly reduce EMS?	Psychiatric outpatients with MDD (n=80) or PAD (n=40). C= hospital staff (n=46).	<i>Pre-intervention and two months post SSRI's:</i> MDD>C: ab, ds, ed, si, fa, sb. MDD>PAD: ab,ds,ed,si,fa,sb.  <i>Pre-intervention only:</i> MDD>C: df, si, dp, as, ss, isc, ps, ei. MDD>PAD: df, us, ei.  <i>Two months post SSRI's MDD significantly reduced:</i> Si,dp,fa,sb, ss, us, ps	Unable to determine the representativeness of those approached or prepared to participate.  No control group comparison.  No assessment of adherence to SSRI therapy.	SCID
Brenning, 2012 Belgium*	Are EMS associated with depressive symptoms in boys vs. girls?	Adolescent mental health service users (n=146) or students (n=118)	All EMS sub-scales were moderately to strongly correlated with depressive symptoms for girls and moderately correlated for boys .	Mixed clinical and non-clinical sample.  Depressive symptoms not depressive status.  Cross-sectional so unable to establish causality.	YSR

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First Author, date Country Design (quality score out of 100)	Aims of study	Sample	Findings	Limitations	Method by which depression was assessed
Calvete, 2007b Spain Cross-sectional (65)	Are EMS domains associated with depressive symptoms?	Physically and/or sexual abused women within 12 months (n=298).	Psychological abuse, physical abuse, disengagement coping and DR and IA EMS domains accounted for 63% of the variance in depressive symptoms.	Depressive symptoms not status  Cross-sectional	CES-D
Csukly, 2011 Hungary Cross-sectional (56)	Are EMS domains associated with depressive symptoms?	Inpatients with depression (n=107)	A factor comprising of ab, si, df, su, fa, dp, en, sb, ei, im, as, ps were associated with depressive symptoms on two measures.	Limited generalisability: inpatients, taking antidepressants and other Axis I disorders.  Cross-sectional and lacks controls – lacks causality	BDI, SCL-90
Dozois, 2012 Canada Cross-sectional (65)	Are EMS domains associated with current MDD?	CAMHS users (n=22) vs. never depressed controls (n=25)	DR, IA and IL were significantly higher for currently depressed.	Small sample size.  Measurement of EMS in adolescence.  Included other disorders.	DICA-IV



Literature Review

First Author, date Country Design (quality score out of 100)	Aims of study	Sample	Findings	Limitations	Method by which depression was assessed
Halvorsen, 2009 US Cross-sectional (53)	Are EMD sub-scales associated with DE status?	Mental health service users (scoring >14 on BDI-II or <14+previous depression) vs. controls (GP's, newspapers, students)	CD>PD>ND for si and for all sub-scales when controlling for depressive severity. CD>PD=ND for dp. CD=PD>ND for ed, ab, mi, df, fa, vhi, en, et, isc and ei. RSE, IL, DR and IA significantly predicted 63% of the variance in depressive symptoms.	A cross-sectional design was used which limits any findings regarding prediction. Included student participants in the control (alongside GP patients). Predominantly female.	SCID, PDQ, BDI
Halvorsen, 2010 US Cross-sectional (53) Longitudinal (55)	Are EMS domains associated with: symptoms, DE status, number of DE's over nine years?	Mix of undergraduates (n=78) and GP patients (n=71).	All domains correlated with symptoms at time 1 and nine years later. CD>PD>ND: DR and IA. CD=PD>ND: UD and RSE. DR, RSE and IL were moderately and IA and UD were weakly correlated with DE over nine years. IA, UD and IL significantly predicted 54% of the variance in depressive symptoms at Time 1.	Unable to determine representativeness of the included sample. Included student participants in the control (alongside GP patients). Predominantly female.	SCID, BDI

Literature Review

First Author, date	Aims of study	Sample	Findings	Limitations	Method by which depression was assessed
Country					
Design (quality score out of 100)					
Lilly, 2011 US Cross-sectional (53)	Are world assumptions associated with depressive symptoms?	Women accessing domestic violence shelters or through advertisements (n=97)	World assumptions were negatively, moderately and significantly correlated with depressive symptoms.	Limited generalisability: women, small sample.  Exact probability not reported.  Depressive symptoms.  Cross-sectional design.	CES-D
Petrocelli, 2001 US* Cross-sectional (56)	Are EMS domains correlated with depressive symptoms?	Psychotherapy outpatients (n=82)	All EMS domains moderately to highly significantly correlate with depressive symptoms on two measures.	Unable to determine the representativeness of the sample recruited.  No clinically determined diagnosis of depression.  Cross-sectional.	BDI, SCL-90

Literature Review

First Author, date	Aims of study	Sample	Findings	Limitations	Method by which depression was assessed
Country					
Design (quality score out of 100)					
Renner, 2012	Are EMS domains associated with depressive symptoms?	Outpatients from a mood disorder clinic (n=132)	All EMS domains were moderately to highly significantly correlated with depressive symptoms.	Depressive symptoms. Cross-sectional design. No control group for comparison. Mixed psychological and pharmacological interventions.	SCID, BDI
Netherlands					
Cross-sectional (48)					
Riso, 2003	Are EMS domains associated with MDD status?	Mood disorders clinic outpatient: ChD/DD (n=42), NChMDD (n=17) and NPI (n=24).	ChD>NChMDD>NPI for all EMS domains. ChD>NChMDD controlled for current depression symptom levels for all DR, IA and OV. ChD>NChMDD controlled for current depression and PED symptom levels for DR, IA and OV.	Unable to determine the representativeness of the sample. Small sample size. Cross-sectional design.	SCID
US					
Cross-sectional (53)					

Literature Review

First Author, date	Aims of study	Sample	Findings	Limitations	Method by which depression was assessed
Country					
Design (quality score out of 100)					
Shah, 2000 UK Cross-sectional (61)	Were EMS sub-scales associated with MDD status?	Outpatients (n=60) and non-student volunteers (n=67)	CD>C for all EMS sub-scales tested (which excluded the dp, as, ps, pu sub-scales).	Unable to determine the representativeness of the sample recruited.  Cross-sectional design.	Therapist diagnosis using DSM-IV criteria
Simmons, 2006 UK* Cross-sectional (53)	Are EMS sub-scales associated with depression status**?	13-17 year old CAMHS users (n=14) + control from schools (n=15)	CD>C for ab, mi, si and df sub-scales regardless of the method of scoring.	Multiple comparisons made at the p<.05 level. Cross-sectional design. Limited generalisability: females only, small n. Depressive symptoms.	Therapist diagnosis using DSM-IV criteria

## Literature Review

First Author, date Country Design (quality score out of 100)	Aims of study	Sample	Findings	Limitations	Method by which depression was assessed
Waller, 2001 UK* Cross-sectional (47)	Are EMS sub-scales associated with MDD status?	BWD (n=26), BWMD (n=17), BMSD (n=31) or MDDWB (n=18) or C (n=45).	CD>BWD≥C for ed, ab, mi, si, dp and df EMS sub-scales and Isc and ei when scored according to the proportion of YSQ scores of 5 or 6. CD>C for vhi fa, sb, ss and us.	Cross-sectional design. Women only. Small sample per group	Researcher assessed using DSM-IV criteria
Wang, 2010 Norway Cross-sectional (47)	Are EMS domains or sub-scales associated with DE status?	Undergraduate students + patients consulting GP (n=115)	CD>PD>ND for IA, si, ab, sb, ss and sd sub-scales. CD=PD>ND for UD, RSE, ed, ab, mi, df, fa, vhi, en, et, isc and ei. CD>PD=ND IL, dp and us.	Cross-sectional design. Undergraduate students as controls. Predominantly female. Depressive symptoms.	SCID

\*country was not reported but Authors were from this country, \*\*it was not specified whether participants met criteria for either a depressive episode or a depressive disorder or if both were included

SSRI=Selective serotonin reuptake inhibitor, MDD=Major Depressive Disorder, DE=Depressive Episode, PAD=Panic Disorder, C=Control, CD=Currently Depressed, PD=Previously Depressed, ND=Never Depressed, EMS=Early Maladaptive Schemas, ChD=Chronic depression, DD=Dysthymic disorder, NChMDD=Non chronic

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major depressive disorder, NPI=never psychiatrically ill, B=Bulimia, BWD=Bulimia without depression, BMD=Bulimia with mild depression, BMSD=Bulimia with moderate-to-severe depression, MDDWB=Major depressive disorder without bulimia  
ab=abandonment, ds=distrust, ed=emotional deprivation, si=social isolation, fa=failure, sb=subjugation, df=defectiveness, dp=dependence, as=approval seeking, ss=self sacrifice, isc=insufficient self control, ps=pessimism, ei=emotional inhibition, us=unrelenting standards, su=social undesirability, en=enmeshment, im=impulsivity, DR=disconnection and rejection, IA=impaired autonomy, IL=impaired limits, mi=mistrust/abuse, vhi=vulnerability to harm or illness, et=entitlement/grandiosity, RSE=restricted self-expression, UD=undesirability, OV=overvigilance, pu=punitiveness  
SCID=Structured Clinical Interview for DSM-IV Axis I Disorders (First, Spitzer, Gibbon, & Williams, 1997); YSR=Youth self-report (Achenbach & Rescorla, 2001); CES-D = Centre of Epidemiological Studies Depression Scale (Radloff, 1977); BDI=Beck Depression Inventory (Beck, Steer, & Brown, 1996; Beck & Steer, 1987); SCL-90= Symptoms Checklist-90 (Derogatis, 1983), DICA-IV= Diagnostic Interview for Children and Adolescents-IV (Reich, 2000), PDQ= Previous Depression Questionnaire (Wang, 1996),

Table 2. A summary of statistically significant relationships between early maladaptive schemas and depressive episode/disorder? ( $p$ 's < .05 in at least one comparison).

YSQ	First author, year (quality assessment score out of 100)												
	Atalay, 2011 (56)	Calvete, 2007b (65)	Csukly, 2011 (56)	Dozois, 2012 (65)	Halvorsen, 2009 (53)	Halvorsen, 2010 (53)	Petrocelli, 2001 (56)	Renner, 2012 (48)	Riso, 2003 (53)	Shah, 2000 (61)	Simmons, 2006 (53)	Wang, 2010 (47)	Waller, 2001 (47)
Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Domains													
Disconnection and Rejection	-	Y	-	Y	Y	Y	Y	Y	Y	-	-	Y	-
Impaired Autonomy/Performance	-	Y	-	Y	Y	Y	Y	Y	Y	-	-	Y	-
Impaired Limits	-	-	-	Y	Y	Y	Y	Y	Y	-	-	Y	-
Other-Directedness	-	-	-	-	-	-	Y	Y	-	-	-	-	-
Overvigilance and Inhibition	-	-	-	-	-	-	Y	Y	Y	-	-	-	-
Undesirability	-	-	-	-	N	Y	-	-	-	-	-	Y	-
Restricted self-expression	-	-	-	-	Y	Y	-	-	-	-	-	Y	-
Overconnection	-	-	-	-	-	-	-	-	-	-	-	-	-
Exaggerated standards	-	-	-	Y	-	-	-	-	-	-	-	-	-
Factor 1	-	-	Y	-	-	-	-	-	-	-	-	-	-
Sub-scales													
Emotional Deprivation	Y	-	-	-	Y	-	-	-	-	Y	Y	Y	Y
Abandonment	Y	-	-	-	Y	-	-	-	-	Y	Y	Y	Y
Mistrust/abuse	Y	-	-	-	Y	-	-	-	-	Y	Y	Y	Y
Social isolation/alienation	Y	-	-	-	Y	-	-	-	-	Y	Y	Y	Y
Defectiveness/shame	Y	-	-	-	Y	-	-	-	-	Y	Y	Y	Y
Failure	Y	-	-	-	Y	-	-	-	-	Y	N	Y	Y
Dependence/incompetence	Y	-	-	-	Y	-	-	-	-	-	N	Y	-
Vulnerability to harm	Y	-	-	-	Y	-	-	-	-	Y	Y	Y	Y
Enmeshment	N	-	-	-	Y	-	-	-	-	Y	N	Y	N
Subjugation	Y	-	-	-	N	-	-	-	-	Y	Y	Y	Y
Self-sacrifice	Y	-	-	-	N	-	-	-	-	Y	N	Y	Y
Attention/recognition-seeking	Y	-	-	-	-	-	-	-	-	-	-	-	-
Entitlement/grandiosity	N	-	-	-	Y	-	-	-	-	Y	Y	Y	Y
Insufficient self-control	Y	-	-	-	Y	-	-	-	-	Y	Y	Y	Y
Emotional inhibition	Y	-	-	-	Y	-	-	-	-	Y	Y	Y	Y
Unrelenting standards/hypercriticalness	Y	-	-	-	N	-	-	-	-	Y	N	Y	Y
Negativity/pessimism	Y	-	-	-	-	-	-	-	-	-	-	-	-
Punitiveness	N	-	-	-	-	-	-	-	-	-	-	-	-
Social undesirability	-	-	-	-	Y	-	-	-	-	Y	-	Y	-
Functional dependence	-	-	-	-	-	-	-	-	-	Y	-	-	Y

Y= $p$ <.05, N= $p$ >.05, -=not tested

criteria for major depressive disorder or episode. As such, these papers will be described first.

**Early maladaptive schema domains and depressive status (including major depressive disorder or depressive episode).** Of the four studies which tested the relationship between early maladaptive schema domains and major depressive disorder (Dozois et al., 2012; Riso et al., 2003) or depressive episode status (Halvorsen et al., 2010; Wang et al., 2010) as defined by diagnostic interviews, those which used early maladaptive schema domains derived through factor analysis (Dozois et al., 2012; Riso et al., 2003) could be considered as providing better quality evidence given that the data are both empirically and conceptually grounded as opposed to simply conceptually grounded.

Riso et al. (2003) found that all four of Lee et al.'s (1999) proposed early maladaptive schema domains were significantly more strongly endorsed by those with chronic major depressive disorder (which included those who met DSM-IV criteria for more than one episode of major depressive disorder) compared to non-chronic major depressive disorder as determined by the SCID (First, Spitzer, Gibbon, & Williams, 1996) and those who had never had a mental health issue, in turn. After controlling for current depressive symptoms, all five domains, with the exception of the Impaired Limits domain remained significantly more strongly endorsed by those who were chronically depressed compared to non-chronically depressed and non-clinical groups. When also controlling for personality disorder symptoms, the above relationship remained for only the Impaired Autonomy/Performance and Overvigilance domains. As such, the authors conclude that the Impaired Autonomy/Performance and Overvigilance early maladaptive schema domains played a more important role in discriminating between chronic and major depressive disorder than



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personality disorder symptoms. This study provides especially good quality evidence given the distinction between chronic and non-chronic major depressive disorder and the control of depressive and/or personality disorder symptoms. However, given limitations in the reporting of the study and the small number of participants in each sub-group, it was not possible to determine how representative the sample was.

Dozois et al. (2012) found that three of the four domains proposed by Hoffart et al. (2005) (Disconnection, Impaired Autonomy and Impaired Limits) were all significantly more strongly endorsed by currently depressed adolescents when compared to control participants (Dozois et al., 2012). It should be noted however, that this study recruited only a small number of total participants across the two groups (n=47), thus the generalisability of the findings may be limited. In addition, as Young et al. (2003) argue that early maladaptive schemas develop as a result of early experiences including adolescence it may be that early maladaptive schemas as measured in adolescence represent a different construct to those measured in adulthood. This is a particular risk given that the study did not report age-matching participants. Finally, although all participants had a primary diagnosis of major depressive disorder, there was some comorbid Axis I disorders. As such, increased endorsement of early maladaptive schemas may be associated with these disorders or a combination of disorders as opposed to the major depressive disorder alone.

Two studies in a series used Young & Brown's (1990) conceptually driven early maladaptive schema domains (Halvorsen et al., 2010; Wang et al., 2010) and consistently found that Disconnection and Impaired Autonomy/Performance domains were significantly more strongly endorsed for those who were currently depressed when compared to those who

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had been previously depressed and, in turn, those who had never been depressed.. In addition, Undesirability and Restricted Self-Expression domains were significantly more strongly endorsed for those who were currently depressed and those who had previously been depressed (Halvorsen et al., 2010; Wang et al., 2010). Wang et al. (2010) found that the Impaired Limits domain was significantly more strongly endorsed for those who were currently depressed when compared to those who were previously depressed in one study and those who had never been depressed in turn but Halvorsen et al. (2010) did not. Given the predominantly female participants and the inclusion of student participants in the control sample it is difficult to determine whether the representativeness of the population.

In summary, across the four studies which tested the relationship between early maladaptive schema domains and major depressive disorder, only the Impaired Autonomy early maladaptive schema domain was consistently associated with major depressive disorder/episodes. This was true even after controlling for current depressive and personality disorder symptoms. The findings regarding other domains were less consistent but the Disconnection domain was also consistently elevated in those with major depressive disorder/episode when compared to those without. This also distinguished between those who were chronically and non-chronically depressed.

**Early maladaptive schema sub-scales and depressive status (including major depressive disorder or depressive episode).** Six studies (Atalay et al., 2011; Halvorsen et al., 2009; Shah & Waller, 2000; Simmons et al., 2006; Wang et al., 2010; Waller et al., 2001) and ten analyses tested the relationship between major depressive disorder or episode status and early maladaptive schema sub-scales.

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Two of the six studies in a series compared early maladaptive schema sub-scales for those who were currently depressed with those who had previously been depressed and those who had never been depressed (Halvorsen et al., 2009; Wang et al., 2010). These studies consistently found the social isolation/alienation sub-scales were significantly more strongly endorsed in those who were currently depressed compared to those who had previously or never been depressed in turn. The dependence/incompetence early maladaptive schema sub-scale was significantly more strongly endorsed in those who were currently depressed when compared to those who had previously or never been depressed. The emotional deprivation, abandonment, mistrust/abuse, defectiveness/shame, failure, vulnerability to harm or illness, enmeshment, entitlement/grandiosity, insufficient self-control, and emotional inhibition early maladaptive schema sub-scales were significantly more strongly endorsed for those who were currently or previously depressed when compared to those who had never been depressed. The findings were inconsistent regarding the following early maladaptive schema sub-scales: subjugation, self-sacrifice, unrelenting standards/hyper-criticalness and social undesirability. As these studies compared currently to previously and never depressed participants, they provide some of the strongest evidence regarding depressive episode status and early maladaptive schema sub-scales. However, given the inclusion of students and a predominantly female sample, it is difficult to determine the representativeness of the sample and generalisability of the findings.

Two studies compared those who were depressed to other clinical groups – those with panic disorder (Atalay et al., 2011) and those with bulimia with or without comorbid major depressive disorder (Waller et al., 2001) – and consistently found that those who were

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currently depressed significantly more strongly endorsed the following early maladaptive schema sub-scales than those with panic disorder (pre-intervention) or bulimia (without major depressive disorder): emotional deprivation, abandonment, mistrust/abuse, social isolation/alienation, failure, vulnerability to harm, subjugation, self-sacrifice, insufficient self-control, emotional inhibition, and unrelenting standards and hypercriticalness. Functional dependence was also increased for those with major depressive disorder compared to those with bulimia (Waller et al., 2001), but not with panic disorder (Atalay et al., 2011). The findings were less consistent for the defectiveness/shame sub-scale which met the  $p < .01$  significance level in one study (Waller et al., 2001), but not the other (Atalay et al., 2011). The following early maladaptive schema sub-scales were non-significant or did not reach the  $p < .01$  level: entitlement and attention-seeking/recognition-seeking (Atalay et al., 2011; Waller et al., 2001), negativity/pessimism and punitiveness (Atalay et al., 2011). This could be considered strong evidence as it provides evidence that early maladaptive schemas discriminate between psychiatric disorders – they are not simply associated with general psychological/psychiatric distress. However, the Atalay et al. (2011) study was limited as there was no healthy control group. This weakness is counterbalanced by the Waller et al. (2001) study that did include a healthy control group. However, Waller et al. (2001) recruited a female only group of participants and only a small number of participants per group. As such, it is not possible to determine how representative the sample was to the population and, in turn, how generalisable these findings might be.

Two studies compared a currently depressed to a currently non-depressed group (Shah & Waller, 2000; Simmons et al., 2006) and consistently found the abandonment, mistrust/abuse, social isolation/alienation, and defectiveness/shame sub-scales were significantly more

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strongly endorsed for those who were currently depressed. The social undesirability and functional dependence sub-scales were found to be significantly more strongly endorsed in the depressed group in the only study which tested for them Shah and Waller (2000). The findings were inconsistent regarding the failure, entitlement, self-sacrifice and unrelenting standards/hyper-criticalness sub-scales as they were found to be significantly more strongly endorsed in the depressed group in one study (Shah & Waller, 2000) but not the other (Simmons et al., 2006). It is of note that the Shah and Waller (2000) study found these sub-scales to meet significance but Simmons et al. (2006) did not when using more stringent alpha levels. It may be that these differences are found due to the differences in samples recruited. Simmons et al. (2006) recruited an adolescent sample that may still be in the process of forming their beliefs about the world (Young et al. (2003) posit that although early maladaptive schemas are primarily formed in early life, this continues into adolescence) and as such, early maladaptive schemas may represent a different construct for this population. These studies could be considered the weakest evidence as a previously depressed or healthy control group was not used for comparison. In addition, the Simmons et al. (2006) study recruited only women and as such, the findings may not be generalisable to the wider population.

In summary, across the six studies which tested the role of early maladaptive schema sub-scales and depressive disorder/episode, the social isolation/alienation sub-scale (part of the Disconnection and Rejection early maladaptive schema domain) was consistently found to be significantly more strongly endorsed for those who were currently depressed when compared to those in other diagnostic categories. In addition, the abandonment and mistrust/abuse early maladaptive schema sub-scales were consistently found to distinguish between those who

currently or previously met criteria for major depressive disorder or episode and those from other diagnostic categories and controls in turn.

**Early maladaptive schema domains and depressive symptoms.** Of the seven studies which explored the association between early maladaptive schema domains and depressive symptoms, six used the YSQ (Calvete et al., 2007b; Csukly et al., 2011; Halvorsen et al., 2009; 2010; Petrocelli et al., 2001; Renner et al., 2012) and one used the World Assumptions Scale (Lilly et al., 2011) (see Table 3).

Table 3. *A summary of statistically significant relationships between early maladaptive schemas and depressive symptoms? ( $p$ 's < .05 in at least one comparison).*

	First author, year (quality assessment score out of 100)						
YSQ	Calvete, 2007b (65)	Csukly, 2011 (56)	Halvorsen, 2009 (53)	Halvorsen, 2010 (53)	Lilly, 2011 (53)	Petrocelli, 2001 (56)	Renner, 2012 (48)
Total	-	-	-	-	-	-	-
Domains							
Disconnection and Rejection	Y	-	Y	Y	-	Y	Y
Impaired Autonomy/Performance	Y	-	Y	Y	-	Y	Y
Impaired Limits	-	-	Y	Y	-	Y	Y
Other-Directedness	-	-	-	-	-	Y	Y
Overvigilance and Inhibition	-	-	-	-	-	Y	Y
Undesirability	-	-	Y	Y	-	-	-
Restricted self-expression	-	-	Y	Y	-	-	-
Overconnection	-	-	-	-	-	-	-
Exaggerated standards	-	-	-	-	-	-	-
Factor 1	-	Y	-	-	-	-	-

Y= $p$ <.05, N= $p$ >.05, -=not tested

One study (Halvorsen et al. 2010) found that all domains were highly (as defined by

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Cohen, 1988) and significantly correlated with depressive symptoms with the exception of Impaired Limits, which was weakly but significantly correlated, at two time points and over nine years. In addition, the Impaired Autonomy/Performance ( $sr^2=.08$ ,  $p=.001$ ), Undesirability ( $sr^2=.06$ ,  $p=.001$ ) and Impaired Limits ( $sr^2=.02$ ,  $p=.020$ ) early maladaptive schema domains significantly accounted for 52% of the variance in depressive symptoms cross-sectionally (Halvorsen et al., 2010). Given the longitudinal and cross-sectional nature, this study could be considered to provide the strongest evidence. However, this study recruited a predominantly female sample and the control sample included students alongside patients consulting their GP. As such, it is difficult to determine how generalisable the findings are.

Csukly et al. (2011) used factors established through factor analysis and found a unit increase in an unnamed Factor (comprised of the abandonment, social isolation, defectiveness/shame, social undesirability, failure, dependence/incompetence, enmeshment, subjugation, emotional inhibition, impulsivity, approval-seeking and pessimism) was associated with higher depressive severity (BDI:  $B=6.7$ , SCL-90 depression subscale:  $B=0.5$ ). It is however difficult to compare this finding to other studies given the use of a different factor structure. However, Csukly et al. (2011) recruited a relatively small number of participants from a specialist mood disorders clinic and found some comorbid axis I and axis II disorders. As such, the generalisability of these findings to a general population of people with depression is likely to be compromised.

Two studies used the Young's (1990) conceptually established domain structure and found that all five domains were moderately to highly correlated with depressive symptoms

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(Petrocelli et al., 2001; Renner et al., 2012). Calvete et al. (2007b) found that psychological abuse, physical abuse, the Disconnection-Rejection and Impaired Autonomy early maladaptive schema domains, and disengagement coping accounted for 63% of the variance in depressive symptoms cross-sectionally. As disengagement coping may be symptomatic of depression, it would be helpful to know how much of the variance was accounted for without this factor however, this is not reported by Calvete et al. (2007b). It should be noted that participants were recruited from health and social services (including domestic violence services). Halvorsen et al. (2009) found that all early maladaptive schema domains were significantly associated with depressive symptoms and explained 40% of the variance on top of the 22% which is explained by a single depressive episode and recurrent episodes of depression. As previously discussed, Halvorsen et al.'s (2009) sample overrepresented females and included students within the control groups (alongside GP patients). As such the findings may not be generalisable to the wider population.

Finally, one study found that scores on the World Assumptions Scale were, moderately and significantly correlated with depressive symptoms ( $r = -.31, p < .01$ ) indicating that as endorsement of positive beliefs increased, depressive severity decreased (Lilly et al., 2011). It should, however, be noted that this study predominantly recruited women and that the authors note that number of participants recruited was small (Lilly et al., 2011).

In summary, across the seven studies which tested the association between early maladaptive schema domains and depressive symptoms, all early maladaptive schema domains as measured by the YSQ were consistently correlated with depressive symptoms as well as scores on the World Assumptions Scale were found to be correlated with depressive



symptoms.

## **2. Do early maladaptive schemas significantly predict depression status or depressive symptoms?**

One study (see Table 4 for a summary) tested prediction of depressive episode status and depressive symptoms (Halvorsen et al., 2010) (see Table 5). Halvorsen et al. (2010) found that only the Impaired Limits early maladaptive schema domain alongside prior depressive symptoms significantly predicted depressive episode status at after nine years accounting for 20% of the variance. In addition, only the Undesirability early maladaptive schema domain (alongside depressive symptom severity at Time 1) significantly predicted depressive symptoms after nine years, accounting for 40% of the variance. Whilst this study provides some strong findings, particularly given the length of time of follow up, as previously discussed the generalisability of these findings may be limited given the overrepresentation of women and the use of students as part of the control group (alongside GP patients).

## **3. Do early maladaptive schemas moderate the relationship between stress and depressive symptoms or depressive episode/disorder?**

Two cross-sectional studies (see Table 6 for a summary) tested the role of moderators in the relationship between early maladaptive schema domains (see Table 7 for a summary of findings) and depressive symptoms (Brenning et al., 2012; Calvete et al., 2007a). Brenning et al. (2012) found that early maladaptive schema domains did not significantly moderate the relationship between life stress and depressive symptoms. In contrast, Calvete et al. (2007a) found that the Impaired Autonomy/Performance early maladaptive schema domain moderated the relationship between all three categories of domestic abuse (physical, psychological and sexual abuse) and depressive symptoms and the Disconnection and Rejection early

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Table 4. *A summary of studies addressing the question: Do early maladaptive schemas significantly predict depressive symptoms or depressive episode/disorder?*

First Author, date	Aims of study	Sample	Findings	Limitations	Method by which depression was assessed
Halvorsen, 2010	Do EMS domains, DA and prior depression at Time 1 predict depression status over nine years?	Mix of undergraduates (n=78) and GP patients (n=71).	IL and prior depression at Time 1 significantly predicted 20% of the variance in major depressive disorder status over nine years ( $sr^2=.09-.10$ , $p's<.001$ ).	Unable to determine whether the included sample was representative of the population. <sup>1</sup>	SCID, BDI
US	Do EMS domains, DA and depression severity at Time 1 predict depressive symptoms over nine years?		UD and depression severity at Time 1 significantly predicted 40% of the variance in depressive symptoms over nine years ( $sr^2=.03-.05$ , $p's=.004-019$ ).		
Cross-sectional (53)					
Longitudinal (55)					

EMS=early maladaptive schemas, DA=dysfunctional assumptions

IL=impaired limits, UD=undesirability

SCID=Structured Clinical Interview for DSM-IV Axis I Disorders (First, Spitzer, Gibbon, & Williams, 1997); BDI=Beck Depression Inventory (Beck, Steer, & Brown, 1996; Beck & Steer, 1987)

Table 5. A summary of statistically significant predictors of depressive symptoms or depressive episode/disorder?? ( $p$ 's < .05 in at least one comparison)

Authors, year (quality assessment score out of 100)	Total	Disconnection & Rejection	Autonomy/Performance	Impaired	Impaired Limits	Other-directedness	Overvigilance and inhibition	Undesirability	Restricted self-expression	Overconnection	Exaggerated standards	Factor 1*
Halvorsen et al., 2010 (53/55)	-	n	y	y	-	-	y	n	-	-	-	-

\*comprised of abandonment, social isolation, defectiveness/shame, social undesirability, failure, dependence/incompetence, enmeshment, subjugation, emotional inhibition, impulsivity, approval-seeking and pessimism.

maladaptive schema domain moderated the relationship between physical abuse and depressive symptoms, but not for psychological or sexual abuse. These findings are complicated by the use of two different methods of categorising schemas which may account for the inconsistency. In addition, both of these studies used a cross-sectional design. As such, it is not possible to make any interpretations regarding causation – instead only correlation can be assumed where statistical significance is reached. Finally, Brenning et al. (2012) used a mixed clinical and non-clinical sample. As such, the findings may not be generalisable to either a clinical population (due to the use of non-clinical participants) or a clinical population.

In summary, there was little consistency in the moderating role of early maladaptive schema domains across stressors (life stress vs. domestic violence) however, where domestic violence was the stressor, Impaired Autonomy/Performance appeared to be an important moderator cross-sectionally.

Table 6. *A summary of statistically significant moderators in the relationship between early maladaptive schemas and depressive symptoms? ( $p$ 's < .05 in at least one comparison).*

YSQ	First author, year (quality assessment score out of 100)	
	Brenning, 2012 (56)*	Calvete, 2007a (65)**
Total	-	N
Domains		
Disconnection and Rejection	Y	-
Impaired Autonomy/Performance	Y	-
Impaired Limits	N	-
Other-Directedness	N	-
Overvigilance and Inhibition	N	-
Undesirability	-	-
Restricted self-expression	-	-
Overconnection	-	-
Exaggerated standards	-	-
Factor 1	-	-
Sub-scales		
Emotional Deprivation	-	N
Abandonment	-	N
Mistrust/abuse	-	N
Social isolation/alienation	-	N
Defectiveness/shame	-	N
Failure	-	N
Dependence/incompetence	-	N
Vulnerability to harm	-	N
Enmeshment	-	N
Subjugation	-	N
Self-sacrifice	-	N
Attention/recognition-seeking	-	-
Entitlement/grandiosity	-	N
Insufficient self-control	-	N
Emotional inhibition	-	N
Unrelenting standards/hypercriticalness	-	N
Negativity/pessimism	-	-
Punitiveness	-	-
Social undesirability	-	-
Functional dependence	-	-

\*life stress, \*\*domestic abuse

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Table 7. *A summary of studies addressing the question: What factors moderate the relationship between early maladaptive schemas and depressive symptoms or depressive episode/disorder?*

First Author, date	Aims of study	Sample	Findings	Limitations	Method by which depression was assessed
Brenning, 2012 Belgium* Cross-sectional (56)	Do EMS sub-scales moderate the relationship between life stress and depressive symptoms?	Adolescents referred to out- or inpatient mental health service users (n=146) vs. students (n=118)	EMS sub-scales did not significantly moderate the relationship between life stress and depressive symptoms.	Mixed clinical and non-clinical sample. Depressive symptoms not status. Cross-sectional design limits interpretation.	YSR
Calvete et al., 2007a Spain Cross-sectional (65)	Do EMS moderate the relationship between domestic abuse and depressive symptoms?	Women who had been psychologically and physically and/or sexually abused within the last year (n=312).	IA domain moderated the relationship between depressive symptoms and all types of abuse. DR domain moderated the relationship between physical abuse and depressive symptoms.	Depressive symptoms not status. Cross-sectional design limits interpretation.	CES-D

EMS=Early Maladaptive Schemas, IA=Impaired Autonomy, DR=Disconnection and Rejection

\*country was not described in the paper but Authors were from this country

YSR=Youth self-report (Achenbach & Rescorla, 2001); CES-D = Centre of Epidemiological Studies Depression Scale (Radloff, 1977)

#### **4. Do early maladaptive schemas act as a mediator in the development of major depressive disorder status, depressive episode status or depressive symptoms?**

Four papers (see Table 8 for a summary) used a cross-sectional design to test the role of early maladaptive schema domains (Calvete et al., 2007a), sub-scales (Brenning et al., 2012; Shah, 2000) or total scores on the YSQ (Brenning et al., 2012) and World Assumptions Scale (Lilly et al., 2011) (see Table 9 for a summary of findings) as mediators of depressive symptoms (Brenning et al., 2012; Calvete et al., 2007a; Lilly et al., 2011; Shah & Waller, 2000).

One study (Calvete et al., 2007a) found support for the mediating role of early maladaptive schemas: (i) Disconnection and Rejection domain partially mediated the relationship between depressive symptoms and physical, sexual and psychological abuse, (ii) Impaired Autonomy/Performance partially mediated the relationship between depressive symptoms and sexual and psychological but not physical abuse and, (iii) Other-Directedness partially mediated the relationship between depressive symptoms and physical but not sexual or psychological abuse. The role of the Impaired Limits and Overvigilance and Inhibition domains was not tested. The authors however note that given that there are differences between women who access domestic violence services when compared to those who do not in terms of their financial, educational and social support. As such, these confounding variables may impact on findings.

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Table 8. *A summary of studies addressing the question: Do early maladaptive schemas act as a mediator in the development of depressive symptoms or depressive episode/disorder?*

First Author, date Country Design (quality score out of 100)	Aims of study	Sample	Findings	Limitations	Method by which depression was assessed
Brenning et al., 2012 Belgium* Cross-sectional (56)	Do EMS mediate the relationship between life stress and depressive symptoms?	Adolescents referred to out- or inpatient mental health service users (n=146) vs. students (n=118)	Total YSQ score, si and vhi partially mediated the relationship between life stress and depressive symptoms.  Total YSQ score, ab, mi, df, dp, fa, isc, sb, and ei sub-scales mediated the relationship between life stress and depressive symptoms for girls.	Mixed clinical and non-clinical sample.  Depressive symptoms used, not depressive status.  Cross-sectional.	YSR
Calvete et al., 2007a Spain Cross-sectional (65)	Do EMS mediate the relationship between domestic abuse and depressive symptoms?	Women who had been psychologically and physically and/or sexually abused within the last year (n=312).	DR domain partially mediated the relationship between all types of abuse and depressive symptoms,  IA partially mediated the relationship between sexual and psychological abuse.  OD partially mediated the relationship between physical abuse and depressive symptoms.	Depressive symptoms used, not depressive status.  Cross-sectional design limits interpretation of moderating and mediating effects.	CES-D

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First Author, date Country Design (quality score out of 100)	Aims of study	Sample	Findings	Limitations	Method by which depression was assessed
Lilly et al., 2011 US Cross-sectional (53)	Do WA's mediate the relationship between depressive symptoms and trauma?	Women accessing domestic violence shelters/ recruited through advertisements (n=97)	WA's fully mediated the relationship between depressive symptoms and both trauma and interpersonal trauma.  Noninterpersonal trauma was not significantly associated with depressive severity therefore the mediating relationship could not be tested.	Limited generalisability: women, small sample.  Exact probability not reported.  Depressive symptoms.  Cross-sectional	CES-D
Shah, 2000 UK Cross-sectional (61)	Do EMS mediate the relationship between recalled parental style and depressive symptoms?	Outpatients (n=60) and non-student volunteers (n=67)	Clinical sample: dp, vhi, fa, ei and us mediated the relationship between recalled parental style and depressive symptoms.  Non-clinical sample: vhi partially mediated the relationship between recalled parental style and depressive symptoms.	Unable to determine the representativeness of the sample recruited.  Depressive symptoms.  Cross-sectional design.	BDI

\*country was not described in the paper but authors were from this country; EMS=Early Maladaptive Schemas, WA=world assumptions, si=social isolation, vhi=vulnerability to harm, ab=abandonment, mi=mistrust/abuse, df=defectiveness, dp=dependence, fa=failure, isc=insufficient self control, sb=subjugation, ei=emotional inhibition, DR=disconnection and rejection, IA=impaired autonomy, OD=Other Directedness, us=unrelenting standards, SCID=Structured Clinical Interview for DSM-IV Axis I Disorders (First, Spitzer, Gibbon, & Williams, 1997); YSR=Youth self-report (Achenbach & Rescorla, 2001); CES-D = Centre of Epidemiological Studies Depression Scale (Radloff, 1977); BDI=Beck Depression Inventory (Beck & Steer, 1987); SCL-90= Symptoms Checklist-90 (Derogatis, 1983), DICA-IV= Diagnostic Interview for Children and Adolescents-IV (Reich, 2000), PDQ= Previous Depression Questionnaire (Wang, 1996),



Table 9. A summary of factors which act as a mediator in the relationship between stress and depressive symptoms ( $p$ 's < .05 in at least one comparison)

YSQ	First Author, year (variable, quality assessment score out of 100)					
	Brenning, 2012 (56)*	Calvete, 2007a (65)**	Lilly, 2011 (53)***	Lilly, 2011 (53)****	Lilly, 2011 (53)*****	Shah, 2000 (61)*****
Total	Y	-	-	-	-	-
Domains						
Disconnection and Rejection	-	Y	-	-	-	-
Impaired Autonomy/Performance	-	Y	-	-	-	-
Impaired Limits	-	-	-	-	-	-
Other-Directedness	-	Y	-	-	-	-
Overvigilance and Inhibition	-	-	-	-	-	-
Undesirability	-	-	-	-	-	-
Restricted self-expression	-	-	-	-	-	-
Overconnection	-	-	-	-	-	-
Exaggerated standards	-	-	-	-	-	-
Factor 1	-	-	-	-	-	-
World assumptions scale	-	-	Y	Y	N	-
Sub-scales						
Emotional Deprivation	Y	-	-	-	-	-
Abandonment	Y	-	-	-	-	-
Mistrust/abuse	N	-	-	-	-	-
Social isolation/alienation	Y	-	-	-	-	-
Defectiveness/shame	Y	-	-	-	-	-
Failure	Y	-	-	-	-	-
Dependence/incompetence	Y	-	-	-	-	Y
Vulnerability to harm	N	-	-	-	-	Y
Enmeshment	Y	-	-	-	-	-
Subjugation	N	-	-	-	-	Y
Self-sacrifice	Y	-	-	-	-	-
Attention/recognition-seeking	Y	-	-	-	-	-
Entitlement/grandiosity	N	-	-	-	-	-
Insufficient self-control	N	-	-	-	-	-
Emotional inhibition	N	-	-	-	-	Y
Unrelenting standards/hypercriticalness	Y	-	-	-	-	Y
Negativity/pessimism	N	-	-	-	-	-
Punitiveness	N	-	-	-	-	-
Social undesirability	-	-	-	-	-	-
Functional dependence	-	-	-	-	-	-

\*life stress, \*\*domestic abuse, \*\*\*trauma, \*\*\*\*interpersonal trauma, \*\*\*\*\*non interpersonal trauma, \*\*\*\*\*parental style,  $Y=p<.05$ ,  $N=p>.05$ , -=not tested

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Two studies tested the mediating role of early maladaptive schema sub-scales (Brenning et al., 2012; Shah & Waller, 2000). Shah and Waller (2000) found that in a clinical population, dependence/incompetence, vulnerability to harm/illness, failure, emotional inhibition and unrelenting standards/hyper-criticalness mediated the relationship between recalled parental style (measured using the Parental Bonding Instrument which assesses “care” and “overprotection” using self-report (Parker et al., 1979) and depressive symptoms. In the non-clinical population, vulnerability to harm/illness partially mediated the relationship between recalled parental style and depressive symptoms. In addition, Brenning et al. (2012) found that social isolation/alienation and vulnerability to harm mediated the relationship between life stress and depressive symptoms. In addition, abandonment/instability, mistrust/abuse, defectiveness/shame, dependence/incompetence, failure, insufficient self-control/self-discipline, subjugation, and emotional inhibition mediated the relationship between life stress and depressive symptoms for girls with the remaining schemas not acting as mediators. However, it should be noted that Brenning et al. (2012) used a mixed clinical and non-clinical sample. As such, the findings are unlikely to be representative of clinical, non-clinical or general populations.

Finally, two studies used the total YSQ (Brenning et al., 2012) or World Assumptions Scale (Lilly et al., 2011) score to test the mediating role of early maladaptive schemas in the relationship between depressive symptoms and general life stress and trauma, respectively. Total YSQ score partially mediated the relationship between general life stress and depressive symptoms and this relationship increased when gender was entered as a moderating variable (Brenning et al., 2012). In addition, total World Assumptions Scale score fully mediated the relationship between depressive symptoms for general trauma and interpersonal trauma but

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not for non-interpersonal trauma (Lilly et al., 2011). This suggests that depressive symptoms are mediated by a large number of general early maladaptive schemas.

As all studies used a cross-sectional design, no causal relationship can be assumed. In addition, all studies used depressive symptoms, not major depressive disorder or depressive episode status. As such, the findings are somewhat limited and it cannot be established if early maladaptive schemas act to better explain the relationship between stress and major depressive status/depressive episode.

In summary, there was little consistency for the mediating role of early maladaptive schemas. However, where domestic abuse or interpersonal trauma was the stressor, schemas as measured by the Disconnection and Rejection early maladaptive schema domain may be an important mediator. In addition, a generally high number of early maladaptive schemas may mediate the relationship between stressors and depressive symptoms. Finally, the abandonment/instability, mistrust/abuse, defectiveness/shame, social isolation/alienation, dependence/incompetence, vulnerability to harm or illness, failure, insufficient self-control/self-discipline, subjugation, and emotional inhibition early maladaptive schema subscales act as mediators between stressors and depressive symptoms cross-sectionally.

## Discussion

This literature reviewed aimed to answer the following four questions:

1. Is there a statistically significant relationship between early maladaptive schemas and depressive symptoms or depressive episode/disorder?

2. Do early maladaptive schemas significantly predict depressive symptoms or depressive episode/disorder?
3. Do early maladaptive schemas moderate the relationship between stress and depressive symptoms or depressive episode/disorder?
4. Do early maladaptive schemas act as a mediator in the development of depressive symptoms or depressive episode/disorder?

**Is there a statistically significant relationship between early maladaptive schemas and depressive symptoms or depressive episode/disorder?** The Impaired Autonomy early maladaptive schema domain and the social isolation/alienation, abandonment, and mistrust/abuse early maladaptive schema sub-scales (all part of the Disconnection and Rejection early maladaptive schema domain) were consistently associated with major depressive disorder/episode. In addition, all early maladaptive schema domains as measured by the YSQ and the World Assumptions Scale were consistently correlated with depressive symptoms. In addition, the Disconnection and Rejection domain was frequently associated with major depressive disorder/depressive episode status.

Young et al. (2003) defined the Impaired Autonomy domain as expectations about oneself and the world which interfere with one's perceived ability to function independently and successfully (Young et al., 2003). The Disconnection and Rejection domain is defined as the belief that one's emotional needs won't be predictably met (Young et al., 2003). The abandonment/instability sub-scale is defined as the perceived unreliability of provision of emotional support or practical protection from significant others (Young et al., 2003). The

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social isolation/alienation sub-scale is defined as the feeling that one is defective to significant others with hypersensitivity to criticism and rejection (Young et al., 2003). Again, the themes of loss associated with the Disconnection and Rejection domain are in line with the cognitive model. In line with the cognitive model, one might expect these early maladaptive schemas which focus on loss to be associated with depressive symptoms. Beck (1976) notes that a preoccupation with loss is evident for those with depression. Such loss can be tangible or intangible, objective or perceived and in the past, present or future (Beck, 1976). This is also supported by empirical data which found that life events with themes of loss or separation are associated with depression (Jenaway & Paykel, 1997). The cognitive model also predicts that expectations that one cannot cope would be associated with depression. Clark and Beck (1999) describe coping as being “linked to self-schemas and personality and is elicited by congruent stressors” and go on to explain that one is more likely to employ a maladaptive coping strategy when encountering a significant negative life event which is congruent with their early maladaptive schemas. Such unhelpful coping strategies might include the use of avoidant coping strategies. Wu et al.’s (2013) review of the literature highlight empirical evidence showing that those employing avoidant coping experienced more distress than those using active coping techniques (Holahan & Moos, 1987; Moos & Schaefer, 1993).

It is of note that the three early maladaptive schema sub-scales which were consistently associated with major depressive disorder/episode status were all part of the Disconnection and Rejection early maladaptive schema domain. As such, these sub-scales may be pushing up the scores on the Disconnection and Rejection early maladaptive schema domain. However, the full Disconnection and Rejection early maladaptive schema domain was also frequently associated with major depressive disorder/episode. As such, this

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Disconnection and Rejection early maladaptive schema domain may be especially important in major depressive disorder/episode status. It is also of note that none of the individual early maladaptive schema sub-scales from the Impaired Autonomy/Performance early maladaptive schema domain (dependence/incompetence, vulnerability to harm or illness, enmeshment/undeveloped self, failure) were consistently associated with major depressive disorder/episode. As such, it is likely to be high endorsement on all or some combination of all of the dependence/incompetence, vulnerability to harm or illness, enmeshment/undeveloped self, failure sub-scales which are important. These findings imply that both early maladaptive schema domains and sub-scales are important to measure in those with major depressive disorder/episode.

It is clear that a larger number of early maladaptive schema domains were associated with depressive symptoms when compared to depressive disorder/episode status. As such, early maladaptive schemas profiles differed with the clinical presentation. This supports the specificity hypothesis of early maladaptive schemas. That is, early maladaptive schemas are not simply associated with psychopathology or distress, they are differentiate between clinical conditions.

In conclusion, this literature review supports Beck's (1976) cognitive theory of depression in that early maladaptive schema profiles differ across: (i) psychiatric conditions including panic disorder and bulimia (emotional deprivation, abandonment, mistrust/abuse, social isolation/alienation, failure, vulnerability to harm, subjugation, self-sacrifice, insufficient self-control, emotional inhibition, and unrelenting standards and hypercriticalness); (ii) major depressive disorder/episode status for those who were currently

depressed compared to those who had previously or never been depressed (Impaired Autonomy/Performance and Disconnection and Rejection early maladaptive schema domains as well as social isolation/alienation, abandonment and mistrust/abuse early maladaptive schema sub-scales); and (iii) depressive symptoms (all early maladaptive schemas). Whilst there was evidence that early maladaptive schemas were associated with depression, as all but one study was cross-sectional, the evidence for early maladaptive schemas in the development of depression is not currently well supported by empirical data.

**Do early maladaptive schemas significantly predict depressive symptoms or depressive episode/disorder?** In summary, this literature review found very limited data testing the predictive role of early maladaptive schema domains in depressive status. The Impaired Limits and Undesirability domains predicted major depressive episode status and depressive symptoms respectively over nine years (Halvorsen et al., 2010). Whilst there is evidence that some early maladaptive schema domains may be predictive of major depressive episodes, there is a need for more research in order to replicate current findings, to establish which domains are predictive.

**Do early maladaptive schemas moderate the relationship between stress and depressive symptoms or depressive episode/disorder?** There were limited and inconsistent results regarding the moderating role of early maladaptive schemas in a two cross-sectional studies. However, Impaired Autonomy moderated the relationship between domestic abuse and depressive symptoms. The Impaired Autonomy/Performance domain is defined as expectations about oneself and the world that interfere with one's perceived ability to function independently and successfully (Young et al., 2003). As such, this logically fits with the

sense of worthlessness and lack of safety that might be experienced in the context of a relationship which features domestic abuse.

**Do early maladaptive schemas act as a mediator in the development of depressive symptoms or depressive episode/disorder?** There were inconsistent results regarding the mediating role of early maladaptive schemas in a number of cross-sectional studies.

However, where domestic abuse was the stressor, Disconnection and Rejection appeared to be an important mediator. As previously discussed, given the definition it is logical that this factor would help to explain the mediation. In addition, a generally high level of early maladaptive schemas may act to mediate the relationship between stressors and depressive symptoms although one study found that this was not the case for non-interpersonal trauma. Finally, the abandonment/instability, mistrust/abuse, defectiveness/shame, social isolation/alienation (all part of the Disconnection and Rejection early maladaptive schema domain), dependence/incompetence, vulnerability to harm or illness, failure (both part of the Impaired Autonomy/Performance early maladaptive schema domains), insufficient self-control/self-discipline (Impaired Limits early maladaptive schema domain), subjugation (Other-directedness early maladaptive schema domain), and emotional inhibition (Overvigilance and inhibition early maladaptive schema domain) early maladaptive schema sub-scales act as mediators between stressors and depressive symptoms. However, given the cross-sectional nature of the research, the findings, are very limited.

**Limitations.** A number of different versions of the YSQ were used to explore schema – there have been three iterations of the YSQ each with a long and short form. The version used was not always clear and complicated the review process. Alongside this, the number



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and content of domains and sub-scales changed with each iteration. In addition, the domains used vary from paper to paper with some using those proposed by Young and others using empirically derived domains. These factors combined to make comparison between studies challenging.

Another major limitation was the over-reliance on cross-sectional designs as a method for exploring, in particular, the predictive, moderating and mediating role of early maladaptive schemas. As such, causation cannot be assumed and it is not possible to conclude with any degree of confidence that early maladaptive schemas are integral in the development of either depressive symptoms or major depressive disorder/depressive episode. On reflection, the use of numerical ratings in the critical appraisal tool used may have acted to take my review away from the initial plan to focus on longitudinal data. This limits the critical nature of the review as it moves away from using the most helpful data for this specific research question by instead focusing on a generic critical appraisal.

**Implications for research and clinical practice.** The findings of this literature review neither prove nor disprove Beck's (1976) hypothesis that early maladaptive schemas are important cognitive factors in the development of depression. One explanation, arguing from the position of parsimony and given the data currently available, is that early maladaptive schemas are mere symptoms of depression. Future research should concentrate on prospective longitudinal designs with never depressed populations in order to test for a causal relationship. Particular attention could be paid to those with abusive childhoods given these people are theoretically more likely to develop early maladaptive schemas.

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Future research should also consider the measurement of early maladaptive schemas and particularly, the YSQ domains employed. Whilst empirically driven domains are preferable in establishing an evidence base for early maladaptive schemas, this leads to a number of different domains being employed and limits meaningful comparison between papers. The inconsistency between domain structures suggests that the factor structure of the YSQ scale is not stable. A very large sample should be recruited in order to establish the domain structure. This research could also help to inform researchers as to the usefulness of YSQ domains versus subscales.

Clinically, psychological interventions at the schema level (see for example Padesky, 1994; Wenzel, 2012; Young et al., 2003) could target the Impaired Autonomy/Performance and Disconnection and Rejection early maladaptive schema domains (with a particular focus on themes of social isolation/alienation, abandonment and mistrust/abuse) given that these early maladaptive schemas were most consistently found to be important in depression. Given that SSRI's alone significantly reduced endorsement on the social isolation, dependence, failure, subjugation, self-sacrifice, unrelenting standards and pessimism early maladaptive schema sub-scales (Atalay et al., 2011), pharmacological interventions could also be considered.

## **Conclusion**

In conclusion, the findings from this literature review neither prove nor disprove the role of early maladaptive schemas in either depressive symptoms or major depressive disorder/episodes as proposed by Beck (1976). The findings do however support the association between depression and themes of loss, worthlessness and the belief that one

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cannot cope. Psychological interventions could focus on these themes at the early maladaptive schema or core belief level. Further research should use more consistent approaches to assessing early maladaptive schemas and there should be a focus on prospective longitudinal studies.

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**Appendix 1.** *A summary of Young's early maladaptive schema domains and sub-scales (adapted from Young et al., 2003)*

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<b>DISCONNECTION &amp; REJECTION</b> -Belief that emotional needs won't be predictably met	
Abandonment/ Instability	The perceived unreliability of provision of emotional support or practical protection from significant others.
Mistrust/Abuse Emotional Deprivation	The expectation that others will intentionally or negligently hurt one. Expectation that emotional needs will not be adequately met by others including deprivation of nurturance, empathy and/or protection.
Defectiveness/ Shame	Belief that one is defective to significant others with hypersensitivity to criticism and rejection; self-consciousness, insecurity and shame.
Social Isolation/ Alienation	The feeling that one is isolated from the rest of the world, different from other people, and/or not part of any group or community.
<b>IMPAIRED AUTONOMY/PERFORMANCE</b> -Expectations about oneself and the world that interfere with one's perceived ability to function independently and successfully.	
Dependence/ Incompetence	Belief that one is unable to cope alone with everyday responsibilities. Often presents as helplessness.
Vulnerability to Harm or Illness	Exaggerated fear of imminent and unpreventable catastrophe including: medical, emotional or external catastrophes.
Enmeshment/ Undeveloped Self Failure	Excessive emotional involvement with significant others (often parents), at the expense of full individuation or normal social development. Including the belief that one cannot survive or the other. The belief that one has or will fail, or is fundamentally inadequate.
<b>IMPAIRED LIMITS</b> -Deficiency in internal/external limits or long-term goal-orientation.	
Entitlement/ Grandiosity	The belief that one is superior to others, deserves special privileges, or is not bound by the rules of normal social interaction.
Insufficient self- control/self- discipline	Pervasive difficulty restraining emotional expression, impulses or exercising sufficient self-control and frustration tolerance. May included an exaggerated emphasis on discomfort-avoidance.
<b>OTHER-DIRECTEDNESS</b> - Excessive focus on the emotional needs/desires of others, at the expense of one's own needs in order to gain/maintain a relationship, or avoid retaliation.	
Subjugation	Giving up control to avoid abandonment including suppression of one's needs and emotions.
Self-Sacrifice	Focus on meeting the needs of others at the expense of oneself to prevent pain to others, distress to self or maintain the relationship.
Approval/ recognition seeking	Excessive emphasis on gaining approval, recognition, or attention from others, at the expense of developing a true sense of self.
<b>OVERVIGILANCE AND INHIBITION</b> -Emphasis on suppressing one's feelings, impulses, and choices or meeting rigid, internalized rules at the expense of own emotions.	
Negativity/ Pessimism	Pervasive focus on the negative. Usually includes an expectation that things will go wrong.
Emotional Inhibition	Inhibition of spontaneous action, feeling, or communication to avoid disapproval by others, feelings of shame, or loss of control.
Unrelenting Standards/ Hypercriticalness	The belief that one must meet high internalized standards, usually to avoid criticism, with significant functional impairment.
Punitiveness	The belief that others should be harshly punished for mistakes.

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**Appendix 2.** A summary of the critique of methodological quality of included papers (adapted from Downs & Black, 1998).

	Atalay, 2011	Brenning, 2012	Calvete, 2007b	Calvete, 2007a	Csukly, 2011	Dozois, 2012	Halvorsen, 2009	Halvorsen, 2010	Lilly, 2011	Petrocelli, 2001	Renner, 2012	Riso, 2003	Shah, 2000	Simmons, 2006	Waller, 2001	Wang, 2010
Design (C=cross-sectional, L=longitudinal)	C	C	C	C	C	C	C	L	C	C	C	C	C	C	C	C
Reporting																
Aims described? (1=yes, 0=no)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Outcomes described before the results section? (1=yes, 0=no)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Participant characteristic described? (1=yes, 0=no)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Intervention described? (1=yes, 0=no)	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-
Distribution of principal confounders compared and described? (2=yes, 1=partially, 0=no)	-	-	-	-	-	-	-	0	-	-	0	-	-	-	-	-
Clear findings? (1=yes, 0=no)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Random variability estimates? (1=yes, 0=no)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adverse events reported? (1=yes, 0=no)	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-
Characteristics of patients lost to follow up? (1=yes, 0=no)	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-
Exact probabilities reported until p<.001? (1=yes, 0=no)	1	1	-	-	1	-	-	-	-	1	-	-	1	-	-	-
External validity (1=yes, 0=no or unable to determine)																
Sample population representative of whole population?	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0
Participants representative of sample population?	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Setting representative of facilities available to whole population?	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0
Internal validity – bias (1=yes, 0=no or unable to determine)																
Participant blinded to intervention?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Researcher blinded to intervention?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
“Data dredging” declared if necessary?	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1

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	Atalay, 2011	Brenning, 2012	Calvete, 2007b	Calvete, 2007a	Csukly, 2011	Dozois, 2012	Halvorsen, 2009	Halvorsen, 2010	Halvorsen, 2010	Lilly, 2011	Petrocelli, 2001	Remner, 2012	Riso, 2003	Shah, 2000	Simmons, 2006	Waller, 2001	Wang, 2010
Analyses adjusted for length of follow-up?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Appropriate statistical tests?	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
Fidelity to intervention?	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Valid and reliable outcome measures?	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
Internal validity – confounding and selection bias (1=yes, 0=no or unable to determine)																	
Participants recruited from same population for interventions?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Participants recruited over same period of time for interventions?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Randomisation to intervention groups?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Double blind randomisation?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Controlled for confounders?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Withdrawn participants accounted for?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Power (based on size of smallest intervention group: 5=n <sub>8</sub> , 4= n <sub>7</sub> - n <sub>8</sub> , 3= n <sub>5</sub> - n <sub>6</sub> , 2= n <sub>3</sub> - n <sub>4</sub> , 1= n <sub>1</sub> - n <sub>2</sub> , 0=< n <sub>1</sub> )																	
Sufficient power?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Percentage score	56	56	65	65	56	65	53	53	55	53	56	48	53	61	53	47	47

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**Appendix 3. *Clinical Psychology Review Guide for Authors***

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**CHAPTER TWO - EMPIRICAL PAPER: DIABETES AND DEPRESSION: THE  
ROLE OF EARLY MALADAPTIVE SCHEMAS AND STRESS.**



## Abstract

**Background.** Depression is often associated with both Type 1 and Type 2 diabetes mellitus. The construct of core beliefs, or early maladaptive schemas in cognitive theory may be one way to understand the psychological mechanisms underpinning this. **Aims.** This study aimed to test the association between early maladaptive schemas and major depressive episode or depressive symptoms. In addition, the role of early maladaptive schemas as a mediator or moderator in the relationship between life or diabetes stress and depressive symptoms was tested. **Method.** A cross-sectional questionnaire study design was used with diagnostic interviews. **Results.** The Disconnection and Rejection and Impaired Autonomy/Performance early maladaptive schema domains and a number of individual schema were associated with current major depressive episode status. The abandonment, social isolation/alienation and defectiveness/unlovability schemas remained significantly associated with current major depressive episode after controlling for current depressive symptoms. Almost all measures of early maladaptive schemas were associated with depressive symptoms. Early maladaptive schemas did not moderate the relationship between either life stress or diabetes distress and current major depressive episode status. The Disconnection and Rejection, Impaired Autonomy/Performance, Other-Directedness and Overvigilance/Inhibition early maladaptive schema domains partially mediated the relationship between life stress and depressive symptoms. Early maladaptive schemas did not mediate the relationship between diabetes distress and depressive symptoms. **Conclusion.** The findings suggest that early maladaptive schemas play some role in major depressive disorder or depressive symptoms. However, further prospective longitudinal research is needed.

## **Depression**

The point prevalence of depression in the general population in the UK is estimated at 2.6% (Singleton, Bumpstead, O'Brien, Lee & Meltzer, 2001) rising to 5-10% in primary care (Boland, Diaz, Lamdan, Ramchandani & McCartney, 1996). The American Psychological Association (APA) provide diagnostic criteria for depression (APA, 2003). This must include low mood and/or loss of interest or pleasure in activities accompanied by at least five of the following over at least two weeks causing significant impairment in functioning: difficulties sleeping or an increase in sleeping, "agitation or psychomotor retardation noticed by others", loss of energy, a sense of worthlessness and guilt, difficulties with thinking, concentration or the inability to make decisions, and thoughts of death or suicidal ideation, intent or plan. Symptoms should not be better explained by bereavement, substance abuse, a general medical condition or mania (APA, 2003).

## **Depression and diabetes**

Depression is more common in long term health conditions (Naylor et al., 2012) with a 23% prevalence with two or more long term health conditions compared to 3.2% in the general population (Moussavi et al., 2007). Comorbid long-term physical health conditions and depression is associated with less favourable health status (Moussavi et al., 2007), decreased quality of life (Alonso et al., 2004; Bayliss, Ellis & Steiner, 2005; Ciechanowski, Katon & Russo, 2000; Fortin et al., 2004; Fortin et al., 2006; Goodwin et al., 2003; Strine, Chapman, Kobau, Balluz, & Mokdad, 2004), extended inpatient admissions (Koopmans, Donker & Rutten, 2005; Saravay & Levin, 1995) and higher utilisation of health services (Stiefel et al., 2008).

Between 3.5% and 5% of the population have diabetes (National Collaborating Centre for Chronic Conditions, 2008) and depression is more common in this population than in the general population (Nouwen et al., 2010). A meta-analysis found an odds ratio of 1.6 when comparing rates of depression for those with a diagnosis of Type 2 diabetes mellitus with controls (Ali, Stone, Peters, Davies & Khunti, 2006). A more recent meta-analysis found that the prevalence of depression is only high in people with diagnosed diabetes and not in undiagnosed or pre-diabetes conditions (Nouwen et al., 2011). Therefore, it is likely that psychological mechanisms play an important role in the increased risk of depression. It should however be noted that the relationship between diabetes and depression is bi-directional - depression increases the chances of developing diabetes (Mezuk, Eaton, Albrecht & Golden, 2008; Renn, Feliciano & Segal, 2011) and diabetes increases the chance of developing depression (Mezuk et al., 2008, Nouwen et al., 2011, Renn et al., 2011).

Depression in diabetes is associated with serious complications including retinopathy, neuropathy, nephropathy, cardiovascular disease, peripheral arterial disease, and sexual dysfunction (De Groot, Anderson, Freedland, Clouse & Lustman, 2001). Comorbid depression and diabetes has been linked to poorer self-care (Lin et al., 2004) and diabetes control (Lustman et al., 2000), a greater risk of diabetes related complications (De Groot, 2001) and an increase in mortality rates (Egede et al., 2005; Katon et al., 2006). Comorbid depression and diabetes is associated with a 44-88% increase in healthcare costs when compared to those without comorbid depression after controlling for diabetes severity (Ciechanowski et al., 2000; Gilmer et al., 2005; Simon et al., 2005).

The reasons for developing depression in diabetes are still poorly understood, with

both psychological and biological factors proposed as explanatory mechanisms (Nouwen et al., 2011). As previously discussed, the evidence regarding the direction of causality between diabetes and depression is currently unclear. It is likely that the relationship between diabetes and depression is bidirectional with depression increasing the risk of developing diabetes (Mezuk et al., 2008; Renn et al., 2011) as well as diabetes increasing the risk of depression (Mezuk et al., 2008; Nouwen et al., 2011; Renn et al., 2011). Psychological factors include the burden associated with chronic health conditions and the complications associated with diabetes (de Groot et al., 2001; Pouwer et al., 2005), and biological factors include uncontrolled hyperglycaemia (Lustman et al., 2000), inflammatory markers (Stuart & Baune, 2012) and reductions in brain derived neurotrophic factor (BDNF) (Nouwen et al., 2011), a protein which regulates the strength of synaptic connections and is necessary for the formation of new connections (Lipsky et al., 2007).

Lustman et al. (1998) conducted a randomized controlled trial with 51 patients with major depression and type 2 diabetes. This study found significant differences in the rates of depression remission (as defined by Beck Depression Inventory scores) following intervention (Cognitive Behavioural Therapy (CBT) + diabetes education) when compared to controls (diabetes education only). In addition, follow up HbA1c levels (a long term measure of glycaemic control) were significantly better for the intervention group when compared to the control group. This suggests that CBT is not only an effective treatment for depression, but may also help with glycaemic control which given the implications of poor self-management detailed previously, is an important finding. As such, CBT is the recommended psychological intervention for comorbid depression and diabetes (McIntyre et al., 2012; Clarke & Goosen, 2009; National Institute for Health and Clinical Excellence [NICE], 2009;

Lustman, Freedland, Griffith & Clouse, 1998). Given the usefulness of CBT, Beck's cognitive theory (Beck, 1976) which is one theoretical model which underpins CBT, may be useful to understand psychological mechanisms in depression in diabetes.

Beck's cognitive theory (Beck, 1976) proposes that as a result of adverse early experiences, one develops early maladaptive schemas and assumptions about ourselves, the world and the future that may lie dormant for many years (Beck, 1976). These become activated in stressful life events (see Kessler, 1997 for a review of the link between stressful life events and depression). In the context of stressful life events and early maladaptive schemas, dysfunctional assumptions, negative automatic thoughts and the behavioural, motivational, affective, cognitive and somatic symptoms typical of depression emerge (Beck, 1976). There is evidence from cross-sectional studies that rates of depression are increased in the presence of stressors associated with diabetes (Pouwer et al., 2003) such as complex dietary, physical activity or medication self-care activities and changes in relationships with family members or health care professionals (Polonsky et al., 2005).

Early maladaptive schemas are hypothesised to be one important cognitive factor in the development of depression and have been defined as pervasive cognitive patterns which allow one to readily and consistently interpret data in a meaningful way (Beck, 1979). Young, Klosko and Weishaar (2003) developed a taxonomy of early maladaptive schemas as part of their Schema Theory, describing five domains each encompassing a number of individual schemas: (1) Disconnection and Rejection (Abandonment/Instability, Mistrust/Abuse, Emotional Deprivation, Defectiveness/Shame, Social Isolation/Alienation); (2) Impaired Autonomy and Performance (Dependence/Incompetence, Vulnerability to Harm

or Illness, Enmeshment/Undeveloped Self, Failure); (3) Impaired Limits (Entitlement/Grandiosity, Insufficient Self-Control/Self-Discipline); (4) Other-Directedness (Subjugation, Self-Sacrifice, Approval-Seeking/Recognition-seeking); and (5) Overvigilance and Inhibition (Negativity/Pessimism, Emotional Inhibition, Unrelenting Standards/Hypercriticalness and Punitiveness).

Those in a major depressive episode significantly more strongly endorsed the Impaired Autonomy early maladaptive schema domain (Dozois et al., 2012; Halvorsen et al., 2010; Riso et al., 2003; Wang et al., 2010) when compared to those who are not currently depressed, even after controlling for current depressive and personality disorder symptoms (Riso et al., 2003). In addition, those in a major depressive episode more strongly endorsed the social isolation/alienation, abandonment and mistrust/abuse early maladaptive schema sub-scales (Atalay et al., 2011; Halvorsen et al., 2009; Shah & Waller, 2000; Simmons et al., 2006; Wang et al., 2010) all of which are part of the Disconnection and Rejection early maladaptive schema domain (Young et al., 2003). It is also of note that those in a major depressive episode significantly more strongly endorsed these early maladaptive schema sub-scales when compared to those with bulimia (Waller et al., 2001) or panic disorder (Atalay et al., 2011). Depressive symptoms are also associated with maladaptive schemata such as the Impaired Autonomy/Performance, Undesirability and Impaired Limits early maladaptive schema domains (Csukly et al., 2011; Halvorsen et al., 2010; McGinn, Cukor & Sanderson, 2005; Petrocelli, Glaser, Calhoun & Campbell, 2001; Renner, Lobbestael, Peeters, Arntz & Huibers, 2012). The Impaired Limits and Undesirability (a factor in an earlier version of Young et al.'s taxonomy) early maladaptive schema domains predict depressive status and depressive symptoms over nine years (Halvorsen et al., 2010).

A generally high number of early maladaptive schemas (Lilly, Valdez & Graham-Bermann, 2011; Brenning, Bosmans, Braet & Theuwis, 2012) mediate the relationship between stress and depressive symptoms. In addition, the Disconnection and Rejection early maladaptive schema domain consistently acts as a mediator in the relationship between domestic violence and depressive symptoms (Calvete, Estevez & Corral, 2007a). The following early maladaptive schema sub-scales also act as mediators between stressors and depressive symptoms: abandonment/instability, mistrust/abuse, defectiveness/shame, social isolation/alienation, dependence/incompetence, vulnerability to harm or illness, failure, insufficient self-control/self-discipline, subjugation, and emotional inhibition (Brenning et al., 2012; Shah & Waller, 2000).

The moderating role of early maladaptive schemas in the relationship between stress and depressive symptoms is less consistent. Brenning et al. (2012) found that early maladaptive schemas did not moderate the relationship between stress and depressive symptoms. However, Calvete et al. (2007a) found that the Impaired Autonomy/Performance early maladaptive schema domain moderated the relationship between depressive symptoms and physical, psychological or sexual abuse whilst the Disconnection and Rejection early maladaptive schema domain moderated the relationship between depressive symptoms and physical abuse (Calvete et al., 2007a).

As early maladaptive schemas were often associated with major depressive disorder or depressive symptoms, early maladaptive schemas might be important factors in depression. However, given the lack of longitudinal research testing the mediating or moderating role of

early maladaptive schemas in the relationship between stress and depressive status or symptoms, there is little evidence to support the role of early maladaptive schemas as a developmental factor in depression.

To date, only one study has tested the constructs from the cognitive model of depression in populations with a diagnosis of diabetes focussing on negative automatic thoughts. Clarke and Goosen (2009) found that emotion focused-coping partially mediated the relationship between negative automatic thoughts and depression with comorbid diabetes. This suggests automatic negative thoughts alone are not sufficient to result in depression but that only when employing emotion focussed coping do automatic negative thoughts result in depression. However, early maladaptive schemas were not explored and negative automatic thoughts are more commonly thought of as maintaining depression as opposed to being a developmental factor of depression. More importantly, as this was a cross-sectional study no causal inferences can be drawn.

No known previous work has explored the role of early maladaptive schemas in comorbid depression and diabetes. As such, the study aims were developed in order to further understand the cognitive mechanisms of depression in diabetes.

### **Aims**

This research aimed to test if the relationship between stress and depressive symptoms or major depressive disorder/episode is better explained by early maladaptive schemas for those with diabetes. The primary research question was: Do early maladaptive schemas mediate the relationship between stressors (both diabetes specific and general) and depressive



symptoms or major depressive disorder/episode in a population with diabetes? The secondary research questions were: (i) Do early maladaptive schemas interact with stressors to explain depressive symptoms or major depressive disorder/episode in a population with diabetes? and (ii) Are early maladaptive schemas associated with depressive symptoms or major depressive disorder/episode in a population with diabetes? The primary outcome measure was depressive status (current or previous caseness of major depressive disorder or major depressive episode as defined by the Schedules for Clinical Assessment in Neuropsychiatry (SCAN: World Health Organisation; Wing et al., 1990; Wing, 1996) or self-report). The secondary outcome measure was severity of depressive symptoms as measured by the Centre for Epidemiology Studies Depression Scale (CES-D; Radloff, 1977).

### **Design**

This study used a cross-sectional design using questionnaires and a structured clinical interview to explore the relationship between depressive symptoms or major depressive disorder/episode, stress and early maladaptive schemas.

### **Participants**

Participants were people with a diagnosis of either Type 1 or Type 2 diabetes attending the diabetes clinics at three Hospitals. Participants were recruited using convenience sampling. Participants were included if they had been diagnosed with diabetes at least two years ago with no major changes in their treatment for the last six months (to minimise the risk that physiological, not psychological factors, are responsible for any differences). As previous research has found that anti-depressants can reduce scores on the YSQ (Atalay et al., 2011) participants taking antidepressants were excluded from the study as

were those who did not speak English fluently as the measures have not all been validated in other languages.

## **Measures**

The questionnaire pack consisted of the following six questionnaire measures as well as a semi-structured interview.

### **Demographics.**

A demographic self-report questionnaire was developed to record socio-demographics (age, ethnicity, marital status, education status, employment status) and health status (other health problems, type of diabetes, duration since diagnosis, diabetes complications, diabetes management, depression diagnosis, medications taken) (see Appendix A).

### **Centre for Epidemiology Studies Depression Scale (CES-D; Radloff, 1977).**

The CES-D is a 20-item self-report questionnaire which measures depressive symptom severity over the past week on a four point scale (see Appendix B). Higher scores are indicative of higher depressive symptoms. Ensel (1997) recommends a score of over 16 may be indicative of clinical depression. Cronbach's alpha for the current sample was .90.

### **Cooper Life Stress Inventory (CLSI; Cooper, Cooper, & Faragher, 1989).**

The Cooper Life Stress Inventory is a 43-item self-report questionnaire which measures the number of stressful life events and associated distress over the last six months on a ten point Likert scale (see Appendix C). Scores were calculated by multiplying the number of events experienced by the associated distress. Higher scores are indicative of

higher distress. Previous research found mean distress for individual items in a control sample of women ranged from 2.7 to 10.00 with standard deviations ranging from 0.5-3.1 (Cooper, Cooper and Faragher, 1989). Cronbach's alpha for the current sample was .83.

**Summary of Diabetes Self-Care Activities scale (SDSCA; Toobert, Hampson & Glasgow, 2000).**

The SDSCA is a five item self-report questionnaire which measures adherence to the following over the past seven days: diet, blood sugar testing, foot care, medication and smoking (see Appendix D). The questionnaire was scored as recommended by Toobert et al. (2000) and higher scores were indicative of higher rates of self-care for continuous variables. Participants were coded as either smokers or non-smokers. A review of seven studies examining normative data for adults with type 2 diabetes found that for the blood sugar testing scale the mean=69.0 and standard deviation=24.9 and for the general diet scale the mean=58.6 and standard deviation=28.7 (Toobert et al., 2000). Cronbach's alpha was .91 (for the general diet subscale) and .76 for the blood glucose testing subscale. Cronbach's alphas were below .70 for the specific diet, foot care and recommended insulin/tablets subscales and as these alphas fell below the widely accepted cut-off of .70 (Nunnally, 1978), they were removed from further analysis.

**Diabetes Distress Scale (DDS; Polonsky et al., 2005).**

The DDS is a 17-item self-report questionnaire which measures distress associated with diabetes over the past month on a six point scale (see Appendix E). Possible scores range from zero to six with a score of <2.0 indicative of mild distress, 2.0-2.9 indicative of moderate distress and  $\geq 3.0$  indicative of high distress (Fisher, Polonsky, Hessler & Mullan,

2012). The sum of all items and the mean for the emotional burden, physician-related distress, regimen-related distress, and interpersonal distress sub-scales were calculated with higher scores indicative of higher distress. Cronbach's alpha for the current sample was .92 for the total scale and ranged from .77 to .93 for the subscales.

**Young Schema Questionnaire - Short Form version 3 (YSQ-S3; Young, 2005).**

The YSQ –S3 is a 90-item questionnaire that assesses 18 early maladaptive schemas sub-scales over the five domains of Disconnection and Rejection, Impaired Autonomy/Performance, Impaired Limits, Other-Directedness, and Overvigilance and Inhibition on a six point scale (see Appendix F). The mean score for each sub-scale (as recommended by the Schema Therapy Institute; Young, 2005) and each of the five domains was calculated in addition to the sum of all items. Higher scores were indicative of higher endorsement of early maladaptive schemas. Normative data is not currently available for the YSQ-S3. However, Schema Therapy New York (n.d) recommend any score of 2 or more for any individual early maladaptive schema on the YSQ-S is “meaningful”. Cronbach's alpha for the current sample were .97 for the total scale, ranged from .77 to .97 for the early maladaptive schema domains and ranged from .60 to .91 for the early maladaptive schema subscales.

**Schedules for Clinical Assessment in Neuropsychiatry (SCAN-2.1; World Health Organisation; Wing et al., 1990; Wing, 1996).**

The SCAN-2.1 is a semi-structured interview that can be used to establish current, representative, or lifetime psychiatric diagnoses. Following training, the 60-item depressed mood and ideation section focussing on current and lifetime diagnosis was used (see

Appendix G). Responses were compared to the DSM-IV-TR (APA, 2003) diagnostic criteria for major depressive disorder/episode in order to establish whether or not participants met diagnostic criteria.

## **Procedure**

Ethical approval was obtained from the East Midlands, Nottingham, and West Midlands, Coventry and Warwickshire Health Research Authority National Research Ethics Service (11/WM/0128; see Appendix H). Recruitment took part between February 2012 and March 2013. It is important to note that this study was part of a larger study which also explored the role of BDNF in depression and diabetes. BDNF has been found to be lower in those with depression and those with type 2 diabetes (Dwivedi et al., 2003). Stress induced lowered BDNF is hypothesised to reduce neuroplasticity which results in depression and therefore it is postulated that effective interventions increase the ability of the brain to change (Molendijk et al., 2010). This study hypothesised that BDNF mediated the relationship between diabetes distress and depression. As such, for the first three months of data collection, as well as completing the questionnaire pack, participants were also required to provide a blood sample in order to measure BDNF levels.

Patients attending their outpatient diabetes appointment were approached by the researcher and given a Participant Information Sheet (see Appendix I). The researcher ensured that participants had a diagnosis of type 1 or type 2 diabetes using self report and had been diagnosed at least two years ago. At this point, the researcher explained that participation in the study included completing a questionnaire pack and that dependent upon their answers they may be contacted by the researcher by telephone. For those who agreed to

take part and met the inclusion criteria, a consent form (see Appendix J) was signed. Those whose data was also used in the BDNF study completed the questionnaire pack within two weeks as they were required to return to the clinic to provide fasting blood sample. Those whose data was not used in the BDNF study completed the questionnaire pack on the same day. Following completion, participants' contact details were obtained as well as the name of a person close to them and their GP's details (in case of concerns about the participant's welfare following telephone interview). Participants who scored 16 or over (Ensel, 1986) on the CES-D (Radloff, 1977) were contacted by telephone by the researcher, initially within a week of completing the questionnaire pack. Participants were interviewed using the depressed mood and ideation section of the SCAN and assessed for major depressive disorder (MDD) or a major depressive episode (MDE). Finally, the last recorded HbA<sub>1c</sub> was obtained from medical records.

### **Statistical analysis**

Statistical analysis focussed on two sets of dependent variables: (i) depressive symptoms as measured by the CES-D, (ii) depressive status (currently depressed vs. previously depressed vs. never depressed) as ascertained by the CES-D, SCAN and self-report. The 'currently depressed' group comprised those who scored 16 or over on the CES-D and met criteria for current major depressive disorder/depressive episode. The 'previously depressed' group was comprised of those who met criteria for past major depressive disorder/depressive episode or who reported that they had a diagnosis of depression. The 'never depressed' group was comprised of those who did not meet criteria for major depressive disorder/depressive episode or who scored less than 16 on the CES-D and did not self-report a diagnosis of depression.

Descriptive statistics were used to describe data. Parametric tests are statistically powerful, but assume normally distributed variables and the use of at least interval data (Brace, Kemp and Snelgar, 2006). However, analysis using the Kolomogorov-Smirnov test showed that scores on the CES-D ( $D=.12$ ,  $p=.016$ ) were not normally distributed. A logarithmic transformation was conducted, but this did not result in normally distributed data for all variables. In addition, a number of categorical variables were used. As such, non-parametric tests were used.

Bivariate statistics were used to test for differences across a range of variables (i.e., socio-demographic, health status, diabetes self-care activities, diabetes distress, life stress and early maladaptive schemas) according to (i) depressive status and (ii) depressive symptoms. Spearman's rho was used to test for correlations between depressive symptoms and continuous variables. Mann Whitney U tests were used to test for the differences in depressive symptoms and binary categorical variables. Kruskal Wallis tests were used to test for the differences in depressive symptoms and non-binary categorical variables as well as differences across depressive status and continuous variables. The exact chi square test was used to test for differences across depressive status for binary categorical variables. Quade's (1967) rank analysis of covariance was used to test for differences across depressive status when controlling for depressive symptoms. The Tukey HSD test was used as a post hoc test to test where differences in depressive status were evident. In addition, Baron and Kenny's (1986) moderation analysis and Preacher and Hayes (2008) bias corrected bootstrapping mediation analysis techniques were used to test whether early maladaptive schemas: (i) interact with stress (both diabetes and general) to explain the severity of depressive symptoms

or depressive status (see Figure 1) or (ii) mediate the relationship between life stress or diabetes distress and depressive symptoms or depressive status (see Figure 2).

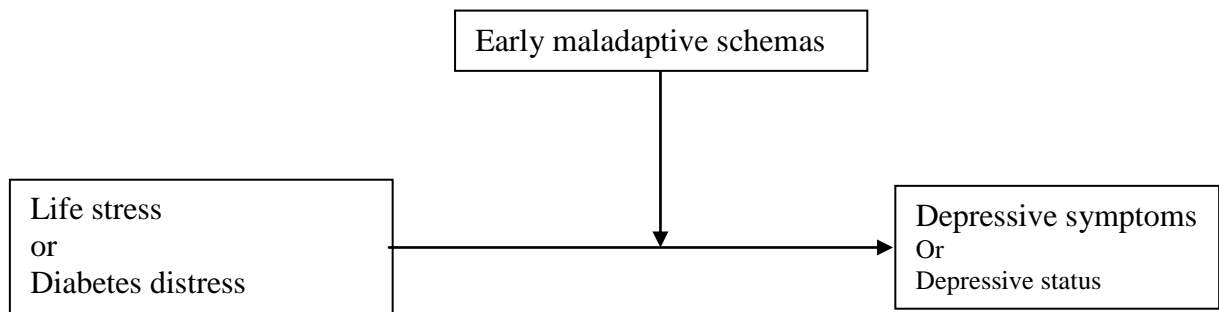


Figure 1. *The proposed relationship between stress and depressive symptoms or major depressive disorder/episode as moderated by early maladaptive schemas.*

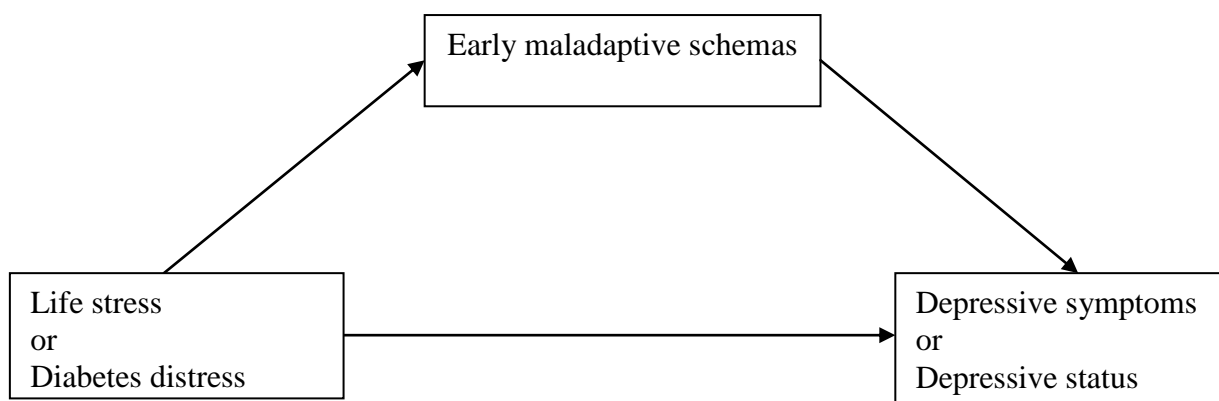


Figure 2. *The proposed relationship between stress and depressive symptoms or major depressive disorder/episode as mediated by the early maladaptive schemas.*

To reduce the risk of Type I errors as a result of multiple comparisons, a significance level of  $p \leq .01$  was applied throughout with the exception of the Tukey HSD and all mediation/moderation analysis where fewer comparisons were made. Where this was relevant, it is highlighted in the text.

## Results



Of the 93 participants who returned their questionnaire pack, 23 were excluded: 11 had considerable missing data, eight were taking antidepressant medication, one had gestational diabetes and three withdrew. Therefore, 70 participants were included in the analysis (see Table 1 for a summary of descriptive data). It was not possible to calculate a response rate as the data was collected by more than one researcher and data was not kept by all researchers.

**Socio-demographic variables, health status and diabetes self-care activities.**

Descriptive data for socio-demographic variables, health status and diabetes self-care activities are summarised in Table’s 1 and 2. Kruskal Wallis and exact chi-square tests found no significant differences across major depressive disorder/episode status groups (currently vs. previously vs. never depressed) on any of these variables ( $p's > .052$ ). In addition, Spearman’s, exact chi-square, Mann Whitney U and Kruskal Wallis tests found no association between depressive symptoms and socio-demographic variables or diabetes self-care activities (all  $p's > .08$ ).

Table 1. *A summary of descriptive data for socio-demographics for total sample and for major depressive disorder/episode status groups.*

	Total sample (n=70)	Currently vs. previously vs. never depressed (n=70)*		
		CD* (n=6)	PD* (n=16)	ND* (n=48)
Median age (interquartile range)	45 (36-54)	43 (34-52)	41 (34-56)	48 (36-54)
Women: Men	32:38	2:4	6:10	20:28
Ethnicity				
White	52	5	14	33
Asian or Asian British	7	0	1	6
Black or Black British	9	1	1	7
Mixed background	1	0	0	1
Marital status				
Living alone	23	5	5	13

Living with partner	42	1	11	31
Education status				
Primary school	0	0	0	0
Secondary school	25	2	8	15
College	21	2	4	15
University	22	2	3	17
Employment status				
Working full-time	34	2	5	27
Working part-time	11	2	3	6
Not employed	22	2	8	12

\* diagnostic interviews, CD=currenty depressed, PD=previously depressed, ND=never depressed

Table 2. A summary of descriptive data for health status and measures for total sample and for major depressive disorder/episode status groups.

	Total sample (n=70)	Currently vs. previously vs. never depressed (n=70)*		
Other health conditions	37	5	12	20
Type 1:Type 2	43:27	5:1	7:9	31:17
Median years since diagnosis (interquartile range)	14 (8-23)	18 (5-26)	13 (6-10)	13 (9-24)
Diabetes complications	30	1	11	18
Median HbA <sub>1c</sub> (interquartile range)	8.30 (7.45-9.85)	8.80 (5.90-8.80)	8.30 (7.90-10.20)	8.30 (7.15-9.45)
Diabetes management				
Diet	2	0	0	18
Tablets	24	1	6	2
Insulin	55	4	12	17
Insulin pump	6	1	2	39
Median CES-D (interquartile range)	11.00 (5.75-18.25)	23.50 (20.25-34.75)	18.50 (9.25-28.00)	8.00 (3.25-13.75)
SDSCA				
Mean general diet (sd)	4.41 (1.95)	4.08 (1.24)	4.44 (2.05)	4.44 (2.02)
Mean blood sugar (sd)	5.03 (2.23)	5.42 (2.01)	4.72 (2.39)	5.08 (2.32)

### Life stress and diabetes distress.

The median score for the total sample on the Cooper Life Stress Inventory was 19.50

(interquartile range 9.75-40.00), for those who were currently depressed the median was 39.50 (interquartile range 19.75-52.50), for those who had previously been depressed the median was 35.00 (interquartile range 26.00-67.50) and for those who were never depressed

the median was 16.00 (interquartile range 8.00-23.75). Possible scores range from 0 to 430.

The median score for the full sample on the Diabetes Distress Scale was .59 (interquartile range 0.59-1.20), for those who were currently depressed the median was .26 (interquartile range .06-.31), for those who had previously been depressed the median was .09 (interquartile range .06-.16) and for those who were never depressed the median was .06 (interquartile range .06-.06). Possible scores range from zero to six with a score of <2.0 indicative of mild distress, 2.0-2.9 indicative of moderate distress and  $\geq 3.0$  indicative of high distress (Fisher, Polonsky, Hessler & Mullan, 2012). As such, the current sample reported mild levels of diabetes distress, regardless of their depressive status.

Kruskal Wallis tests found significant differences in diabetes distress and life stress between the three major depressive disorder/episode status groups and these differences remained significant when controlling for current depressive symptoms (see Table 3). For all scales, those who were previously depressed scored significantly higher than those who were never depressed ( $p$ 's<.05-.01). In addition, those who were currently depressed scored significantly higher on total diabetes distress (but not life stress) as well as the interpersonal distress sub-scale than those who had never been depressed. These differences remained significant when controlling for depressive symptoms: life stress ( $F=7.31$ ,  $df=2$ ,  $p=.001$ ), diabetes distress ( $F=6.30$ ,  $df=2$ ,  $p=.003$ ), the emotional burden sub-scale of the DDS ( $F=6.53$ ,  $df=2$ ,  $p=.003$ ), and the interpersonal distress sub-scale of the DDS ( $F=6.16$ ,  $df=2$ ,  $p=.004$ ).

In terms of exploring the relationships between depressive symptoms to life stress and diabetes distress, Spearman's tests showed depressive symptoms to be significantly positively

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correlated with diabetes distress ( $\rho$ 's=.39-.63,  $p \leq .001$ ) and life stress ( $\rho$ =.43,  $p \leq .001$ ) (see Table 3).

In summary, life stress and diabetes distress were moderately associated with both depressive status and depressive symptoms.

Table 3. A summary of the differences across depressive status groups and depressive symptoms for life stress and diabetes distress.

Measure	Depressive status (n=70)					Depressive symptoms (n=70)	
	K&W $\chi^2$	Tukey HSD	CD median (interquartile range)	PD median (interquartile range)	ND median (interquartile range)	rho	Median (interquartile range)
Cooper Life Stress Inventory	<b>10.27**</b>	<b>PD&gt;ND**</b>	<b>39.50</b> (19.75-52.50)	<b>35.00</b> (26.00-67.50)	<b>16.00</b> (8.00-23.75)	<b>.43***</b>	<b>19.50</b> (9.75-40.00)
Diabetes Distress Scale Total	<b>9.28**</b>	<b>CD, PD&gt;ND*</b>	<b>.26</b> (.06-.31)	<b>.09`</b> (.06-.16)	<b>.06</b> (.06-.06)	<b>.62***</b>	<b>0.59</b> (0.59-0.12)
Subscales							
Emotional Burden	<b>10.35**</b>	<b>PD&gt;ND**</b>	<b>3.30</b> (2.55-4.65)	<b>3.50</b> (1.80-4.75)	<b>1.60</b> (1.40-2.55)	<b>.63***</b>	<b>1.80</b> (1.40-3.60)
Physician-related Distress	1.08		1.63 (1.00-2.75)	1.25 (1.00-1.88)	1.00 (1.00-2.19)	<b>.39***</b>	<b>1.00</b> (1.00-2.06)
Regimen-related Distress	3.79		2.60 (1.70-3.70)	2.40 (1.65-3.65)	1.90 (1.20-2.75)	<b>.46***</b>	<b>2.00</b> (1.35-3.05)
Interpersonal Distress	<b>9.89**</b>	<b>CD, PD&gt;ND*</b>	<b>3.00</b> (1.25-4.58)	<b>2.00</b> (1.00-2.92)	<b>1.00</b> (1.00-1.67)	<b>.51***</b>	<b>1.33</b> (1.00-2.00)

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$  CD=currently depressed, PD=previously depressed, ND=never depressed

**Early maladaptive schemas and major depressive disorder/episode status.**

To explore differences in early maladaptive schemas across the three depressive groups, Kruskal-Wallis tests were used. Results showed significant differences on the YSQ total scores as well as on two of the YSQ domains: Disconnection and Rejection, and Impaired Autonomy/Performance. Post hoc analyses showed that those who were currently and previously depressed significantly more strongly endorsed the YSQ total and the Disconnection and Rejection early maladaptive schema domain when compared to those who had never been depressed ( $p$ 's=.05-.001). In addition, post hoc analyses showed that those who were previously depressed significantly more strongly endorsed the Impaired Autonomy/Performance early maladaptive schema domain when compared to those who had never been depressed ( $p$ =.001). After controlling for current depressive symptoms, significant differences did not remain across depressive status group on the YSQ total score ( $p$ =.083), Disconnection and Rejection ( $p$ =.044) or Impaired Autonomy/Performance ( $p$ =.083) early maladaptive schema domains.

In terms of the subscales of the YSQ, six differences were found: abandonment, social isolation/alienation, defectiveness/unlovability, practical incompetence/dependence, vulnerability to harm or illness, and subjugation early maladaptive schema sub-scales (see Table 4). Post-hoc analyses on the six subscales showing difference, showed that those who were currently and previously depressed significantly more strongly endorsed the abandonment, social isolation/alienation, defectiveness/unlovability, vulnerability to harm or illness and subjugation early maladaptive schema sub-scales when compared to those who had never been depressed ( $p$ 's=.05-.001). In addition, those who were previously depressed

significantly more strongly endorsed the practical incompetence/dependence early maladaptive schema sub-scales (see Table 4). After controlling for depressive symptoms, only three of the original six subscales remained significant: abandonment ( $F=8.07, p=.001$ ), practical incompetence/dependence ( $F=6.44, p=.003$ ) and subjugation ( $F=6.00, p=.004$ ) early maladaptive schema sub-scales remained significant.

### **Early maladaptive schemas and depressive symptoms.**

In terms of exploring the relationship between depressive symptoms and the YSQ domain and sub-scale scores, Spearman's tests showed that depressive symptoms were significantly and positively correlated with the YSQ total score as well as all five domains and fifteen of the YSQ sub-scale schema scores, with the exception of the self-sacrifice, unrelenting standards and entitlement early maladaptive schema sub-scales (see Table 4).

In summary, those who were currently depressed and previously depressed significantly more strongly endorsed YSQ total scores, the Disconnection and Rejection early maladaptive schema domains and the abandonment, social isolation/alienation, defectiveness/unlovability, vulnerability to harm or illness and subjugation early maladaptive schema sub-scales when compared to those who were never depressed. In addition, those who were previously depressed more strongly endorsed the Impaired Autonomy/Performance early maladaptive schema domain and the practical incompetence/dependence early maladaptive schema sub-scale when compared to those who were never depressed. After controlling for current depressive symptoms, only the abandonment, practical incompetence/dependence and subjugation early maladaptive schema sub-scales remained significant. Finally, the YSQ total, all five early maladaptive schema domains and fifteen of the YSQ early maladaptive

Table 4. A summary of the differences across depressive status and depressive symptoms for early maladaptive schemas.

YSQ	Depressive status (n=59 <sup>†</sup> , df=2)			K&W $\chi^2$	Tukey HSD	rho (p)	Depressive symptoms
	CD median (interquartile range)	PD median (interquartile range)	ND median (interquartile range)				(n=59) Median (interquartile range)
Total	<b>230.0</b> (192.0-299.5)	<b>229.0</b> (198.0-268.5)	<b>163.0</b> (134.8-204.0)	<b>13.93****</b>	PD>ND*** CD>ND*	.49****	182.0 (140.0-232.0)
Domains							
Disconnection & Rejection	<b>78.0</b> (52.0-107.0)	<b>50.5</b> (40.8-69.0)	<b>34.0</b> (29.0-51.0)	<b>12.67**</b>	CD, PD>ND**	.51****	41.1 (30.0-58.0)
Impaired Autonomy/Performance	<b>37.0</b> (31.8-47.5)	<b>47.5</b> (35.8-55.0)	<b>29.0</b> (22.3-35.8)	<b>15.44****</b>	PD>ND***	.54****	32.5 (25.8-41.0)
Impaired Limits	17.0 (10.1-18.5)	12.3 (10.1-16.4)	10.0 (7.5-12.9)	7.08*		.33**	10.5 (8.5-14.1)
Other-Directedness	55.0 (34.5-59.0)	40.0 (28.0-54.5)	31.0 (26.0-37.0)	8.79*		.43****	34.0 (26.3-43.5)
Overvigilance/Inhibition	66.5 (55.3-86.5)	47.0 (41.0-69.0)	42.0 (32.0-51.0)	6.47*		.43****	43.0 (34.0-63.8)
Schema							
Emotional deprivation	2.4 (1.0-5.3)	1.9 (1.1-3.0)	1.2 (1.0-2.0)	3.70		.32**	1.5 (1.5-2.3)
Abandonment	<b>2.8</b> (1.2-4.6)	<b>2.2</b> (1.1-3.2)	<b>1.2</b> (1.0-1.8)	<b>11.77**</b>	CD, PD>ND*	.36**	1.4 (1.0-2.2)
Mistrust	3.6 (1.8-4.6)	2.5 (1.7-3.3)	1.6 (1.2-2.4)	7.58*		.44****	2.0 (1.4-3.0)
Social Isolation/Alienation	<b>3.0</b> (2.8-3.3)	<b>2.3</b> (1.9-2.8)	<b>1.4</b> (1.0-1.8)	<b>11.89**</b>	CD, PD>ND**	.44****	1.6 (1.0-2.8)
Defectiveness/Unlovability	<b>2.6</b> (2.2-3.6)	<b>1.8</b> (1.1-2.4)	<b>III</b> (1.0-1.6)	<b>12.32**</b>	PD>ND* CD>ND***	.50****	1.2 (1.0-2.0)



YSQ	Depressive status (n=59 <sup>†</sup> , df=2)			K&W $\chi^2$	Tukey HSD	Depressive symptoms (n=59)	
	CD median (interquartile range)	PD median (interquartile range)	ND median (interquartile range)			<i>rho</i> (p)	Median (interquartile range)
Vulnerability to harm or illness	<b>2.6</b> <i>(1.9-3.5)</i>	<b>2.6</b> <i>(1.6-3.0)</i>	<b>1.2</b> <i>(1.0-1.8)</i>	<b>12.50**</b>	PD>ND*** CD>ND*	.60***	1.6 (1.0-2.5)
Enmeshment	1.4 (1.0-2.7)	1.4 (1.0-1.8)	1.0 (1.0-1.6)	4.89		.35**	1.0 (1.0-1.6)
Subjugation	<b>3.3</b> <i>(2.2-4.7)</i>	<b>2.2</b> <i>(1.5-3.0)</i>	<b>1.4</b> <i>(1.0-2.0)</i>	<b>10.26**</b>	PD>ND* CD>ND**	.427***	1.6 (1.2-2.4)
Self sacrifice	4.0 (2.1-5.0)	3.2 (2.2-4.3)	2.8 (2.2-3.6)	2.25		.27*	3.0 (2.2-3.9)
Emotional inhibition	3.9 (2.5-4.5)	2.5 (1.6-3.0)	1.8 (1.2-2.9)	6.77*		.39***	2.0 (1.4-3.4)
Unrelenting standards	3.7 (1.9-5.1)	3.4 (2.2-4.4)	2.6 (1.9-3.6)	3.76		.25*	2.8 (2.0-3.8)
Entitlement	2.5 (2.1-3.3)	2.0 (1.6-3.4)	2.0 (1.4-2.6)	4.02		.25*	2.1 (1.6-2.8)
Insufficient self control	4.1 (1.9-4.4)	2.6 (2.3-3.4)	1.8 (1.4-2.8)	7.08*		.39***	2.2 (1.7-3.2)
Admiration/Recognition- seeking	3.4 (1.6-4.0)	2.2 (1.5-3.8)	2.0 (1.4-2.6)	7.43*		.38***	2.0 (1.4-2.9)
Pessimism	3.3 (2.6-4.1)	2.6 (1.3-3.0)	1.8 (1.2-2.4)	7.56*		.54***	2.0 (1.20-2.8)
Self punitiveness	3.1 (1.7-4.1)	1.9 (1.2-3.4)	1.7 (1.2-2.8)	2.19		.29*	1.8 (1.2-3.0)

CD=currenty depressed, PD=previously depressed, ND=never depressed

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ , <sup>†</sup>data deleted pairwise

schema sub-scales were positively associated with depressive symptoms with the exception of the self-sacrifice, unrelenting standards and entitlement early maladaptive schema sub-scales. Incompetence/dependence and subjugation early maladaptive schema sub-scales remained significant. Finally, the YSQ total, all five early maladaptive schema domains and fifteen of the YSQ early maladaptive schema sub-scales were positively associated with depressive symptoms with the exception of the self-sacrifice, unrelenting standards and entitlement early maladaptive schema sub-scales.

### **Moderation analysis.**

Baron and Kenny's (1986) moderation analysis technique was used to test whether early maladaptive schemas interacted with stress to explain depressive symptoms. There were only a small number of participants in the currently depressed group (n=6), which is likely to have a negative impact on statistical power. As such, the role of early maladaptive schemas as moderators between stress and depressive status was not tested. Although moderation analysis assumes normally distributed variables, Russell and Dean (2000) ran simulations using log transformed variables and concluded that such transformations substantially increase the probability of Type II errors. As such, moderation analysis was conducted using untransformed CES-D data.

After mean centring the independent (life stress or diabetes distress) and moderating variables (early maladaptive schemas total or domain) an interaction term was calculated. The following conditions must then be met: (1) the independent variable (life stress or diabetes distress) must significantly predict the dependent variable (depressive symptoms); (2) when conducting a regression analysis, the independent variable (life stress or diabetes distress)

must not significantly predict the dependent variable (depressive symptoms) and the moderator (early maladaptive schemas total or domain) must predict the dependent variable (depressive symptoms); and (3) there must be a significant interaction term between the independent variable (life stress or diabetes distress) and moderator (early maladaptive schemas total or domain) when predicting the dependent variable (depressive symptoms) alongside a significant  $r^2$  change.

***The moderating role of early maladaptive schemas in the relationship between life stress and depressive symptoms.***

Moderation analysis showed that the  $r^2$  changes at Steps 3 were not significant when testing for the relationship between life stress and depressive status with the exception of the Disconnection and Rejection early maladaptive schema domain ( $\Delta r^2=.03$ ,  $p=.04$ ) (see Table 5). However, as both life stress and the Disconnection and Rejection early maladaptive schema domain were significant predictors of depressive symptoms (step 2), the Disconnection and Rejection early maladaptive schema domain does not meet the criteria for moderation. As such, there is no evidence that early maladaptive schemas significantly moderated the relationship between life stress and depressive symptoms.

***The moderating role of early maladaptive schemas in the relationship between diabetes distress and depressive symptoms.***

Moderation analysis showed that the  $r^2$  change at Step 3 were not significant when testing for the relationship between diabetes distress and depressive symptoms with the exception of the Impaired Limits early maladaptive schema ( $\Delta r^2=.04$ ,  $p=.03$ ) (see Table 6). However, diabetes distress but not the Impaired Limits early maladaptive schema domain met

Table 5. *Testing the moderating role of early maladaptive schemas in the relationship between life stress and depressive symptoms.*

	<i>B</i>	<i>SE B</i>	$\beta$	Adj $r^2$	$\Delta r^2$
<b>YSQ Total</b>					
Step 1				.22	.23***
Cooper Life Stress Inventory	.15	.04	.48***		
Step 2				.39	.18***
Cooper Life Stress Inventory	.10	.04	.33**		
YSQ Total	.07	.02	.45***		
Step 3				.38	.01
Cooper Life Stress Inventory	.10	.04	.30**		
YSQ Total	.07	.02	.44***		
Cooper Life Stress Inventory *YSQ Total	.00	.00	.10		
<b>Disconnection &amp; Rejection</b>					
Step 1				.22	.23***
Cooper Life Stress Inventory	.15	.03	.48***		
Step 2				.47	.25***
Cooper Life Stress Inventory	.11	.03	.35***		
Disconnection & Rejection	.24	.04	.52***		
Step 3				.50	.03*
Cooper Life Stress Inventory	.10	.03	.30**		
Disconnection & Rejection	.24	.04	.52***		
Cooper Life Stress Inventory * Disconnection & Rejection	<b>.00</b>	<b>.00</b>	<b>.19*</b>		
<b>Impaired Autonomy/Performance</b>					
Step 1				.22	.23***
Cooper Life Stress Inventory	.15	.03	.48***		
Step 2				.41	.20***
Cooper Life Stress Inventory	.10	.03	.31**		
Impaired Autonomy/Performance	.38	.08	.48***		
Step 3				.40	.00
Cooper Life Stress Inventory	.10	.04	.31**		
Impaired Autonomy/Performance	.38	.09	.48***		
Cooper Life Stress Inventory * Impaired Autonomy/Performance	.00	.00	-.01		
<b>Impaired Limits</b>					
Step 1				.22	.23***
Cooper Life Stress Inventory	.15	.03	.48***		
Step 2				.33	.10**
Cooper Life Stress Inventory	.14	.03	.43***		
Impaired Limits	.81	.25	.32**		
Step 3				.32	.02
Cooper Life Stress Inventory	.13	.03	.42***		
Impaired Limits	.88	.25	.35***		
Cooper Life Stress Inventory * Impaired Limits	.01	.01	.14		

	<i>B</i>	<i>SE B</i>	$\beta$	Adj $r^2$	$\Delta r^2$
Step 1				.22	.23***
Other-Directedness					
Step 1				.22	.23***
Cooper Life Stress Inventory	.15	.03	.48***		
Step 2				.32	.10**
Cooper Life Stress Inventory	.10	.04	.32**		
Other-Directedness	.30	.10	.36**		
Step 3				.31	.00
Cooper Life Stress Inventory	.11	.04	.34**		
Other-Directedness	.30	.10	.36**		
Cooper Life Stress Inventory * Other-Directedness	.00	.00	-.04		
Overvigilance/Inhibition					
Step 1				.22	.23***
Cooper Life Stress Inventory	.15	.03	.48***		
Step 2				.35	.14***
Cooper Life Stress Inventory	.12	.03	.37***		
Overvigilance/Inhibition	.21	.06	.39***		
Step 3				.34	.00
Cooper Life Stress Inventory	.12	.03	.37***		
Overvigilance/Inhibition	.22	.06	.39***		
Cooper Life Stress Inventory * Overvigilance/Inhibition	.00	.00	-.01		

\* $p \leq .05$ , \*\* $p \leq .01$ ,  $p \leq .001$

Table 6. *Testing for moderating role of early maladaptive schemas in the relationship diabetes distress and depressive status or depressive symptoms.*

	<i>B</i>	<i>SE B</i>	<i>β</i>	<i>Adj r<sup>2</sup></i>	<i>Δr<sup>2</sup></i>
<b>YSQ Total</b>					
Step 1				.41	.42***
Diabetes Distress Scale	.41	.06	.65***		
Step 2				.47	.06*
Diabetes Distress Scale	.31	.07	.49***		
YSQ Total	.05	.02	.30*		
Step 3				.46	.00
Diabetes Distress Scale	.31	.07	.49***		
YSQ Total	.05	.02	.27*		
Diabetes Distress Scale *YSQ Total	.00	.00	.06		
<b>Disconnection and Rejection</b>					
Step 1				.41	.42***
Diabetes Distress Scale	.41	.06	.65***		
Step 2				.52	.11***
Diabetes Distress Scale	.29	.06	.46***		
Disconnection and Rejection	.18	.05	.38***		
Step 3				.52	.01
Diabetes Distress Scale	.28	.06	.44***		
Disconnection and Rejection	.16	.05	.33**		
Diabetes Distress Scale *	<b>.00</b>	<b>.00</b>	<b>.12</b>		
Disconnection and Rejection					
<b>Impaired Autonomy and Performance</b>					
Step 1				.41	.42***
Diabetes Distress Scale	.41	.06	.65***		
Step 2				.48	.08**
Diabetes Distress Scale	.30	.07	.47***		
Impaired Autonomy and Performance	.26	.09	.33**		
Step 3				.47	.00
Diabetes Distress Scale	.29	.07	.47***		
Impaired Autonomy and Performance	.25	.10	.32**		
Diabetes Distress Scale* Impaired	.00	.00	.02		
Autonomy and Performance					
<b>Impaired Limits</b>					
Step 1				.41	.42***
Diabetes Distress Scale	.41	.06	.65***		
Step 2				.43	.02
Diabetes Distress Scale	.37	.06	.59***		
Impaired Limits	.39	.25	.16		
Step 3				.46	.04*
Diabetes Distress Scale	.34	.06	.54***		
Impaired Limits	.37	.24	.15		
Diabetes Distress Scale* Impaired	.03	.01	.21*		
Limits					

	<i>B</i>	<i>SE B</i>	$\beta$	Adj $r^2$	$\Delta r^2$
Other-Directedness					
Step 1				.41	.42***
Diabetes Distress Scale	.41	.06	.65***		
Step 2				.43	.03
Diabetes Distress Scale	.34	.07	.54***		
Other-Directedness	.17	.09	.20		
Step 3				.42	.00
Diabetes Distress Scale	.34	.07	.54***		
Other-Directedness	.16	.10	.19		
Diabetes Distress Scale*Other-Directedness	.00	.01	.02		
Overvigilance/Inhibition					
Step 1				.41	.42***
Diabetes Distress Scale	.41	.06	.65***		
Step 2				.46	.05*
Diabetes Distress Scale	.34	.06	.54***		
Overvigilance/Inhibition	.14	.06	.26*		
Step 3				.45	.00
Diabetes Distress Scale	.34	.06	.53***		
Overvigilance/Inhibition	.14	.06	.25*		
Diabetes Distress Scale*Overvigilance/Inhibition	.00	.00	.03		

\* $p \leq .05$ , \*\* $p \leq .01$ ,  $p \leq .001$

criteria for moderation (step 2). As such, there was no evidence that early maladaptive schemas significantly moderated the relationship between diabetes distress and depressive symptoms.

In summary, there was no evidence that early maladaptive schemas moderated the relationship between either life stress or diabetes distress and depressive symptoms.

### **Mediation analysis.**

Preacher and Hayes (2008) nonparametric bootstrapping approach to multiple mediation model analysis is recommended for small samples. This technique was used to test for mediation using 5000 bootstrapped samples. Mediation is evidenced through 95% bias

corrected confidence intervals which do not include zero and this must include the total of indirect effects (that is, the combined path through mediators). A significant direct effect indicates partial mediation.

***The mediating role of early maladaptive schemas in the relationship between life stress and depressive symptoms.***

Life stress and early maladaptive schemas explained 55% of the variance in depressive -symptoms through the partial mediators of YSQ total (95% CI -3.04 - -.21), Disconnection and Rejection (95% CI .04-.88), Impaired Autonomy/Performance (95% CI .06-.73), Other-Directedness (95% CI .04-.73), and Overvigilance and Inhibition (95% CI .02-.83) (see Table 7). As the total of indirect effects is also significant, this shows that the combination of all schemas included in the analysis upon depressive symptoms is also significant.

***The mediating role of early maladaptive schemas in the relationship between diabetes distress and depressive symptoms.***

Although diabetes distress and early maladaptive schemas predicted 63% of the variance in depressive symptoms, as the indirect effect of diabetes distress on depressive symptoms through early maladaptive schemas did not include zero in the 95% confidence interval, there was no evidence of mediation (see Table 7).

In summary, the YSQ total and the Disconnection and Rejection, Impaired Autonomy/Performance, Other-Directedness and Overvigilance/Inhibition early maladaptive schema domains partially mediated the relationship between life stress and depressive symptoms. However, there was no evidence that early maladaptive schemas mediated the



relationship between depressive symptoms and diabetes distress.

Table 7. Analysis testing for mediating role of early maladaptive schemas in the relationship between life stress and depressive symptoms.

	<b>Asymptotic Path Estimate</b>	<b>Bootstrap Path Estimate</b>	<b>Bias</b>	<b>Standard Error</b>	<b>Lower 95% Bootstrap Confidence Interval</b>	<b>Upper 95% Bootstrap Confidence Interval</b>
<b>Life stress (<math>R^2=0.55, p\leq 0.0001</math>)</b>						
Direct Effect	.10			<b>.03 (<math>t=3.20, p=.0024</math>)</b>		
YSQ total	-1.02	-1.02	.00	.03	<b>-3.04</b>	<b>-.21</b>
Disconnection and Rejection	.26	<b>.26</b>	.00	.66	<b>.04</b>	<b>.88</b>
Impaired Autonomy/Performance	.25	<b>.25</b>	.00	.18	<b>.06</b>	<b>.73</b>
Impaired Limits	.05	.05	.00	.15	-.01	.27
Other-Directedness	.27	<b>.28</b>	.00	.06	<b>.04</b>	<b>.73</b>
Overvigilance and Inhibition	.23	<b>.24</b>	.00	.16	<b>.02</b>	<b>.83</b>
Total of Indirect Effects	.05	<b>.06</b>	.00	.19	<b>.01</b>	<b>.15</b>
<b>Diabetes distress (<math>R^2=0.63; p\leq 0.0001</math>)</b>						
Direct effect	.30			<b>.06 (<math>t=4.99, p\leq 0.0001</math>)</b>		
YSQ total	-4.96	<b>-4.92</b>	.04	1.93	-9.66	<b>-1.82</b>
Disconnection and Rejection	1.53	<b>1.51</b>	-.02	.62	6.12	<b>3.21</b>
Impaired Autonomy/Performance	1.07	<b>1.07</b>	.00	.40	.39	<b>1.99</b>
Impaired Limits	.44	<b>.42</b>	-.02	.20	.16	<b>1.09</b>
Other-Directedness	1.00	<b>1.00</b>	.00	.38	.37	<b>1.99</b>
Overvigilance and Inhibition	1.01	<b>1.01</b>	-.01	.47	.30	2.27
Total of Indirect Effects	.09	.08	-.01	.06	-.03	.21

## **Discussion**

This study aimed to test if the relationship between stress and depressive symptoms or major depressive disorder/episode is better explained by early maladaptive schemas, acting as either a mediator or a moderator, as proposed by Beck (1976) for those with a diagnosis of diabetes mellitus. The findings regarding the role of early maladaptive schemas and depressive status will be discussed first followed by the findings around the role of early maladaptive schemas and depressive symptoms.

### **Early maladaptive schemas and depressive status.**

Those who were currently or had previously been depressed more strongly endorsed YSQ total scores, the Disconnection and Rejection and Impaired Autonomy/Performance early maladaptive schema domains and the abandonment, social isolation/alienation, defectiveness/unlovability (all part of the Disconnection and Rejection early maladaptive schema domain), vulnerability to harm or illness (part of the Impaired Autonomy/Performance early maladaptive schema domain) and subjugation (part of the Other-directedness early maladaptive schema domain) early maladaptive schema sub-scales when compared to those who had never been depressed. This suggests that a generally high number of early maladaptive schema, expectations that one's emotional needs won't be predictably met (Disconnection and Rejection early maladaptive schema domains and the abandonment, social isolation/alienation, defectiveness/unlovability early maladaptive schema sub-scales), expectations that one is unable to function independently and successfully (Impaired Autonomy/Performance early maladaptive schema domain and the vulnerability to harm or illness early maladaptive schema sub-scale) and a tendency to give up control to others are associated with depressive status in diabetes. This is consistent with Beck's (1976)

theory that early maladaptive schemas (unspecified) are associated with depression in diabetes although only a small sample was recruited to the current study which may limit the generalisability of these findings to the entire population of people with diabetes, particularly to those who are currently depressed.. The findings from this study are consistent with previous research for the Disconnection and Rejection (Dozois et al., 2012; Halvorsen et al., 2010; Riso et al., 2003; Wang et al., 2010) and Impaired Autonomy/Performance early maladaptive schema domains (Dozois et al., 2012; Halvorsen et al., 2010; Riso et al., 2003; Wang et al., 2010) and, the social isolation/alienation, defectiveness/unlovability, vulnerability to harm or illness and abandonment (Atalay et al., 2011; Halvorsen et al., 2009; Shah & Waller, 2000; Simmons et al., 2006; Waller et al., 2001; Wang et al., 2010) early maladaptive schema sub-scales. Previous research has been much more inconsistent for the remaining early maladaptive schema sub-scales. Whilst some studies have found differences across depressive status on the subjugation (Atalay et al., 2011; Shah & Waller, 2000; Simmons et al., 2006; Waller et al., 2001; Wang et al., 2010) early maladaptive schema sub-scales, this was not the case in all studies (Halvorsen et al., 2009).

After controlling for current depressive symptoms, none of the early maladaptive schema domains were significantly associated with depressive status in diabetes. Only the abandonment, practical incompetence/dependence and subjugation early maladaptive schema sub-scales were associated with depressive status in diabetes after controlling for current depressive symptoms. This neither supports nor disproves Beck's (1976) hypothesis that early maladaptive schemas are not simply a symptom of depression in diabetes, but a more stable trait. No previous research has tested for differences in early maladaptive schema sub-scales when controlling for depressive symptoms, however, Riso et al. (2003) found that both

the Impaired Autonomy and Performance and Other-Directedness early maladaptive schema domains significantly differentiated between those who were currently, previously and never depressed when controlling for depressive symptoms. Whilst the current study did not support the relationship between the Impaired Autonomy/Performance and Other-Directedness early maladaptive schema domains, the practical incompetence/dependence and subjugation early maladaptive schema sub-scales are part of the Impaired Autonomy and Performance and Other-Directedness early maladaptive schema domains respectively. As such, there is some consistency between the findings from this study and previous research.

Finally, those who were currently or previously depressed with diabetes scored more highly on the YSQ total score. This is consistent with Beck's (1976) theory that early maladaptive schemas are associated with major depressive disorder/episode. However, given the cross-sectional nature of the study, it is not possible to conclude that early maladaptive schemas are developmental factors in major depressive disorder/episode in diabetes. In addition, only a small number of people with diabetes who currently met criteria for major depressive disorder or major depressive episode were recruited. As such, these findings may not be generalisable to the general population with diabetes.

In summary, the findings of the current study are consistent with Beck's original (1976) theory of depression. Consistent with previous research, there were differences between depressive status in diabetes on Disconnection and Rejection and Impaired Autonomy/Performance early maladaptive schema domains and the social isolation/alienation, abandonment, defectiveness/unlovability, vulnerability to harm or illness, practical incompetence/dependence and subjugation early maladaptive schema sub-scales.

After controlling for current depressive symptoms, the abandonment, practical incompetence/dependence and subjugation early maladaptive schema sub-scales remained significant in diabetes. These results should however be considered in the context of the small sample size recruited, particularly for those who currently met criteria for major depressive disorder or major depressive episode. As such, the findings may not be directly generalisable to the general population with diabetes and depression.

### **Early maladaptive schemas and depressive symptoms.**

The YSQ total and the Disconnection and Rejection, Impaired Autonomy/Performance, Other-Directedness and Overvigilance/Inhibition early maladaptive schema domains partially mediated the relationship between life stress and depressive symptoms in diabetes. This suggests that a generally high number of early maladaptive schemas as well as beliefs that one's emotional needs will not be met (Disconnection and Rejection), expectations that one will be unable to cope independently (Impaired Autonomy/Performance) and a focus on others needs at the expense of one's own (Other-Directedness) and suppression of one's needs (Overvigilance and Inhibition) mediate the relationship between stress and depressive symptoms in diabetes. This is consistent with Beck's (1976) hypothesis that early maladaptive schemas explain the relationship between stress and depression. However, only a small number of participants were recruited. As such the findings may not be generalisable to the general population with diabetes. This is however largely consistent with previous research which has identified the Disconnection and Rejection (Calvete et al., 2007a; Cukor, 2006; McGinn et al., 2005), Impaired Autonomy/Performance (Calvete et al., 2007a; McGinn et al., 2005) and Other-Directedness (Calvete et al., 2007a) early maladaptive schema domains to mediate the relationship between

depressive symptoms and current domestic violence (Calvete et al., 2007a) or historical child abuse (Cukor, 2006; McGinn et al., 2005). However, it should be noted that there is little consistency across previous research regarding which domains act as mediators. In addition, previous research has failed to identify the Overvigilance/Inhibition early maladaptive schema domain as a mediator but has identified the Impaired Limits early maladaptive schema domains as mediators between depressive symptoms or historical child abuse (McGinn et al., 2005).

Although diabetes distress was associated with depressive symptoms and the combination of diabetes distress and schemas accounted for a large percentage of the variance of depressive symptoms, there was no evidence that early maladaptive schemas mediated this relationship. This finding does not support Beck's (1976) hypothesis that early maladaptive schemas explain some of the relationship between stress and depression and does not fit with previous research testing the mediating role of early maladaptive schemas as discussed above. It is of note however that this was not the case for the relationship between life stress and depressive symptoms in diabetes. As such, early maladaptive schemas explain the relationship between life stress and depressive symptoms in diabetes but do not explain the relationship between diabetes distress and depressive symptoms in diabetes. Fisher et al. (2012) note a body of literature which conclude that diabetes distress is distinct from major depression with regard to glycaemic control, self-care (Fisher et al., 2010; 2009; 2007; 2008), self-efficacy and quality of life (Fisher, Mullan, Skaff, Glasgow, Arean & Hessler, 2009). As such, one of these factors may better explain the relationship between diabetes distress and depressive symptoms or may explain some of the variance left unaccounted for after controlling for early maladaptive schemas. However, as only a small number of participants

were recruited, the findings may not be generalisable to the general population with diabetes.

There was no evidence that early maladaptive schemas moderated the relationship between either life stress or diabetes distress and depressive symptoms in diabetes. This does not support Beck's (1976) theory that early maladaptive schemas interact with stress to explain depressive symptoms. Previous research supports these findings. Brenning et al. (2012) found that early maladaptive schemas did not moderate the relationship between life stress and depressive symptoms (Brenning et al., 2012). However, in contrast to this, Calvete et al. (2007a) found that the Disconnection and Rejection and Impaired Autonomy and Performance early maladaptive schema domains moderated the relationship between domestic violence and depressive symptoms. One explanation for this may lie in the type of stressor. The findings in this study were consistent with previous research which looked at general life stresses (Brenning et al., 2012) but not those associated with violence. Given that early maladaptive schemas are activated only when stressors replicate the early adverse life experiences in which they developed (Beck, 1976), it may be that the life stresses and diabetes distress experienced are not tapping into the relevant schemas for those with diabetes.

Stronger endorsement of early maladaptive schemas, with the exception of the enmeshment and entitlement early maladaptive schema sub-scales, were associated with depressive symptoms in diabetes. As with the findings regarding depressive status, these findings are in line with Beck's (1976) cognitive theory of depression although given the small sample size recruited, the findings may not be generalisable to the wider diabetes population. There is no research including a clinical group of depressed participants exploring the role of early maladaptive schema sub-scales and depressive symptoms.

In summary, the YSQ total and the Disconnection and Rejection, Impaired Autonomy/Performance, Other-Directedness and Overvigilance/Inhibition early maladaptive schema domains partially mediated the relationship between life stress and depressive symptoms in diabetes. However, there was no evidence that early maladaptive schemas moderated the relationship between life stress and depressive symptoms in diabetes and there was no evidence that early maladaptive schemas mediated or moderated the relationship between diabetes distress and depressive symptoms in diabetes. In addition, the YSQ total, all five early maladaptive schema domains and fifteen early maladaptive schema sub-scales (with the exception of the self-sacrifice, unrelenting standards and entitlement early maladaptive schema sub-scales) were associated with depressive status in diabetes. As such, there is mixed evidence for Beck's (1976) cognitive model of depression for depressive symptoms in a population with diabetes. These results should however be considered in the context of the small sample size recruited, particularly for those who currently met criteria for major depressive disorder or major depressive episode who had more symptoms of depression. As such, the findings may not be directly generalisable to the general population with diabetes and depression.

### **Limitations**

One major limitation of this study was the cross-sectional design. Beck (1976) hypothesized that early maladaptive schemas develop as the result of early life experiences and are therefore a cognitive vulnerability to depression. As such, a longitudinal study testing for the role of early maladaptive schemas as mediators between stress and depression would carry more weight as a direct test of the model.



In addition, the number of participants recruited was somewhat lower than originally intended due to changes in the research team. In particular, the small sample who met criteria for a current diagnosis of major depressive disorder/episode meant that it was not appropriate to conduct moderation and mediation analysis with depressive status as the dependent variable. This also had a negative impact on power. Fritz and MacKinnon (1997) document that  $n=71$  is sufficient only to detect a medium effect size at .8 power for partial mediation when conducting bias-corrected bootstrap mediation analysis. In order to detect a small-small effect size for total mediation, a sample size of 462 is required. As such, this study has insufficient power to detect small mediation effects and this may have led to a conservative estimate of the role of early maladaptive schemas.

Finally, diagnostic interviews were only conducted with participants who scored 16 or over on the CES-D. Whilst this is an appropriate cut off for current depression, it is likely that the previously depressed and never depressed groups are less well defined. That is, the major depressive disorder/episode status of those who were not interviewed relied upon self-report. Information from self-report may have reduced the accuracy of the diagnostic groupings – participants may not have been informed that they met criteria for major depressive disorder/episode.

### **Implications**

Given the mixed evidence for the role of schema as moderators or mediators in the relationship between stress and depressive symptoms or major depressive disorder/episode comorbid with diabetes, further research should be conducted. Further research should

include the measurement of other cognitive constructs with particular emphasis on the interaction between early maladaptive schemas and automatic negative thoughts – do early maladaptive schemas account for more of the variance in depression than just automatic negative thoughts in those with co-morbid diabetes and depression? A prospective longitudinal design should be used in order to establish a causal, not simply correlational aspect. It is also of note that the low rates of life stress reported by participants were associated with depressive symptoms via the mediating role of early maladaptive schemas. Further research could explore the interpretation of stressful life events in those with a diagnosis of diabetes compared to healthy controls.

Clinical implications should be considered in the context of the limitations of this study, most notably the small sample size recruited in this study. Clinically, given that the Disconnection and Rejection and Impaired Autonomy/Performance early maladaptive schema domains were most consistently found to be factors in both depressive status and depressive symptoms, it may be helpful to screen patients for endorsement of this schema. Those who most endorse these early maladaptive schemas may benefit from further support regarding their mood. This group of patients could be monitored and, where appropriate, referred on for further support. In addition, psychological interventions in the form of cognitive behavioural therapy could focus on themes of loss and inability to cope described within the Disconnection and Rejection and Impaired Autonomy/Performance early maladaptive schema domains respectively.

In addition, a full holistic assessment of stressors with a focus on life stressors as opposed to diabetes stressors may allow for the identification of those who are at risk of

experiencing depression. Those identified could be supported in order to manage their depressive episode or symptoms which may improve their ability to effectively self-care.

## **Conclusion**

In conclusion, the findings from this study add to the already inconsistent evidence base regarding the empirical basis for early maladaptive schemas in depression. There was evidence that early maladaptive schemas were associated with depressive symptoms or major depressive disorder/episode in a sample with diabetes. In addition, there was evidence that early maladaptive schemas could help explain the relationship between life stress and depressive symptoms but not the strength of the relationship. However, given the small sample size, particularly for those who currently met criteria for major depressive disorder/major depressive episode, these findings may not be generalised to the wider diabetes population. Given the mixed findings, further research using prospective longitudinal designs should be conducted.

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**Appendix A: Demographic questionnaire**

**Participant Identification Number:.....**

Demographic Information

- 1) How old are you? .....
- 2) When were you first diagnosed with diabetes?.....(year)
- 3) Which ethnic group do you belong to? **Please tick the box.**
  - White:** British, Irish, or any other
  - Asian or Asian British:** Indian, Pakistani, Bangladeshi, or any other
  - Black or Black British:** Caribbean, African, or any other
  - Chinese**
  - Any other Asian background**
  - Mixed background (e.g. White and Black , Black and Asian, or any other)**
  - Other** .....
- 4) What is your weight? .....stone & pounds / kilograms (please circle)
- 5) What is your height? .....feet & inches / metres (please circle)
- 6) **A.**  
Do you suffer from any illnesses or health problems apart from diabetes? \_\_\_yes \_\_\_ no  
If yes please could you state which other health problems you suffer with:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 6) **B.**  
Do you suffer from any health problems/complications due to your diabetes? \_\_\_yes \_\_\_no  
If yes please could you state which problems you suffer with:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 7) What is your current marital status? **Please tick the box.**
  - Living alone
  - Living with partner
- 8) What is your education level?
  - Primary school
  - College

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Secondary School

University

9) What is your current employment status? If currently on maternity leave please tick the box which applied to you before taking leave. **Please tick one box.**

Working full-time

Working part time

Not employed

10) What is your present occupation? (JobTitle) \_\_\_\_\_

11) How do you control your diabetes (tick all that apply)

Diet only

Tablets (how many tablets per day\_\_\_\_\_?)

Insulin (how many injections per day\_\_\_\_\_?)

Insulin pump

12) Have you ever been diagnosed with depression?                   ` \_\_\_yes \_\_\_no

13) Are you currently taking any anti-depressant medication?       \_\_\_yes \_\_\_no

14) Are you currently taking any other medication?               \_\_\_yes \_\_\_no

Please list

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**Q15-17 are for women only**

15) Are you currently taking any oral contraception?               \_\_\_yes \_\_\_no

16) When was your last menstruation period? \_\_\_\_\_

17) Are you currently taking any hormone replacement therapy?   \_\_\_yes\_\_\_no

**\*Thank you very much for taking the time to complete this questionnaire\***

**Appendix B: Centre for Epidemiology Studies Depression Scale (CES-D; Radloff, 1977)**

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**Appendix C: Cooper's Life Stress Inventory (CLSI; Cooper, Cooper, & Faragher, 1989)**

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**Appendix D: Summary of Diabetes Self-Care Activities scale (SDSCA; Toobert, Hampson & Glasgow, 2000)**

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**Appendix E. Diabetes Distress Scale (DDS; Polonsky et al., 2005)**

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**Appendix F: Young Schema Questionnaire - Short Form version 3 (YSQ-S3; Young, 2005)**

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**Appendix G. Schedules for Clinical Assessment in Neuropsychiatry (SCAN-2.1; World Health Organisation; Wing et al., 1990; Wing, 1996)**

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**Appendix H. Ethical approval from the East Midlands, Nottingham, and West Midlands, Coventry and Warwickshire Health Research Authority National Research Ethics Service (11/WM/0128).**

Data removed from electronic version to preserve anonymity.



## Empirical Paper

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## Appendix I. Participant Information Sheet.

### Study Title: Mood States, Brain Derived Neurotrophic Factor, and Diabetes

#### Participant Information Sheet

[Research Ethics Committee reference number: 11/WM/0128]

We are inviting you to take part in a research study. Before you decide whether you want to take part, it is important for you to understand why the research is being done, and what it will involve. We would be grateful if you could take the time to read the following information carefully. Please feel free to discuss it with friends, relatives or your family doctor (GP) if you wish. If there is anything that is not clear, or if you would like more information, please contact the study researcher Aimee Poote, whose contact details you will find at the end of this information sheet.

NHS hospitals have a Patient Liaison and Advisory Service (PALS) and this is an independent route for you to seek advice or express any concerns that you may have. Their local contact details are listed below.

**INFORMATION REMOVED TO MAINTAIN CONFIDENTIALITY**

#### **What is the purpose of this study?**

The aim of this study is to investigate whether stress related to managing diabetes, plays a role in the development of depressive symptoms. We also aim to investigate whether psychological factors play a role.

#### **Why have I been selected to take part in the study?**

All those attending the **INFORMATION REMOVED TO MAINTAIN CONFIDENTIALITY** hospitals with a diagnosis of diabetes will be asked to participate in this study.

#### **Do I have to take part?**

It is up to you to decide whether or not to take part. This information sheet is provided to help you to make that decision. You will be given time to think about the information in this letter and decide whether or not you wish to take part. Even if you decided to take part, you would still be free to withdraw at any time and would not have to give a reason. A decision to withdraw or not take part in the study would not affect the standard of care you receive.

Any information you provide will be treated as confidential except if we are concerned or worried about your wellbeing or safety. In such circumstances, the researcher will speak to you about what steps you can take and it may be necessary that we contact your GP so that he/she is able to help and support. Your participation in this study would not affect any other support or care that you were receiving

#### **What would taking part in the study involve?**

If you agree to take part in the study you will be asked to complete a number of short questionnaires. The questionnaires, which will assess mood, thoughts, problems with

diabetes, and physical activity, should take no longer than 30 minutes to complete. You will have the option to take these away with you and post them back to the researchers.

In order to view your recent results concerning the control of your diabetes (HbA1c results) the research team will require access to your medical records.

Should you score highly on the questionnaire assessing mood, you will be contacted by the researcher, Aimee Poote, to take part in a more in-depth telephone interview about your mood. This should last no longer than 30 minutes and will enable the team to provide you with tailored feedback on the appropriate next steps to take. If at the time of the interview we have significant concerns about your wellbeing or safety, we will ask to speak to a family member or friend who might be able to assist you and we will liaise with your GP so that he/she can support and advise you.

**Who would know about me taking part in the study?**

Only members of the research team (**INFORMATION REMOVED TO MAINTAIN CONFIDENTIALITY**; Dr Arie Nouwen, Senior Lecturer; and Aimee Poote, Trainee Clinical Psychologist, University of Birmingham) would know whether you had agreed to take part in the study. However, we would also like to inform your GP about your participation.

When writing up the findings of the study the researchers would take care to ensure that they do not reveal the identity of participants. All information that you provide us will be treated as confidential and will not be shared with anyone outside the research team.

**What do I have to do?**

A member of our research team is available to give you the opportunity to discuss the study in more detail. If, after discussion you are still interested in participating in the study, an appointment can be made for the research to take place. However, if you feel that you must discuss your involvement in the study with your doctor or anyone else, please do.

**What are the benefits of taking part?**

There are no direct benefits to taking part in the study. However the information we receive from this study may give us a better understanding of the role stress and thoughts about yourself and others may play in the development of depressive symptoms in people with diabetes. This may help to develop more effective treatment and intervention strategies.

**What are the possible disadvantages and risks of taking part?**

In the unlikely event that you become distressed as a result of your participation, please let us know using the contact details below. In the first instance we will discuss the difficulties that arose. If you require professional help, we will discuss this with you first and suggest that you contact your GP.

**What if something goes wrong?**

Once again, if participating in this research project distresses you, you should let us know by using the contact information at the end of this sheet. In the first instance, we will discuss your difficulties with you. If you need professional help, we will speak to you about this and you may then want to contact your GP or Doctor at the clinic.

There are no special compensation arrangements. If you are harmed due to someone's negligence, then you may have grounds for a legal action but you may have to pay for it. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been approached or treated during the course of this study, the normal National Health Service complaints mechanisms should be available to you.

**What if I have special needs?**

We will make every effort to ensure that there are no barriers for you if you wish to take part. If you have 'communication problems' (due to a disability – e.g. hearing impairment / visual impairment/ dyslexia) you are asked to contact us using the details below. If you have difficulties with reading, please inform us. The researcher may be able to offer you more time to complete the study and/or assist you in reading the questionnaire. If you envision any other problems, please contact the researcher and every effort will be made to make things easier for you.

**What would happen to the information I provide?**

The questionnaire information will be entered on a research computer at the University of Birmingham and then stored in a locked cabinet at the University of Birmingham. Your information would only be identifiable via a unique study number. The responses would only be used for the purposes of this study, and would be destroyed after a period of ten years.

**What will happen to the results of the research study?**

The results of the study will be written up in a final report and the results may also be written up in professional journals. When the study is complete you will be sent a letter, which will contain details of the results and any significant findings.

**Who is organising the research?**

Researchers from the University of Birmingham together with **INFORMATION REMOVED TO MAINTAIN CONFIDENTIALITY** are organising and conducting the study. The study is being conducted under the direction of Dr Arie Nouwen, Senior Lecturer at the University of Birmingham. The study researchers is Aimee Poote.

**Who has reviewed the study?**

The study has been reviewed and approved by the NHS Research Ethics Committee .

**What if I want further information about the study?**

If you would like any further information about the study please contact the study researchers, Aimee Poote (**INFORMATION REMOVED**) or Dr. Arie Nouwen, (**INFORMATION REMOVED**).

\* \* \* \* \*

**Thank you for taking the time to read this information sheet**

**Appendix J. Consent Form.**

**Study Title: Mood States, Brain Derived Neurotrophic Factor and Diabetes**

**Participant Identification Number:**

**Research Ethics committee number: INFORMATION REMOVED**

Consent form for research participants

(Please tick each box)

1. I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
2. I understand that my participation in the study is voluntary and that I am free to withdraw at any time during the research, without giving any reason, and without my care being affected.
3. I understand that the information which I provide will be treated in confidence and that it will not be shared with any person outside of the research team.
4. I agree to allow members of the research team access to my medical records.
5. I agree for my GP to be contacted and informed about my participation in this study.
6. I agree that my GP and my nominated family member or friend can be contacted should the researchers have serious concerns about my wellbeing.
7. I confirm that I am willing to take part in this research study.

.....  
Name of participant

.....  
Date

.....  
Signature

.....  
Name of researcher

.....  
Date

.....  
Signature



Empirical Paper

**Appendix K. Behaviour Research and Therapy Guide for Authors.**

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## **CHAPTER THREE - EXECUTIVE SUMMARY.**

## **Outline**

This research was conducted in partial fulfilment for the qualification of Doctorate in Clinical Psychology at the University of Birmingham.

The cognitive theory hypothesises that pervasive patterns of thinking which are hypothesised to develop early in life are important in the development of depression (Beck, 1976). These patterns of thinking are called core beliefs or early maladaptive schemas and become activated when stressed in depression. Young, Klosko and Weishaar (2003) described five domains of early maladaptive schemas: Disconnection and Rejection (the belief that one's emotional needs won't be predictably met), Impaired Autonomy/Performance (the expectation that one will be unable to successfully and independently function), Impaired Limits (a deficiency in internal/external limits or long-term goal orientation), Other Directedness (an excessive focus on the emotional needs of others at the expense of one's own needs) and Overvigilance and Inhibition (an emphasis on suppressing one's feelings, impulses and choices or meeting rigid internalised rules at the expense of one's emotions).

The literature review synthesised and critically appraised all research testing the role of early maladaptive schemas and stress in the development of depression. This found that there is some empirical evidence to support the role of early maladaptive schemas in the development of depression. However, more longitudinal research is needed.

## **Background**

## Executive Summary

Up to 5% of the population have a diagnosis of diabetes mellitus (National Collaborating Centre for Chronic Conditions, 2008). Depression is more common in those with diabetes when compared to the general population but only after a diagnosis of depression (Nouwen et al., 2010). It is therefore likely that psychological factors might be important.

As stress may be an important factor in the development of depression for those with diabetes, cognitive theory, which postulates that negative ways of thinking are triggered by stress and lead to depression, may be a helpful way to understand depression for those who have diabetes. However, only one study has tested the role of the cognitive model in those with diabetes and depression and this study did not explore the role of early maladaptive schemas (Clarke & Goosen, 2009).

### **Aims of the study**

This study aimed to test if: (i) the relationship between stress and depression is better explained by early maladaptive schemas for those with diabetes, (ii) early maladaptive schemas strengthen the relationship between stress and depression, and (iii) early maladaptive schemas are associated with depression.

### **Methods**

A cross-sectional study was used. Participants were recruited from diabetes clinics in three inner city Hospitals and asked to complete questionnaires assessing depressive

## Executive Summary

symptoms, early maladaptive schemas, diabetes distress and life stress. Those who scored highly for depressive symptoms were interviewed in order to establish if they met criteria for depression.

## Results

70 participants with Type 1 and Type 2 diabetes were included in the analysis. There was evidence that early maladaptive schemas could help explain the relationship between life stress and depressive symptoms. The important early maladaptive schemas were the Disconnection and Rejection, Impaired Autonomy/Performance, Other-Directedness and Overvigilance and Inhibition early maladaptive schema domains. However, there was no evidence that any early maladaptive schemas helped explain the relationship between diabetes distress and depressive symptoms.

There was no evidence that any early maladaptive schemas strengthened the relationship between stress and depressive symptoms.

Those who currently or previously met criteria for a major depressive episode more strongly endorsed the Disconnection and Rejection and the Impaired Autonomy/Performance early maladaptive schema domains when compared to those who had never met criteria for a major depressive episode. However, when removing the influence of the severity of depressive symptoms, those who were currently or had previously had a major depressive episode did not score any differently than those who had never had a major depressive episode. However, the abandonment, practical incompetence/dependence and subjugation



## Executive Summary

early maladaptive schema sub-scales remained significantly more strongly endorsed by those who had met criteria for a major depressive episode when compared to those who had never met criteria.

Those who reported more depressive symptoms scored more highly on all measures of early maladaptive schemas with the exception of the self-sacrifice, unrelenting standards and entitlement early maladaptive schema sub-scales.

## Conclusion

In conclusion, the findings from this study add to the already inconsistent evidence for early maladaptive schemas in depression. There was evidence that early maladaptive schemas were associated with depressive symptoms or major depressive disorder/episode for those with diabetes. In addition, there was evidence that early maladaptive schemas could help explain the relationship between life stress and depressive symptoms but not the strength of the relationship. Given the mixed findings, further research using prospective longitudinal designs should be conducted.

## Contact Details

Dr Aimee Poote, School of Psychology, University of Birmingham, Edgbaston, Birmingham, B15 2TT.

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