EMOTION-RELATED INFORMATION PROCESSING BIASES ASSOCIATED WITH DEPRESSION IN CHILDHOOD

Lyndsey Elizabeth Drummond

A Thesis Submitted for the Degree of PhD at the University of St. Andrews

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EMOTION-RELATED INFORMATION PROCESSING BIASES ASSOCIATED WITH DEPRESSION IN CHILDHOOD

LYNDSEY ELIZABETH DRUMMOND

A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy

School of Psychology

UNIVERSITY OF ST ANDREWS

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Abstract

Few studies have examined depression in children from an Information Processing (IP) perspective. In this thesis a number of domains of IP (known to be associated with adult depression) are examined in children and adolescents, in particular, autobiographical memory specificity in both clinical and non-clinical samples. Foremost, overgeneral memory (OGM) was found for the first time, to be characteristic of dysphoric (Study 1) and clinically depressed children (Study 2). Similarity in the extent of the OGM bias in depressed and dysphoric children was observed. OGM was also comparable across child, adolescent and adult depressed groups (Study 2). Second, OGM predicted depressive symptoms in children during a stressful life event, in the first longitudinal diathesis-stress investigation of OGM to date (Study 3). OGM was also linked for the first time to an overgeneral thinking style and to a depressive attributional style (Study 3) thereby offering possible mechanistic insight in OGM. Third, in support of Williams' (1996) developmental origins hypothesis, OGM was also demonstrated in children in residential care who had suffered significant independently verified negative life events (Study 5). OGM in these youth was positively correlated with deficits in social problem solving and facial-affect identification, in part contextualizing OGM in children alongside depressogen-typical biases. Performance on the AMT also varied as a function of severity of abuse with more abused children demonstrating less OGM – a recency memorial coping strategy is proposed to account for this effect. Fourth, a new measure of EF was introduced and highlights the importance of encoding preferences in explaining OGM (Studies 1 & 5). Finally, considerable attention is paid to the pattern of valence results across studies. It is noted that effects most often lie with biases in the processing of positive information and that future studies may benefit from a concentration on this aspect of depressogenic bias utilizing a developmental perspective. Several key theoretical and practical implications are carefully discussed.
Declarations

I Lyndsey Drummond hereby certify that this thesis, which is approximately 77,000 words in length, has been written by me, that it is the record of the work carried out by me and that it has not been submitted in any previous application for a higher degree.

Date
January 2006

I was admitted, as a research student in September 2001 and as a candidate for the degree of Doctor of Philosophy in August 2002. The studies herein for which this thesis is a record were carried out between September 2001 and January 2006.

Date
January 2006

I hereby certify that the candidate has fulfilled the conditions of the Resolution and Regulations appropriate for the degree of Doctor of Philosophy in the University of St Andrews and that the candidate is qualified to submit this thesis in application for that degree.

Date
January 2006

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Date
January 2006
Acknowledgements

I would like to give my sincere thanks to all the clinicians and staff members who went out of their way to assist me in my data collection. I am indebted to you.

My sincere thanks goes to Dr. Sharp without whom my thesis would have looked rather bland. Your undeserved support means I can boast of a very interesting and important residential study. I am truly grateful.

I am also grateful to the teaching staff and parents of all the schools I have worked in. Thank you for not being too suspicious of me and trusting me to research your children. I hope it was worthwhile.

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Thank you to my supervisor, Dr. Barbara Dritschel, for putting up with my last minute ideas and theories. Thank you to Dr. Tim Dalgleish for contributing valuable time, ideas, humour and encouragement.

My heartfelt thanks to you to my parents without whose constant support emotionally and financially I would never have come this far! I love you.

Thanks to Matsy, Jacque, Sharon, Maur, Prosy & Matthew for believing in me and always making me want to do my best. And thank you to John A. Francis, for always speaking life and fearlessness.

Above all, thank you to you God, through whom all things are possible and in whom all things are made good. "Speak it into existence, without intimidation. Exhale all God has inhaled into you" (Bishop T. D. Jakes)
"The real intellectual challenge won't lie ultimately in sheer happiness-maximisation. After all, if eternal bliss were the sole objective of paradise-engineering, then a rat with electrodes fixed in its pleasure-centres already points the way forward" from A Commentary on the Need for Sadness.

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List of Publications arising from the thesis

Papers:


Drummond, L. E., Dritschel, B., Ridout, N., & Dalgleish, T. Evidence of Overgeneral Autobiographical Recall in Clinically Depressed Children, Adolescents and Adults (submitted)


Published Abstracts:


Drummond (2005) An Affective-Information Processing Profile of Boys in Residential Care, BPS CYP conference, Edinburgh

Papers in preparation:

Drummond L. E., A Content Analysis of Autobiographical Memory in Child, Adolescent and Adult Groups: Predicting Themes and Valenced Responses (in preparation)

Drummond, L. E., Ridout, N. & Dritschel, B. The Facial Affect Memory Test in Children and Adolescents (in preparation)

Drummond, L. E., Dritschel, B., & Dalgleish, T., Does Overgeneral Memory Predict Depressed Mood in Longitudinal Study of 9-11 year olds (in preparation)
### List of Abbreviations

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<th>Abbreviation</th>
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<tr>
<td>AM</td>
<td>Autobiographical Memory</td>
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<tr>
<td>OGM</td>
<td>Overgeneral Autobiographical Memory</td>
</tr>
<tr>
<td>AMS</td>
<td>Autobiographical Memory Specificity</td>
</tr>
<tr>
<td>AMT</td>
<td>Autobiographical Memory Task</td>
</tr>
<tr>
<td>MI</td>
<td>Mneumonic Interlock</td>
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<tr>
<td>ARH</td>
<td>Affect Regulation Hypothesis</td>
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<tr>
<td>EF</td>
<td>Emotion-Focusing</td>
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<tr>
<td>ER</td>
<td>Emotion-Recognition</td>
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<tr>
<td>CS</td>
<td>Cognitive Style</td>
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<tr>
<td>SPS</td>
<td>Social Problem Solving</td>
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<tr>
<td>CDI</td>
<td>Children’s Depression Inventory</td>
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Happiness is an illusion; only suffering is real (Voltaire)

The mass of men lead lives of quiet desperation (Thoreau)

What is worth being happy about? (Anonymous)
Abstract 1 | This General Introduction provides an outline of the thesis and its primary research objectives. In Part I, a general background on the topic of depression in childhood is presented. Therein, issues pertaining to childhood depression are considered and discussed in light of adult depression. In Part II, prominent theories of cognition and emotion and the information-processing approach are introduced as the central theories guiding this body of research. In Part III, the current IP research in childhood depression is reviewed.
Chapter 1 General Introduction

Thesis Aims and Theoretical Perspective

The objective of the present thesis is to examine cognitive aspects of depression in children and adolescents, looking for the origins and possible development of cognitive biases strongly associated with adult depression. Many theories of depression assert that the origins of processing biases occur in childhood or adolescence where schemas are being established (e.g. Beck, 1976). The experimental aim of this research project was to investigate depression-associated emotion-related cognitive biases in children, assessing the parameters of these biases where appropriate. This mainly takes the form of extending work on overgeneral autobiographical memory bias, to a child population. There is also some investigation of facial-affect recognition, cognitive style, social problem-solving and emotion-focusing tendencies. The major goal in studying such depressive information processing in children in this thesis is to learn more about the processes by which cognitive vulnerabilities to adult depression may be acquired in childhood. At its conclusion, it is hoped that the work will also allow for some assessment of the temporal relationship between bias and disorder. This is integral to elucidating causal theories of depression.

This body of work is based on an information-processing approach to the investigation of major depression. A number of cognitive theories have been proposed to account for the growing literature on the cognitive aspects of depression. For example, one of the most influential of these theories is Beck’s Schema Theory (1967; 1976). Beck’s theory is founded on the idea that emotional disorders are characterized by schemata; a set of cognitive beliefs which influence a person’s perceptions, interpretations and memories, which may result in biased cognition. The aetiological proportion of depression attributable to cognitive biases is not known. However evidence from the adult literature suggests that cognitive models play an
important role. There are however considerable gaps in our knowledge about how mechanisms of dysfunctional information processing are acquired. It is the attempt of this thesis to investigate cognitive biases or operations which may exist and originate in childhood, and may contribute to the onset of later adult depression.

This thesis principally attempts to look at the relationship between mood and cognition in children. A developmental approach to the acquisition of negative self-schemas was first suggested by Teasdale (1983) who hypothesized that depressive information processing is learned through the experience or repeated associations between mood and thoughts or memories (see also Bower, 1981). Work that has been conducted seems to suggest that schema based processing, with its capacity for bias and selective recall, is already well in place in children before adulthood and may play a role in future vulnerability to depression. For example, the loss of a parent through divorce, though not directly connected to depression, could be predicted to be indirectly connected to later depression through its potential influence on the development of the child’s cognitive set (Brown & Harris, 1978).

This process can be referred to as a form of developmental psychopathology (Rutter, 1989) and is important in the sense that it is the study of the origins and course of individual patterns of maladaptation; integrating clinical, cognitive, social and developmental aspects of psychology. Though it is out with the remit of this thesis to tackle all possible component parts, the thesis does attempt to address the deficit in research of an information processing nature in children. This is important because early onset of depression increases the likelihood of more serious depression in the future (Birmaher, 1996). One explanation is that the first episode of depression sensitises the individual to future episodes (see Segal, Williams, Teasdale & Gemar, 1996). According to this view, the first episode of depression is
accompanied by lasting changes in biological processes and alterations in responsivity to future stressors (Post et al, 1996). Depression may therefore be accompanied by changes in cognitive processing which result in future vulnerability to depression. The stance taken in this thesis is that demonstration of depression or depressive symptoms in childhood is a prequel to that evidenced in adult populations. A core disorder continuum hypothesis is endorsed.
1.1. What is Depression?

Depression is a common and debilitating psychiatric affective disorder. Depression typically involves multiple episodes and can be chronic. Although depression can be viewed as a constellation of symptoms, sad affect is central. The affective state of depression is often accompanied by feelings of inadequacy, an inability to concentrate, feelings of helplessness, hopelessness and negativity. Depression can follow diverse courses and has multiple aetiologies. Depression is a construct (Scott & Ingram, 1998). Depression represents a psychologically mediated disorder, is reactive to life events and reflects a state of both social and psychological dysfunction. It is debilitating in several domains of functioning and costly in terms of individual suffering as well as mental health resources.

1.2. What is Childhood Depression?

Childhood depression is now considered much the same as adult depression according to criteria in the fourth edition of the diagnostic and statistical manual of mental health disorders (DSM-IV; American Psychiatric Association, 1994). Diagnosis of childhood depression largely parallels that in adults with only minor amendments (see Appendix 1.1). Depression in children includes depressive feelings (sadness, despair, anhedonia), depressive behaviours (aggression, irritability, withdrawal, psychosomatic symptoms) and depressive cognitions (negative beliefs, devalued view of self). Yet until the late 1970’s depression was not widely accepted as a valid affective disorder in children. For instance, it was believed that children lacked sufficient superego to experience ‘negative affect turned inwards’ (Rochlin, 1959).
However, research over the last 30 years has demonstrated that depression is prevalent in children and that, though some symptoms may vary as a function of age, the essence of depression, from a cognitive perspective, remains the same e.g. negative thoughts about self, world and future, hinged on themes of personal loss and failure.

### 1.2.1. Symptomatology

The fact that childhood depression is characterised by the same diagnostic criteria used for adults, has an advantage of developmental continuity. However there are some differences. For example, separation anxiety, phobias, somatic complaints, and behavioural problems are more commonly co-morbid in children. Anhedonia, psychomotor retardation, psychosis, suicide attempts and completions, and impairments in cognitive functioning increase with age (Hammen & Rudolph, 2003). Hypersomnia, weight loss and delusions are less common in children. Depressed children also often exhibit irritability unlike adults for example (Kovacs, 1997). Clearly a child's depressive symptoms will vary with his/her developmental level for example, crying hourly, at 8 months of age has different implications than this same behaviour at age seven. The expression of depression in the elderly can also manifest differently to that of adult depression. Hence, developmentally relevant differences in symptom expression do not necessarily indicate different pathologies.

### 1.2.2. Prevalence

Prevalence rates are estimated between 2-8% for serious depression in prepubescence and 10-20% in adolescence (Reynolds & Johnston, 1994). Occurrence of depression in children and adolescents is increasing whilst age of onset is decreasing (Fombonne, 1999). This may be linked to greater awareness of the condition in youth. Otherwise, rapid social change,
overcrowding, loss of family support through family breakdown, shifts in occupational and employment patterns may be implicated (Kovacs, 1997).

1.2.3. Onset

Retrospective accounts from adults report first depressive episodes around 15-19 years (Burke, Burke, Regier, & Rae, 1990). However, prospective studies of children and adolescents find that the most common age of onset is earlier, between 11-15 years (Lewinsohn, Hops, et al., 1993). Depression in children under the age of seven is diffuse and less easily identifiable, but it still important to recognize depression-associated deficits in children since their less visible symptoms may develop into depressive disorders during late childhood or early adolescence (Cantwell, 1990).

1.2.4. Recurrence

Recurrence rates are high for childhood depression (Kovacs, 1996). Figures suggest 25% after 1 year, 40% after 2 years and 70% recurrence after 5 years (Fombonne et al., 2001). In fact recurrence rates are similar to those found in adults (Birmaher, 2004).

1.2.5. Co-morbidity

Inter-correlation is an inherent characteristic of child and adolescent psychopathology. Co-morbidity, or the co-occurrence of two independent diagnoses in some studies, has been found to be high in depressed children and adolescents (Birmaher et al., 1996; Hammen & Compas, 1994). Anxiety, dysthymic and conduct/behavioural disorders, and substance abuse
are the most frequent co-morbid diagnoses. The mood states of depression and anxiety are highly correlated. This empirically tested co-occurrence has been shown across diverse groups (Compas & Oppedisano, 2000; Seligman & Ollendick, 1998). However, to some extent this co-occurrence reflects the way in which anxiety and depression are measured. Psychiatric conceptualisations of the two states share several symptom criteria e.g. problems with eating, sleeping and concentration. Hence, there are clearly going to be overlaps in diagnosis. However, even when non-overlapping criteria are used, there is still a strong correspondence- probably due to the fact that both states are characterised by negative affect (Clark & Watson, 1991). Despite the features they have in common, anxiety and depression are not interchangeable constructs. There are clear differences with respect to cognitive content and behaviour and biases even in childhood (e.g. Schneiring & Rapee, 2004). It is highly desirable that techniques and methodologies are developed to try to further aid differentiation of childhood disorders and look at ways of assessing disorder specific differences in cognitive functioning. Moreover, it is important to point out that rates of co-morbidity may be only slightly higher than in adults, 60-90% in adults and 80-95% in children, co-morbid with Axis I and II, clinical and personality disorders (Kovacs, 1996).

1.3. Child and Adult Depression

Though there are clear commonalities between childhood and adult manifestations of depression, there remains some controversy over whether child and adult depression form part of the same disorder or whether they are distinct entities. During the past 20 years the existence of MDD in children and adolescents has been consistently documented (Kovacs, 1996). The continued reasons for ambiguity therefore principally concern high rates of co-morbidity, suggesting a possible ‘negative affect’ disorder rather than distinct anxiety or
depression in childhood. Though recent work by Schniering and Rapee (2004) on content specific biases in children, for example, has cast doubts on this theory. Another complexity in viewing the continuity between child-adult depressions concerns possible differences in symptom manifestation. However, information about differences in symptom expression is sparse and difficult to synthesize. “Evidence regarding developmental changes in symptoms of depression is unsystematic and inconclusive” Kovacs (1996). Moreover, none of the symptoms that are believed to differ (e.g. irritability) are core depressive symptoms.

Thus, there is consensus that children and adolescents both experience depressed mood. There is however controversy over children’s capacity to experience depressive disorder as commensurate with adults (Double, 2005; Timimi, 2004). This has perhaps made researchers reluctant to investigate the ‘depressed child’ as a precursor to the depressed adult. However, Kovacs (1996) concluded that ‘early onset MDD is a particularly serious form of affective disorder’. Moreover, the difficulty in recognizing the continuity between child-adult depression may also exist due to that fact that although a number of children develop cognitive vulnerability to depression through-out childhood, at this age, they perhaps do not experience significant enough (or relevant enough) stressors to trigger depression, i.e. consistent with a diathesis-stress model of mental health (Abela, 2001). However, in late adolescence there is perhaps more fertile ground for ‘stress’ and therefore latent vulnerabilities may become exposed. Therefore, evidence of depressive vulnerability may not be recognized until this point, creating a false ‘gap’. In essence, even if child depression is not a useful developmental precursor to adult depression, efforts are still needed to assess effects of mood in children, from the point of view and rationale of looking for evidence of the onset and development of adult type biases. The recurrence rates however, and also the statements
endorsed (e.g. I hate myself) support the decision to make theoretical, as well as literal links between child and adult depression.

1.4. The Importance of Early Onset-Depression

Not only is depression evident in childhood but, the earlier the onset of depression, the poorer the prognosis for the individual (Birmaher et al., 1996; Garrison, Waller, Cuffe, & McKeown, 1997). Numerous outcome studies have documented the negative effects of depression on children (e.g. Hammen & Compas, 1994; Kaslow, Deering & Racusin, 1994). For example, when undetected and therefore untreated, childhood depression increases a child’s risk for substance abuse, suicidal behaviour, and poor psychological, social, and academic functioning (Birmaher et al., 1996; Kaslow, Brown & Mee, 1994). Depressive symptoms reported in children aged 8 also independently predicted an increased number of depressive symptoms 10 years later in a prospective community-based study (Haavisto et al, 2004).

Moreover there may be important differences between depression, which has its aetiological roots in childhood, versus depression, which has later onset and perhaps is more clearly linked to an immediate adverse life event. For example, when Ma and Teasdale (2004) examined the effectiveness of mindfulness based cognitive therapy (MBCT) as a treatment for depression, they found that though the treatment was successful in reducing remission, there were group differences in treatment, based on the nature of the history of depression. The treatment proved particularly effective for depressed individuals with three or more previous episodes of depression and where depression was not preceded by life events but by more childhood adversity and earlier first depressive onset. Thus, it is important to distinguish between age
relevant origins of depression, as it may result in different underlying cognitive dysfunctions. This thesis is exploring the origins of depressive dysfunction from childhood.

Steinberg, Alloy and Abramson (1998) found that a lower age of onset of first lifetime episode of depression predicted relapse and recurrence, even when cognitive risk status was controlled for: “When they appear in childhood or adolescence, persistent anhedonia and persistent feelings of worthlessness merit special attention”. These two clinical features, in particular, were found to predict later risk of adult onset depression. The positive predictive value of anhedonia reported in adolescence was 58% and for persistent feelings of worthlessness was 61%. A total of 33% of adults with MDD reported early-life clinical features before age 19. Though adults are subject to errors in recall these results are suggestive of an insidious onset of MDD. Wilcox & Anthony (2004) examined cumulative occurrence of clinical features of depression from age 6-18 in a retrospective epidemiological study of 150 adults with MDD, aimed at identifying specific early markers or precursors to risk for depression occurring 13-15 years later. The earliest and most frequently occurring problem was persistent depressed mood. This had special prognostic value. The importance of studying the earliest clinical features in the screening and prevention of depression are therefore clear.

1.5. The Continuity-Discontinuity Debate

There is no uniformity in the literature as to whether depression as a mood (e.g. dysphoria) is qualitatively different to depression as a disorder. The distinction seems to be quantitative i.e. how much (how severe) and for how long (symptom duration). The continuity argument would be that depression exists as an entity on a dimension from unstable to stable. The
discontinuity argument would view depression more as a disease with a discrete aetiology. As already mentioned, there is also some uncertainty over whether childhood and adult depression reflect a continuum of the same disorder, or whether they describe separate conditions (e.g. Fombonne et al, 2001; Harrington, 1993; Harrington, Rutter & Fombonne, 1996).

1.6. Relationship between Clinical and Sub-clinical levels of depression in Children

The continuity hypothesis would assert that the only differences between clinical and sub-clinical depression are ones of degree not quality. That is, that clinical depression is classified by greater length and intensity of depressive symptoms, which have greater delirious effects on other functioning. On the other hand, sub-clinical depression would be characterized by the same symptoms (depressed mood, negative self cognitions, hopelessness) but these symptoms would be fewer in number, would have occurred for less time, or would not be significant enough to have affected daily functioning (DSM-IV, 1994). Clinical depression is often preceded by a history of sub-clinical episodes of depression in children (Gotlib & Hammen, 1992).

1.7. The Reasons for Using Sub-clinical Child Populations

Research is needed to examine whether cognitive biases can be found in individuals before they manifest clinical levels of depression. Such work is ultimately aimed at a preventive course i.e. locating the existence of biases before they become deeply rooted or established. It is also important to test individuals before clinical sequelae as it is unclear whether existant biases are a product or cause of the depressed state. One goal of this thesis is to look for
possible biases in childhood, which could act as cognitive vulnerability markers for depression. Hence, clinical groups were used in order to investigate the severity or extent of bias in children and adolescents in Study 2. Equally, a clinical but non-depressed population were used to meet the requirements of the specific hypotheses being tested in Study 5. In all other empirical chapters, normative populations with sub-clinical levels of depression were tested. Both clinical and sub-clinical testing have theoretical value.

1.8. Incidence in Current Samples

There are relatively few children in community populations who score in the extreme category for depressed symptoms (Kovacs, 1992). However, there is evidence that even moderate levels of depression can have a negative impact on children and adolescents. For example, chronic, moderate depression is associated with significant impairment in school and peer functioning in children (Nolen-Hoeksema et al., 1992). Gotlib, Lewinsohn and Seeley (1995) also found adolescents who scored high on self-report measures but did not meet diagnostic criteria for depression showed just as much psychosocial dysfunction as clinically depressed adolescents. So although depressed symptoms may not meet criteria for psychiatric disorder they remain a clinical concern.
There are many available theories proposed to account for depression. There are also multiple approaches to the study of depression (biological, neurological, psychodynamic, genetic, social). This thesis favours a cognitive information-processing approach, due to its applicability across a wide range of ages and groups and also due to the nature of its therapeutic potential, offering a real sense of self-efficacy to patients. Cognitive theories of depression emphasize negative cognitions and negative information processing biases. This section of the General Introduction introduces the information-processing approach to depression. In addition, the key theories of cognition and emotion and depression are introduced, as the most important in a discussion of the results of this thesis.

1.9. The Information Processing (IP) Approach

Figure 1.1. The Information Processing Approach

There is nothing in itself good or bad but our thinking which makes it so (Shakespeare's Hamlet 1623 p216)

The IP paradigm focuses on the fact that information processing mediates the relationship between the occurrences of events, be they external or internal, and individuals' subsequent behavioural and emotional responses (Figure 1.1). Hence, IP styles are central to depression. Person A and Person B, experiencing the same levels of stress, may both experience the same
additional negative life stress, but it depresses only one of them. This is because it is not the event in of itself, but rather the personal interpretation and processing of that event which determines how they will respond. In a very real way, information processing affects how we feel. The way we feel then determines how we process information.

This interaction can give us valuable insight into forms of psychopathology such as depression. However, saying that the way we ‘think’ affects how we ‘feel’ presents rather vague terminology and offers little leverage for either empirical research or subsequent psychotherapeutic change. IP offers a way of breaking down these holistic terms into the likely constituent parts. Typically therefore IP is conceived of encompassing three domains of processing; Attention and Orientation; Perception and Interpretation; and Memory (Figure 1.2). This is not to suggest that these processes are in any way discrete or sequential. Instead it offers a useful way of framing our understanding of the cognitive processes involved in complete information-processing.
Emotion can affect/ bias any one of the three domains of IP (Figure 1.3). Indeed this is a central tenet of IP research (e.g. Beck, Rush, Shaw & Emery, 1979; Power & Dalgleish, 1997; Williams, Watts, MacLeod & Mathews, 1997). In part, emotion can be conceived as 'system level information' indicating goals or more specifically; the state of the organism in relation to its current (long term and short term, automatic vs. higher order, specific vs. less specific) goals (Power & Dalgleish, 1997). On one level we can have the implicit goal to 'remain physically safe'. Fear or anxiety often signals that the system is processing information, which it interprets as suggesting this goal attainment or maintenance is in jeopardy. For instance, it has been suggested that the emotion of 'depression' signals a cognitive 'time-out' informing the system that something has gone wrong and that certain schemata need to be revised. Prolonged experience of depression is furthermore posited to reflect failure or
resistance to modify these schemata (Welling, 2003). Equally, we may have the peculiar goal of ‘be successful’ the intermediary goal of which might be ‘obtain a good job’. It is suggested that IP is motivated (biased) by such goals. Hence if a goal such as ‘be liked’ was relinquished, preferential attention to positive facial feedback may be abandoned. Again, emotional states may reflect a person’s perception of how close or far away they feel they are from their goals (Power & Dalgleish, 1997). Of course, how a person comes to arrive at personal goals is another matter. The probable value of ‘emotion’ is that it signals the perceived need for change or contrastingly confirms a given approach therefore no need for change. This of course is a system with continual, multiple, complex and basic, changing and unchanging and sometimes contradictory goals in multiple domains at any given time.

Figure 1.4. IP Model indicating the central role of goals
Schemata are pivotal in explicating cognition from an IP approach. Schemata are formed through our interpretation of commonalities in experience. They are not just passive representations of experience, but can actively effect processing (Figure 1.5). Schemata affect processing by aiding the processing of information consistent with the schema content. Schema incongruent material may then be overlooked by the system. Although, it is unclear at what level (or multiple levels) of processing this may occur. Schema congruent processing is fast and powerful. To process information which is schema incongruent therefore may require effortful, voluntary elaboration of such material to prevent this information being 'filtered out' (Philippot et al., 2004).

Figure 1.5. IP Model indicating the central role of Schema

The final key aspect of IP to be recognized concerns that of action. Perceiving and interpreting the consequences of actions that have been derived from these cognitive
processes is a vital way in which the system can learn. For example, 'When I get angry and shout at Sam I feel worse afterwards and Sam dislikes me even more'. Such information 'when I shout it makes things worse' feeds into memory and schema, and hence provides new information to inform the next cognitive-emotional cycle. Of course, as with the initial information cycle, this information too is subject to biased processing in that it will be accepted or rejected or interpreted in line with current goals and schema. For example, if it is a personal goal to 'not deal with anger issues', then the above person may interpret the situation with Sam as 'her fault', or 'just an anomaly' and not learn from it. Moreover, individuals who have had dysfunctional experiences, such as 'If I tell mum I'm hungry she will smack me' will develop dysfunctional schema, which will direct action, though not always consciously (Figure 1.6)

Figure 1.6. IP Model highlighting Action Feedback
Much of cognitive psychology and the study of the affective disorders is concerned with understanding how these processes interact with one another and how biases in one system may affect the others. Locating the domain(s) in which there are disorder relevant biases is a primary aim of research efforts. As can be seen, our interpretation of any given event is fuelled and governed by attention, memory and schema. Sometimes understanding the nature of these component biases (many of which may not be accessible to conscious introspection) is important in understanding the source of the more 'visible', conscious and idiosyncratic end biases, which otherwise may seem unfounded from an objective world view. For example, 'I hate myself, I hate life, nothing is ever going to work out for me'. Once we understand that such views are fuelled by a biased information processing system it becomes easier to understand the nature of the problem, and perhaps, how to deal with it.

1.10. Prominent Theories of Cognition and Emotion

Within an information-processing framework 'Cognition and Emotion and the Affective Disorders' has become a recognized and fruitful domain of psychology. In particular four theories, designed to account for or discuss the inter-relationship between cognition and emotion have contributed substantially to the underpinning of practical research findings in the area and are reviewed in the next section. They are the principal theories discussed in the relevant literature. These same four theories have most impacted the work in the present thesis. They are: Williams et al's priming vs. elaboration account of affective disorder, ICS macro-theory of cognition, SPAARS multi-level model of cognition and emotion and of course Beck's Cognitive Theory of Depression. Further theories, which are specifically relevant to an interpretation of the results of this thesis, but are either newer (Philippot & Schaefer's Dual Memory Model of Emotion) or more specialized (the theory of Depressive Realism), are also considered.
Beck’s Schema Theory, (1967; 1976; 1979)

Beck is sometimes referred to as the father of cognitive theory of depression. According to Beck (1967; 1976; 1979) depression relates to the activity of dysfunctional schema. In terms of Beck’s model, schemata are stable representations of knowledge, which have been acquired by an individual during development. According to this view individuals who become depressed have had early experiences that result in the formation of dysfunctional schema. Schema are described as cognitive constructs for encoding, screening and retrieving information. The knowledge stored in schemata represent a person’s beliefs, attitudes and assumptions, which are used to perceive, interpret and think about experiences (Fig. 1.7).

Figure 1.7. Beck’s Schema Theory

Beck’s cognitive theory centres around the idea of schema influencing information-processing preferences, congruent with schema content, hence biasing processing.
Furthermore, Beck makes a statement to the effect that the development of dysfunctional schema in the case of depression could be a result of early life experience of loss. These dysfunctional schema lead to negative biases in the way the individual processes information. Beck suggests that the experience of matching stressors can activate these schemata, which is the source of a series of subsequent cognitive biases, including recall, in the processing of information.

Beck, Rush Shaw & Emery (1979) assert that "generalised negative expectancies" are at the core of depression, which are "based on attitudes or assumptions (schemas), developed from previous experiences." An assumption is that these assumptions are misconceptions of reality. However it may be that in childhood, depression is not associated with misconceptions as such. Rather, depression may be associated with accurate perceptions, which because they are more 'negative' relative to the norm, may lead the individual to depression.

Furthermore, the Cognitive Model of Depression postulates three specific concepts to explain the psychological substrate of depression: (1) The Cognitive Triad (2) Negative Schemas and (3) Cognitive Errors (faulty information processing).

1) The cognitive triad concerns negative patterns of thinking about self, world and future. A depressed person will view himself as defective, inadequate, diseased or deprived. He tends to attribute negative experiences to a defect in himself. He believes he lacks the attributes he considers essential to attain happiness and contentment. He sees the world as cruel and demanding and presenting obstacles to him reaching his goals. The depressed person will also have a negative view of the future and will anticipate problems and suffering indefinitely.
2) The concept of ‘schema’ arises from the observation that any given situation is composed of a host of stimuli and every individual needs to selectively attend to specific stimuli in that environment and conceptualise the situation. Schemata are a way of conceptualising how we do this. A schema is a filter; a basis for screening and coding information that confronts us. A depressed person categorises and evaluates his experiences through a matrix of negative schemas.

A schema may be inactive, active or dysfunctional. “As schemas become more active, they are evoked by a wider range of stimuli, which are less logically related to them.” (Beck et al., 1979) The depressed patient loses much of his voluntary control over his thinking processes and is unable to invoke other more appropriate schemas as the negative schemas become increasingly dominant. In fact in severe depression, idiosyncratic schemas become autonomous. The depressive cognitive organisation may become so independent of external stimulation that the individual is unresponsive to changes in his immediate environment.

3) Faulty information processing ‘errors’ in depression include; arbitrary inference, selective abstraction, over-generalisation, magnification and minimisation, personalisation, absolute, dichotomous thinking (black and white thinking). Beck suggests the thinking of a depressed person is synonymous with a child’s thinking in that it is primitive, over-simplistic, and non-adaptive to situations or experience; rigid. These are the traits of depressive thinking; it is one dimensional e.g. ‘I am fearful’ - as opposed to the multidimensional – ‘I am fearful, I am strong, I am kind’. Thinking is absolutistic and moralistic e.g. ‘I am a coward’ - as opposed to relativistic – ‘I am not more fearful than other people’. It is invariant e.g. ‘I always have been and I always will be fearful’. It is also irreversible e.g. ‘There is nothing I can do about it, there is nothing I can do or learn to allow me to change'.
Beck et al. (1979) manage only a brief reference to predispositions to adult depression, in which is stated, "early experiences provide the basis for forming negative concepts about one’s self, the future and the external world." During this developmental period, each individual learns rules or formulas by which he attempts to ‘make sense’ of the world. These formulae determine how the individual organizes perceptions into behaviour, and how he understands or comes to terms with the events in his life. In essence, these basic assumptions form a personal matrix of meaning and value. These rules are active in situations that impinge on areas relevant to the person’s specific vulnerabilities. Such as acceptance-rejection, success-failure, health-sickness, or gain-loss. These assumptions are learned and at one time may have been articulated. Furthermore they may be culturally reinforced. However, one limitation of the Beckian model is that it predicts a consistent pattern of bias in attention and memory for both depressed and anxious persons. In contrast other models such as Williams et al. (1997) posit that different types of biases characterize different disorders.

In summary, Beck suggested the importance of biased cognitive styles in explaining the existence of depression in response to adversity, such as black and white thinking, overgeneralization, and selective abstraction. All of which are deduced from the person’s written or oral verbalisations. ‘Schemas’ are now consistently used as a tool in explaining dysfunctional thinking and are incorporated in all of the prominent theories of cognition and emotion interactions (e.g. SPAARS and ICS, see below). However, despite the widespread acceptance of the importance of underlying schema, little is known about the processes that contribute to the existence and content of such schema. One further limitation is that Beck’s (1976) formulation concerning information processing would predict a consistent pattern of bias in attention and memory for both depressed and anxious persons i.e. it is a global cognitive theory. This does not fit with our current knowledge of biases in depression and
anxiety. For instance instead, Williams and his colleagues, (1997) have posited disorder specific characteristic biases, such that whereas anxiety in associated with negative bias in attention, depression is associated with biases in memory.

Williams, Watts, MacLeod & Mathews (1997)

This is an empirically driven theory. Negative information processing is known to form a substantial part of the cognitive classification of depression in adulthood. “Seeing things negatively” or “taking a negative view of things” is classically linked to a depressive profile. However, Williams et al proposed that there are two stages of cognitive processing involved in the maintenance and/or onset of anxiety and depression. In line with Graf & Mandler (1984), Williams et al propose a “pre-attentive” integration (priming) stage and a subsequent elaboration phase of IP. Priming is described as an automatic process that occurs rapidly without cognitive effort and involves the activation of multiple elements associated with the representation of information. In contrast, elaboration refers to a strategic process that involves the association of new information with related material. Unlike Beck, Williams et al suggest that depression is largely characterized by biased processing at an elaborative stage of processing whilst anxiety is associated with pre-attentive biases (Figure 1.8).

In keeping with the theory of Williams et al, most conclusive work on initial perceptual biases and the emotional disorders has been with anxious patients. Anxiety is linked to a bias in preconscious processes such as selective attention for threatening material, whilst such preconscious biases do not appear to play a role in characterizing depression (see Mogg, Bradley & Williams, 1995 for a review). Instead, it is generally agreed that adult depressive biases emerge at an elaborative stage of processing, during the interpretation, sustained attention, recognition or recall of information. In a broad sense, depression prone individuals would
look for evidence of being ‘doomed to failure’ whereas anxious persons would avoid attending to such information and moreover, normal individuals would look for counter-evidence. Williams et al., (1997) argue that the shift of attention in anxiety versus the sustaining of attention to negative information in depression may be the dimension which best differentiates the disorders. These differences can be thought of in terms of the allocation of limited resources (Williams et al., 1997).

More recent empirical evidence regarding attention and depression by Gotlib, Kransnoperova, Joorman and Yue (2004) has indicated that depression is associated with initial attention towards depression relevant (negative) stimuli. However, this attention is not always maintained, as was demonstrated using a dot probe paradigm with manipulated exposure times to stimuli. Some patients showed sustained attention to negative stimuli whilst others failed to. It would therefore appear that the depressed population may not be homogenous in terms of attentional bias and added levels of complexity may be needed to fully account for biased processing in depression. What is interesting is that to attend to ‘negative’ information preferentially, an individual must first encode or perceive it as such. That is, perception and attention would appear intrinsically linked in these studies.

Therefore there may be evidence to suspect attentional biases do play some role in depression. Nevertheless, on the whole, research to date has supported the usefulness of distinguishing between priming and elaboration stages of processing to account for observed differences in anxious and depressed biases. Anxiety is associated with an initial bias towards threat, and subsequent strategic bias away from threat. Depression is associated with strategic bias towards depression congruent information and there is inconsistent evidence regarding initial
biases in depression. Whether a bias is automatic or elaborative has direct implications for therapeutic intervention.

Figure 1.8. Williams et al. (1997)

Williams et al suggest that specific emotional disorders may arise not only because of biases in content of appraisal but also because of biases in specific IP domains. For example, predominantly pre-conscious attentional bias in anxiety and strategic memory biases in depression.

One limitation of this work is that it is really advocating a single level model of cognition and emotion and does not capture the full complexity of multi-level models of information processing of which SPAARS and ICS are two best-known examples. In addition, little comment has been made regarding the extent to which this theory applies to children. For example, is it that the same biases exist outright in childhood or should there be some form of development of these biases across age?
ICS is macro-level theory of cognition-emotion relations. It differs from Williams et al's priming vs. elaboration theory in that it is an attempt to offer a framework for all cognitive-affective relationships. ICS is not designed to account for any specific order or disorder. Teasdale & Barnard propose that human cognitive architecture is divided into nine subsystems each specialized for handling a specific type of information processing. Cognitive processing depends on the interactions between these subsystems. Each subsystem processes its own unique 'code' and has its own recording (memory) system. Each subsystem has an image record, a copy process, and a transformation e.g. sound to words. Five subsystems are periphery. Three of these subsystems (visual, acoustic and body state) concern sensory and proprioceptive representations. Two further periphery subsystems (articulatory and limb) relate to output systems. Of the four central subsystems, two (morphonolexical and object) represent intermediate structural descriptions. The two final central systems, and those most central to a discussion of emotion (propositional and implicational) represent higher order meaning.

According to ICS emotion is primarily generated within the implicational subsystem. The implicational subsystem directly receives and integrates information about an occurring event from other subsystems. It is a synthesizing subsystem. Emotion is triggered when the implicational subsystem produces a code, which corresponds to a previous 'affective-theme' or schemata from a past emotion-eliciting situation. The implicational code generates emotional reactions by activating expressive patterns in the effector subsystems. In other words, the implicational system is the final mode through which all emotions are mediated.
This system 'adds' emotional connotations to otherwise 'cold' cognitions. In terms of this model, emotion results only following processing in the implicational subsystem. For example, the literal meaning of the statement, "I passed my exam" can be represented in the propositional subsystem and this representation will not be accompanied by an emotional reaction. This would be termed 'cold cognition'. While the same thought or statement represented in the implicational subsystem i.e. in terms of a schematic model such as "I am a success" will result in emotional reactions. This is termed 'hot cognition' and it is hot cognition, which results in affective arousal. ICS can therefore account for the important distinction between intellectual and emotional beliefs. For example, 'I know I'm not ugly but I don't believe it in my heart'. In ICS the thinking comes from the propositional code and the feeling comes from the implicational code and importantly, the two can be discrepant.

In ICS the type of emotion elicited is highly dependent upon matching incoming or inferred information to stored information about past emotional experiences. Hence, the system must be heavily influenced by the development of schema, from childhood. It is also possible that some original implicational code is more difficult to recode than newer information.

Moreover, ICS offers a way of conceptualising psychological disorders such as anxiety and depression as dysfunctional patterns of interaction with the subsystems. Depression is theorized to be a result of interlocking between implicational and propositional level subsystems such that an individual focuses on negative propositions, which are supported by implicational code, and thus result in iterative cycles. For instance, it may be that that schema models in depressed individuals are particularly negative or dominant, or that they are more closely related in depression (e.g. Teasdale, Taylor, Cooper, Hayhurst & Paykel, 1991) and hence this perpetuates iteration. Alternatively, iterative thinking may be characteristic of depression. Teasdale and Barnard's model therefore offers insight into the possible
mechanism of depressive cognition. That is, according to ICS, depression is a consequence of generation of depressogenic, schematic models in the implicational subsystem, which are maintained via a feedback loop with the propositional subsystem (Figure 1.9). In effect, the implicative schematic model generates propositions such as “I am a failure”, which feed back to the implicational subsystem reinforcing the active schematic model. The account given by Teasdale and Barnard mirrors that of Williams et al, in the sense that (a) depression relevant material is more highly elaborated in depressed individuals and (b) ongoing processing of depressive schematic models will increase the likelihood that these representations will be accessed and affect processing.

Figure 1.9. ICS

ICS is concerned with a macro-theory of cognition. ICS highlights ‘hot’ vs. ‘cold’ processing, which takes place within the implicational and propositional subsystems. In depression these subsystems are said to be interlocked.
ICS assumes a piagetian type development of the subsystems. However, the model is not discussed with any developmental considerations in mind, besides perhaps the inherent implication regarding the development of schema content.

SPAARS, Power and Dalgleish (1997)

The preferred model of emotion in this thesis is the Schematic Propositional Associative Analogical Representational System (SPAARS). There are strong and weak versions of cognitive theory. The SPAARS model endorses a strong version in which cognition can result in emotion. The issue of appraisal is central to this model. Here, the process of appraisal is deemed the central engine of emotion. Emotion is defined as a process; an interpretation and subsequent appraisal of an event (be it internal or external) and an appraisal of a physiological change or action potential deriving from this event appraisal. Interpretation is defined as the comprehension of the event elements and appraisal is defined as an evaluation of these elements.

In essence, SPAARS is a model of emotion-elicitation attempting to offer an account of both ordered and disordered emotion. SPAARS is a multilevel model with 4 levels of representation, namely those indicated in the acronym; schematic, propositional, analogical and associative. These levels can help account for different levels of cognition and emotion. The analogical mode of representation comprises images of the different sensory modalities, including visual, olfactory, auditory, gustory, proprioceptive and tactile. Analogical representations inform the other levels of representation. Propositional representations are representations of beliefs, thoughts, ideas, objects and concepts as well as the relations between them. Propositional representations take a non-language specific form but are
amenable to description in language form. Propositional representations according to SPAARS are explicit, abstract and discrete. According to this model, the analogical and propositional modes of representation have no direct role in eliciting emotion. Emotion elicitation occurs only through the schematic and associative modes of representation.

The schematic model level of representation contains higher order information about the world and the self, abstracted from information at the other levels of representation. Schematic level representations cannot be easily or fully expressed verbally, and are basically equivalent to Teasdale and Barnard's 'implicational subsystem'. Finally, the associative level of representation contains associations between situations and the meaning ascribed to the situations. As mentioned, the associative level accounts for direct single step access to information stored in memory, established through repetition of event emotion combinations and is best understood as being the equivalent of automatic processing. In contrast, the schematic model level includes the representation of self and goals that are relevant for appraisal processes.

Thus, SPAARS assumes that there are two main ways in which emotion can be generated. First, emotion can result via cognitive processing involving the schematic system. In this instance, information about the self, world and future is combined with information about current goals in order to generate an internal representation of the immediate situation. For example, 'I am an academic + I have an impending paper deadline + GOAL - I want to submit this paper'. If this analysis reveals discrepancy between reality and an individuals' current goals, then an emotional response ensues, e.g. 'I want to submit this paper + I have no time and too much administrative work to do = RESPONSE - frustration'. The second route to the production of emotion involves an associative pathway. This route is automatic and has
been described by Dalgleish et al., (1998); ‘if the same event is repeatedly processed in the same way at the schematic level, then an associative representation will be formed such that, on future encounters of the same event, the relevant emotion will be automatically elicited’. That is, the associative route short-circuits concurrent appraisal but is based on previous appraisal, such that when the academic sees a paper submission deadline in a journal he immediately feels frustration. Further, it is possible that some associative pathways are prepared or hardwired (e.g. Seligman, 1971). As with any automatic process, forms of associative emotion are difficult to control or modify.

Emotion elicitation in the SPAARS framework can therefore occur via an appraisal process (schematic level) or via an automatised memory retrieval route, bypassing any appraisal process (associative level). Conscious awareness at some or all stages is needed in order to ‘experience’ emotion and as with ICS, the propositional level is cold and only contributes information for the schematic model level. According to SPAARS, this propositional information only becomes emotional when it is assessed with respect to one’s goals by the schematic model representations. One area in which Power & Dalgleish develop theory further than ICS is that they explicitly discuss the different types of emotion that can be generated by appraisal processes and how appraisal of physiological arousal in line with goals can account for various emotional labels and disorders.

In this regard, SPAARS posits a functional goal directed mind in which emotions are distinguished on the basis of appraisal. Appraisals occur in levels or cycles with each cycle leading the event to be appraised in more sophisticated way. There are 5 basic emotions and thereafter SPAARS posits combinations or ‘blends’ of emotions. Examples of such complex emotions include guilt, shame, envy, love, and grief, so called because they all require higher
levels of appraisal. Emotions can also be conflicting due to multiple appraisal processes producing different end outcomes or associatively generated emotions conflicting with schematically generated emotions, for example. Goals are believed to operate in hierarchies and appraisal of these goals can be inhibitory and facilitatory, necessary or sufficient in terms of emotion elicitation. Moreover, in this model, initial emotions can be reappraised and then act as the impetus for further emotional experiences. This is presented as a potential key factor in underlying disordered emotion.

In terms of disordered emotion, SPAARS assumes a goal-based system whereby fear reflects a threat appraisal, sadness reflects an appraisal of failure/loss, anger reflects appraisal of a blocked goal, happiness reflects appraisal of achievement of a goal, and disgust is an appraisal and rejection of something repulsive to self or goals. Therefore, depression according to SPAARS is linked to the basic emotion of sadness and can be coupled with disgust or anger e.g. “self as worthless, failed or bad”. The coupling of sadness and disgust in depression has received little theoretical or research attention to date. However, it may well capture a unique quality of depression and would also explain the pervasive link with anxiety disorder i.e. anxiety would be linked to fear, also often coupled with disgust, such as in OCD.

Thus, SPAARS endorses the interlock (coupling) theory of Teasdale and Barnard in which the system may become ‘captured’ by emotion due to the coupling of thoughts and feelings (propositional and schematic representations) making it difficult to deactivate the emotion in question. In addition, SPAARS further purports the coupling of emotions, whereby two basic emotion states reciprocally activate each other or one emotion activates itself. In this state the experience of the emotion becomes the object emotion (e.g. fear or fear) again locking the person into an emotion mode, from which it is difficult to disengage (Figure 1.10). SPAARS
posits that in depression it may be particularly difficult to disengage from a negative emotional mode, because of poor integration between positive and negative schema. Hence, once in a negative emotional state it may be difficult for these individuals to access counteractive positive information.

Finally, SPAARS underscores the belief that depressed individuals overinvest in and overvalue certain goals, distinguishing these individuals from the normal population - an idea with its roots in Beck’s Cognitive Theory of Depression. Highly valued goals or fixed goals in SPAARS would suggest the existence of greater biases and greater emotional reactions in response to appraisals concerning these goals, particularly concerning loss of these goals and hence - vulnerability.

Figure 1.10. SPAARS

SPAARS is primarily concerned with appraisal processes and the generation of emotion.
With respect to developmental issues, SPAARS briefly alludes to the development of schematic models and goals, asserting many of which are established in early childhood. SPAARS also states that emotion provides a guiding principal around which development occurs, and is organised. SPAARS further posits that, given the right stressors, old models can become reactivated and dominate processing in a schema congruent fashion, similar to Beck’s idea of latent schemas. SPAARS makes some reference to the possibility than children may ‘deal with’ emotional situations differently to adults, for instance, greater dissociation in childhood in response to traumatic events. This may be linked to the different appraisal abilities of children relative to adults. However, no more detailed discussion of developmental issues is pursued, perhaps because within a SPAARS framework, cognition and emotion interactions are couched in terms, which are equally applicable across development. This is not so obvious in Williams et al’s discussion of strategic biases or in ICS multiple subsystem model which appear more adult-centric. For example, if pattern matching accounts for emotion in ICS can a child only feel something if they have felt something like it before? And the strategic biases of Williams et al. suggest a cognitive style, which presumably needs to be developed. SPAARS is more ‘timeless’ (i.e. appraisals are generated on a moment to moment basis) unlike models requiring developmental clarification.

Interim Summary

The above are summaries of the main theories of cognition and emotion. Each model emphasizes different aspects of cognition and emotion processing. Models broadly converge in terms of the perceptual and conceptual processes involved in emotion elicitation. The models differ in the detail with which they describe each underlying mechanism and in the relative roles they attribute to the processing modes. Beck’s is a global model of cognition
viewing emotion and biases as a consequence of thinking styles and schema. Williams is a theory of characteristic biases emphasizing stages of processing. ICS introduces the idea of hot and cold cognition, and interlock, however the exact workings of emotion-cognition relationships are given little substance. SPAARS gives an account of emotion as a hierarchical goal based appraisal phenomenon and discusses depression in terms of coupling and overvalued goals. All the models are designed in full or in part to deal with depression. In so doing, no model explicitly addresses developmental considerations. It is striking how few of the cognition-emotion theories account for the development of the dysfunctional processes they espouse. Beck's Cognitive Theory of Depression is the temporal predecessor to the above theories, however it continues to exert a pervading and enduring quality in guiding and interpreting (specifically) results of depression research. Next to be introduced is the newer theory of Philippot & Schaefer, and an adjunct theory to a cognitive bias theory of depression; the theory of Depressive Realism. This is followed by a brief comment on conducting IP research within a developmental framework.


Philippot, Baeyens, Douilliez & Francart (2004) discuss the cognitive regulation of emotion. As indicated in the above sections, most cognition-emotion models assert that emotional responses are determined by the activation of schema. Schema activation relies on fast processes requiring few cognitive resources but has great impact in terms of attentional focus, concept priming and physiological arousal. Moreover, schemata are not accessible to conscious inspection instead multilevel models assume schema activation occurs automatically. In contrast, voluntary processes that might moderate the effects of schema are slower, require more cognitive resources and require inhibition of the more automatic
processes. Specifying information is generally believed to involve effortful, strategic processing. In the Dual Memory Model of Emotion, it is argued that strategic, high-level voluntary processes should inhibit emotional arousal, by reducing automatic schematic level processing (see Appendix 1.2). Of course, phenomena like flashbulb memories in trauma (e.g. Brewin, 2001) are both highly emotional and specific. However these are instances of direct retrieval (Conway & Pleydell-Pearce, 2000) and emotion is activated via the associative route (SPAARS, 1997). This does not involve high level cognitive processing. Instead the dual memory model of emotion is concerned with the inhibition of emotion generated through schematic processing and the wilful elaboration of information. Thus, Philippot et al., (2004) propose a theory of emotion elicitation and regulation based on the automatic activation of schema eliciting emotion, and the wilful elaboration of specific (propositional) information inhibiting emotion (Figure 1.11)

Figure 1.11. The Dual Memory Model of Emotion
The final theory to be established in this General Introduction is that of Depression Realism (DR). Most cognitive and IP theories of depression discuss depressive cognition in terms of negative biases. DR is instead simply a theory, which postulates that this emphasis concerning depreso-typical processing is wrong. Instead of depressed individuals being viewed as negatively biased this theory suggests that depressed individuals can actually be more 'balanced' in their appraisals of information in some circumstances and that the 'bias' instead lies with non-depressed normal individuals, who processes information in a positively biased fashion (Albright & Henderson, 1995; Alloy & Abramson, 1979; Johnson & Lorenzo, 1998; Pacini, Muir & Epstein, 1998; Kapci & Cramer, 1998). This is the classic 'rose-tinted' glasses phenomenon.

Unfortunately few empirical studies have tested participants with material that has clear truth validity (see Ackermann & deRubeis, 1991 for a commentary) and some studies which have failed to find a DR effect or have contested the validity of the effect (e.g. Msefti, Murphy, Simpson & Kornbrot, 2005) can equally be criticised on the grounds of inadequate test material or 'problem' validity i.e. if test material is not salient or where a particular judgement is obvious, convincing biases will not be demonstrated in either direction. DR may also depend on the extent of depression with typically mild depressed groups demonstrating the effect (see Albright & Henderson, 1995; Haaga & Beck 1995). One further consideration concerning the DR effect is that the typically fixed conditions of DR contingency tasks perhaps better suit the typical thinking styles of depressives (e.g. unchangeable, immutable events allied to poor self-efficacy) rather than non-depressed typical thinking. In this case, DR results would be reflecting something called 'stereotypic' accuracy (Cronbach, 1955) rather
than a flexible ability to view information accurately. Therefore patent interpretation (or rejection) of depressive realism is not possible. However, counter to the typical flow of thought on depression, there remains some reason to consider that under some circumstances depressed individuals may be getting it right. Depressed individuals may sometimes be more realistic in their judgements than normal individuals, although the precise conditions under which this may occur are yet unknown.

In this thesis DR is approached from the possibility that DR may hold true more in children than in adults. That is, is it possible that existence of DR (seeing negative as negative) could be more prevalent in childhood but that it may result in negative bias over time, such that in adulthood what was originally a realistic appraisal is now negative skewed? This transition would of course be dependent on experience. Seeing bad as bad over time, when there is lots of bad to be seen, could effect mood and subsequently future IP as described in the above IP sections. This theory is drawn out more fully in a discussion of the results of Studies 1 and 4. Suffice to say that all the theories discussed above will be referenced in the appropriate empirical chapters and all of these theories are the ones most cited in terms of explicating cognitive biases in the depressed adult literature.

1.11. A Developmental Perspective

Unlike the mainstream cognition and emotion literature, Developmental Psychopathology focuses on such cognition and emotion interactions in youth. A developmental psychopathology approach to depression maintains that early structures are often incorporated into later structures therefore an early deviation or disturbance in cognitive functioning may cause much larger disturbances to emerge later on. Rutter (1986) has stressed the importance
of studying how earlier experiences modify later ones, how maladjustment in childhood may set the stage for depression in later years. An early depressive episode is also hypothesized to leave long-term developmental and functional impairments. This is the theory that an episode of depression sensitises an individual to future episodes, such that the first episode of depression may be linked to a particular stressor, and is accompanied by lasting changes in biological processes and alterations in responsivity to future stressors (Post, 1996). In addition, the initial externally produced changes in the brain can be conditioned so that following the first depressive episode, even more events that resemble loss or stress experiences, may result in depression. This is the phenomenon referred to as kindling (Kovacs, 1997; Post, 1992).

Moreover, within this developmental-psychopathology framework qualitative reorganisations which are believed to take place during development can be conceived as proceeding in accordance with the Orthogenetic Principle (Werner, 1948) which states that the developing organism moves from a relatively diffuse and globally undifferentiated state, by means of differentiation and hierarchical integration, to a state of greater articulation and organised complexity. This idea may apply as much to cognitive processes as any other processes, and hence, highlights the importance of investigating biases early in development, in order to gain an understanding of initial biases, before layers of complexity make adult depressive biases increasingly more difficult to unravel.

A transactional model of depression also states that pathology such as depression does not occur in isolation, caused by one process alone, but rather is the result of various factors operating together. This is a ‘broad’ model of depression, which seeks to take into account multiple processes. A transactional model specifies that the interrelationships between the
organization of developmental domains (biological, socio-emotional, cognitive) and the environment in which the individual resides (family, school, community) exert a bi-directional influence on the individual. Cicchetti & Toth (1995) provide an exhaustive review of affective disorders and clinical depression from a transactional approach. For example, a child who is the product of depressed parents may possess a unique set of risk and protective factors, while another child who has undergone chemotherapy may face a completely different set of factors; each child may warrant a diagnosis of clinical depression but the aetiologies leading to each child’s depression differ drastically. In effect, although it is difficult to empirically research depression from a transactional approach, it is worth holding in mind the complex of interactive effects of the child and their environment, when considering the implications our more controlled experimental findings. Understanding multiple risk and protective factors will ultimately increase the efficacy of our approach to depression, whether in childhood, adolescence or adulthood.


Therefore, while adhering to the philosophies of developmental psychopathology and a transactional approach, and motivated by adult theories of cognition and emotion, this thesis attempts to focus more specifically on a cognitive-developmental model of depression within this larger framework. Thus, for example, social and environmental concerns are controlled for, rather than studied in this thesis, in order to focus specifically on cognitive factors and depression in childhood. Basically the premise of the cognitive-developmental model of depression is that cognitive vulnerability to adult depression is acquired in childhood. This approach, in the long-term, promises to contribute to important aetiological answers regarding the origins of depressive biases.
1.13. Extending Adult Research

It is clear that we have reached a reasonable research plateau regarding what cognitive biases manifest in adult depression. Prolific and robust research is available covering various aspects of cognition (perception, attention, memory) in adults. However, we do not know the precise origins of these biases. Most cognitive-emotional theories of depression would assume that depressive biases are stable, i.e. they have developed steadily over time and are not simply transient or incidental. It therefore seems sensible to address the issue of from whence these biases arise.

However, to a greater extent, adult work in depression has not been extended to child populations. Possible reasons are that the cognitive abilities of children in the past have been underestimated. Also only 30 years ago, it was not believed that children experienced clinically significant depression so presumably researchers doubted the validity of extending cognitive research into child samples. Equally, it is difficult to design tasks, which are suitable across all ages. Thereafter previous work may not have readily addressed depression from a developmental perspective, due to disagreement regarding whether or to what extent, depression in child and adult-hood reflect a continuation of the same disorder.

1.14. Why extend adult research?

Extending adult research in depression into child population is useful on several fronts. It can inform preventative measures and interventions from a research perspective. Professionals need a set of theories from which forms of treatment or diagnoses have been scientifically derived. This will eventually reduce costs to the mental health system.
the manifestation of depressive symptoms and biases in children will also, importantly, reduce
the suffering of young people and improve people's awareness of the existence of affective
disorders in youth. Thirdly, managing depressive biases before they become more critically
established in adulthood will reduce the onset of clinical depression in adults. Finally, to
understand a thing fully, one must understand its origins. Thus, research efforts into studying
depressive processes in children will help underpin broader questions concerning the
existence of cognition-emotion interactions.

1.15. Problems Carrying Out Research

Childhood depression as a recognised clinical condition is relatively new and consequently
our understanding of the disorder in comparison to its namesake in the adult population is
limited. Unfortunately many of the adult methodologies and theories of depression have been
transferred wholesale into the study of childhood depression without due consideration of
developmental issues (see Vasey, Dalgleish & Silverman, 2003 for a commentary). Although
information processing has been widely studied in depressed adults, less effort has been
directed toward studying the information processing styles of depressed children and
adolescents. Information processing paradigms can be used to investigate aspects of child's
functioning, which are not accessible to direct introspection. Basically, information
processing research can be used to map various cognitive biases. This may prove useful
intervention strategy for children who may otherwise be on a developmental pathway leading
to depression.
PART III | CURRENT IP RESEARCH IN CHILDHOOD DEPRESSION

The IP approach was a research avenue developed to look at biases in adults and has not yet been fully or systematically replicated in children or adolescents. Nevertheless there is some evidence of processing in depressed youth analogous to that found in depressed adults.

1.16. Memorial Biases

A number of studies have documented depression-typical memory biases and preferential processing of negative information in clinically depressed children. For example, negative self-descriptions are recalled more frequently than positive in childhood depression (Gencoz et al 2001; Hammen & Zupan, 1984; Zupan & Jaenicke, 1987). Neshat-Doost, Taghavi, Moradi, Yule, & Dalgleish, (1998) observed that depressed children recalled more negative words than non-depressed children. Similarly, Timbremont and Braet (2004) reported that after a negative mood induction, never-depressed control children demonstrated biased for recall for positive words. This positive bias was not evident in the depressed groups. Instead, currently (but not formerly) depressed children showed a bias for recall of negative words.

Bishop, Dalgleish, and Yule (2004), also presented positive and negative emotional stories to children who scored low and high on a measure of depressive symptoms and found that children with high levels of depressive symptoms (aged 5-11 years) showed enhanced recall for sad emotional stories, relative to positive stories, compared to the low depressed group. This effect did not vary with age. Authors conclude that, when child-oriented materials are used, depression-related biases towards negative information are observable even in a non-clinical sample of children.
Moreover, Gencoz, Voelz, Gencoz, Petit and Joiner, (2001) investigated the specificity of biased IP styles to depression and anxiety, in 58 youth inpatients aged 9-17. Lower rates of positive adjective endorsement and lower rates of positive adjective recall were found to be associated with depression, but not anxiety. Furthermore, in the Gencoz study, even when positive adjectives were rated as self-referent, depressed children were still less likely to recall them relative to negative. Hence, it appears positive information was unlikely to be elaborated in depressed youth, consistent with Williams et al’s priming and elaboration theory of depression (1997). Moreover, such results do not implicate a general memory dysfunction in depressed children, since only poor positive recall was associated with depression in children in this study (see Gencoz et al., 2001).

1.17. Attentional Biases

A common underlying feature of paediatric depressive disorder (as with adults) may be alterations associated with the strategic processing of and allocation of resources towards valenced emotional information. Evidence in support of preferential attention to negative information in depressed youth was provided by Ladouceur, Dahl, Williamson, Birhaher, Ryan & Casey (2005). Ladouceur et al. found that depressed (and co-morbid anxious-depressed) children (aged 8-16, mean age 12) took longer to react to a neutral stimulus on a negative emotional background (compared to a neutral background) on an emotion-distracting task. In contrast, non-depressed children showed longer reaction times for target stimuli on positive backgrounds. This shows an interesting dissociation effect, whereby depressed children appeared biased towards negative emotional stimuli whereas controls appeared biased towards positive emotional stimuli, in keeping with adult depressed literature.
Similarly, Joiner, Katz and Lew (1997) found depressed children expressed more interest in negative feedback than non-depressed counterparts.

Furthermore, Neshat-Doost, Moradi, Taghavi, Yule, and Dalgleish, (2000) found no evidence of an attentional bias towards depression-related or threat-related emotional information in clinically depressed children and adolescents on the dot probe task. In the same vein, results from Taghavi, Neshat-Doost, Moradi, Yule and Dalgleish, (1999) demonstrated selective attention toward threat stimuli in clinically anxious children, relative to controls. However, no attentional bias in mixed anxious-depressed children. Thus, as with adults (see Williams, et al 1997), depression in children does not appear to be associated with priming level attention towards negative information but rather, with biases at a strategic level.

1.18. Schema Biases

With respect to the applicability of Beck et al’s (1979) schema model of depression to children, recently, Schniering & Rapee (2004) found evidence of the content-specificity of negative schema in 200 community youths and 160 clinical youths aged between 7-16 years. Depression was associated with themes of personal failure and loss; anxiety was associated with social threat, consistent with the idea that specific depressogenic vulnerabilities exist in childhood. In the same way, links have been found between negative beliefs and depressive symptoms in community (e.g. Krantz & Hammen, 1979; Dobson & Shaw, 1987) and clinical child samples (see Segal & Ingram, 1994). Since the origin of the development of schemas about the self, world and future occur during childhood, a more concentrated focus on this time span in normal and depressed children would be useful.
Joiner, Metalsky, Lew and Klocek (1999) also reported that dysfunctional attitudes interacted with a negative outcome on a mid-term examination increased depressive symptoms in students. Anxious cognitions did not mediate the relationship between exam stress and depression. Abela and D’Alessandro (2002) examined 136 high-school students and found that increased depressed mood was associated with dysfunctional attitudes following a negative stress, but not following positive event, supporting a diathesis-stress model of depression in youth. Cole and Jackson, (1993) further found evidence that negative cognitive errors mediated the relationship between peer rated competence (across academic, social, and personal domains) and depression in children. Hammen, Adrain & Hiroto (1988) also tested children aged 8-16 years at high risk of depression due to parental affective disorder or illness and a normal comparison group and found that negative cognitions about the self predicted onset or change in depression over a 6 month follow up period. Indeed negative self-evaluation appears to be a common symptom of depression in childhood (Stark, 1990).

1.19. Attributional Biases

Evidence of biases in the way children attribute causes to positive and negative events has also been demonstrated in line with adult depressive literature. Attribution theory is a theory of how people link actions and emotions to particular causes, both internal and external and biases in attributional style are considered 'a risk' factor for depression (Abramson, Seligman & Teasdale, 1978; Abramson, 1989). Numerous studies have demonstrated the predicted association between a negative explanatory style and depressive symptoms in youth (e.g. Gladstone & Kaslow, 1995; Blumberg & Izard, 1985; Hops, Lewinsohn, Andrews & Roberts, 1990).
Muris, Schmidt, Lambrichs & Meesters (2001) found that a negative attributional style featured as the primary source of depression in a sample of 373 normal adolescents aged between 13-19 years. There is abundant evidence that high levels of depression in childhood and adolescence is associated with internal-global-stable attributions to negative events and that the reverse is true (external-specific-unstable attributions) for positive events (e.g. Joiner & Wagner, 1995; Gladstone & Kaslow, 1995). For example, between the ages of 8-12, attributional style begins to interact with negative life events to affect depressed mood in children (Abela, 2001; Nolen-Hoeksema et al, 1992; Turner & Cole, 1994).

In addition, Joiner (2000) showed that a negative attributional style interacted with occurrence of negative life events to significantly predict depressive symptomology in youth psychiatric inpatients. There are also several studies of children of depressed mothers, which show similar results (e.g. Taylor & Ingram, 1999; Jaenicke et al, 1987; Garber & Robinson, 1997) i.e. more negative self-concepts, less positive self-schemata and more negative attributional styles in high risk children than in children of medically ill or normal mothers. Thus, there is evidence that negative IP and negative self-schema may be characteristic of depressed children and adolescents, as well as children who are at high risk of developing depression.

1.20. Current Cross-modal Studies

In one of the very few but important studies of IP across a significant age range and across different disorders in childhood, Dalgleish, Taghavi, Neshat-Doost, Moradi, Canterbury & Yule (2003) compared children with diagnoses major depressed disorder (MDD), general anxiety disorder (GAD), and post traumatic stress disorder (PTSD) with healthy controls between the ages of 7-18 on tests of attention, memory and prospective judgement. No biases
on any task were found in the depressed group. The lack of support for an attentional bias towards depression-congruent words in depression is consistent with the bulk of adult literature (Williams et al., 1997). The lack of memory bias in depressed children in this study is slightly more surprising given that previous work in depressed adults (and depressed children; see above) often demonstrates an elaborative mood-congruent memorial bias (Williams et al., 1997). Work in depressed child, adolescent and adult groups have produced evidence of a memorial bias for self-referent negative information. The cue words used in the Dalgleish et al., study were not examined for self-reference and were not explicitly processed in a self-referent mode. This could therefore explain the absence of a memorial bias for cue words in this study.

Finally, the failure to make ‘other’ or ‘self’ -referent biases in judgements for negative events is consistent with previously published evidence from these authors, indicating evidence of depressive realism in depressed youth (Dalgleish et al., 1997; 1998; Neshat-Doost et al., 2000). This study highlights the importance of appropriate stimuli material in IP paradigms. It also highlights possible additional levels of complexity in childhood depressive processing beyond that predicted, for example, by Beck et al., (1979). For instance, depressive realism, as evidenced in depressed children’s prospective judgements, is not predicted by a ‘negative bias’ account of depression. Thirdly, this study looked at a representative sample of IP tasks used in the adult literature, it did not look at autobiographical memory biases, which are common in adult depressive literature. This thesis hopes to extend our knowledge concerning memorial and other emotion-related processing biases in children, which may be associated with depression. In particular, the aim was to examine autobiographical memory (AM) bias in childhood.
Abstract 2 | One of the strongest findings in the adult depressive literature is that depressed individuals demonstrate an overgeneral autobiographical memory (OGM) bias in response to valenced cue words. This is a robust finding and has implications in terms of self-schema, information processing, downstream processing and encoding. This bias has not been examined in children. The present chapter reviews the relevant literature and introduces the main contending theories posited to account for this bias.
2.1. What is Autobiographical Memory?

Autobiographical Memory (AM) is memory for information pertaining to the self (Brewer, 1986). There are arguably two components to AM. The first component is semantic and encompasses autobiographical facts (e.g., names, addresses and trait information). Autobiographical facts are a type of autobiographical knowledge that is not indexed by event related information (Conway, 1987). The second component is episodic and contains personally experienced events. Within this episodic component there are subtypes of AM. These are specific, categoric and extended memory. Specific AM is memory for a single event that lasted less than 1 day and occurred at a specific place and time whilst categoric (generic) memory is of a collection or class of events (Williams & Dritschel, 1992). Extended memory involves memory for an event that occurred at a specific time and place, yet lasted more than 1 day e.g. a holiday. Overgeneral memory (OGM) then refers to inappropriate retrieval of categoric and extended episodic memories and is linked to depression. This thesis is concerned with episodic retrieval, in particular, influences on autobiographical memory specificity (AMS).

2.2. Why is AM important?

What and how autobiographical memories are retrieved is important. If there are biases in what we remember in terms of autobiographical (personally relevant) events this will affect how we feel about ourselves, the world and the future. For instance remembering only negative personal events will have implications for anticipation of negative events in the future. In addition biases in how we remember (i.e. in terms of specificity) will also effect subsequent processing. For example, both specific and categoric memories are required for
successful everyday functioning. Access to general scripts is needed to provide context and orientation in a situation while specific episodic recall is needed to differentiate one event from another. People should be able to move through an AM hierarchy to select the appropriate level of specificity in a given context. It is important to note that there are dysfunctional consequences to lacking either specific or general memories. (T. Dalgleish, personal communication, 2005).

2.3. Overgeneral Memory and Depression

Depression is characterized by OGM (Van Vreeswijk & de Wilde, 2004). This bias was first reported in parasuicidal individuals by Williams & Broadbent (1986). When asked to report specific AMs in response to cue words, parasuicidal patients instead responded with categoric, script-like memories. Hence, this phenomenon is observed when an interviewer tries to elicit specific information from a patient but the patient fails to produce a particular recollection even when prompted. Eventually, the patient may access a specific memory but this is both difficult and delayed. A number of studies have replicated this OGM in depressed individuals, relative to controls (e.g. Brewin, Reynolds & Tata, 1999; Goddard, Dritschel, & Burton, 2001; Kuyken & Dalgleish, 1995; Wessel, Meeren, Peeters, Arntz, & Merckelbach, 2001; Williams & Scott, 1988). OGM is not considered to reflect a function of psychopathology generally, for instance with the exception of post-traumatic stress disorder, OGM is not associated with anxiety disorders (e.g. Richards & Whittaker, 1990; Burke & Matthews, 1992). OGM is also linked to impaired social problem solving (Goddard, Dritschel, & Burton, 1996; 1997; Evans et al., 1992; Pollock & Williams, 2001), suicidality (Williams et al. 1996; Williams & Dritschel, 1988; Evans, Williams, O’Loughlin & Howell,
1992) and has also been shown to predict depressive symptoms in prospective designs (e.g. Brittlebank, Scott, Williams and Ferrier, 1993).

Evidence suggests that OGM exists as part of a stable, dysfunctional cognitive style and is somewhat independent of current mood. For example, the OGM bias is present in patients remitted from depression (Mackinger et al 2000). However OGM also appears subject to modification as demonstrated in formerly depressed adults following Mindfulness-Based Cognitive Therapy for example, where the development of a more specific retrieval mode for AM was associated with a lower risk for relapse into depression (Williams, Teasdale, Segal & Soulsby, 2000). It seems to be that OGM can predict depression and is not just a cognitive curiosity, but is indicating something fundamental about depressive bias. Mounting evidence supports the hypothesis that OGM reflects a modifiable but stable cognitive bias, which has led a number of theorists to assert that the roots of this bias may lie in childhood.

2.4. OGM and Trauma

Although the weight of OGM evidence is for depressed groups, research has also demonstrated a relationship between reduced AMS and trauma groups. This includes adults (Kuyken & Brewin, 1995) and adolescents (Johnson, Greenhoot, Glisky and McCloskey, 2005) reporting a history of childhood abuse, adults reporting past physical abuse (Hermans, Van den Broeck, Belis, Raes, Piter & Eelen, 2004) or emotional abuse (Raes, Hermans, Williams & Eelen, 2005), adolescents with a history of serious burns in childhood (Stokes et al 2004), inpatient adolescents (de Decker, Hermans, Raes & Eelen, 2003) outpatient adolescents (Meesters, Muris & Wessel, 2000), war traumatized adults (McNally, Lasko,
Macklin & Pitman, 1995) and eating disorder patients with a history of parental abuse (Dalgleish et al 2003).

Some studies have failed to find a significant relationship between AMS and trauma (Arntz, Meeren & Wessel, 2002; Wessel et al 2001; Peeters, et al 2002; Orbach, Lamb, Sternberg, Williams & Dawud-Noursi, 2001). These incongruent findings could be linked to the severity, type, timing or impact of trauma experienced, as well as individual coping responses. As this OGM and trauma literature is in its infancy these factors have not yet been systematically examined. Also, the AMT was not used in the Orbach et al study, where overgenerality was instead assessed, by coding child responses to direct questions about family disagreements, which is a very different task to the AMT. There is also no consistent valence pattern across the existant trauma studies. Trauma related OGM effects have been demonstrated to both negative cues (e.g. Dalgleish et al 2003) and to positive cues (e.g. de Decker et al 2003). The testing of such diverse groups, among other things, may account for this inconsistency. Nevertheless, the weight of evidence suggests a link between trauma and OGM, which is crucial to understanding some theories of OGM (e.g. Williams et al, 1996).

2.5. Mnemonic Interlock

Work on OGM came out of a mood congruent memory tradition, i.e. do people remember events consistent with their mood such that depressed persons remember more negative than positive information. It was found that irrespective of the valence of material, depressed individuals demonstrated an overgeneral memory style in reporting past experiences. Mnemonic Interlock (MI; Williams, 1996) was designed to give an account of this OGM in depression. Assuming a hierarchical autobiographical memory system, MI states that the
overgeneral memory retrieval phenomena observed in depressed adults may be a result of a truncated memory search caused by memory becoming locked at a schematic level of processing. This would occur, primarily in depression, due to depressed individuals preferentially processing at this schematic level of analysis. The reason for preferential processing at this level of analysis is further hypothesized to be linked to a passive form of affect avoidance or affect regulation (AR). In avoiding the more specific event memories and sticking to an overgeneral mode of retrieval, individuals are proposed to be able to regulate the impact of painful affect generated by specific recollections. Hence, it is most likely that individuals who have experienced ‘pain’ in early childhood may in part develop this overgeneral autobiographical memory style. The argument concludes that it is these same individuals who suffer from depression.

However, MI is a theory specifically designed to account OGM and in isolation it does not have any broader explanatory appeal. Therefore, a second model, that of Conway & Pleydell-Pearce (2000), is now frequently adopted to give more substance to the theory of MI. The Self-Memory System of Conway & Pleydell-Pearce offers a more complete hypothesis concerning the possible self, memory and goal interactions in human cognition. Although it has less to say concerning emotion, or indeed depression, it remains a useful overview of memory structures and the self, placing them on a clear stage from whence to communicate the importance and appeal of studying autobiographical memory phenomena.

2.6. The Self-Memory System (Conway & Pleydell-Pearce, 2000)

Conway & Pleydell-Pearce’s (2000) Self Memory System (SMS) is a hierarchical search model of personal event, autobiographical memory (AM). In this model there are three levels
of AM knowledge. These are lifetime periods (e.g. at school) general event representations (GER; e.g. sitting exams) and event specific knowledge (ESK; e.g. winning the class honours trophy). GERs are assumed to be the preferred mode of memory entry for all individuals. ESK is the lowest level in the memory hierarchy and is normally more concrete and visual than the more abstract and verbal summaries of past events.

In this model ESK can be generated via generative or direct retrieval. Generative retrieval is elaborating on mnemonic cues and searching for matches supervised by executive processes, guided by goal structures. Generative search is hierarchical. This constructive process starts with a general memory that is progressively specified. Importantly to the study of depression, this slow and effortful process may be disrupted by activation of emotion and therefore may be aborted. Generative search also involves conceptual representations (see next paragraph). Direct retrieval in contrast is the immediate activation of a memory. Hence, as with Williams’ (1996) truncated search, in SMS, a dysfacilitation of the retrieval process, is assumed to underlie the retrieval of overgeneral memories.

Furthermore, according to Conway & Pleydell-Pearce (2000) remembering is a goal-directed activity. In other words there is a strong relationship between self, goals and memory in this model. The conceptual self contains abstract self-knowledge such as attitudes, beliefs and self-guides which are constrained by and associated with the general event memories, lifetime period memories and self-schema representations of the autobiographical knowledge. The episodic memory system, lower in the hierarchy, contains sensory perceptual event specific knowledge (ESK), which if relevant to ongoing goal processing, becomes linked to stored representations in the autobiographical knowledge base. Basically then, AM constrains the self.
Moreover, memory according to this model becomes distorted under two guiding principles: coherence and correspondence. Coherence results in changing the accessibility of memories to make it consistent with the 'self' (could inter-change 'self' for 'schema' here). It is argued that this occurs due to driving needs to maintain a confirmatory past and to heavily resist goal change. Correspondence means memory has to correspond to a fact however it can still be distorted, for example, in the case of overgeneral memory, selective memory, or rehearsal. Something else, which is important in terms of the SMS is the difference between recent and remote memories. It is remote (long-term) memories, which define the self. Recent memories unless rehearsed and incorporated into long-term memory, are transient. This has implications for the AM literature As well as determining which aspects of ESK become integrated with the AM base (being retained for later retrieval), the working self influences which episodic memories are retrievable at any given point in time, retrieval being dependent to a large degree on the extent to which episodic memories are consistent with and relevant to the current goals of the working self.

2.7. 'Origin' Theories

Williams (1996) is one of the only theorists to have put forward a developmental mechanism through which OGM may evolve. Williams (1996) first posited the theory of Mnemonic Interlock (MI) to account for the excess of categoric memories recalled by depressed individuals. In this theory, memory retrieval becomes deadlocked following the categoric stage of memory because of the tendency for an initial self-referent categoric description to elicit other highly self-referent descriptions in depressed memory. For example, the cue 'unhappy' in a depressed person will likely elicit the memory 'I always fail things', which
may trigger further categoric descriptions such as 'I always let people down'. Several such iterations (which can be about self, world or future) will result in reinforcement of these negative categoric descriptions, lead to a closer relationship of these schemas in memory and therefore a greater likelihood of one categoric description triggering another in the future. Of most relevance to the current thesis, is that Williams (1996) theorizes that this overgeneral cognitive style develops from childhood perhaps in response to negative events. He suggests that children who are either subjected to numerous negative events or who have difficulty coping with negative affect, may develop an OGM style to minimize their experience of negative affect at recall. There is the Affect Regulation (AR) hypothesis. An assumed adverse consequence of adopting an OGM style is that individuals will also recall overgenerally for positive events.

2.8. The Theory of Affect Regulation (Williams, 1996)

The theory of Affect Regulation (AR) is conceived of as a passive cognitive avoidance strategy, within a developmental framework. Consistent with this theory, Kuyken & Brewin (1995) found that depressed women with a history of abuse as children demonstrated more overgeneral retrieval than those who had not. Individuals who have experienced trauma during childhood have greater difficulty in specific retrieval even for events unrelated to the trauma (Meesters, Merckelbach, Muris & Wessel, 2000). Thus, evidence from trauma research supports the affect control hypothesis to the extent that experience of negative life events in childhood is associated with overgeneral retrieval in adulthood (Dalgleish et al. 2003; de Decker et al. 2003; Kuyken & Brewin, 1995; Henderson, Hargreaves, Gregory & Williams, 2002; Hermans, et al, 2004).
However, evidence that categoric recall reduces the experience of negative affect, consistent with AR is not uncontested. For example, Hanawalt & Gebhart (1965) found that when children gave ratings of event pleasantness and unpleasantness, individual events were rated as more unpleasant than events that had been summarized consistent with an AR interpretation. However no mood or physiological measures were taken to confirm that rating of unpleasantness actually effected mood. Second, Raes, Hermans, de Decker, Eelen & Williams (2003) found evidence in support of AR in an experimental study of undergraduate students where students demonstrating very high OGM reported less distress on a subsequent frustration task compared to students reporting very low OGM. However, findings contradictory to an ARH have been reported by Philippot and colleagues who found specific processing was consistently related to reduced emotional arousal in a series of studies. For example, Philippot, Schaefer & Herbette, (2003) found that re-evocation of negative memories (primed for specific or general retrieval) resulted in reduced ratings of emotional intensity for the specific primed condition while ratings of emotional arousal in the general primed condition remained the same. Results are interpreted as evidence that actively specifying emotional memories actually reduces emotion elicitation, contradictory to the AR hypothesis. This result was also replicated in a second study with induced anxious students, whereby specifying anxiety related information actually resulted in less emotional arousal than general level processing (Philippot, Burgos, Verhasselt & Baeyens, 2002).

Work on AR and AM is clearly in its infancy. Results have not yet been tested in depressed populations and there is discrepancy in current findings. There are several possible reasons to account for such differences. One such reason may be a fundamental difference between the effects of induced high-low specificity vs. a trait high-low OGM style (Raes et al., exclusively examined the latter). Equally, another difference concerns reporting of emotion. Raes et al.,
asked participants to rate mood on a 0-100 (not at all- extremely) visual analogue scale in response to various mood adjectives whereas participants in Philippot et al., study reported emotion intensity on a scale of 0-10 (no emotion – strongest emotion ever experienced). This too could account for differences. Ultimately, that the process of overgeneral retrieval may be an affect reducing mechanism is popular but as yet unproven.

2.9. Other OGM theories

OGM bias may otherwise be explained with reference to (a) schema and (b) prototypicality; (c) problems of inhibitory control or (d) affect-regulation failure. For example, (a) Rather than a passive memory search strategy, OGM may reflect ‘capture errors’ due to AMT cues mapping onto core concerns and dysfunctional schema in depressed or traumatized individuals, resulting in temporary memory system disruption (Dalgleish et al., 2003). OGM to positive cues in depression would then be explained in terms of depressed individuals failing to encode or store positive memories because of strong negative schema making positive memories incongruent with self. (b) Similarly, I would suggest, negative OGMs may result from decisions regarding prototypicality. Under normal circumstances people use generic memory because of the efficiency it affords in summarizing large numbers of individual episodes and events. General memories can give quick access to information. However, general memories are formed not merely as a frequency effect, i.e. the more frequent an event the more likely it is to become generic. Instead, one off events may be generalized if they are viewed as ‘typical’ by the individual. Importantly then, individual events can become generic in a person’s memory if they are seen as paradigmatic or representative and what an individual considers ‘typical’ is effected by their current schemas and scripts. Hence depressed individuals may retrieve overgeneral negative memories as prototypical (i.e. multiple specific events summarized or single negative events viewed as
paradigmatic) whereas overgeneral positive memories may be a result of failure to encode specific positive events (as schema incongruent). OGM theories so far have failed to give an adequate explanation for the existence of reduced specificity to both positive and negative cues.

(c) Regarding the inhibitory control hypothesis, Hasher & Zacks (1979) proposed that depressed individuals have difficulty inhibiting interfering cognitive material when seeking to perform cognitive tasks. This would lead to OGM because specific retrieval requires appropriate inhibition of mnemonic material from other stages of the memory hierarchy. Deficits in the ability to inhibit interfering information may contribute to OGM errors. This inhibition theory was very recently proposed and tested by Dalgleish et al., (in press). It may be that AM retrieval is particularly vulnerable to executive failures of inhibitory control. Dalgleish et al. have argued that, if a central problem in specific memory retrieval is a failure to inhibit interfering information, the numbers of OGMs on the AMT should be associated with errors of performance on executive tasks that require inhibition of irrelevant information. In a series of studies in dysphoric individuals, Dalgleish et al. demonstrated that this was the case. Levels of OGM were correlated highly with levels of inhibitory task errors on a range of executive paradigms with little or no relationship to autobiography, memory or emotion. Thus, OGM may be associated with a failure to inhibit task irrelevant information. This particular line of OGM research is in its infancy but highlights the possibility that there may be more than one plausible account for OGM retrieval and more than one mechanism may be in operation.

Finally, (d) Philippot et al., (2004) argue that instead of OGM reflecting a truncated memory search motivated by affect regulation, OGM may instead be a result of failure to emotion
regulate. That is, it may be that when an AM is activated in a depressed person, the associated emotion is so poorly regulated that any attempt to further specify the emotional memory is disrupted by the emotional arousal. This theory is similar to the schema disruption theory, in which schema activation disrupts the memory search process. This AR-failure (or Affect-Arousal) theory asserts that the elicitation of emotion disrupts the memory search process. Furthermore, the ARH suggests a specific memory mode results in increased emotional arousal. In contrast, the present account suggests specifying information from memory should reduce emotional arousal. This would be due the reduction of automatic, schematic (emotion associated) processing. Though not yet tested in depressed groups, this has held true in several student studies (Philippot, Burgos, Verhasselt & Baeyens, 2002; Philippot, Schaefer & Herbette, 2003; Philippot, Burgos, Douilliez & Francart, 2004). In addition, both schema and affect-arousal explanations of OGM also have the advantage of being able to account for both positive and negative OGM, while a cognitive avoidance explanation (AR) can only comfortably account for negative memory effects.

In summary, evidence of OGM in depression is robust and at present, MI and AR remain the most prominent and well-established mechanistic or causal theories. Moreover these theories are not mutually exclusive. However, clear empirical evidence validating theories of OGM is still pending. As a prime example, though the links between the development of an OGM style from childhood and depression have been made in theory, to date there are no studies examining OGM bias in children. The principle aim of this thesis is to address this gap in the literature.

2.10. Valence
In terms of trying to account for valence effects in the context of current OGM theories, AR would assume the OGM effect starts with negative recall and may later spread to include positive recall due the system wide bias. Schema interpretations of OGM would not predict directional valence effects, since overgenerality in this view is linked to cues mapping onto underlying schema as opposed to being a product of the valence of the word cues themselves. However, it is unclear whether OGM to positive cues would reflect underlying negative schema or the absence of positive schema. A mood congruent theory of OGM would probably predict increased specificity to negative cues and reduced specificity to positive cues, which cannot fully account for the negative OGM effects in depression. An affect-arousal account, like the schema account, would also allow for an incorporation of positive or negative OGM, dependent on whether disruptive affect was generated by the cue word e.g. The cue word ‘Happy’ generating distress by triggering thoughts of ‘I am never happy’ which would interfere with specific processing. One of the central aims of this thesis is to look more closely at valence effects in the child AM responses.

2.11. In Conclusion

In this chapter I have reviewed the rhetorical and empirical literature on autobiographical memory and depression. Within this broad domain I have concentrated on the OGM effect, as this is the central focus of the research in this thesis. I have outlined the key adult studies in this area and highlighted the fact that, to date, there are no published studies in children. The rationale for the present thesis was therefore to examine the fundamental components of OGM, for the first time in children and to then extend our knowledge of OGM in children by studying OGM in the context of other biases associated with depression.
To this end, Chapter 3 describes a study examining whether or not OGM effects exist in younger populations, along with an investigation of the relationship between OGM and individual differences in emotion focusing. In Chapter 4, this research is extended to a clinical population of children, and OGM in the sample is compared with OGM in both adolescent and adult samples. In Chapter 5, the adult finding that OGM predicts later levels of depressed affect (e.g. Brittlebank, et al., 1993; Dalgleish et al., 2001) is examined using a prospective longitudinal design in a school sample. This study also examines the relationship between OGM and cognitive style. Chapter 6 describes a study that validated an additional information-processing paradigm for use in children and to support AMT results, this new paradigm involved labeling of facial affect. Finally, Chapter 7 reports a study of looking at the relationship between OGM, emotion focusing, facial affect recognition and social problem solving in a sample of traumatized residential children.
Chapter 3 | Study 1 | Autobiographical Memory Specificity in Children: Effects of Age, Dysphoria and Emotion-Focusing
Abstract 3 | Overgeneral autobiographical memory (OGM) is strongly associated with depression in adults and appears to reflect a stable cognitive bias (van Vreeswijk & de Wilde, 2004). Theories of OGM have postulated that this bias may originate in childhood (Williams, 1996). However, it is not known whether this bias exists in children or what factors contribute to its development. The roles of age, dysphoria and a new variable, Emotion-Focusing (EF) on the production of specific autobiographical memories was examined in children aged 7-11 years using the standard Autobiographical Memory Test (AMT; Williams & Broadbent, 1986). Results show that older children retrieved more specific memories than younger children irrespective of cue valence. Dysphoric children retrieved fewer specific positive memories irrespective of age and a three-way interaction was discovered between age, valence and dysphoria, such that older dysphoric children also demonstrated OGM to negative cue words. In addition, EF was associated with specific retrieval, providing new evidence for the possible importance of encoding preferences in OGM. Results are discussed in terms of the development of depressogenic biases.
3.1 Introduction

In the previous chapter we saw that overgeneral memory (OGM) has been extensively studied in adults and appears to be a key feature of adult depression (van Vreeskwijk & de Wilde, 2004). In considering the origins of this bias Williams (1996) put forward a developmental hypothesis in which he theorized that OGM may develop from childhood in response to negative events. However, to date no studies have looked at OGM in children. Moreover there is no empirical evidence regarding how mood or other individual difference factors, such as emotion focusing might influence the production of overgeneral memory in children using standard AMT cuing paradigms. Importantly, if OGM does reflect a stable bias, it could be a useful marker of cognitive vulnerability to depression in children. The principal aim of the present study was therefore to investigate whether children could generate AMs to cue words, and whether this effect would be affected by age, levels of dysphoric mood, level of emotion-focusing or cue valence.

3.1.1. Adolescent AM

We have some insight into the development of OGM from investigations involving adolescents, using the same AMT cuing paradigm that is used in the adult literature (de Decker, Hermans, Raes & Eelen, 2003; Park, Goodyer & Teasdale, 2002; Swales, Williams & Wood, 2001). In these studies, as expected from the adult literature, clinically depressed adolescents are more overgeneral in their responses to cue words than non-depressed controls (Park et al., 2002). However, in the Swales et al. study there was also a positive correlation within the clinical
population, with the more depressed and hopeless adolescents demonstrating greater specificity to negative cues. This is in the opposite direction to that which would be expected from previous findings with depressed adults (van Vreeswijk & de Wilde, 2004). Post-hoc analyses attributed this finding to a repeated memory phenomenon, whereby a sub-set of parasuicidal adolescents recalled the same negative traumatic event to more than one cue word. The researcher was the therapist in this study, which may also be pertinent to the result. Repeated specific recall can be addressed with clear participant instruction to prevent or judge repetition. Adolescents exposed to family violence during childhood, and reporting co-morbid depression, also exhibited an OGM bias as evidenced in interview data concerning family conflict (Orbach, Lamb, Sternberg, Williams & Dawud-Noursi, 2001).

3.1.2. Developmental-Child AM

Instead of examining OGM effects, existing studies examining AM retrieval in children have tended to concentrate on the onset of AM recall in pre-school to early school age children and have used different methodologies from those used in the adult literature. Currently there is no literature available on OGM bias in children. However, it is possible to look at literature on the influences on the development of AM to look for factors, which may contribute to the development of an OGM style. This subsection reviews this literature on development of AM retrieval in children.

Conscious memory begins to develop at 8 months which is when granule neurons in the hippocampal dentate region have all finally formed, when myelination of many important limbic
pathways gets underway, and when activity in the frontal lobes (which plays a part in both short
and long term conscious memory) surges (McCall & Carriger, 1993). Thereafter, toddlers can
demonstrate accurate and durable recall of personally experienced events. However, these
reports are often fragmentary and heavily dependent on questioning and prompting. Moreover
there are doubts as to whether event memory of this sort is truly autobiographical, in the sense of
personally relevant (Howe & Courage, 1997).

With respect to specificity, children as young as 3 can recall one-off or routine events but details
are often lost and they tend to rely on script like information e.g. ‘having dinner’, ‘taking a bath’,
‘going to bed’. Such generic event memory provides a schema derived from experience that
sketches the general outline of a familiar event without details of specific time or place and is
believed to represent a functional stage in memory development in early childhood (Nelson,
1993). In contrast, older preschool children and school age children are able to provide
narratives, which contain more referential detail, orienting information, evaluative comment,
temporal markers and require less prompting (Howe & Courage, 1997). This developmental
literature reveals that specific questions can yield specific AM responses even in very young
children (e.g. Barr, Dowden & Hayne 1996; Carver & Bauer, 1999). However, overall, young
children’s preferred mode of memory reporting is general (Nelson, 1993).

Greater detail, structure and reference to temporal markers are then observed in AMs as a
function of increasing age (Howe & Courage, 1997). Both narrative and AM continue to develop
in structure, length, organization, content and elaborativeness over early school years (Fivush &
Hammond, 1990; Hudson, Fivush & Kuebli, 1992; Peterson & McCabe, 1991). These findings
are discussed in terms of language acquisition (Nelson, 1993) and self-concept formation (Howe & Courage, 1997) rather than in terms of specificity or generality per se. However, improvement in knowledge base, strategy use, language skill, self-concept and storage capacity, with age (for a full review see Howe & Courage, 1997), are likely to facilitate AM response specificity. By age 7 therefore children's AM recall is considered comparable with adult functioning; “memory function appears adult like in organization and strategies and shows only a gradual quantitative improvement through to early adolescence” (Gathercole, 1998).

However, developmental literature can suffer from lack of experimental control. For example, child narratives are typically heavily prompted and structured/scaffolded by interviewers, making results difficult to validate. The present study therefore sought to test an early to middle-school age child population on the standard AMT cuing task in order to bridge the gap in the AM and depression literature, and to look for evidence of the development of or onset of an overgeneral retrieval style prior to its establishment in adolescence. The use of the AMT cuing methodology then makes direct comparison between child and adult retrieval styles possible, providing a clear baseline from which to examine any effects of mood.

### 3.1.3 Factors known to influence AM Development

The question then remains, what contributes to the development of AM style and content in childhood? Howe & Courage (1993) state the emergence of AM arises from basic developments in the establishment of the self-concept. By definition, AM is memory for information and events pertaining to the self, it is therefore only following knowledge of one's self as an independent
entity that experiences can be organized in memory as personal or autobiographical. In effect, the
development of self-concept theory claims "the development of the self-concept (or self
schema), like that of other schemata, has a dramatic impact on the way in which memories are
organized (encoded, stored and retrieved)". At 3 years of age for example, a transition occurs in
children's qualitative ability to describe themselves and this marks the development of an
organized psychological self around which memories can be organized. Self-concept may also
instruct the organization of AMs. Stored AMs add features to the 'self', which in turn influences
subsequent encoding (Conway, 1996). For example, adults with highly committed self-identities
recall more AMs and recalled them faster than individuals with low commitment self-identities
(Neimeyer & Rareshide, 1991) and in adolescence, memories best recalled as contributing to life
stories were organized around clear themes and personality traits, with high levels of congruency
and consistency (Habermas & Bluck, 2000). Therefore it seems likely that organization of self-
concept effects AM. Howe & Courage (1993) state that with the emergence of the self we
witness the emergence of AM. They argue that AM does not depend on language for its
existence but does require a cognitive sense of self. So is it possible that self-concept is less
sophisticated in depression and that this can add to an account of OGM? Beck et al, (1979)
would certainly assert that the self-concept in depression is child-like in that it is over-simplistic,
one-dimensional and fixed e.g. 'I am fearful' - as opposed to the multidimensional 'I am
sometimes fearful, but I am also often strong and kind'. If the theory of self-schema and memory
association is true this would presumably affect AM.

Nelson and colleagues on the other hand assert language, not self-concept, is the key factor
which influences AM development. Around the same time as the development of self-concept
children also begin to generate personal narratives around their memories. This language-based
development of AM explanation (Nelson 1992; 1993) suggests that it is the development of
language that marks the development of AM. Nelson proposes that children learn the social-
cultural forms of narrativising memory in conversation with others and it is this that aids
developing mental representations about knowledge in the form of AM. The impetus for personal
memories according to this theory occurs when children begin to appreciate the contribution of
AM and personal memories to social bonding. In this way social bonding is viewed as the
impetus underlying the development of AM. According to this view social interaction, therefore
distinguishes AM from other types of memory (Nelson, 1993). In this regard, parental
conversational style has been shown to affect retrieval style (Fivush & Fromhoff, 1988), as has
culture (Wang, Leichtman & Davies 2000), each having a strong social aspect. Thus, from a
developmental perspective both self-concept formation and social interaction have been shown
to influence the content and style of AM.

3.1.4. Age and Depression

Age and dysphoria might also interact to affect AM production. In a 5-year longitudinal study of
8-13 year olds, Nolen-Hoeksema, Girgus & Seligman (1992) found that as children age,
cognitive style as measured by the Children’s Attributional Style Questionnaire (Kaslow, 1978),
became a significant predictor of depression. In contrast, only negative life events predicted
depression in the younger group. Authors suggest the reason for this apparent increasing role of
cognitive style in depression with age may be due to cognitive capacities increasing with age, or
because cognitive styles become more stable across later childhood. Similar data exist, showing
an increasing relationship between depression and mood congruent memory bias with age.
(Neshat-Doost, Taghavi, Moradi, Yule & Dalgleish, 1998). If age, mood and cognition do interact in this way, the association between dysphoria and overgeneral retrieval may manifest itself differently in younger as opposed to older children.

3.1.5. Importance of Cue Valence

A further factor that might interact with age and dysphoria to influence AM retrieval is cue valence. In the adult literature overgeneral recall occurs more in response to positive as opposed to negative cue words (e.g. Williams & Broadbent, 1986), However it can show the reverse effect (e.g. Mackinger, 2000) with more overgenerality to negative cues. Inconsistent valence effects in depressed groups may be attributable to variance in the relative causal contribution of AR (Williams, 1996), temporary memory system disruption caused by schema activation (Dalgleish et al, 2003) or mood congruency (see Williams, Watts, MacLeod & Matthews, 1997). For example, AR would predict greater OGM to negative cues relative to positive, schema activation theory would suggest OGM is dependent on relevant schema activation not cue-valence and so directional valence effects would not necessarily be predicted. Mood congruency would then anticipate mood congruent processing and therefore poor positive AMS in depressed or dysphoric groups. It is also possible that age may further influence this valence effect though, to my knowledge this has not been demonstrated in any AM literature.

3.1.6. Emotion-Focusing and AMS
Finally, this study is the first to introduce the idea of 'Emotion Focusing' (EF) as a possible additional variable influencing the OGM effect. The original motivation for studying this variable comes from Williams (1996) who argued that OGM may, in part, be attributable to preferential encoding of situations according to their emotional content in individuals who are predisposed to focus on emotion due to negative life experiences. Williams (1996) suggested that encoding emotion may lead to global memories because it encourages a schematic level of thinking (Teasdale & Barnard, 1993). From this, it can be assumed that people who have a greater tendency to encode the emotional content of situations may be more likely to demonstrate overgeneral recall than those who do not. Williams, Teasdale, Segal & Soulsby (2000) re-stated that trauma in early childhood may result in a cognitive style in which individuals habitually focus on, or are hypersensitive to, the affective features of events. The extent to which individuals focus on (encode) the emotional features of their environment is an important factor that has hitherto been neglected in both child and adult investigations of AM retrieval.

It may be for example, that rather than simply reflecting a defensive memory search strategy, OGM may also be governed by encoding preferences. OGM is characteristically exclusively discussed as a retrieval phenomenon, however it is also useful to consider OGM as a possible encoding phenomenon. Individuals do not necessarily encode all information in a given context and then later suppress specific aspects at retrieval. Indeed people tend to selectively encode information that is salient to them (Howe & Courage, 1997). Some individuals may therefore preferentially encode or avoid specific features (or emotional features) of events such that it effects specific representations in memory. This would mean that both encoding and storage (not just retrieval) are important in understanding OGM.
Williams (1996) suggested that people who encode emotion would be more likely to demonstrate overgeneral recall than those who do not. An alternative hypothesis for the effect of EF on AM retrieval is that an individual's predisposition to focus on the emotional features of their environment may result in improved specific recall of emotional events. Various theoretical accounts of cognition-emotion relations would concur with this prediction. For example, cognitive theories of depressed mood and/or AM (Beck et al., 1979; Bower, 1981; Conway & Pleydell-Pearce, 2000; Power & Dalgleish, 1997; Teasdale & Barnard, 1993) would suggest that, to the extent that a specific autobiographical event is encoded in emotional terms, the presence of a congruent emotional cue word (such as in the AMT) would be more likely to elicit retrieval of that event from memory. The rationale here is that retrieval of AMs is facilitated by the presence of any information that maps onto the underlying representational content of that memory. Consequently, because high EF individuals would habitually lay down AM representations with a greater proportion of emotional content, the presentation of emotional cues should be more likely to activate those representations leading to facilitated generation of specific memories. An alternative hypothesis for the effect of EF on AM retrieval is therefore that individuals' predisposition to focus on the emotional features of their environment may result in more specific AM recall to emotional cue words. People who are depressed may then have strong, activated connections between affective "negativity" nodes and multiple semantic concepts (Ingram, 1984).

EF is used in this study to denote an individuals' predisposition to focus on the emotional features of their environment. Though EF could be state induced, it is conceptualised primarily as a trait-like characteristic of an individual. For example, given a typical scenario of a university
library during an exam period, one individual may encode the fact that several students at their desks look terrified and tearful, while another individual, viewing the same scene, may notice instead that there is a pile of precariously stacked books against a chair leg. The first individual will be effectively cued to remember the library event by the word ‘fear’ while the second individual would be better cued by the phrase ‘safety-hazard’ and would probably not remember the event based on an emotional descriptor.

Thus, it is possible that sensitised emotion encoding may either result in OGM as a form of affect regulation or, it may result in improved recall (i.e. increased specificity) due to enhanced memory for emotion. Either way, EF may provide clues to the precipitation of certain AM retrieval styles. People who are depressed may preferentially encode negative affective aspects of events, such that depressed high emotion-focusers would be highly specific to negative cues. It is currently not known whether EF is associated with overgeneral or specific valenced recall. The final aim of the present study was therefore to investigate the influence of EF, and the putative interactions of EF, age, valence and dysphoria, on AM retrieval in children.

3.2. Study Rational

The overall rationale for this study was simply to extend the adult AM literature to a child population. To my knowledge, no one study has looked at the interaction of age, dysphoria and valence as factors known to influence AM. Nor has any study looked at child AM using the standard cuing task, or considered EF as a contributing factor. The present study was therefore designed to investigate these issues. The specific hypotheses were as follows:
3.3. Hypotheses

1. Age, valence and dysphoria will interact to influence AMS in children.
   - Younger children will be less specific than older children.
   - Dysphoria in children will be associated with reduced AMS
   - The effects of dysphoria may be valence specific and may vary with age.

These effects will remain after controlling for any effects of general scholastic ability.

2. EF will explain a significant proportion of the variance in AMS. EF will be associated with either increased or reduced AMS and will interact with age, valence or dysphoria, factors already known to influence AMS. The effects of EF will occur independent of scholastic ability or age.

3.4. METHOD

3.4.1. Participants

Seventy children (35 girls) took part in this study. Thirty-five of the participants were aged 7-8 years ($M = 7.86$, $SD = .40$). The remaining thirty-five participants were aged 10-11 years ($M = 10.6$, $SD = .72$). The gender ratio across age groups was similar with 17 females in the younger group and 18 females in the older group. Two different age groups of children were recruited. Children aged 7-8 years were chosen as the youngest age group. This is because AM retrieval is believed to be commensurate with adult functioning by this age (Gathercole, 1998). Children aged 10-11 were then chosen to provide a discrete age comparison group and to form a good
bridge with previous adolescence literature on OGM (e.g. Park et al., 2002). These two age groups ensured the best chance of detecting any deviance in normal child AM development, if any exists. There were 14 dysphoric participants (8 from the younger group and 6 from the older group). The remaining participants (27 and 29 respectively) were categorized as non-dysphoric. ‘Dysphoric’ in this study was defined as a score of 7 or above on the short form of the Child Depression Inventory; Kovacs, 1992, see Materials and Measures section.

All participants were volunteers recruited from a London, UK Junior School. The school was initially contacted to sanction the research proposal. Research approval was then obtained from the relevant ethical bodies. Permission to conduct research was sought from individual classroom teachers, followed by a letter of consent to parents and finally written consent from the children themselves. The sample was ethnically mixed. No individual with Special Educational Needs was included in this study. No child with any known history of trauma or emotional disturbance, as established from school records and teacher reports, was included. We elected to use this criterion since a history of trauma is known to influence AM recall (e.g. de Decker et al., 2003) and there would have been insufficient children with a history of trauma to examine any such influences systematically.

3.4.2. Materials and Measures

AM. The standard Autobiographical Memory Test (AMT; Williams & Broadbent, 1986) was used. The AMT is based on a cue word method as adapted by Lloyd & Lishman (1975) and is widely used to assess personal event recall. The task comprised 10 emotional words, 5 positively
valenced (happy, surprised, safe, successful, interested) and 5 negatively valenced (sad, lonely, hurt, careless, angry). Words were presented orally and visually to participants on 120 mm x 100 mm laminated index cards and participants were asked to retrieve a specific memory for each cue word. All participants completed three practice trials involving neutral words, with feedback, to ensure that all participants understood and were able to complete the requirements of the task. Every child retrieved at least one specific memory during the practice trial. Participants were informed that they would be prompted to provide a specific memory if an overgeneral response was given (i.e. a memory that was not of a particular event on a given day). In addition, clear instruction was given requesting the child not to give the same memory to more than one cue word, to avoid the phenomenon of 'repeated memories' discussed earlier. The presentation of cue words was mixed across valence. Participants were given 60 seconds to retrieve a memory. Failure to respond was coded as an omission; failure to retrieve a memory was coded as a 'no memory'. Failure to retrieve a specific memory resulted in the allocation of an overgeneral response categorisation for that cue word. All participant responses were recorded on audiotape and later coded for specificity.

Two independent raters coded the AM responses as either specific, categoric or extended (where a specific memory is an memory for an event on a particular day, an extended memory is of a single event lasting more than one day and a categoric memory is a generic collection or class of events) or as 'no memory'. The mean numbers of specific first-response memories for each child, were used as the data for analysis. An example of scoring of a categoric response to the cue word 'Lonely' was, "When I was in Year Two I used to sit on the lonely bench every play time". A specific memory response to the same cue was, "On Friday- When I was at home. I had
no-one to play with 'cause my brothers were out at a friends and I wasn’t allowed to go". This memory was coded as a specific response because the memory is of a particular place and time (of less than one day). Over 85% inter-rater reliability was achieved on coding of these responses. This reliability estimate is comparable to reliability rates found in the adult literature (e.g. Williams & Broadbent, 1986).

As noted, there are numerous indices of OGM style that can be derived from standard AMT data. This means that some care has to be taken as to how best to approach data analysis for this task. One possibility is to present analyses for all of the AMT indices for all of the studies. However, this would require the reader to digest many pages of, invariably repetitive, analyses. Another possibility, and the one adopted here, is to select a representative AMT measure for analysis. The main contenders for this more selective approach are the measure of number of specific memories, the measure of overgeneral memories (i.e. categoric plus extended) or the measure of categoric memories. Each of these has pros and cons. Overgeneral and categoric measures have sometimes been preferred as more sensitive indices of memory style (see Williams & Dritschel, 1992). However, in practice, the core effects in the literature that have been reported for 'generality' have almost always also emerged when using measures of specific memories. Hence the terms 'reduced AMS' or 'OGM' are typically used interchangeably throughout the literature. A disadvantage of analysing generality measures is that the numbers of such memories can often be quite low for any given study as, essentially, these responses represent 'errors' on the AMT. These low numbers presents difficulties for carrying out parametric data analysis and means that factorial examination of the data (which is really ideal for most of the studies) is often not possible. There is also the concern about floor effects for categoric data, especially in control
participants. Measures of numbers of specific memories (essentially 'correct' responses on the AMT), on the other hand, are usually compatible with parametric examination and avoid problems with floor (or ceiling) effects. For these various reasons, the following approach to AMT data analysis has been adopted in the thesis: 1) to report data on numbers of specific memories and on numbers of overgeneral memories (categoric plus extended) where necessary; 2) to present full data analyses on numbers of specific memories; 3) where experimental hypotheses involving the AMT are not supported using such specific memory analyses and where pre-existing findings in the adult literature have shown effects using generality measures, then to analyse the overgeneral memory scores to see if the key effects are present using this index. In practice, this last step was only necessary and relevant in the longitudinal study (Study 3 - See Chapter 5). For all other studies analyses with specific memories produced results in keeping with the a priori hypotheses.

Another issue that merited consideration was whether raw numbers of specific memories should be the focus of analysis or whether specific memories calculated as a proportion of all meaningful responses (i.e. after non-responses or omissions have been subtracted) should be used. Usually these two measures produce the same results. Notwithstanding this, because recent work using the AMT indicates that AMT performance may represent, at least in part, a general problem with executive functioning (e.g. Dalgleish et al, 2005), it seems more sensible to use raw data. This is because omissions, according to such an executive functioning view, could potentially index executive failures as much as overgeneral memories do; therefore, controlling selectively for omissions would be theoretically suspect. For this reason, and because omissions
were very rare in the studies reported in the thesis, raw data on numbers of specific memories were analysed throughout.

Validity of the AMT for use in children was also established in several ways. No child failed to retrieve a specific AM to at least one practice cue word and some of the experimental cue words. Some children in the youngest age group were unsure of the meaning of the words ‘successful’ or ‘careless’ (N = 4). In these instances, the experimenter explained the meaning of the word by invariably saying ‘good at something’ or ‘clumsy’. This was sufficient for all children to acknowledge their understanding of the word and quickly retrieve a valid memory (specific or overgeneral). There were only 7 ‘no memory’ responses in total, which were distributed across age (3 from older children) and cues. There were no omissions or memory repetitions. Content validity was also examined by having two raters judge whether the content of the reported memory was appropriate to the cue word used to elicit the memory. All children recalled appropriate content memories. High content validity was confirmed by over 95% inter-rater agreement on memory content appropriateness on a random 50% of the sample. For examples of specific and overgeneral coded child responses see Appendix 3.1.

*Emotion Focusing.* A measure of EF was constructed using combined results from two tasks: Card Sorting and Image Description. The Card Sorting Task consisted of a set of 12 cards (90 mm x 60 mm) each portraying an adult face displaying one of three different emotional facial expressions (happy, neutral or sad). The faces were arranged in a 6x2 formation and consisted of an equal gender mix, mixed age and appearance e.g. hair length, colour. The faces were not of mixed race due to limited availability. All photographs were drawn from a sample set of faces,
which had previously been used and received over 75% inter-rater agreement concerning the emotion being portrayed (Le Gal & Bruce, 1999; see Appendix 3.2 for examples). Firstly, the experimenter verified that each child understood the nature of grouping and physically demonstrated that the cards could be sorted into two groups, using gender as the most obvious sorting-category. Once established, the cards were then replaced and the children were required to sort the cards according to their own sorting category, verbalising the decision as soon as one was made. A score of 1 was given when the child sorted the faces according to affect (emotion). A score of zero was given for any other (non-emotional) sorting category. The sorting categories suggested by children were emotion (happy and sad faces), hair colour, hair length, age, face-shape and subjective attractiveness.

The second EF task was the Image Description Task. This involved a picture-cuing methodology. A series of 11 photographic images of socio-emotional behavioural settings e.g. family laughing around a dinner table, child being admonished by parent figure, were drawn from a developmental psychology stimulus pool. The 11 images were presented to the participants as 200 mm x 150 mm laminates, and depicted for example, ‘Parents standing over a baby, smiling’. All but one of the cards involved a child protagonist. Protagonists were of mixed age and race. Participants were simply asked to ‘Tell me what you see’ in response to being shown each pictorial card (see Appendix 3.3 for examples). The participant responses were recorded and later coded for emotional description. Subjects were given a score of 1 if an emotional adjective or adverb was used in the description of the card, for example ‘happy, excited, loving’. A score of zero was given for each card where no emotional description was given, for example ‘a baby, a mum and a dad.’ Two raters examined participant responses in
terms of these categories. When emotion was implied but an emotional adjective was not directly used e.g. ‘running hard’ or ‘dad is making up with son for missing him play football’, it was decided that a strict criterion would be used and only an emotional descriptive would result in an emotional classification. That is, inference of emotion was not sufficient to classify as an emotional description. Using this criterion, 100% inter-rater category agreement was achieved.

From these two tasks a combined measure of EF was constructed whereby the sample was divided into high, medium or low emotion-focusers according to the following criteria. The criteria for low EF was that the participant neither sorted the cards by emotion nor used emotion descriptions in over 75% of the images in the image description task. The criteria for medium EF was that the participant either sorted the cards by emotion or described over 75% of the images in terms of emotion. The criteria for high EF required the participant to both sort the cards by emotion and describe over 75% of the images in terms of emotion. This classification was considered statistically reasonable in the absence of any other theoretical or empirical constraints.

*Child Depression Inventory.* The shortened version of the Child Depression Inventory (CDI-S, Kovacs, 1992) was completed. The reasons for using the CDI-S are described in Appendix 3.4. This measure consists of 10 mood-related items with three possible responses per item. Participants are directed to indicate which of each of the 3 statements best applies to them over the last 2 weeks. The statements are read out loud to the participants and participants are required to tick the most appropriate statement to them (see Appendix 3.5). According to CDI guidelines (Kovacs, 1992) participants with a CDI score of 7 or above are classed as dysphoric and those
with scores below 7 are classed as non-dysphoric. The word ‘dysphoric’ is used in this study rather than ‘depressed’ simply to stress that the current authors felt the measure best reflects a depressive mood or emotional state characterised by depression, which can be transient, rather than a depression disorder, which should be formally diagnosed.

**General Ability.** A measure of scholastic ability was constructed for each child using a combination of teacher report and age appropriate National Curriculum Attainment levels. This is a method of ability grouping commonly used in British Primary School education. From these two sources, children were divided into high, medium and low ability groups. Where discrepancy existed between groupings based on optional SAT levels, e.g. high attainment in Maths but medium attainment in English, the teacher’s summative assessment on overall ability was used as the final criterion. Though standard IQ measures are more commonplace and therefore easier to interpret across studies, this measure of scholastic ability was favoured in order to respect testing time constraints, to avoid unnecessary stress caused to individuals by IQ testing in a young and partly dysphoric sample, and to utilize teacher reports of child potential for an arguably stronger index of actual ability.

*A note on statistical analyses:* For all analyses presented below, data were initially explored to ascertain homogeneity of variance, normality of distributions and, where relevant, sphericity, across conditions, using Levene's Test, Kurtosis and Skew indices, and Mauchley's W test. Where data violated the assumptions for parametric statistics both parametric and either non-parametric analyses or analyses with adjusted degrees of freedom were conducted. If these produced comparable results then parametric output is reported. Otherwise, non-parametric
output is presented. In practice, in almost every case, data were suitable for parametric analysis or parametric and non-parametric output did not differ. All analyses were two-tailed. Unless otherwise stated, alpha was set at .05. In the case of analyses examining post hoc comparisons or unhypothesised contrasts, statistical correction was employed and this is noted where relevant. All analyses were conducted using SPSS version 11 (SPSS for Windows, Released 11.01.2001. Chicago: SPSS Inc.).

3.4.3. Procedure

Participants were tested individually and face to face, in a quiet testing environment within the school. Participants were first asked to complete the AMT, followed by the two EF tasks and the CDI. Task order was fixed to avoid possible contamination effects of the CDI or EF on the AMT. Once the participants had completed all 4 measures they were thanked for their participation and fully debriefed. After the testing session an indicator of general scholastic ability was obtained from school records and in consultation with the appropriate class teacher.

3.5. RESULTS

Data on AMS is reported in this study. The numbers of specific AMs split by age, dysphoria and cue valence are shown in Table 3.1. In keeping with the hypotheses, the data indicated that young non-dysphoric children were less specific to negative cues than to positive cues. Furthermore young dysphoric children appeared to recall more specific negative memories and fewer specific positive memories compared to their non-dysphoric age equivalents. The data also
indicate that dysphoric children in the older group were less specific than older non-dysphoric children to both positive and negative cues, suggesting evidence of the OGM bias.

Table 3.1. Mean Positive and Negative Specific AMs (and standard deviations) recalled by Dysphoric and Non-dysphoric Children, grouped by Age

<table>
<thead>
<tr>
<th>Cue</th>
<th>7-8 yrs (n=35)</th>
<th>10-11 yrs (n=35)</th>
<th>Total (n=70)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
<td>Total</td>
</tr>
<tr>
<td>Non-dysphoric</td>
<td>2.97 (1.27)</td>
<td>0.93 (1.25)</td>
<td>3.90 (2.08)</td>
</tr>
<tr>
<td>Dysphoric</td>
<td>1.67 (1.21)</td>
<td>2.00 (2.37)</td>
<td>3.67 (3.14)</td>
</tr>
<tr>
<td>Total</td>
<td>2.74 (1.34)</td>
<td>1.11 (1.51)</td>
<td>3.86 (2.24)</td>
</tr>
</tbody>
</table>

Hypothesis 1. Age, Valence and Dysphoria will interact to influence AMS in children

A three way ANOVA with Age (7-8 yrs and 10-11 yrs), Dysphoria (high and low) and Valence (positive and negative) was conducted to examine this hypothesis. General Ability (high, medium and low) was initially included as a covariate but was not significant, $F(1, 65) = 1.56, p = .22$. Reported analyses are therefore without this covariate. The ANOVA revealed a significant
main effect of Age $F(1, 66) = 38.80, \ p < .001$, such that older children were more specific than younger children. Results also revealed a main effect of Dysphoria, $F(1, 66) = 7.38, \ p = .01$, such that overall dysphoric children were less specific than non-dysphoric children. There was also a Valence trend, $F(1, 66) = 3.77, \ p = .056$, in that all children tended to recall fewer specific negative memories than positive. However, these main effects were qualified by a 3-way interaction between Age x Valence x Dysphoria on AM recall, $F(1, 66)= 4.4, \ p = .04$.

In order to deconstruct this 3-way interaction, two 2-way ANOVAs were conducted. The first examined the relationship between Age and Dysphoria on recall to positive cues, the second looked at the relationship between Age and Dysphoria on recall to negative cues. In the first 2 x 2 ANOVA (Age x Dysphoria) on specific positive recall there remained a main effect of Age, $F(1, 65) = 8.25, \ p < .001$, such that younger children recalled fewer specific positive memories than older children and a main effect of Dysphoria, $F(1, 65) = 20.75, \ p < .001$, such that dysphoric children recalled fewer specific memories to positive cues than non-dysphoric children. There was no significant interaction between Age and Dysphoria on positive recall ($F(1, 65) = .26, \ p = .63$).

In the second 2 x 2 ANOVA (Age x Dysphoria) on specific negative recall there remained a main effect of Age, $F(1, 65) = 27.31, \ p < .001$, such that younger children recalled fewer specific negative memories than older children. There was no main effect of Dysphoria, $F(1, 65) = .04, \ p = .85$, however, there was a significant interaction between Age and Dysphoria, $F(1, 65) = 7.79, \ p = .007$, such that non-dysphoric children’s recall of negative memories significantly improved across age ($\tau(54) = 10.21, \ p < .001$). In contrast, dysphoric children’s negative specific recall,
though higher than non-dysphorics in the younger group, stayed static across age ($t(12) = .97, p = .35$). Moreover, by age 10-11 dysphoric children recalled significantly fewer specific memories to negative cues than their non-dysphoric age equivalents ($t(33) = 2.4, p = .02$), in keeping with an OGM bias.

In summary, the main findings were that age affected specificity such that older children were more specific than younger children, especially to negative cues (see Figure 3.1). Dysphoria exerted a main effect on positive recall such that dysphoric children retrieved fewer specific positive memories than non-dysphoric children (Figure 3.2) and the 3-way interaction above was attributable to age and dysphoria interacting to influence the recall of negative memories. Young non-dysphoric children showed low specificity to negative cues. Older non-dysphoric children showed relatively high negative specificity. In contrast, young dysphoric children showed higher specificity to negative cues than their same age counterparts and yet specificity to negative cues in the older dysphoric group was comparatively low (see Figure 3.3).

**Figure 3.1.** Age, Valence and AMS: Older children were more specific compared to younger children, especially to negative cues.
Figure 3.2. Dysphoria, Valence and AMS: Dysphoria in children was related to reduced positive specific recall

![Chart showing mean specific AM for positive and negative cues across non-dysphoric and dysphoric groups.]

Figure 3.3 Age, Dysphoria and Valence: older dysphoric children were less specific to negative cues than same age non-dysphoric counterparts.

![Chart showing mean specific AM for negative cues across 7-8 yrs and 10-11 yrs age groups, with dysphoric and non-dysphoric groups compared.]

With respect to the second aim, although dysphoria was not simply a correlate of another variable such as age or valence, exploratory analyses were conducted with age and valence. There was interest in whether dysphoria anticipated age and valence, as they were not measured in the same order. To examine whether dysphoria or age and valence accounted for significant variance in AMS (F(1, 69) = 45.69, p < .001), adjusted $R^2 = .47$ was used to test whether the model included Age as the first independent predictor of specificity ($F(1, 69) = 70, p < .001$), followed by EM ($F(1, 68) = 27, p < .001$). All three variables significantly predicted variance in specificity (F(2, 67) = 10.11, p < .001). There was no significant interaction between variables (N2 = 2.2, p > .05). All analyses were conducted separately for each age group and for each valence of cue. The exploratory analysis was used to test whether dysphoria in dysphoric and non-dysphoric groups were therefore accounted for positive and then for negative valence. This was
Hypothesis 2. EF will explain significant independent variance in AMS and may interact with Age, Valence or Dysphoria to affect AMS.

With respect to the second hypothesis this is the first study to examine EF. It was therefore important to first establish that EF was not simply a correlate of another variable such as age or scholastic ability, which would reduce the usefulness of EF as a measure. There was however no correlation between EF and Age ($r_s = .13, n = 70, p = .27$); General Scholastic Ability ($r_s = .08, n = 70, p = .51$) or Dysphoria ($r_s = .12, n = 70, p = .3$) in this sample. Subsequently, to investigate whether EF accounted for unique variance in AMS, over and above any effects of age and dysphoria an enter-stepwise regression model was conducted on total specific AMs such that Age and Dysphoria were entered in a first step and EF was added in a second step. Age and Dysphoria accounted for significant variance in AMS ($F(2, 69) = 45.69, p < .001$, Adjusted $R^2 = .56$). The inclusion of EF resulted in a significant additional 12% of variance in AMS being explained ($R^2$ change = .12, $F = 25.05, p > .001$). The final model included Age as the best independent predictor of specificity ($r = .72, n = 70, \beta .66, p < .001$), followed by EF ($r = .47, n = 70, \beta .35, p < .001$) and then Dysphoria ($r = .07, n = 70, \beta -.27, p < .001$). All three variables contributed to a significant final model accounting for 68% of the variance in specificity ($F(3, 69) = 49.75, p < .001$, Adjusted $R^2 = .68$). There was no collinearity between variables (VIF < 2).

Given that EF was shown to be an important predictor of AMS, the analyses used to test Hypothesis 1 were repeated, including EF as an additional factor. Two 3 x 2 x 2 ANOVAs with EF (high, medium and low), Age (7-8 yrs and 10-11 yrs) and Dysphoria (dysphoric and non-dysphoric) were therefore conducted, first for positive and then for negative valence. This was
done to test the hypothesis that EF would interact with other factors known to influence AM specificity. The relevant mean data comparisons for the effects of EF on AMS are indicated with superscript numbers in Table 3.2 These superscript numbers correspond with those accompanying the relevant statistical analyses in the following text.
Table 3.2 Mean AMS scores (and standard deviations) recalled by children within Emotion-Focusing and Age groups (the same superscript numbers indicate relevant cell comparisons, as discussed in the text).

<table>
<thead>
<tr>
<th></th>
<th>EF</th>
<th>Low (n=19)</th>
<th>Medium (n=30)</th>
<th>High (n=21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/age</td>
<td></td>
<td>7-8</td>
<td>10-11</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>n=12</td>
<td>n=7</td>
<td>n=19</td>
<td>n=16</td>
</tr>
<tr>
<td>Negative</td>
<td>0.56</td>
<td>2.42</td>
<td>1.21</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>(1.00)</td>
<td>(1.27)</td>
<td>(1.44)</td>
<td>(0.86)</td>
</tr>
<tr>
<td>Positive</td>
<td>2.25</td>
<td>4.14</td>
<td>2.95</td>
<td>2.87</td>
</tr>
<tr>
<td></td>
<td>(1.42)</td>
<td>(1.06)</td>
<td>(1.58)</td>
<td>(1.15)</td>
</tr>
</tbody>
</table>

Once again results of ANOVA on positive recall confirmed the main effects of Age, $F(1,58) = 18.68, p<.001$ and Dysphoria, $F(1, 58) = 28.95, p<.001$ on AMS. Thereafter, as can be seen in Table 3.2, there was no main effect of EF on positive recall, $F(2, 58) = 1.79, p = .18^{(1)}$. However, a significant interaction was found between EF and age on positive recall, $F(2, 58) = 4.29, p = .018$, such that older children were more specific than younger children in the low ($t (17) = 3.04, p = .007^{(2)}$) and medium EF categories ($t (28) = 4.13, p<.001^{(3)}$). However, in the high EF group there was no significant difference between younger and older children's specific positive recall ($t (19) = -.91, p = .38^{(4)}$). Young children were just as likely to produce a specific positive
memory as older children in this group. There was no significant 3-way interaction between EF, Age and Dysphoria \((F(2, 58) = 0.25, p = .78)\) and no interaction between EF and Dysphoria \((F(2, 58) = 1.02, p = .37)\). See Appendix 3.6 for the AMS means within EF, Age and Dysphoric subgroups.

**Figure 3.4. Effect of Emotion-Focusing on Child AMS**

![Bar chart showing the effect of emotion-focusing on child AMS](image)

When EF was included in ANOVA on specific negative recall, there remained a main effect of Age \((F(1, 58) = 35.18, p < .001)\) with no main effect of Dysphoria \((F(1, 58) = 1.41, p = .24)\). However EF exerted a main effect on negative recall, \(F(2, 58) = 17.02, p < .001\), as can be seen in Figure 3.4 high emotion focusers were more specific to negative cues compared to low \((t(38) = 6.12, p < .001)\) or medium \((t(48) = 3.70, p < .001)\) emotion focusers\(^5\). EF did not interact with age to affect negative recall \((F(2, 58) = 1.74, p = .18)\)\(^6\) nor was there any 3-way interaction between EF, Dysphoria and Age \((F(2, 58) = 1.22, p = .30)\). Of interest to us was whether EF and Dysphoria would interact significantly to influence negative specificity however, no such interaction was found \((F(2, 58) = 1.68, p = .20)\).
3.6. DISCUSSION

The results of this study show that, as predicted, age, dysphoria and cue valence interact to influence AMS in children. Older children were more specific than younger children especially to negative cues. Dysphoric children were overgeneral to positive cues and there was an interaction between age, dysphoria and cue valence such that older dysphoric children also showed reduced AMS to negative cues. Regarding EF, high emotion-focusing was positively associated with AMS and EF significantly predicted unique variance in AMS. Each of the main findings is discussed in turn and possible mechanistic implications are considered.

3.6.1. Age and AMS

First, as predicted, older children were able to produce a specific memory more readily than younger children. This suggests that between 7 and 11 years of age, a child’s autobiographical recall develops from a general to a more specific memory style consistent with developmental literature (Howe & Courage, 1997; Nelson, 1993). Moreover, this effect of age on specificity was further influenced by cue valence. Younger children produced fewer specific memories in response to negative cues than to positive. This difference was not apparent with the older children, who presented approximately equal numbers of positive and negative specific memories. This age by valence effect has not been previously demonstrated and it suggests that it is particularly children’s specific negative recall, which improves with age. It is clear that the
development of cognitive processing of valenced stimuli in children is an interesting and previously neglected area of research, which could hold clues to the origins of information processing biases associated with depression. In addition, if AM in a normal population develops from a general to a specific retrieval style with age, the question remains whether in a depressed population memory fails to develop into a specific style or whether depressed individuals regress back to an overgeneral style.

3.6.2. Dysphoria and AMS

Results are the first to provide direct evidence that dysphoria is linked to OGM in children. Dysphoric children retrieved significantly fewer specific positive AMs than non-dysphoric children, irrespective of age. This is consistent with the well-documented adult AM literature, and with adolescent findings in general. Indeed results are consistent with an intriguing finding from Joorman & Siemer (2004) whereby dysphoria in adults was associated with a reduced ability to use mood incongruent happy memories to repair sad mood compared to controls. If specific positive recall is used to repair negative mood (Joorman & Siemer, 2004), then there are major mood regulatory implications for OGM to positive cues in dysphoric children.

Moreover age and dysphoria interacted to affect specific negative retrieval, such that there was an effect of dysphoria on negative recall in the older group. Dysphoric children in the older group retrieved significantly fewer specific negative memories compared to their non-dysphoric age equivalents. What is more, when the pattern of negative AM retrieval across groups was more closely examined, the younger dysphoric children were shown to have retrieved more
specific negative memories than their non-dysphoric age-group counterparts. However, while non-dysphoric negative recall significantly improved across age group, the same was not true for dysphoric children. By age 10-11, therefore, dysphoric children were retrieving significantly fewer specific negative memories than non-dysphoric older children. Thus, though dysphoric children demonstrate reduced specificity for both negative and positive cues, the effects of dysphoria on negative recall was only really apparent in the older group.

3.6.3. Mechanisms

It may be that dysphoria affects positive and negative recall through different underlying mechanisms or processes. For instance, dysphoria may be affecting positive recall via mood congruency, which is a relatively autonomous mechanism based on spreading activation and therefore less dependent on age or cognitive ability than other possible mechanisms. In contrast, the impact of dysphoria on negative recall may be more schema dependent and therefore its effect on recall is not observed until later in childhood when schemas are more firmly in place. For a review of mechanistic theories of OGM see Chapter 2. In keeping with this schema explanation, repeated experience of dysphoric mood may allow negative biases to become more engrained and better established in older dysphoric children. In younger dysphoric children however, negative schemas may be less well defined and therefore exert less influence on information processing. This interpretation though speculative, is supported by results from Nolen-Hoeksema et al. (1992), which showed that effects of cognition on depression increased with increasing age. This interpretation is also consistent with results from Neshat-Doost et al. (1998) who found evidence suggestive of an age-related increase in the elaboration of negative
self-referent schematic representations in depressed youth. Predictions from kindling and sensitization theory would also lend credence to this type of interpretation such that one episode of depression may sensitise an individual to further depression by increasing the likelihood of depressive cognition (see for example Segal, Williams, Teasdale & Gemar, 1996).

Alternatively, it may be that a young child’s negative AM response style is already so highly overgeneral that dysphoria can exert little additional effect. It would therefore not be until later in childhood, when children have typically developed a more specific retrieval style, that the overgeneral effect of dysphoria on negative recall would become apparent. Interestingly, this relative difficulty in retrieving specific negative memories in older dysphoric children is not in keeping with the finding that depressed adolescents demonstrate highly specific recall to negative cues (e.g. Park et al., 2002). Further research is needed to track the evolution of the OGM bias and to clarify the differences in valence specific AM styles in children, adults and adolescents.

With respect to the broader OGM theories present results speak to the developmental and schema-based hypotheses of OGM and depression, in that there is evidence of OGM in dysphoric children as predicted. Future work is needed to directly assess emotion arousal in order to examine other aspects of OGM theories.

3.6.4. EF

Another important way in which this study adds to our understanding of OGM is through the results of EF. EF significantly contributed to predicting variance in AM specificity in children,
even above the predictive value of age and dysphoria. Results indicate that high emotion-focusers demonstrate specific memory recall to emotional cue words. Thus, an emotion-focused who preferentially focuses on emotion in the environment may form memory representations with relatively high emotional content. When these individuals are then asked to recall events in response to emotional cue words, specific retrieval is then relatively easy for these individuals. Thus, EF could have implications, for example, in therapy when attempts are made to assist patients in recalling specific AM information, something that is a core component of some cognitive based clinical treatments. Heightened emotion encoding does not appear to correspond with overgeneral recall (as expected by Williams, 1996). However, it is proposed that with the addition of an environmental stressor, EF may emerge as a vulnerability factor for OGM in depression, more in keeping with the trauma-induced EF hypothesis proposed by Williams.

It is important to note that EF was not correlated with any measured independent variable in this study. Though there was an interaction between age and EF on positive recall, there was no colinearity with this variable. EF was not a product of age nor was there any correlation between scholastic ability or dysphoria, and EF. Therefore the variability accounted for by EF in this study is clearly not attributable in any straightforward way to the effects of dysphoria, age or ability. Further longitudinal studies are required to look more closely at the relationship between negative life events, EF and AM retrieval over time. It may be, for example, that EF interacts with ruminative style to affect AM and depressive mood. It is clear that EF is an interesting new variable to consider in children and adults.
3.6.5. Caveats and Limitations

EF is a new measure so no data are available to validate its use. The division used here to differentiate high, medium and low EF was selected only as a prudent statistical division. Ultimately, if EF is to be developed in the future as a standard measure, more sophisticated coding and classification categories could be explored, with greater numbers of participants, whereby different levels of description are recognised. It might then be helpful under some circumstances to accept inference of emotion if it is found, for example, to be a typical descriptive style of some groups. It would also be interesting to eventually introduce a greater range of stimuli to the image description element and systematically look at intensity of emotion or valence effects. High EF was positively associated with AMS. It would also be of interest to test individuals on non-emotional cue words (in addition to emotional cue words), to test whether high EF individuals still demonstrate specific recall outwith their area of focal interest.

Regarding other caveats or limitations of the present study, it was important in investigating the possible mechanisms through which overgeneral recall may develop and act as a vulnerability marker for the etiology or maintenance of depression, that we test a sample vulnerable to clinical depression but not suffering from it. However, it is not clear in the literature what the precise relationship is between dysphoria and depression. With the addition of clinical data and larger sample sizes, different patterns may be observed. Although the present results are nonetheless interesting, replication with greater sample sizes would add to the strength of the findings; for example, some subgroups in the ANOVA design were small, thus leading to reduced power in
our investigation of the higher order EF interactions. For this reason a four-way ANOVA was not initially conducted to examine the possible interactive effects between EF, dysphoria, age and valence on AMS. Finally, as noted, this is the first study to use the standard AMT in this age range. Although all children retrieved appropriate content memories to all cue words and were able to produce specific memories to at least some cue words, the lack of established validity and reliability data for this measure in children should be acknowledged as a limitation of the study.

3.7. In Conclusion

This study highlights the importance of testing OGM in children. Present results also demonstrate the usefulness of testing children with valenced emotional stimuli. As already highlighted, a key finding was that younger children tended to retrieve relatively fewer specific memories, particularly in response to negative cue words, while dysphoric children demonstrated reduced specific positive recall. It may be of interest in future studies to track this valence effect through development to see what role it may play in the later onset of depression. An understanding of the nature and development of normal valenced biases in childhood clearly have important implications for understanding the development of depressogenic biases. This study has attempted to examine the development of valenced AMS as one such bias. Looking at AMS from this developmental perspective should help us better understand the existence of OGM in adults and in psychopathology. The results of the current study also suggest that dysphoria affects AM in children, not by increasing availability of negative memories but by decreasing the availability of specific positive memories. It is unclear what underlying processes are responsible for such effects in the AM literature. It is likely though that more than one mechanism, bias or effect is in operation at any given time. Further work is needed to unravel the
contributions and roles of associated variables. Moreover, examining differential bias across age is essential. It may be for example that such depressive biases originate with deficits in processing of positive information but spread to include negative information processing biases with age, or failing intervention.

In the next study (Chapter 4) a clinical population of depressed children, adolescents and adults are examined in order to test the hypothesis that OGM bias exists in a clinically depressed child group and that the bias may be comparable across a wide age range. Dysphoric data from this chapter (Study 1) are also utilized to make comparisons of dysphoric versus clinically depressed children’s performance on the AMT.
Abstract 4 | A plethora of studies have provided strong evidence regarding adult autobiographical specificity (AMS) over the past 20 years, such that we can confidently assert that reduced AMS is associated with depression, relative to non-depressed controls. There is currently no equivalent data available concerning the same autobiographical memory (AM) effects in depressed children. In addition, we do not know how AMS compares across age within depressed samples. The previous chapter reported the effects of dysphoria on AMS in childhood. This present study developed this work further by testing 100 participants (30 children, 30 adolescents and 40 adults), half with clinical depression and half matched-controls, on the standard autobiographical memory test (AMT; Williams & Broadbent, 1986). Results indicated that the reduced AMS bias exists in children with depression. The extent of this overgeneral memory (OGM) effect was equivalent across child, adolescent and adult groups. In addition, comparisons with dysphoric, depressed and non-depressed/or dysphoric child AMS were of interest in terms of valence effects. The valence effects observed across samples may offer some insight into the mechanisms of the development of the OGM bias.
In the previous study (Study 1) OGM was evidenced for the first time in normal children exhibiting high depressive symptoms. This study (Study 2) seeks to demonstrate the OGM effect in a clinical child population. This is the first study to examine OGM in depressed children. It is also the first study to examine OGM in depressed child, adolescent and adult age groups.

4.1.1. OGM and Clinical groups

The overgeneral autobiographical memory (OGM) effect is well established in depressed adult populations. Since Williams & Broadbent’s (1986) seminal work, OGM bias has been consistently and reliably associated with adult clinical depression (Brewin, Reynolds & Tata, 1999; Goddard, Dritschel & Burton 1996; 2001; Kremers, Spinovem & Van der Does, 2004; Kuyken & Dalgleish, 1995; Nandrino, Pezard, Poste, Reveillere & Beaune, 2002; Puffet, Jehin-Marchot, Timsit-Berthier & Timsit, 1991, Wessel, Meeren, Peeters, Arntz & Merckelbach, 2001, Williams & Scott, 1988). Studies examining depression in adult populations find that depression is associated with OGM in response to valenced cue words.

In addition, OGM has also now been demonstrated in adults with sub-clinical depression (i.e. dysphoria), (Goddard, Dritschel & Burton, 1997; Moffit, Singer, Nelligan, Carlson & Vyse, 1994; Ramponi, Barnard & Nimmo-Smith. 2004). Thus, the OGM bias is not limited to clinical populations. In the same vein, the OGM effect has now been replicated in a group of dysphoric children (Study 1, Chapter 3). Thus, it would seem that although the OGM effect
has principally been demonstrated in adult clinical groups, the bias appears significant and pervasive enough to also be detected in sub-clinical and younger age groups.

In fact to my knowledge only one study has failed to demonstrate a relationship between depression and OGM. Dalgleish, Spinks, Yiend, & Kuyken, (2001) studied a group of seasonal affective disorder (SAD) patients and failed to find the OGM effect. Authors suggest this finding could possibly reflect underlying differences in major depressive disorder (MDD) and SAD aetiology. For example, SAD is not typically associated with experience of childhood adversity and dysfunctional negative schema akin to MDD (for a discussion see Dalgleish, Golden, du Toit & Spinks, 2004). Instead SAD may be linked to more biological causes (see Dalgleish, Rosen & Marks, 1996, for a review). Thus, AM is perhaps less likely to be affected in SAD in the way that it is proposed to be affected in MDD, according to an affect regulation (AR) hypothesis. An AR hypothesis of OGM asserts that early adversity impacts a person’s developing AM style so as to minimize the negative affect generated by the recall of these specific negative experiences. If SAD is less associated with adversity and therefore memory style is less implicated in the aetiology of this particular depressive disorder, then the absence of OGM in SAD results from Dalgleish et al (2001) bolster the AR hypothesis that it may be early life experience which affects memory in depression and contributes to an overgeneral style.

Also of importance is that, with the exception of post-traumatic stress disorder (PTSD), OGM has so far not been shown to be associated with any other anxiety disorders. For example, several studies have looked at anxiety in the form of general anxiety disorder (GAD) or phobias (Burke & Matthews, 1992; Wenzel, Jackson & Holt, 2002, Wessel, Meeren, Peeters, Arntz & Merckelbach, 2001; Kremers, Spinoven & van der Does, 2004) and found no
relationship between AMS and anxiety. The results may be interpreted as evidence that OGM is specifically associated with (symptoms of or vulnerability to) depression, rather than reflecting a general characteristic of psychopathology. In due course, further research will either support or refute this claim, but for now there is no evidence to suggest that OGM is linked to any affective condition other than depression or trauma (as noted in Chapter 2). This of course will prove crucial if research intentions are to pursue OGM as a vulnerability factor for depression.

4.1.2. Extending Work to Clinically Depressed Children

Though a body of research exists examining the OGM effect in depressed adults, no study has tackled this issue in children. The study reported in the previous chapter examined the effects of dysphoria on AM functioning in children aged 7-11. The results showed that age had an effect on AMS, such that younger children typically demonstrated an OGM style. However, in addition, the presence of dysphoria in childhood was associated with OGM recall, in particular, to positive cues. With increased chronological age, the effect of dysphoria was found to also extend to negative OGM. The present study seeks to extend this work to a group of clinically depressed children. The first aim of repeating work in a clinically depressed child sample was to ascertain whether depressed children demonstrate the OGM bias. This group has not previously been studied with the standard AMT cuing paradigm, despite theoretical implications that the OGM bias may originate in childhood (e.g. Williams, 1996). As discussed in full in the previous chapter, a few studies (de Decker et al., 2003; Park et al; 2002; Swales et al; 2001) have investigated OGM in clinical adolescent populations but no study has extended this work to children. It is possible that the OGM effect is restricted to post-adolescent clinical groups. However, if evidence of this bias is found in younger
depressed groups this would lend support to the developmental aspects of the theory of AR, and would have direct implications for early therapeutic intervention to tackle OGM.

4.1.3. Depression and AMS across Age

The second motivation for this study is to compare the AM style of depressed patients across different age groups. It is of interest to examine whether there are differences (or indeed similarities) in the nature and extent of depressive biases in children, relative to adolescents, relative to adults. Since, in the clinical literature it is generally unclear whether cognitive deficits exist in childhood, analogous to those found in older clinical groups. In addition, Study 1 revealed that OGM varies as a function of age. Advantageously, the AMT can be used across a wide age range. Therefore the OGM bias can be examined across age groups. No one study has compared depressed AMS across age-groups, and comparing age groups across different studies is slightly problematic e.g. different experimenters, different AMT instructions, different additional test materials, and so on. Therefore, an objective of this study was to examine child, adolescent and adult depressed groups within the same study and using the same methodology, to first establish that depression is associated with OGM across age and thereafter, to compare the OGM effect across age-group. For example, one possibility is that depressed adults may be more overgeneral than depressed children, consistent with a degeneration assumption. That is, will the bias have increasingly deleterious effects with increasing age? Again, such results would have direct implications for intervention efforts.

4.1.4. Developmental Considerations
In considering cognitive bias across age, several issues must be carefully considered. Assessing the magnitude of depression in each group is important in order to ensure any effects are not attributable to the extent of current mood, but instead, may reflect an effect related to age or developmental level. It is therefore important to ensure levels of depression are comparable across groups. Another consideration when testing clinical populations across age is that symptom expression may be different across groups. Some clinicians would assert that depression is not necessarily the same disorder across age groups (see General Introduction: Chapter 1). However, this assertion is controversial, and where symptoms are argued to differ (e.g. irritability in childhood but not in adulthood) these symptoms do not reflect core depressive features. Instead, they reflect manifestations of the features. It is perhaps most appropriate to say that the phenomenology of childhood and adult depression is similar, despite peripheral differences in symptom expression (Kovacs, 1997). Nevertheless it is important to acknowledge that studying the effects of depression across age, by necessity involves added developmental complexities. This was highlighted for example, in the previous chapter, whereby AMS varied as a function of age, not only depression.

In considering depression across age it is important to acknowledge these developmentally relevant issues. One further issue concerns co-morbidity. Unlike adult and adolescent samples, children who present with depression often have especially high co-morbidity (often with anxiety or conduct disorder) and often also present with developmental disorders, such as ADHD or autism (Hammen & Compas, 1994). This means for example, that locating a pure depressed population in childhood is more difficult than in adulthood. Moreover, as discussed in the general introduction to this thesis, affective disorders are rarely formally diagnosed in childhood, not least because it is difficult to tell whether disorders are mediated by environmental factors in childhood rather than reflecting an internalised disorder. To test a
pure depressed child population means delineating clinical depression via clinical interview and clinical assessment questionnaires, with strict exclusion criteria. Stringent criteria reduces sample sizes but hopefully presents as clean a population as is currently possible, given our present understanding of these disorders in youth.

4.1.5. The OGM Trajectory

Although results of cognitive-developmental studies have added layers of complexity, which single level developmental studies avoid, examining affective disorder from a cognitive-developmental perspective speaks to the underlying nature of depression and ideally offers insight into the possible development of depressive biases. Single level studies can tell us what biases exist, but not where they may have come from. For example, as discussed in the General Introduction (Chapter 1) cognitive theories of depression (e.g. Beck et al, 1979) often hint at developmental origins and principal theories of cognition and emotion (e.g. Power & Dalgleish, 1997; Teasdale & Barnard, 1993) contain fundamental elements such as ‘schema’, which by necessity invoke developmental implications (i.e. our experiences from childhood onward inform schema content). However, research efforts in cognitive and clinical domains have not yet systematically studied bias and functioning across age using the same methodologies. One of the few studies to replicate adult results in child populations is Dalgleish, Taghavi, Neshat-Doost, Moradi, Canterbury & Yule (2003) who compared children (aged 7-18) with MDD, GAD, PTSD and controls on tests of attention, memory and prospective judgement. When the studies do exist uniting child and adult research in this way, our understanding of depression and other disorders with likely developmental trajectories, will be transformed. Investigating the existence of OGM across such developmental groups can help elucidate the possible course of the bias and thus inform theoretical discourse.
4.1.6. Dysphoria versus Depression

Thirdly, this study seeks to extend the previous investigation of the effects of dysphoria in childhood, to an investigation of the effects of depression in childhood. Changes, in terms of the extent or nature of the biases are expected. Biases may be more pronounced in clinical groups. As discussed in Chapter 1, this thesis advocates a continuity theory of depression, not only in terms of continuity of the disorder from childhood to adulthood, but also in terms of continuity of bias from dysphoria to depression. Meaning, that these two labels (dysphoria and depression) may ultimately be distinguishable in terms of quantity (length and severity of symptoms) rather than in terms of quality. It is acknowledged that this proposition is speculative given the lack of work specifically examining the cognitive substrates of these two conditions. Nevertheless, it is possible that underlying cognitive nature of dysphoria and depression in childhood is the same, or at least very similar.

Consistent with this view, Gotlib, Lewinsohn & Seeley (1995) found that sub-clinical depression was associated with the same level of social dysfunction in adolescents as clinically diagnosed depression. Similarly, if the same levels of OGM bias are found in dysphoric as depressed children, this has serious implications for the significance of sub-clinical depression in childhood. In effect, children suffering from sub-clinical levels of depression may not meet arbitrary criteria for affective disorder, however they may be demonstrating similar levels of dysfunction, which may predispose them to future onset of depression. Indeed, we may assume that in many cases depression as a disorder at some point existed in comparable, but less severe form. Furthermore, high recurrence rates for childhood depression (Birmaher, 2004; Kovacs, 1996); sensitisation (Post, 1996), and kindling theories (Kovacs, 1997; Post, 1992), would also suggest that the experience of pervasive or significant
negative mood in childhood has long-term deleterious effects, which are then difficult to repair or ameliorate. It would therefore seem appropriate, from a research perspective, to pay close attention to the possible relationship between biases in dysphoria and depression in childhood.

4.1.7. Valence

Valence effects also continue to be of interest. The potential significance of valence effects was substantiated in the dysphoric child sample in the previous chapter (Study 1) whereby effects of dysphoria were more pronounced for positive recall. If dysphoria primarily affects positive recall in youth, what effects will the presumably more severe, clinical depression, have on valenced recall? Will depressed children also show reduced positive recall or will the effects also be carried by or incorporate negative recall? Such findings will inform our understanding of the differences or similarities between dysphoria and depression. For example, negative events may be better remembered as schema congruent in depressed groups, whereas positive events may be dismissed as schema incongruent. This would result in specific negative recall but overgeneral positive recall. Alternatively depressed individuals may view negative events as prototypical and therefore also recall overgenerally to negative cues. In dysphoric children, this effect may not be as pronounced, as dysphoric children may not evidence such extreme negative views, but instead may endorse mixed schema. This would result in overgeneral recall, but not to the same extent as depressed groups. It is also of interest to observe what pattern of valenced OGM retrieval is found in depressed children, as opposed to adolescents and adults, since an age related valence effect was observed in the previous study (Study 1).
4.1.8. Age versus Depression

Finally, results from the previous chapter indicated that age accounted for unique variance in AMS over and above depressive symptomology, in a sub-clinical, normal population of children aged 7-11 years. It is of interest to investigate whether the same result is found in the present depressed population with an increased age range. However, it should be acknowledged that due to the difficulty in recruiting clinically depressed children, numbers in the present study do not permit the same age specific analyses.

4.2. Study Rationale

This study is designed to extend OGM research to a clinically depressed child population and to address the effects of depression across age by also testing adolescent and adult groups on the same task. Results of this study should contribute to our understanding of the development of the OGM bias. Results also allow direct comparison of the effects of depression on AMS, with the previous data on the effects of dysphoria in childhood. This allows us to draw conclusions on the possible continuity of the OGM bias across age and across different levels of depression. The study also allows a comparison of effects of depression with effects of age on AMS.

4.3. Hypotheses

1. There will be evidence of reduced AMS in depressed children and the effects of depression will hold across age-group such that each depressed group will be overgeneral relative to controls. The OGM effect may be valence specific.
2. In the depressed groups there may be different valence patterns across age.

3. The Continuity of Bias hypothesis may be evidenced such that depressed children will demonstrate less AMS relative to dysphoric children and dysphoric children will demonstrate reduced AMS relative to non-depressed / non-dysphoric controls.

4. Depression will account for variability in AMS over and above that of age.

4.4. METHOD

4.4.1. Participants

A total of 100 participants was recruited for this study. Fifteen clinically depressed children (aged 7-11; mean age 8.66), 15 clinically depressed adolescents (aged 14-18; mean age 15.47) and 20 clinically depressed adults (aged 25 to 55, mean age 40.95) were tested. The male: female gender distribution for each depressed group was: children 12:3, adolescents 9:6, and adults 8:12. Fifty age and gender matched non-depressed controls were also tested. For some analyses data from the previous chapter were utilized. Where this is the case, this is made clear in the text. For details on dysphoric participants see Chapter 3 (section 4.1).

Child and adolescent clinical groups were recruited from Child and Adolescent Services within the South London and Maudsley (SLAM) NHS trust. Ethical approval was granted by all relevant authorities. The recruitment procedure then followed two streams. Clinicians were made aware of the study through various presentations and information sheets and were asked to forward details of any clients they felt would meet the study criteria. In the adolescent unit clinicians were asked to recruit any individual who met criteria for MDD (not co-morbid and not remitted). In the child unit, either children who were suspected as meeting depressive criteria were highlighted by the clinician, or children who met criteria for ‘abnormal
affectivity' as demonstrated by case files were highlighted by the experimenter and more specific details were then sought from the relevant lead clinician regarding the exact nature of this problem. If it was felt to be depression (as opposed to any other affective abnormality) these children were also highlighted for directed recruitment.

After this initial stage of recruitment, permission to contact the parent/guardian or the adolescent (in children over 16) was sought by way of an initial 'permission to contact consent-form' available at reception. Once this was completed the experimenter was able to contact the families direct and make testing arrangements if welcomed. At this stage no family, child or adolescent declined to participate.

Clinicians at the Affective Disorders Clinic (ADC), Ninewells Hospital Dundee, recruited depressed adults. Clinical status was assessed according to ICD-10 diagnostic criteria following a semi-structured interview by a psychiatrist. Depressed adults met MDD criteria without bipolar or psychotic symptoms, without recent ECT treatment, suspected substance abuse, or neurological disorder. Written informed consent was obtained for all participants (and guardians, if under 16) on the day of testing.

There are pragmatic problems when comparing clinical groups across age due to inconsistencies in diagnosing and assessment. Patients in the adolescent and adult groups all met ICD-10 criteria for Major Depressive Disorder (MDD). The depressed child group however differed in that typically no child below the age of 13 was formally diagnosed with depression at the approached clinic. Instead, children were included in this group if they met suspected depression criteria as judged by the lead clinician, supported by case notes and if they scored highly on the Strengths and Difficulties Questionnaire (SDQ; see Appendix 4.1).
The SDQ is an initial assessment questionnaire completed by all patients on entrance into the clinical system in the Clinics under study (see next section). If a child scored highly (‘high’-'very high’) on the ‘Emotional Disorder’ component of this measure, and met criteria on this measure for psychiatric disorder but did not meet criteria for any of the other conditions, she/he was referred for potential testing. The lead clinician then confirmed whether depression was suspected over any other affective diagnosis. Any child who scored highly on any other component was not recruited for testing. Children with autism were also excluded due to the potential bias in affective information processing. Most children in the clinic met co-morbid criteria. Using these inclusion and exclusion criteria therefore 15 children were included in the depressed group. All control group participants were community-based volunteers, in the child and adolescent groups these controls were recruited via schools, friends and colleagues. In the adult group these controls were recruited via university and community settings. Only participants with scores lower than the cut off for ‘significant depressive symptoms’, as designated by the authors of each measure, were included in control groups.

4.4.2. Materials and Measures

The Strengths and Difficulties First Assessment Questionnaire (SDQ): measures various psychiatric symptoms in childhood and is completed by children aged 11-15 (or by parents if this is felt more appropriate in younger children). A computerised program calculates scores for each child. Scores on the measure are grouped into four bands such that in the general population, roughly 80% of children, score ‘close to average’, 10% have ‘slightly raised’ scores, 5% score ‘high’ and 5% score ‘very high’ for each component. A total difficulties score, an emotional symptoms score, a conduct problems score, an inattention
hyperactivity/hyperkinesis score, peer problems score, pro-social score and an impact score are provided for this measure. A category of 'very low' through to 'very high' is produced for each of these components. A computer based diagnostic prediction is then calculated based on these scores. This consists of a prediction concerning: Any Psychiatric Disorder; Emotional Disorder; Oppositional Conduct Disorder; ADHD or Hyperkinesis.

*AMT:* The AMT was completed by all participants as was described in the methodology section of Chapter 2 section 4.2). The administration of this task was the same across all groups except that task instructions for children were worded differently using age-appropriate language (see Appendix 4.2) and one AMT cue-word differed such that children and adolescents were tested with the word 'sad' whereas adults were tested with the word 'sorry'. The word 'sorry' was replaced in the AMT-C as subsequent to pilot testing, it was felt to require second order social appraisal not appropriate for very young children (see Chapter 3 section 4.2 for details of validity regarding AMT-C cue words).

*Depression Inventories.* The Child Depression Inventory short form (CDI-S; Kovacs, 1992) was administered to all children and adolescents (for full description see Chapter 3 section 4.2). The Beck Depression Inventory (BDI; Beck, et al 1961) was administered to all adults as the adult equivalent of the CDI. The BDI is a 21 item questionnaire with four possible responses coded 0-3. It has a range of 0-63. A score of less than 10 is coded as normal, 10-18 reflects mild depression, 19-29 denotes moderate depressed symptoms, and scores of 30 or above are believed to reflect severe depressive symptoms. Mean scores on the CDI-S and mean scores on the BDI are shown in Table 4.1.
Table 4.1. Mean Scores on the Mood Measures

<table>
<thead>
<tr>
<th>Mood Scores</th>
<th>(n)</th>
<th>Measure</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>15</td>
<td>CDI-S</td>
<td>10.47</td>
<td>(2.35)</td>
</tr>
<tr>
<td>ND</td>
<td>15</td>
<td>CDI-S</td>
<td>1.20</td>
<td>(1.15)*</td>
</tr>
<tr>
<td>Adolescent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>15</td>
<td>CDI-S</td>
<td>11.13</td>
<td>(2.29)</td>
</tr>
<tr>
<td>ND</td>
<td>15</td>
<td>CDI-S</td>
<td>1.13</td>
<td>(1.64)*</td>
</tr>
<tr>
<td>Adult</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>20</td>
<td>BDI</td>
<td>30.70</td>
<td>(8.96)</td>
</tr>
<tr>
<td>ND</td>
<td>20</td>
<td>BDI</td>
<td>3.75</td>
<td>(2.83)*</td>
</tr>
</tbody>
</table>

* significant difference (p<.001) between depressed (D) and non-depressed (ND) groups

Independent t-tests for unequal variances confirmed significant differences in mood between depressed and non-depressed age-matched groups (child depressed vs. non-depressed \( t(20) = 13.70, p < .001 \), adolescent depressed vs. non-depressed \( t(25) = 13.73, p < .001 \) and adult depressed vs. non-depressed \( t(23), p < .001 \). There was also no significant difference between child and adolescent CDI scores, \( t(28) = .79, p = .44 \).

4.4.3. Procedure

All child and adolescent clinical participants were tested individually and face to face, in a quiet testing environment within a child and adolescent outpatient unit in London. All adult clinical participants were tested within an adult outpatient clinic, in Fife. All controls were community-based volunteers. All participants were first asked to complete the AMT, followed by the CDI (or BDI for adults). Task order was fixed to avoid possible contamination effects of the mood measure on the AMT. Once the participants had completed the experimental tasks they were thanked for their participation and fully debriefed. All child
and adolescent data were collected by Lyndsey Drummond. Adult data were collected by Dr. N. Rideout, at Ninewells Hospital, Dundee or at the University of St. Andrews, School of Psychology.

4.5. RESULTS

As can be seen in Table 4.2 the OGM data approximates the AMS data. AMS data is the dependent variable most typically analyzed in the literature. Therefore, as described in the methodology section of Chapter 3, AMS was the dependent variable analyzed throughout the present study.

Table 4.2. Means (and standard deviations) for AM data

<table>
<thead>
<tr>
<th>AM</th>
<th>Valence</th>
<th>Child</th>
<th>Adolescent</th>
<th>Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D</td>
<td>ND</td>
<td>Total</td>
<td>D</td>
</tr>
<tr>
<td>OGM</td>
<td>+ve</td>
<td>2.26</td>
<td>1.40</td>
<td>1.83</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.88)</td>
<td>(1.30)</td>
<td>(1.18)</td>
</tr>
<tr>
<td></td>
<td>-ve</td>
<td>3.13</td>
<td>1.67</td>
<td>2.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.46)</td>
<td>(1.45)</td>
<td>(1.61)</td>
</tr>
<tr>
<td>Specific</td>
<td>+ve</td>
<td>2.67</td>
<td>3.53</td>
<td>3.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.97)</td>
<td>(1.46)</td>
<td>(1.29)</td>
</tr>
<tr>
<td></td>
<td>-ve</td>
<td>1.67</td>
<td>3.33</td>
<td>2.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.29)</td>
<td>(1.45)</td>
<td>(1.59)</td>
</tr>
<tr>
<td>Total OG</td>
<td></td>
<td>5.40</td>
<td>3.10</td>
<td>4.23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.20)</td>
<td>(2.37)</td>
<td>(2.54)</td>
</tr>
<tr>
<td>Total Sp</td>
<td></td>
<td>4.33</td>
<td>6.87</td>
<td>5.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.06)</td>
<td>(2.50)</td>
<td>(2.59)</td>
</tr>
</tbody>
</table>

D = depressed, ND = nondepressed, OGM = overgeneral memories Sp = specific memories
Hypothesis 1. There will be evidence of OGM such that all Depressed Age groups will show reduced AMS relative to controls and this OGM effect may be valence specific.

First, to compare the levels of depression across Age-group, the raw scores on the appropriate depression inventory were converted into percentage scores for each individual. This allowed direct comparison of severity of depression across Age-group. As can be seen in Table 4.3, the mean percentage scores and the percentage score range on the depression measures were not significantly different across each age group. That is, the magnitude of depressive symptoms across groups was not significantly different. This was confirmed by a non-significant between group difference according to ANOVA, $F(2, 49) = 1.29, p = .28$ and by a non-significant test of Levene’s homogeneity of variance, Levene’s $(2, 47) = 1.35, p = .27$, indicating the variances in depression scores in these groups were not significantly different, thus validating further between group analyses of depression.

Table 4.3. Converted Percentage Mean Depression Scores across Age-group

<table>
<thead>
<tr>
<th>Depressed Group</th>
<th>Mean Score</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child</td>
<td>52.33</td>
<td>11.78</td>
<td>35</td>
<td>80</td>
</tr>
<tr>
<td>Adolescent</td>
<td>55.67</td>
<td>11.47</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>Adult</td>
<td>48.70</td>
<td>14.26</td>
<td>30</td>
<td>79</td>
</tr>
<tr>
<td>Total</td>
<td>51.88</td>
<td>12.83</td>
<td>30</td>
<td>80</td>
</tr>
</tbody>
</table>

Hence, a $2 \times 3 \times 2$, Depression (depressed vs. non-depressed) x Age-group (child, adolescent and adult) x Valence (positive vs. negative) ANOVA was conducted on AMS. Results for this analysis confirmed a main effect of Depression ($F(1, 94) = 37.03, p < .001$) such that
depressed persons were less specific than non-depressed persons, a main effect of Age-group 
\( F(2, 94) = 5.65, p = .005 \) such that adult AMS was significantly higher than AMS in the two 
younger age-groups, and no Depression*Age-group interaction \( F(2, 94) = .110, p = .90 \), 
indicating that depression did not operate significantly differently across the three age groups 
(see Figure 4.1).

**Figure 4.1. Effects of Depression on AMS**

![Bar graph showing effects of depression on AMS](image)

The within-subjects results revealed a main effect of Valence \( F(1, 94) = 4.55, p = .04 \) such 
that overall fewer specific negative memories were recalled compared to positive but there 
were no significant interactions (Depression*Valence, \( F(1, 94) = 1.58, p = .21 \); Age-
group*Valence, \( F(2, 94) = 2.35, p = .10 \) or Depression*Age-group*Valence, \( F(2, 94), = .67, 
p = .52 \)).

In order to examine the main effect of Age-group t-tests were carried out. T-tests on negative 
AMS confirmed the main effect of depression across all three Age-groups \( (ps < .01) \). T-tests
on positive AMS then confirmed significant differences between depressed and non-depressed groups in the adolescent and adult samples ($t(28) = 3.39, p = .002$ and $t(38) = 3.38, p = .002$, respectively). The difference in positive specificity between depressed and non-depressed did not reach statistical significance in the child sample ($t(28) = 1.91, p = .066$), though there was a trend in the right direction.

Hypothesis 2. *In depressed groups AMS may result in different valence patterns across age.*

Given the previous results from Study 1, we were specifically interested in Valence and Age effects in the depressed group. The previous omnibus 3 x 2 x 2 ANOVA did not yield the significant predicted interaction (e.g. between Age-group and Valence in the Depressed group). To better test this hypothesis AMS data was therefore analyzed for depressed and non-depressed groups separately. Two 3 x 2 ANOVAs involving Age-group (child, adolescent and adult) and Valence (positive and negative) were therefore conducted.

In the non-depressed sample, results showed a main effect of Age-group ($F(2, 47) = 6.30, p = .004$) such that AMS increased with age. There was no main effect of Valence ($F(1, 47) = .37, p = .55$) and no Age-group*Valence interaction ($F(2, 47) = .42, p = .66$). In contrast, in the depressed group, there was no significant effect of Age-group ($F(2, 47) = 1.48, p = .24$), such that AMS did not significantly increase with age. There was however a main effect of Valence ($F(1, 47) = 6.08, p = .02$) such that fewer specific negative memories were recalled relative to positive. There was also an Age-group* Valence trend ($F(2, 47) = 2.72, p = .076$), suggesting that negative or positive AMS altered as a function of Age-group in the depressed sample. T-tests were conducted in order to clarify these results.
Across the non-depressed age-groups, specific recall increased with age \((p = .004)\) such that non-depressed adults recalled more specific positive memories than both children \((t(33) = 2.42, p = .02)\) and adolescents \((t(33) = 4.34, p < .001)\). Non-depressed adults also recalled more specific negative memories relative to children \((t(33) = 2.07, p = .05)\) and showed a suggestive trend for increased negative AMS relative to adolescents \((t(33) = 1.72, p = .09)\). There were no significant differences in specific positive or negative recall across the three depressed age groups \((ps > .05)\). Hence, while AMS increased from childhood to adulthood in non-depressed groups, AMS did not significantly increase with age in depressed groups.

Moreover, in explaining the Age-group* Valence result in the depressed sample, differences for positive and negative specific recall in the child depressed group were significant, \(t(14) = 3.87, p = .002\). Depressed children recalled fewer specific negative memories than specific positive memories. There was however no significant within group difference in valenced recall for the depressed adolescents \((t(14) = 4.87, p = .63)\) and though depressed adults recalled slightly fewer specific negative memories compared to positive, unlike the child group, this difference was not significant, \(t(19) = 1.45, p = .16\). Hence, AMS did not significantly increase across the three depressed Age-groups, but compared to the older depressed groups, depressed children were particularly vulnerable with respective to negative overgeneral recall (see Figure 4.2).
Hypothesis 3. The Continuity of Bias hypothesis will be evidenced such that depressed children will demonstrate less AMS relative to dysphoric children and dysphoric children will demonstrate reduced AMS relative to same-age controls.

To examine this hypothesis child clinical data from the present study were compared to dysphoric data imported from Study 1. Age and gender (non-depressed or dysphoric) matched controls for the depressed children (NDD1) were used from the present study. Age and gender (non-depressed or dysphoric) matched controls for the dysphoric children (NDD2) were imported from Study 1. There were no age differences across the four groups, $F(3, 57, = 1.74, p = .17$.

As illustrated in Table 4.4, it appears the continuity hypothesis is supported. As predicted, mean total AMS declined from the control groups (6.86 and 6.57), to the dysphoric group (mean 4.93), with the lowest level of specificity in the depressed group (mean 4.33). This
effect was demonstrated statistically in a 4 x 2 ANOVA with Group (depressed, dysphoric, NDD1 and NDD2) and Valence (positive and negative) on AMS.

Table 4.4. Mean AMS (standard deviations) and gender ratios across depressed, dysphoric and control child groups.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Gender</th>
<th>AMS</th>
<th>AMS</th>
<th>AMS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=</td>
<td>Age</td>
<td>Positive</td>
<td>Negative</td>
<td>Total</td>
</tr>
<tr>
<td>Depressed</td>
<td>15</td>
<td>8.67</td>
<td>12:3</td>
<td>2.66 (0.97)</td>
<td>1.67 (1.29)</td>
</tr>
<tr>
<td>Dysphoric</td>
<td>14</td>
<td>9.19</td>
<td>6:8</td>
<td>2.36 (1.08)</td>
<td>2.57 (1.91)</td>
</tr>
<tr>
<td>NDD 1</td>
<td>15</td>
<td>8.13</td>
<td>12:3</td>
<td>3.53 (1.46)</td>
<td>3.33 (1.45)</td>
</tr>
<tr>
<td>NDD 2</td>
<td>14</td>
<td>9.14</td>
<td>6:8</td>
<td>4.14 (0.86)</td>
<td>2.43 (1.70)</td>
</tr>
</tbody>
</table>

NDD1 = controls for the depressed group. NDD2 = controls for the dysphoric group

Results of the 4 x 2 (Group x Valence) ANOVA revealed a main effect of Valence, $F(1, 54) = 10.83, p = .002$, such that overall children recalled fewer negative specific memories relative to positive memories (mean 2.50 vs. 3.17). There was also a main effect of Group, $F(3, 54) = 4.34, p = .008$, such that the depressed and dysphoric groups recalled fewer specific memories than their matched controls. These main effects were qualified by a significant Group x Valence interaction, $F(3, 54) = 4.26, p = .009$, such that the difference between depressed children and their matched controls was more prominent for negative recall than for positive, but the difference between dysphoric children and their matched controls was more prominent for positive recall, as can be seen in Figure 4.3.
Independent t-tests on relevant hypothesis driven pairs, confirmed that the difference between depressed children and matched controls (NDD1) was significant for negative recall, \( t(28) = 3.33, p = .002 \), but that the difference between these groups for positive recall only produced a significant trend, \( t(28) = 1.91, p = .066 \). On the other hand, the difference between dysphoric children's recall of positive memories relative to matched controls (NDD2) was significant, \( t(26) = 4.82, p < .001 \), while the difference between matched controls and dysphoric children's recall was not significant for negative recall, \( t(26) = .21, p = .84 \). Furthermore, when the AMS of depressed and dysphoric children was compared, results showed that there was no significant difference between these groups for either positive, \( t(27) = .810, p = .43 \), or negative recall, \( t(27) = 1.50, p = .14 \). Results therefore indicate that the effect of depression on AMS, relative to controls, lies with negative recall. The effect of dysphoria on AMS, relative to controls, lies with positive recall and although depressed and dysphoric groups are less specific than controls, there are no significant differences in AMS between these groups.

What is of equal interest are the within-subject valence effects Depressed children were less specific (more overgeneral) to negative cues relative to positive cues \( (t(14) = 3.87, p = .002, \)
2-tailed). Dysphoric children did not show this bias \((t(13) = .44, p = .66)\) they produced an approximately equal number of specific responses to positive and negative cues. The means for negative and positive specific recall across the two controls groups did not statistically differ (for positive, \(t(27) = 1.36, p = .19\) or for negative recall \(t(27) = 1.55, p = .13\)). However, while there was no valence difference in the depressed control group (NDD1), \(t(14) = .57, p = .61\), the dysphoric controls (NDD2) were more specific to positive cues relative to negative \((t(13) = 3.45, p = .004)\) suggesting that normal children demonstrate AM recall somewhere between valence-balanced AMS and positively biased AMS.

Alternatively the difference in valenced AMS in these groups may be attributable to differences in gender ratios, with near equal males: females in the dysphoric and dysphoric control groups but predominantly males in the depressed and depressed control groups. To test this possibility, the 4 x 2 ANOVA was repeated with Gender as a covariate. Results of this analysis showed the main effect of Group remained, \(F(3, 53) = 11.17, p = .009\), as before, the Group x Valence interaction remained, \(F(3, 53) = 4.16, p = .01\), as before and there was no main effect of Gender, \(F(1, 53) = .317, p = .58\). The only difference, when controlling for Gender in the present analysis, was the loss of the main effect of Valence, \(F(1, 53) = .34, p = .56\). Even when controlling for gender all other previous effects remained.

**Hypothesis 4. Depression will account for variability in AMS over and above any variability in AMS attributable to age.**

When age-group and depression as a categorical variable, were added into an enter-stepwise regression analysis, with age-group entered as the first step and depression added as the second step, and child, adolescent and adult total AMS as the dependent variable; Age
accounted for a significant 5% of the variability in AMS, $F(1, 99) = 6.66, p = .011$, $\text{Adj}R^2 = .05$. The addition of depression resulted in a significant model explaining 32% of variability in AMS, $F(2, 99) = 23.99, p < .001$, $\text{Adj}R^2 = .33$. Thus, depression accounted for 27% of the variability in AMS over and above age in this study.

4.6. DISCUSSION

This study, to my knowledge, is the first to examine effects of clinical depression on AMS in a child population. It is also the first study to attempt to compare depressed child, adolescent and adult functioning on the AMT and to consider effects of dysphoria and depression on child AMS.

4.6.1. Main effects of Depression, Valence and Age

The first finding is that clinical depression in children is associated with reduced AMS. As with adolescents and adults, clinically depressed children were less specific than age matched non-depressed controls. The main effect of depression on AMS held for recall to positive and negative cues. Overall, participants recalled fewer negative than positive specific memories. In addition, there was a small but expected overall improvement in AMS with age. Hence, results suggest that in a normal sample, by age 10, AMS is similar to adult specificity, with specificity increasing only slightly thereafter. This pattern is consistent with developmental data regarding the relatively minor improvements in AM abilities following age 7 (Gathercole, 1998). However, interestingly, this main effect of age-group on AMS was not significant in the depressed groups, where AMS remained static across age.
4.6.2. Effects of Depression across Age

The second original finding resulting from this study was that in clinical groups the effect of depression in on AMS did not significantly vary across age-group. That is, the mean AMS for depressed children did not significantly differ from AMS mean of depressed adolescents or adults. Depressed children demonstrated 43% specificity (69% in controls), depressed adolescents demonstrated 44% specificity (69% controls) and depressed adults demonstrated 57% specificity (86% in controls). The extent of this overgenerality in adolescents and adults is consistent with that previously found in clinical groups of a similar age (e.g. Swales, et al, 2001; Williams & Broadbent, 1986). Hence, depression related OGM is as striking a bias in childhood as it is in adulthood. However, there were interesting valence specific differences, such that depressed children were particularly vulnerable with respect to negative overgeneral AM. This is discussed in the next section.

When comparing the effects of clinical depression across age it was important to first establish that the levels of depression were equivalent across age. Percentage scores on each depression measure indicated that variance in depression symptoms was not significantly different across child, adolescent and adult clinical groups. Differential severity of depression is unlikely to account for the OGM effect across age as analyses indicated comparable severity across group. The implications of this finding are therefore that depressed children display comparable levels of OGM as depressed adults. If OGM in depressed adults is associated with various forms of dysfunctional cognition, including hopelessness and suicidality (Williams & Broadbent, 1986; Williams, Barnhofer, Crane & Beck, 2005), then these children may be especially vulnerable to analogous cognitions. Basically, the seriousness of OGM in children may mirror the seriousness of it in adulthood.
Moreover, OGM in the child group cannot be explained in terms of the depressed children simply demonstrating an age appropriate overgeneral retrieval style. Depressed children in this study had a mean age of 8.13 years. We know from Study 1 that children below the age of 10 may typically demonstrate an OGM style, but in this study, depressed children were overgeneral relative to same age and gender matched controls. Hence, developmental level cannot account for this particular result.

4.6.3. Valence, Age and Depression

As in Study 1, there was also a main effect of cue valence. Overall, fewer specific negative memories were recalled relative to positive. Depression was associated with reduced AMS to positive and negative cues. In particular, depressed adolescents and depressed adults also showed reduced AMS to positive cues relative to their same age controls. However this difference was only a trend in the depressed child group. Instead, the more robust reduced AMS effect in the depressed child group was attributable to overgeneral negative responses.

Thus, for memories to positive cues, depression was more strongly associated with reduced AMS between children and adolescents/adults. However, for memories to negative cues, the effect of depression was more stable. That is, depressed adolescents and depressed adults showed significantly reduced positive and negative AMS relative to controls, whereas depressed children only showed significantly reduced AMS to negative memories. This would support an AR interpretation. That is, early experience of negative life events (predisposing vulnerable children to experience depression) may result in the adoption of a passive avoidance strategy and therefore overgeneral recall to AMT cues designed to activate these
negative memories. An assumption of the ARH is that OGM originates with OGM for negative information and spreads to include positive AMs, as a bi-product of the system level bias. So the presence of OGM to negative cues in childhood, but the strengthening of OGM to positive cues with later development would support this theory.

The result is also somewhat in keeping with a schema-based interpretation of OGM. That is, negatively biased schema, developing in early childhood, may incline a depressed child to view negative information schematically. Children’s actual life experiences may originally inform these schemata. Hence, these children view negative events as prototypical and present with overgeneral responses to negative cues. However, it is unclear how to interpret the relatively weaker effect for positive OGM in children in terms of schema theory, since negative schema should also make specific positive recall less likely i.e. specific positive events dismissed as schema incongruent. One possibility is that depressed children retrieve trivial or inconsequential positive memories, which by default are specific. Ad hoc inspection of depressed children’s responses to AMT cues did not indicate particularly trivial or recent positive AM responses, relative to controls, however formal content analysis would be needed to properly test this supposition. Alternatively, it may be that during child development schema congruence (the acceptance of congruent information) is more proficient than schema incongruent processing (i.e. rejecting incompatible information). However, it is worth noting that the positive OGM effect in depressed children was a strong trend \((p = .066)\). Hence, caution is warranted when interpreting this particular valence effect. Future studies are first required to confirm or disconfirm the stability of this effect.

4.6.4. Dysphoria and Depression
The third novel research area investigated in this study concerned the relationship between dysphoria and depression in childhood. AMS declined from non-depressed to dysphoric, to depressed children as predicted, suggesting this bias may operate on a linear continuum. However, there were subtle differences in the patterns of valenced AMS evidenced in these groups. For example, dysphoric children demonstrated evenhanded OGM across valenced cues, whereas same age depressed children showed the same level of overgenerality to positive cues words as dysphoric children, but further reduced specificity to negative cue words. Thus, depressed children were less specific (more overgeneral) to negative cues relative to positive cues. Dysphoric children did not show this bias. Moreover, the difference between depressed children and controls was for negative AMS. Depressed children were less specific to negative cues. However, the effect of dysphoria on AMS relative to controls was for responses to positive cues. Dysphoric children were less specific to positive cues.

Results are in keeping with a mixed schema interpretation. That is, dysphoric individuals may have both negative and positive self-world beliefs, which equally effect memory recall. Depressed children, on the other hand, demonstrated negatively biased recall such that they produced more overgeneral negative responses than positive; suggesting predominantly negative underlying schema. The final result in the trio, was that control data rested somewhere between balanced and positively biased AMS. This supports the proposition that normal mood state individuals possess predominantly positive underlying schema (Mezulis, Abramson, Hyde & Hankin, 2004; Taylor & Brown, 1988; 1994).

That the dysphoria effect lies with positive recall and the depressed effect lies with negative recall perhaps suggests differences in the nature of underlying information processing biases. The implications of these data are simply that there may be differences in the nature of
dysphoria relative to depression, which may be conceptualized as dysphoric individuals having difficulty in effectively processing positive information whereas depression, as a more severe form of dysphoria, seems to be more strongly associated with negative information processing biases. This was not hypothesized in the introduction to this study. The results raise interesting questions about the nature of dysphoria and depression, whether dysphoria is a lesser form of depression featuring biases that shift with depression severity, or whether dysphoria and depression reflect different underlying constructs. Differences in cognitive biases based on low levels of positive affect vs. high levels of negative affect have been posited in the child depression literature for example (Luten, Ralph & Mineka, 1997).

Finally, though mean AMS declined in the predicted direction from non-depressed to dysphoric to depressed groups, the differences between dysphoric and depressed specificity were not significant. The fact that AMS did not significantly differ across depressed and dysphoric data can be interpreted as evidence that dysphoria in childhood reflects a serious condition, such that OGM effects are equivalent to those found in clinically depressed children. This raises serious questions about pervasive negative mood in normal child populations - specifically, that this is perhaps not a condition that should be overlooked.

4.6.5. Age versus Depression

The last hypothesis considered in this study examined the relative effects of depression and age on AMS. Results from Study 1 indicated that specificity increased as a function of age between 7-11 years but that dysphoria accounted for significant variance in AMS independent of age. The present study sought to investigate whether clinical depression would account for unique variance in AMS over and above age across a wider age range Due to the small
numbers of clinically depressed children, it was not possible to analyze the child data with the same age cut-offs as in the previous study. Instead, participants were grouped as child, adolescent or adult. The results confirmed the hypothesis, such that whether the participant was depressed or not accounted for significant variance in AMS over and above age in this study.

4.6.6. Caveats and Limitations

There are several limitations and caveats to be considered when reading the results of this study. Being unable to assess the comparative severity of depression precisely across the three age groups given the different mood measures somewhat compromises clear-cut interpretation of the age and depression results. However, this is an inevitable problem encountered by any study assessing depression over a wide developmental age range. Moreover, OGM tends to remain fairly stable for example, OGM is found in remission from depression (e.g. Brittlebank et al., 1993) and has only been shown to change following direct therapeutic intervention (Williams et al., 2000). Hence, even if the groups did differ in terms of severity of depression, this still may not be the most parsimonious explanation to account for any OGM effects across the three depressed groups.

Another, perhaps more significant problem, is that trauma was not controlled for in this study. Given our increasing understanding of the relationships between trauma, depression and AMS (e.g. Hermans et al, 2004), future studies should perhaps pay closer attention to the discrete influences of depression and trauma. For example, in some cases, trauma is associated with less OGM (e.g. Kuyken et al in press; Swales, et al 2001). It is not possible to determine whether trauma influenced the valence specific OGM effects in the present study. For
example, it is possible that depressed children were particularly overgeneral to negative cues because depression is tied more closely to some form of trauma (or life adversity) in the depressed child group than in the adolescent and adult groups. The justification for this statement comes from the fact that depression has been more closely tied to adversity in youth than in later years where problems associated with MDD may have become more internalised (see Nolen-Hoeksema, Seligman & Girus, 1992, for a commentary on the strong links between adverse experience and depression in childhood). That is, in youth there is often a measurable external impetus (family disruption, bullying, illness) whereas in adulthood negative schemata are more often the candidate explanation for depression. Kindling theory (Kovacs, 1997; Post et al., 1992) would support this idea. Hence, future studies should investigate the relative roles of depression and trauma in accounting for any OGM effects.

Finally, though gender was controlled for in the analyses where gender ratios were unequal across groups, it is preferable to ensure equal gender ratios methodologically. This proves difficult in an investigation of depression in youth, where considerably more boys are diagnosed with depression in childhood relative to girls (Mash & Wolfe, 2005). However, greater efforts and resources could ensure gender-matched groups. Small numbers also mean that caution must be aired when interpreting the results. For example, two-way ANOVAs were conducted to specifically test an a priori hypothesis although there was no significant three-way interaction. This means that there are no statistically significant differences between the clinical and non-clinical groups and so caution should be used in reading these results. Better mapping of age, i.e. with finer increments in age-groups would also allow for a more sophisticated analysis of the development of AMS with age, and of the parallel interactive effects of depression. Formal diagnosis of depression in children would help strengthen the conclusions that can be drawn. It would also be of great interest to examine
whether therapeutic intervention early in childhood would affect AMS. The depressed patients tested in this study were all recruited from outpatient services and although no cognitive-behavioural treatment was in effect, specifically designed to tackle memory overgenerality in these units, it is impossible to say whether experience of any intervention has modified OGM functioning in these groups. Again, longitudinal studies would be needed to address this issue.

4.7. In conclusion

Despite, these methodological shortcomings the present study is the first to demonstrate OGM in depressed children and to map effects of depression on AMS across age. The data also facilitates an interesting comparison with the previous findings in dysphoric children from Study 1, and extends our understanding of age and depression, as factors influencing the recall of personally relevant memories. The data can also be utilised to lend support to the theory of AR proposed by Williams (1996). Evidence is also consistent with various schema interpretations of the OGM effect. It may be that depression related OGM in childhood is as conspicuous a bias as it is in adulthood, and hence in conclusion, greater research attention should be paid to this phenomenon in youth.

In the next study, Study 3, the potential for reduced AMS to predict later symptoms of depression/dysphoria, consistent with adult studies of AM (e.g. Brittlebank et al, 1993), was examined using a prospective-longitudinal design.
Chapter 5 | Study 3 | A Longitudinal Study: The relationship between cognitive style, autobiographical memory and depressed mood and the ability of these variables to predict self-reported depressed symptoms in children 8 months later during a stressful life event
Abstract 5 | Many studies have shown a link between depression and overgeneral autobiographical memory (OGM) in adults. Studies of children are required in order to examine the origins of this link. A subsequent issue with respect to testing OGM is whether this cognitive bias is linked to other biases in cognition such as those pertaining to cognitive style (CS). This study looked at self-report measures of CS in children aged 9-11 and a standard measure of AM retrieval. A measure of depressed mood was taken at Time 1 and then at a follow up 8 months later during a stressful life event. Results demonstrated a relationship between OGM and CS in children, such that OGM was positively correlated with an overgeneralising tendency and with making unstable positive attributions. Mood was the best predictor of subsequent mood. Both CS and AM were correlated with mood at Time 1 and both predicted mood at Time 2, before controlling for previous mood. Few measures could predict mood above previous mood score. As with the bulk of previous work, the effects were stronger for processing of positive information. Results highlight the importance of studying OGM in the context of other biases and of the importance of downward extension of adult work in child populations to pre-empt depressive cognition early in development.
5.1. Introduction

The previous study (Study 2) looked at the existence of OGM in clinically depressed youth. No study has considered OGM as a predictor of depressive symptoms in children, nor considered the possible relationship between OGM and other depression-related biases such as Cognitive Style (CS) in childhood. In the following sections evidence of the predictive quality of OGM and CS in accounting for depression in children (or in adults where child data is absent), is presented. This is followed by an argument for the possible relationship between these variables.

5.1.1. Longitudinal Studies of OGM

Though there is some uncertainty regarding the total functional implications of OGM (see Hermans et al., 2005), it can confidently be assumed to be dysfunctional in the long-term due to its strong and robust association with psychopathology, in particular depression, in adulthood (Van Vreeswijk & de Wilde, 2004). To date there has been no investigation of OGM in childhood besides that demonstrated in this thesis, in which OGM memory was demonstrated in dysphoric children aged 7-11 years (Study 1) and in clinically depressed children aged 7-11 (Study 2). Moreover the importance of OGM in predicting depressed mood in children has not yet been investigated. However some studies have looked at OGM as a predictor of depression severity in adults.

As noted in the Introduction (Chapter 2), one of the strongest findings in the adult OGM literature is that levels of OGM independently predict the course of depression. Specifically, to my knowledge, there are six studies examining longitudinal aspects of OGM in predicting
depression in adults. Brittlebank, Scott, Williams & Ferrier (1993) were the first to look at the longitudinal aspects of OGM style. Brittlebank et al. followed 13 adults with MDD for 7 months. Positive OGM in this sample predicted 33% of variance in levels of depressive symptoms at follow-up. Initial depressive symptoms did not significantly predict subsequent depressed mood in this study. This OGM result was replicated by Peeters, Wessel, Merckelbach & Boon-Vermeeren, (2002) except the result was found for negative rather than positive cues in this study. Dalgleish, Spinks, Yiend & Kuyken (2001) also found that OGM to positive cues (when depressed in winter) predicted symptom levels (when remitted in summer) even after controlling for initial symptom level, in a group of Seasonal Affective Disorder (SAD) patients. In another longitudinal study, Brewin, Reynolds & Tata (1999) followed 44 adults with MDD over 6 months. OGM in this sample predicted depressed symptoms at follow up, but not above that of prior depressive symptoms.

Hence, three of these four studies looking at clinical levels of depression found evidence that OGM can predict depressive symptoms in adults with psychopathology above that of previous mood (Brittlebank et al., 1993, Peeters et al., 2002 and Dalgleish et al., 2001). The fourth study (Brewin et al., 1999) found some predictive power in OGM, though not as powerful as that of prior mood. Results from Dalgleish et al. suggest the differences in the predictive ability of OGM may be attributed to the specific depression measure used. In the studies that have demonstrated the predictive value of OGM above previous mood, the Hamilton Rating Scale for Depression was used (HRSD; Hamilton, 1960). This measure taps mainly somatic vegetative symptoms of depression. The Beck Depression Inventory (BDI; Beck, Beck, Ward, Mendelson, Mock & Erbaugh, 1961) was used in the Brewin et al. study where less impressive results for OGM were established. The BDI reflects more the cognitive symptoms of depression. Furthermore, Dalgleish et al., included both the BDI and the
Hamilton and showed that OGM did not significantly predict later BDI levels in SAD patients, despite being a unique predictor of later Hamilton scores. It is unclear whether the Hamilton is appropriate for use in children (Pavuluri & Birmaher, 2004). Also, all of the above studies used clinical samples where the Hamilton is appropriate. It is unclear whether the Hamilton is appropriate for non-clinical testing.

A fifth longitudinal study investigated AMS and depression. However the standard AMT methodology was not used. Rottenberg, Joorman, Brozovich & Gotlib (2005) attempted to look at emotionality and detail in generated descriptions of memories of happiest and saddest events, in 26 depressed adults (19 at follow up) to assess whether detail or emotionality would predict depressed symptoms 1 year later. Importantly, however, this study did not use the standard AMT measure. Instead an idiographic memory procedure, which entailed an interactive interview, with several prompts for specific descriptions and no time limit, was used. Though this methodology does focus on meaningful AM events (i.e. the saddest and happiest memories that come to mind), responses were heavily prompted. Moreover, ‘emotionality’ of the memories was not rated by the respondents themselves but by the researchers coding the videotaped interviews. Rating was based on language and detail used, which could confound the two variables of interest. Allowing for these methodological particulars, results indicated that ‘reduced emotional intensity’ associated with sad memory descriptions was predictive of depressive symptoms at follow-up even after controlling for initial psychopathology. Memory detail, as measured in this methodology did not predict depressive symptoms. Rottenberg et al. introduce and discuss their results in terms of previous work on OGM. However caution must be used in interpreting the results in relation to previous OGM work, since a very different paradigm was used. It is unclear what the relationship is between results gleaned from a heavily prompted interview format discussing
‘saddest’ and ‘happiest’ memories and that of the AMT cuing paradigm, which uses minimal prompts and 10 generic valenced cue words. Only a study using both paradigms could clarify this issue and speak to whether results on the tasks are comparable.

Finally, Gibbs & Rude (2004) examined OGM, negative life events and depressive symptoms in a non-clinical sample of college students. Over a 4-6 week period and after controlling for initial depressive symptoms, negative life events were associated with increased depressive symptoms but only in those students who had initially demonstrated high OGM. Thus, OGM acted as a depression symptom vulnerability marker in a non-clinical sample. Despite this accumulating evidence, to date, there have been no longitudinal studies of OGM in children or adolescents. The primary aim of Study 3 was to examine this issue for the first time in a child population.

5.1.2. Cognitive Style (CS)

A second aim of Study 3 was to investigate the relationship between OGM and measures of depressive cognitive style (CS) within a longitudinal design. As noted in the General Introduction (Chapter 1) self-report studies indicate that depressed children exhibit more negative cognitions (e.g., Dobson & Shaw, 1987; Krantz & Hammen, 1979; Tems, Stewart, Skinner, Hughes, & Emslie, 1993; Robinson, Garber, & Hilsman, 1995) and more negative attributions (Abela, 2001; Blumberg & Izard, 1985; Gladstone & Kaslow, 1995; Hops, Lewinsohn, Andrews & Roberts, 1990; Metalsky & Joiner, 1992) than non-depressed children. Importantly, several longitudinal studies exist providing evidence regarding the possible causal relationship between these cognitive factors and depression in childhood (e.g. Joiner et al, 2000; Nolen-Hoeksema et al, 1992; Panak & Garber, 1992).
In a longitudinal study examining the relationship between depressive symptoms and negative perceptions of the self (in a non-clinical sample of 248 children aged 8-11 years), McGrath and Repetti (2002) found that depressive symptoms predicted a change in negative cognition about the self. However, negative self-perceptions were not correlated with subsequent change in depressive symptoms. This suggests that negative self-beliefs were not playing a significant role in predicting depression. However, the stress component of the diathesis-stress model was not tested. This could be crucial. For instance, Metalsky et al (1993) found that depression scores in college students were only predicted by a 3-way interaction between attributional style, self-esteem and failure. Hence, testing the stress component of the diathesis-stress model may be integral.

This issue was examined by Nolen-Hoeksema, Seligman & Girgus (1992) who conducted a 5-year longitudinal study of 8-13 year olds (n = 352). The primary question in this study was whether a negative explanatory style as measured by the cognitive attributional style questionnaire (CASQ), either alone or in the presence of a stressor would correlate or predict depression in children i.e. this time testing the applicability of the Beckian diathesis-stress model (Beck et al., 1979) in children. Results of the Nolen-Hoeksema study showed that the best predictor of depression in children was already-elevated depression. Negative life events also significantly predicted depression in younger children. With increasing age, explanatory style or the interaction between explanatory style and negative life events emerged as significant predictors of depression. Also the correlation between explanatory style and depression increased with age. The Nolen-Hoeksema study offers a provocative insight into the interrelationship between cognition and emotion in childhood. Arguably, the only limitation of this study was that a specific measurable stressor was not assessed. Further
prospective studies, which have tested a diathesis-stress theory, in which cognitive predisposition and negative life events (stress) are examined, rather than just a cognitive-trait vulnerability theory, have also found significantly improved predictability of depression in children (e.g. Hilsman & Garber, 1995; Panak & Garber, 1992; Robinson, Garber & Hilsman, 1995). In addition, Hops et al., (1990) found that negative attributions predicted those who remained stably symptomatic of depression and those who were initially symptomatic, but improved in a one-month prospective study of 14-18 year olds. The results of this study suggested negative attributional style was involved in the maintenance of depressive mood.

In line with Nolen-Hoeksema et al., Joiner et al., (2000) also showed that attributional style (specifically attributing negative events to stable and global causes) interacted with occurrence of negative life events to significantly predict depressive symptomology in youth psychiatric inpatients and this interaction did not predict increases in anxiety levels. Thus, several studies that have explicitly studied the cognitive-stress model (an interactive model), have found support for the existence of cognitive vulnerability to depression in childhood. These studies used grades, peer rejection and school transition as potential stressors and over different time periods found that cognitions (attributions, self-worth) measured before the stressors occurred, moderated the effect of the stressors on depressive symptoms in children. It appears then, at least during childhood that the expression of depression is more closely linked with stress exposure than in adulthood, when depression presumably becomes more endogenous.

Although not in children, Alloy et al, (1999) demonstrated the importance of cognitive factors in predisposition to depression, in youth without any previous history of depression. In this significant study Alloy et al. tested 5378 undergraduates, who completed various CS
measures every 6 weeks for 2 years. After 2 years, high cognitive-vulnerability risk groups showed a 17:1 likelihood of first episode depression compared to low risk groups. In contrast there was no group difference for first episodes of anxiety disorders (7:3). Moreover, this effect remained even when co-varying out initial mood scores, suggesting that the cognitive biases themselves played a causal role. This prospective result is unique amongst the studies reviewed here, in that it provides direct support for the cognitive vulnerability hypothesis, uncontaminated by prior history of depression. As with the results from Joiner et al (2000) it also suggests depressogenic CS may confer specific risk for depression (i.e. and not for anxiety disorders). Moreover, the results again highlight the importance of valenced processing in understanding depression vulnerability - high-risk individuals were less likely to process positive self related stimuli.

Moreover, one further study that attempted to assess the specific forms of depressive attribution found that depressed adolescents differed significantly from a psychiatrically ill comparison group only on a positive events component, not on the negative (Curry & Craighead, 1990). So, depression in adolescents was specifically related to low scores on attributional style for positive events. This valenced bias is comparable to the depressive OGM bias found in adult and adolescent literature, that is, a more pronounced effect for positive cues, and suggests there may be a common mechanism. Low stable or self-attributions for positive events may render them less well encoded or memorable for example.

5.1.3. CS and OGM
To my knowledge, no study has looked at the relationship of OGM bias to other vulnerability markers for depression, such as CS measures, in children, nor examined which is a better indicator of depressed mood in children. For example, there is nothing in the literature to show the possible relationship between OGM and overgeneral thinking (Beck et al., 1979), despite clear theoretical links. Typically OGM has been studied in isolation. However some informative studies have recently emerged indicating a relationship between OGM and rumination (e.g. Watkins & Teasdale, 2001) and a relationship between OGM and a cognitive avoidant coping style (Hermans, deFranc, Raes, Williams & Eelen, 2005). Further studies are needed to develop our understanding of OGM in the context of other related biases.

In this vein, and as already noted at various points throughout this thesis, schema explanations have been posited in trying to account for the OGM effect (e.g. Dalgleish et al, 2003). However, no study has provided direct empirical evidence for the relationship between schema and OGM. Existence of negative self-schema (or an absence of positive self-schema) is a likely component in explaining poor specific positive recall in depression, for instance. However, little research has focused directly on assessing this link. Self-report scales of dysfunctional attitudes, cognitive errors and negative beliefs can be utilised to address the relationship between schema-based bias, OGM and depressed mood.

In addition, there is a clear case for examining attributional style and AM in that the way in which causes are attributed to events may effect the way in which they are encoded, stored and retrieved. For example, overgeneralization can be a feature component of both attributional style and OGM. Cognitive theories of depression assert that 'categorical' thinking is highly characteristic of depression (e.g. Beck et al, 1979) and OGM can be conceived as a form of categorical bias. Hence, cross modal 'overgeneralising' could be a
possible underlying theme in explaining OGM in depression. Little comment has been made in the literature regarding the possible links between overgeneral thinking and overgeneral memory in depression. This seems to be an obvious omission in a discussion of OGM to date. This study therefore sought to address the possibility that CS and OGM would predict depressed mood in children and moreover, that there might be a relationship between CS (in particular certain subcomponents of CS such as overgeneralization) and OGM.

Thus, some relationship between CS and OGM can be anticipated due to their common association with depression. Equally, some relationship between CS and AM would also be expected due to their reciprocal contribution in cognition. Ultimately cognitive style and memory form part of an ongoing appraisal-memory cycle (e.g. Teasdale & Barnard, 1993; Power & Dalgleish, 1997). Therefore views and appraisals about events affect the way in which events are processed, stored and later retrieved. Equally the way memories are stored and retrieved is likely to affect appraisal of future information. Events that are inconsistent with current schema (or goals), for instance, are less likely to be remembered (see Conway, 2005). Therefore there is plausible reason to predict a relationship between CS and AM style.

Another motivation for examining the possible relationships between schema, attributional style and OGM is that schema and causal attribution may help explain valence effects in the OGM literature. For example, OGM to positive cues in depression could be linked to positive material being dismissed as schema-incongruent. In addition, depressed persons may struggle to remember specific positive events if they are attributed to unstable factors outside themselves (low internal or stable attributions). There is nothing in the child (or adult) literature assessing this possibility.
5.2. Study Rationale

We have seen then, that biases in CS and AM are linked to the development of depression. Biased AM may therefore be related to other cognitive factors implicated in depression onset. Following these factors over time in a child sample should therefore give us an indication of some of the relevant cognitive factors involved. Although several longitudinal studies have looked at the relationship between CS and development of depression in children (e.g. Abela, 2001; McGrath & Repetti, 2002), no one study has looked at whether OGM biases can be used to predict depression in children, or considered whether there is a relationship between OGM bias and negative CS in children. The overarching aim of Study 3 was therefore to investigate these issues. The more powerful longitudinal studies of CS in children, as we have seen, utilised a diathesis-stress design. To my knowledge, no studies of OGM in any age group have applied this design, despite its obvious utility. The present study therefore used a longitudinal, diathesis-stress approach to investigate the relationship between AM, CS and mood in children.

5.3. Hypotheses

1. There will be a positive relationship between depressed mood, OGM and depressive CS in children at Time 1.

2. OGM will positively correlate with particular CS sub-components, such as overgeneral thinking, at Time 1.

3. CS and OGM will predict depressed mood in children 8 months on during a stressful life event (Time 2).

4. These predictive roles of CS and OGM will exert their influence independently of Time 1 depressed mood.
CHAPTER 5: A LONGITUDINAL STUDY

5.4. METHOD

5.4.1. Participants

Thirty children aged 9-10 years at Time 1, were included. Of the sample, 14 were girls. Children were recruited from a London-based Primary School. The sample was ethnically mixed. No child with any known mental illness or Special Educational Need was included. Parental, School, University and Local Education Authority consent were obtained prior to testing and individual child consent was obtained on the day of testing.

The children tested were in the final year of their primary school education and were about to undergo transition to secondary school at Time 2. At Time 2, all children had just received their SAT exam results. These are national examinations sat by all children in British primary school education. All children were in the process of finding out about acceptance or rejection from secondary schools. Children have to make certain grades to be admitted into their preferred school in London and will also be separated from friends. This is rated as a significant life event by children and has been used as a life stressor in previous studies (e.g. Hilsman & Garber, 1995). Children in this study rated the significance of the event on a scale of 1-10 (mean = 8.33, SD = 2.62 range 1-10).

Two children did not rate the event (changing schools) as significant (i.e. rated as 1). However these 2 children did indicate high stress concerning starting their new school (i.e. rated as 8). Therefore these 2 children were not excluded from the data analysis, although it is acknowledged that their stress may have had a different locale compared to the other children, who rated both aspects of school transition as stressful. 73% of children in the sample rated the change of schools as a highly significant and stressful (scoring between 8-
10). Barring the two children already mentioned, all other children rated the event as 5 or above.

5.4.2. Materials and Measures

The measures used to capture schema-based biases in children in this study were the Dysfunctional Attitudes Scale (DAS; Beck, 2002), the Children’s’ Negative Cognitive Errors Questionnaire (CNCEQ; Leitenberg, 2002) and the Cognitive Triad Inventory for Children (CTI-C; Kaslow, 2002). The Children’s Attributional Style Questionnaire (CASQ; Kaslow, 2002) was used to assess biases in attributional style in children. These measures have all been used previously to assess CS associated with affective disorder in children (Winters, Myers & Proud, 2002). These scales cover a broad domain of negative constructs and provide a broader representation of youth functioning than is covered by diagnostic scales alone. These were selected based theoretical significance. These scales are now detailed below.

**DAS (Dysfunctional Attitudes Scale; Beck, 2002):** This scale measures pervasive negative beliefs about oneself in relation to others e.g. ‘I cannot be happy unless most people I know admire me’ or ‘Asking for help is a sign of weakness’ This measure is not specifically designed for use in children but has been validated for use in youth (see Winters et al., 2002). Dysfunctional attitudes are conceptualised as stable, higher-order depressogenic beliefs, which approximate trait constructs. Responses are recorded on a 1-7 point likert scale (totally agree- totally disagree). DAS is scored from +1 to +7 for adaptive responses and +7 to +1 for non-adaptive responses. Internal consistency is 0.9 and convergent validity is 0.4-0.66* for this measure. There are 40 items.

* All psychometric properties for cognitive style measures are derived from Winters, Myers and Proud (2002); a 10-year review of cognitive ratings scales.
CNCEQ (Children’s Negative Cognitive Errors Questionnaire; Leitenberg, 2002): The CNCEQ assesses overgeneralisation, personalising, catastrophising and selective abstraction (Beck, 1979). Cognitive errors in academic, social and athletic areas are tested. The measure presents hypothetical situations/vignettes followed by possible responses e.g. ‘Some of your friends ask if you are going to try out for the school sports team. You think what’s the point, I didn’t get in last year.’ (‘exactly what I would think’- ‘not at all like I would think’). Each item is scored 1-5, with higher scores indicating more functional responses so that ‘exactly what I would think’ is scored 1 and ‘not at all like I would think’ is always scored 5, for each cognitive error. Item scores are summed for a total CNCEQ score. There are 6 items per subtype of cognitive error. The score range is 24-120. The measure has good psychometric properties. Internal consistency is 0.75-0.89 and test-retest is 0.56-0.65, across the different sub-scales. This measure was developed with 4-8th graders. Distortions may not be specific to depression but may relate more generally to negative affectivity. There are 24 items.

CTI-C (Cognitive Triad Inventory for Children; Kaslow, 2002): The CTI-C assesses Beck’s cognitive triad in children: a negative view of self, world, and future e.g. ‘I am a failure’, ‘Most people are friendly and helpful’, ‘Nothing is likely to work out for me’, ‘My worries will never go away’ (rated ‘yes’, ‘maybe’, ‘no’). Adaptive responses are given a score of 2, maladaptive responses are scored with 0 and ‘maybe’ responses are scored 1. The total score is simply a sum of all item scores, thus leading to a score range of 0-72, with lower scores indicating more depressive cognitive beliefs. This measure was developed with 4-7th graders. Kaslow et al. (1992) reported adequate internal consistency and convergent validity for this measure. There are 36 items.
CASQ (Children's Attributional Style Questionnaire; Kaslow, 2002): The CASQ measures depressotypic attributional style in children regarding stable, global, internal causes of positive and negative hypothetical events. Children are presented with an event and are asked to choose an explanation for this event e.g. 'I get an “A” on a test. Is it because a) I am smart or b) I am good in the subject that the test was in’ or ‘If I make a friend it is because a) they are nice b) because I am nice’. A score of 1 is allocated for every functional positive event attribution. A score of 1 is allocated for every dysfunctional negative event attribution. The composite score is the total negative score subtracted from the total positive score, providing a score range of minus 12 to plus 12, with the lower scores indicating a more depressive attributional style. Internal consistency is 0.31-0.66. Test-retest reliability at 3 months is 0.31-0.66 and at 12 months is 0.35-0.56. Convergent validity is 0.34-0.43 with good discriminant ability and good predictive ability across multiple samples. There are 24 items.

CDI-S (Children's Depression Inventory- Short Form; Kovacs, 1992): The CDI-S was administered as was described in the methodology of Chapter 3 (Study 1). This scale measures cognitive depressive symptomology in children. Each item offers three possible statements e.g. ‘Nobody really loves me, I’m not sure if anybody loves me, I am sure somebody loves me’. Of the 10 items (1, 5, 6) relate to negative mood. One item (3) relates to ineffectiveness. Two items (8, 9) relate to anhedonia and items 2, 4, 7 and 10 relate to negative self-esteem.

AMT (Autobiographical Memory Test; Williams & Broadbent, 1986): The AMT was administered as has been outlined in Chapter 3 (Study 1).
Additional Feeling State Questions: At Time 2, in addition to the CDI, a series of questions were presented to the children to gain a fuller account of their feeling state during the potential life stress. Of the 23 questions presented, 6 related to ratings of the significance of the life event and feelings about changing schools, 5 questions were directed at assessment of mood control and the remaining 12 questions were adapted from the Birelson Self-Rated Depression Scale (BSRDS; Birelson, 1981) (see Appendix 5.1). The Birelson questions were included to try to capture additional mood related statements, which are not captured by the CDI (for example, 'I like to go out', 'I have lots of energy', 'I sleep ok', 'I look forward to a lot of things'). These questions were presented to children either in a 'often' 'sometimes', 'never', response format, scored 1-3, or on a 1-10 rating scale (the life stress related questions).

5.4.3. Procedure

At Time 1 children were asked to complete the standard AMT cuing task, the four questionnaires designed to measure cognitive style, and the CDI. All cognitive style questionnaires were completed in a classroom setting, with instructions and all questions read out loud by the experimenter. Practice examples were given on a white board for each measure and three support staff were on hand to offer assistance to children if any was needed. The AMT and the CDI were completed on an individual basis with each child in a classroom within the school. The same experimenter (L. Drummond) administered all testing. These children were re-tested at Time 2 after an 8-month period. Time 2 testing took place during the final week of teaching, prior to school transition. At Time 2 the CDI and several feeling state questions were individually administered to obtain a measure of mood.
5.5. RESULTS

The mean data on CS, AMT performance and the Mood measures are presented in Table 5.1. From Time 1 to Time 2, 10 children showed no change in mood score, 11 children reported slight decreases in depressed mood and 9 children reported slightly increased depressed mood. However, there was no significant difference between CDI scores at Times 1 and 2 ($t(29) = 1.30, p = .21$). Children’s mood at Time 1 was highly correlated with mood at Time 2 ($r(30) = .79, p < .001$). For a note on Gender see Appendix 5.2.

Table 5.1. Means (and standard deviations) scores for CS, AMT and CDI

<table>
<thead>
<tr>
<th>Measures</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAS (range 40 - 280)**</td>
<td>130.63</td>
<td>(36.79)</td>
</tr>
<tr>
<td>CASQ (range -12 - 12)*</td>
<td>3.93</td>
<td>(2.95)</td>
</tr>
<tr>
<td>CTI-C (range 0 - 72)*</td>
<td>52.40</td>
<td>(10.88)</td>
</tr>
<tr>
<td>CNCEQ (range 24-120)*</td>
<td>76.47</td>
<td>(13.78)</td>
</tr>
<tr>
<td><strong>AM</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ve Overgeneral</td>
<td>2.23</td>
<td>(1.19)</td>
</tr>
<tr>
<td>+ve Specific</td>
<td>2.50</td>
<td>(1.20)</td>
</tr>
<tr>
<td>-ve Overgeneral</td>
<td>1.63</td>
<td>(1.47)</td>
</tr>
<tr>
<td>-ve Specific</td>
<td>2.57</td>
<td>(1.41)</td>
</tr>
<tr>
<td><strong>CDI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1 (range 0-13)</td>
<td>3.60</td>
<td>(3.66)</td>
</tr>
<tr>
<td>Time 2 (range 0-10)</td>
<td>3.07</td>
<td>(3.13)</td>
</tr>
</tbody>
</table>

** higher scores indicate more depressive cognitions
*lower scores indicate more depressive cognitions

Throughout this thesis I have focused on AMS responses on the AMT as outlined in the method section of Study 1. In the previous studies involving the AMT (Studies 1 & 2), AMS
and OGM results have mirrored each other. Therefore as discussed in Study 1 (Chapter 3 section 4.2), only one set of data, AMS data, were presented as the most typically reported in the literature. In this study some effects were absent for AMS but present for OGM. Moreover as the longitudinal relationship in the adult literature has been found for categorical memories, both OGM and AMS data are presented in this study.

**Hypothesis 1. There will be a positive relationship between depressed mood, negative CS and OGM, in children at Time 1**

As expected all four measures of CS significantly correlated with children’s mood (on the CDI) at Time 1 (see Table 5.2). Thus, increased low mood was associated with increased dysfunctional CS in children. There was also some inter-correlation between the CS measures (see Appendix 5.3). In addition, with respect to the relationship between AM and mood, AMS to positive cues was negatively associated (and OGM to positive cues was positively associated) with depressed mood at Time 1. There was however no correlation between children’s mood and recall to negative cue words (Table 5.2).

**Table 5.2. Correlations between mood, CS, and AM in children at Time 1.**

<table>
<thead>
<tr>
<th>CS</th>
<th>DAS</th>
<th>CTI-C</th>
<th>CASQ</th>
<th>CNCEQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDI</td>
<td>r</td>
<td>.58</td>
<td>-.52</td>
<td>-.38</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>.001</td>
<td>.003</td>
<td>.040</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AM</th>
<th>Positive</th>
<th>Negative</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDI</td>
<td>r</td>
<td>.51</td>
<td>.18</td>
<td>-.44</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>.004</td>
<td>.351</td>
<td>.019</td>
</tr>
</tbody>
</table>
Thus, increased low mood was associated with the retrieval of fewer specific memories to positive cue words and greater retrieval of overgeneral memories to positive cue words in children (see Figure 5.1)

Figure 5.1. The Relationship between Positive AM and mood at Time 1.

With respect to CS and AM in children, AM recall style was significantly correlated with all four CS measures as predicted. These effects were more pronounced for recall to positive cues (see Table 5.3). Results showed that as cognitive errors (CNCEQ), dysfunctional attitudes (DAS), depressive biases (CTI-C) and negative attributional style (CASQ) increased, the frequency of specific positive recall decreased and positive OGM increased. Note that high scores on the DAS and low scores on the CNCEQ, CTI-C and CASQ are associated with depressive cognition. In summary, results showed that, as hypothesized, positive OGM in children was highly correlated with a dysfunctional, negative CS.
Table 5.3. Correlations between CS and AM at Time 1.

<table>
<thead>
<tr>
<th>CS</th>
<th>Overgeneral</th>
<th>Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>r</td>
<td>r</td>
</tr>
<tr>
<td>DAS</td>
<td>.56</td>
<td>.35</td>
</tr>
<tr>
<td>p</td>
<td>.00*</td>
<td>.00*</td>
</tr>
<tr>
<td>CTI-C</td>
<td>-.59</td>
<td>-.30</td>
</tr>
<tr>
<td>p</td>
<td>.00*</td>
<td>.00*</td>
</tr>
<tr>
<td>CASQ</td>
<td>-.44</td>
<td>-.41</td>
</tr>
<tr>
<td>p</td>
<td>.02</td>
<td>.02*</td>
</tr>
<tr>
<td>CNCEQ</td>
<td>-.39</td>
<td>-.19</td>
</tr>
<tr>
<td>p</td>
<td>.03</td>
<td>.32</td>
</tr>
</tbody>
</table>

* significant correlations after controlling for mood.

In addition, it was critical to establish that the relationship between CS and AM was not fully explained by mood i.e. that mood was not accounting for the correlation between these two important variables. Partial correlations were therefore conducted between CS and AM, controlling for mood at Time 1. Once the variance accounted for by mood was removed, the CNCEQ no longer significantly correlated with AM. Other significant associations remained (see Appendix 5.4).

Hypothesis 2. OGM will positively correlate with certain CS components at Time 1

In order to explore the relationship between CS and AM more fully, the subcomponents of the CS measures were analysed separately. Three of the four CS measures are derived from component scores. The CTI-C is constructed from three components; negative beliefs about
self, world and future. The CASQ is composed of several subcomponents, these being; internal, stable and global attributions, to both positive and negative events (a total of 6 components). The CNCEQ comprises 4 elements; catastrophising, personalising, selective abstraction and overgeneralisation. The DAS has no subcomponents. The mean data for the three CS sub-component scores are shown in Table 5.4.

Table 5.4. Mean (and standard deviations) for CS Sub-component Scores

<table>
<thead>
<tr>
<th>CS</th>
<th>Sub-component</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTI</td>
<td>Self</td>
<td>17.87</td>
<td>(5.26)</td>
</tr>
<tr>
<td></td>
<td>World</td>
<td>16.40</td>
<td>(3.37)</td>
</tr>
<tr>
<td></td>
<td>Future</td>
<td>18.13</td>
<td>(3.84)</td>
</tr>
<tr>
<td>CASQ</td>
<td>+ve Internal</td>
<td>2.83</td>
<td>(0.79)</td>
</tr>
<tr>
<td></td>
<td>+ve Stable</td>
<td>2.23</td>
<td>(1.25)</td>
</tr>
<tr>
<td></td>
<td>+ve Global</td>
<td>2.00</td>
<td>(0.91)</td>
</tr>
<tr>
<td></td>
<td>-ve Internal</td>
<td>1.43</td>
<td>(1.01)</td>
</tr>
<tr>
<td></td>
<td>-ve Stable</td>
<td>0.97</td>
<td>(1.07)</td>
</tr>
<tr>
<td></td>
<td>-ve Global</td>
<td>0.73</td>
<td>(0.64)</td>
</tr>
<tr>
<td>CNCEQ</td>
<td>Catastrophising</td>
<td>19.13</td>
<td>(4.43)</td>
</tr>
<tr>
<td></td>
<td>Personalising</td>
<td>18.90</td>
<td>(4.60)</td>
</tr>
<tr>
<td></td>
<td>Selective Abstraction</td>
<td>19.93</td>
<td>(4.33)</td>
</tr>
<tr>
<td></td>
<td>Overgeneralisation</td>
<td>18.50</td>
<td>(5.04)</td>
</tr>
</tbody>
</table>

Subsequently, correlations were investigated between sub-components of the three CS measures and AM response categories. See table 5.5 for a summary of the sub-component correlational analyses with AM.

CTI-C. All three sub-components of the CTI-C were significantly correlated with specific and overgeneral positive AM recall. Dysfunctional beliefs about self, world and future were correlated with positive AM retrieval style in children, such that greater negative beliefs about self, world and future were associated with reduced positive AMS. There was no
correlation between any of the CTI-C subcomponents and negative AM recall. Thus the presence of negative schemata were associated with overgeneral positive recall.

**CASQ.** There was a significant correlation between stable positive attributions and AM, such that more positive unstable attributions were associated with reduced positive and negative AMS. There was also a trend between stable negative attributions and increased overgeneral-positive retrieval \((p = .052)\). Thus, whether a child regarded an event as stable (likely to change over time or not) was related to AM retrieval style. Unstable positive and stable negative attributions were associated with OGM in children. There was no relationship between globalisation and AM or between internalising tendencies and AM in children, as demonstrated by this measure.

**CNCEQ.** This measure assessed negative cognitive errors in children. There are 4 component parts assessing recognized categories of cognitive error associated with depression. Out of these 4 subcomponents there was no correlation between children’s AM and catastrophizing, personalising or selective abstraction. The relationship between CNCEQ and AM in children was therefore carried by the significant association between overgeneralising and positive OGM. Children, who demonstrated an overgeneralizing tendency with respect to negative events, were relatively less likely to recall positive specific events and more likely to recall overgenerally to positive cues. There was no correlation between overgeneralising and responses to negative cue words for either specific or general recall.

Therefore the relationship between AM and CS in children is principally a relationship between reduced positive AMS and increased negative views (of self, world and future), an unstable attributional style for positive events and a negative overgeneralising tendency. For a graphical depiction of the significant associative relationships see Appendix 5.5.
Table 5.5 Correlations (2-tailed) between AM and Sub-Component CS Scores.

<table>
<thead>
<tr>
<th>Cognitive Style Components</th>
<th>Overgeneral</th>
<th>Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td><strong>CTI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self</td>
<td>-.49 v</td>
<td>-.29</td>
</tr>
<tr>
<td>World</td>
<td>-.47 v</td>
<td>-.24</td>
</tr>
<tr>
<td>Future</td>
<td>-.60 v</td>
<td>-.26</td>
</tr>
<tr>
<td><strong>CASQ</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ve Internal</td>
<td>-.25 v</td>
<td>-.03</td>
</tr>
<tr>
<td>+ve Stable</td>
<td>-.36 v</td>
<td>-.55</td>
</tr>
<tr>
<td>+ve Global</td>
<td>.06 v</td>
<td>.00</td>
</tr>
<tr>
<td>-ve Internal</td>
<td>-.22 v</td>
<td>-.28</td>
</tr>
<tr>
<td>-ve Stable</td>
<td>.36 v</td>
<td>.15</td>
</tr>
<tr>
<td>-ve Global</td>
<td>.05 v</td>
<td>.44</td>
</tr>
<tr>
<td><strong>CNCEQ</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catastrophising</td>
<td>-.34 v</td>
<td>-.07</td>
</tr>
<tr>
<td>Personalising</td>
<td>-.09 v</td>
<td>-.12</td>
</tr>
<tr>
<td>Selective</td>
<td>-.33 v</td>
<td>-.18</td>
</tr>
<tr>
<td>Abstraction</td>
<td>.08 v</td>
<td>.35</td>
</tr>
<tr>
<td>Overgeneralisation</td>
<td>-.40 v</td>
<td>-.20</td>
</tr>
</tbody>
</table>

Note: lower CTI-C, CASQ and CNCEQ scores reflect higher depressive cognition.
Hypothesis 3. CS and AM will predict depressed mood in children at Time 2

A series of regressions were conducted to test the hypothesis that CS and AM would predict depression symptoms in children at Time 2 during a stressful life event. (For correlations between CS, AM and Mood measures at Time 2 see Appendix 5.6). Regression analyses were first conducted before controlling for previous mood then secondly when previous mood was controlled for (by forcing mood scores at Time 1 in to the first step of a linear regression stepwise model). This procedure is consistent with the statistical procedure employed by Brewin et. (1999). In addition, due to the recommended ratios of predictor variables to participants in regression analyses (Howell, 2002), a series of analyses were conducted, rather than entering all variables simultaneously. Unsurprisingly, in all Time 2 analyses, previous mood at Time 1 was the strongest single predictor of mood at Time 2 (AdjR² = .61, p < .001). A summary of the results of the regression analyses is presented in Table 5.6.

CS. The first set of predictor variables were CS measures reflecting the extent of negative cognition found in children at baseline. In the presence of a stressor CNCEQ accounted for a significant 40% of variance in mood scores and the CTI-C added a significant additional 7% to predictive variance in a model of best fit (F(2) = 13.85, AdjR² = .47, p < .001, beta CNCEQ = -.451, beta CTI-C = -.352, significant increment p = .041). When controlling for baseline mood, only the CTI-C and the CASQ predicted significant variability in depressed mood at follow up (F(3) = 22.66, AdjR² = .69, p < .001). The CDI accounted for 61% of variability in Time 2 mood scores, the CTI-C accounted for a further 4% of variability and the CASQ a further 4%.
The second set of predictor variables to be examined were the AMT responses. From among the four AM predictors (overgeneral-positive, overgeneral-negative, specific-positive and specific-negative), Overgeneral-positive recall was the strongest predictor of mood at follow up \( (F = 9.97, \text{Adj} R^2 = .24, p = .004) \). Positive overgeneral recall predicted a significant 24% of variability in mood scores at Time 2. No other AM variable predicted significant variance in mood above that of positive overgeneral recall. After controlling for mood at baseline however, no AM response category was able to predict mood at Time 2 in children, above the variance already predicted by reported mood at Time 1.

Overall Model. To compare the relative predictive values of CS and AM, a stepwise linear regression analysis with mood at Time 2 as the dependent variable, and with CNCEQ, CTI-C, Positive OGM (as the strongest CS and AM predictors) was conducted. The CNCEQ was the strongest relative predictor, significantly predicting 40% of variability in depressed scores in children at an 8-month follow up \( (F = 20.41, \text{Adj} R^2 = .40, p < .001) \). The addition of the CTI-C added a further 7% to the model \( R^2 \text{ change} = .072, p = .045 \). Positive overgeneral recall did not contribute significant additional predictive value to this model and was therefore excluded \( (\beta = .102, p = .55, \text{n.s.}) \). After controlling for mood at Time 1, only the CTI-C added significant predictive ability above that of the predictive value of previous mood \( (F \text{ change} = 4.43, \ R^2 \text{ change} = .053, p = .045) \). When this analysis was repeated, replacing the CNCEQ with the CASQ (since the CASQ was earlier shown to significantly predict mood scores once prior mood was controlled for), the CASQ was again included in a best fit model predicting variance alongside the CTI-C and CDI, when previous mood was controlled for, \( F(3) = 22.66, \text{Adj} R^2 = .69, p < .001, \ R^2 \text{ change} = .05, p = .049 \).
Thus, the CNCEQ was the best predictor of Time 2 mood. OGM also predicted 24% of variance in mood, but after controlling for mood at Time 1, only the CASQ (attributional style) and the CTI-C (negative schema) significantly predicted variance in depressed mood at Time 2.

Table 5.6. Summary of Predictors of Depressed Mood at Time 2: CS and AM

<table>
<thead>
<tr>
<th>Significant Predictors of Mood at Time 2.</th>
<th>Before controlling for Mood at Time 1.</th>
<th>Adjusted R²</th>
<th>After controlling for Mood at Time 1.</th>
<th>Adjusted R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS</td>
<td>CNCEQ</td>
<td>.40</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>CTI-C</td>
<td>.07</td>
<td>CTI-C</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>CASQ</td>
<td>.04</td>
</tr>
<tr>
<td>AM</td>
<td>+ ve OGM</td>
<td>.24</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Overall</td>
<td>CNCEQ</td>
<td>.40</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>CTI-C</td>
<td>.07</td>
<td>CTI-C</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>CASQ</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td>+ve OGM</td>
<td>Excluded</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Finally, children were asked to answer several feeling state questions at Time 2 in addition to the CDI. This was designed to provide a fuller description of children’s feelings during the life stress. Correlational analyses indicated that many of these individual questions (such as ‘I feel worried’) correlated with mood as a composite measure in the form of the CDI (for examples see Appendix 5.7). Interestingly, OGM predicted some of the responses to these questions even after controlling for previous CDI score. For example, OGM to positive cues predicted assenting responses to ‘When I’m in a bad mood it lasts for a long time’ and ‘I find it difficult to control a bad mood’. AMS to positive cues, on the other hand predicted positive responses to ‘How happy are you right now’ on a scale of 1-10, again, after controlling for previous mood (see Table 5.7).
Table 5.7. Predictors of Feeling State at Time 2: AM and Mood (Time 1)

<table>
<thead>
<tr>
<th>Feeling State Question</th>
<th>Significant Predictor(s)</th>
<th>$F$</th>
<th>df</th>
<th>Adj $R^2$</th>
<th>$p$</th>
<th>Summary Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>How happy are you on a scale of 1-10?</td>
<td>+ve AMS</td>
<td>10.50</td>
<td>1</td>
<td>.25</td>
<td>.003</td>
<td>↑ AMS – happier during a stressful life event</td>
</tr>
<tr>
<td>When I’m in a bad mood it lasts for a long time</td>
<td>+ve OGM</td>
<td>4.81</td>
<td>1</td>
<td>.12</td>
<td>.037</td>
<td>↑ OGM - more likely to report an enduring bad mood</td>
</tr>
<tr>
<td>I find it difficult to control a bad mood</td>
<td>CDI and +ve OGM</td>
<td>7.53</td>
<td>1</td>
<td>.31</td>
<td>.003</td>
<td>↑ CDI and ↑ OGM more likely to struggle to control a bad mood</td>
</tr>
<tr>
<td>When I am in a good mood I allow myself to feel that way totally</td>
<td>CDI</td>
<td>8.05</td>
<td>1</td>
<td>.20</td>
<td>.008</td>
<td>↑ CDI - less likely to allow oneself to feel in a good mood totally</td>
</tr>
<tr>
<td>I am looking forward to secondary school</td>
<td>+ve OGM</td>
<td>4.55</td>
<td>1</td>
<td>.11</td>
<td>.042</td>
<td>↑ OGM – less likely to be looking forward to the new school</td>
</tr>
</tbody>
</table>

Thus, AM was able to predict responses to certain bespoke feeling state questions even after controlling for baseline mood. Furthermore, positive OGM predicted responses to ‘I am looking forward to going to secondary school’ on a scale of 1-10. Therefore children demonstrating OGM to positive cues endorsed less positive feelings about going to secondary school, indicating a possible relationship between positive OGM and children’s anticipation of future events. The CDI in contrast, did not predict responses to this question.

5.6. DISCUSSION

This study was designed to tackle several questions pertaining to children’s CS, AM and experience of depressed mood. The study aim was to elucidate possible relationships between
these variables and to examine the possible predictive value of CS and AM in explaining mood in response to a stressful life event (school transition). This study assessed children on a range of CS questionnaires and also on a test of AM. No study with either children or adults has previously examined this particular theoretically driven combination of measures.

5.6.1. Association between CS, AM and Mood

This is the first study to demonstrate a relationship between CS, AM and mood in children. Results provide evidence that if children think negatively they are unlikely to remember positively. That is, there was a significant correlation between a negative CS in children and failure to retrieve specific positive memories. Specifically, if children endorsed negative beliefs about self, world and future (on the CTI-C) and if they demonstrated a depressogenic attributional style (on the CASQ) then they were less likely to remember positive specific memories, independent of their levels of mood. CASQ scores were also significantly related to AMS to negative cue words, independent of mood.

In addition, all negative CS measures and OGM to positive cues were associated with low mood in children. A possible account of these data, as put forward in the introduction to this chapter, is that children with a negative CS dismiss specific positive events due to cognitive dissonance. In other words, positive events are not compatible with negative views of self, world, future and are therefore may be remembered less well. This would likely reduce the availability of positive information for the future and thereby consolidate negative cognition and facilitate negative mood. Though speculative, this account is plausible given our understanding of cognition-emotion interactions (Teasdale & Barnard, 1993, Power & Dalgleish, 1997, Conway, 2005).
It is also highly important to note the relationship between AM and specific CS components. This is the first study to demonstrate a relationship between an overgeneralising tendency (consistent with Beck’s Cognitive Theory of depression) and the overgeneral AM phenomenon associated with depression (van Veerswijk & de Wilde, 2004). OGM has been conceived as an avoidant coping strategy (Williams 1996; Hermans et al., 2005) or as reflecting deficits in executive function (Dalgleish et al., in press). However, present results with children would suggest that another possibility is that the OGM bias originates as part of a wider, cross modal ‘overgeneralising’ tendency, typical of depressed cognition. Increased overgeneralising errors were associated with increased OGM errors to positive cues in children.

Overgeneralizing is a core characteristic of depression ‘I always fail things’, ‘People always let you down’. This will inevitably have implications for event encoding i.e. specific events becoming merged under ‘overgeneral’ labels. Hence overgeneral memories may be very easily retrieved and map closely onto depressive overgeneral memory tags such as ‘lonely’, ‘sad’ or ‘happy’. As indicated, this relationship was specifically a relationship between overgeneralising and overgeneral positive recall. However, the relationship between CNCEQ and AM disappeared once initial mood was partialled out. These two findings strongly suggest that the relationship between overgeneralising and overgeneral positive recall may be highly mood related.

The positive OGM bias was also specifically associated with the ‘stability’ component of the CASQ i.e. in viewing events as more or less likely to change over time. An unstable positive
attributional style (viewing positive events as temporary and likely to change) was associated with failure to retrieve specific positive memories in children. Again, if children view positive events as unstable, unreliable, or unpredictable they may be unlikely to commit these events to memory. It may be that fewer resources are allocated to events that are considered random compared to events that are considered stable in childhood. There are clear implications here for a dynamic between attributions regarding events and memory in childhood. If these results are found to be reliable, this unstable positive attribution error, alongside an overgeneralising tendency, could be targeted for cognitive intervention.

There was no relationship between AM and globalising or internalising in this study. It may be that these cognitive errors are less relevant to children. In support of this view, Joiner and Wagner (1995), in a meta-analytical review of the CASQ in children, demonstrated that while findings for the two dimensions internalising and globalising were equivocal, the stability dimension was reliably correlated with depression in children. Interestingly there was also no consistent evidence of a link between CS and negative recall in the present study. It may be that in early-mid childhood biased processing originates with positive information processing and only encompasses negative information processing later in development or following greater severity in negative mood, indeed possibly as a long-term consequence of poor processing/assimilation of positive information. This is consistent with evidence from Studies 1 and 2. Further evidence to support this hypothesis comes from Nandrino, Dodin, Martin & Henniaux (2004) whereby first episode depression was associated with problems with positive information processing. Subsequent depressive episodes were associated with negative-information processing biases in addition to the positive. Moreover, in remission, the negative bias remitted, but the positive-information bias remained.
5.6.3. Predicting Symptoms of Depression

The final aim of this study was to investigate the importance of CS and AM in predicting depressed symptoms during a stressful life event. Unlike cross-sectional analyses, assessing predictors of depression allows some determination of temporal precedence in non-experimental, longitudinal designs. All children deemed the change of schools (or the anticipation of the new school) stressful. Before controlling for Time 2 mood and apart from prior mood, the CNCEQ was the best CS predictor of depressive symptoms at Time 2. This questionnaire uses hypothetical vignettes and tackles cognitive errors in domain specific areas such as academia or sports performance, which are directly relevant to a child's life. This may explain the stronger effects for this measure. However when controlling for mood this measure did not predict further variability in mood, suggesting that it overlaps significantly with the CDI measure.

To précis the other CS measures; the DAS asks mainly relational questions e.g. ‘people like me because x’ and was not predictive of depression. The CASQ is a comparatively difficult questionnaire due to the fact that the response options are quite closely related and require significant thought to pull apart the abstract distinctions, such as ‘I get an A on a test because I am smart or because the test was easy’. This measure proved to be a significant predictor of mood even after controlling for previous mood, suggesting that causal attributional style is tapping something distinct from the CDI. Finally, the CTI-C is a very direct questionnaire i.e. ‘no-one likes me’. The reason this may have emerged as a significant predictor at time 2, during a stressful life event, may be because more extreme thinking occurs during stressful experiences, or because it is very similar in content but more extensive than the statements asked in the CDI. Of the CS measures both the CASQ and the CTI-C predicted Time 2 mood
and in both cases these relationships remained significant, once Time 1 mood was partialled out. This suggests that depressive attributional style and a wide-reaching negative belief system help to independently drive mood state during times of stress.

Out of the AM predictors overgeneral positive recall was the strongest predictor of Time 2 mood, consistent with the adult literature (Brittlebank et al., 1993; Dalgleish et al., 2001). However, relative to the CS measures and after controlling for previous mood, AM was not able to significantly contribute additional predictive power in line with Brewin et al., 1999. Though the two facets of cognition were associated, AM recall appeared to be a less useful predictor of mood than negative CS in children. It could be that memory recall is less central to mood processes than cognitive attitudes. For instance, in another longitudinal study, Dalgleish et al. (2004) found a correlation between attributional style, negative word endorsement and depressed mood in patients with SAD. There was however no correlation between word-recall and mood. Is this further evidence demonstrative of a more removed relationship between mood and memory compared to mood and CS? Or could some other individual difference variable mediate the relationship between mood and memory, such as rumination? Alternatively memory may simply be less well measured. For instance, cognitive attributional style questionnaires assess various domains of dysfunctional thought, while the AMT measures only one aspect of memory functioning- its specificity. An advanced AMT could perhaps be developed whereby facets in addition to specificity are coded. For example, latency, recency versus remoteness of memory, detail, richness, diversity/recurrence of personal themes could all be considered. This might offer a fuller measure of ‘memory style’, equitable to that found in CS measures.
This null finding for OGM may also be because the effects of a stressor in school children are not sufficiently profound so as to relate to AM style. Alternatively, the very fact that a diathesis-stress design was used at all may have washed out any effects (previous studies have looked at mood at Time 2, without an identifiable stressor). Alternatively, the CDI may not be sufficiently sensitive as to pick up any longitudinal associations with AM. As noted in the Introduction, studies using the BDI in adults to index Time 2 mood have not detected longitudinal AM effects. This interpretation is given further weight by the finding that certain bespoke feeling questions presented to children at Time 2 were able to reveal independent relationships with prior AM style.

5.6.4. When controlling for Previous Mood

The CDI alone predicted 62% of variability in depressed symptoms at time 2. Though important in terms of confirming the stability of depressed symptoms in childhood. To say depressed mood predicts depressed mood tell us nothing of the underlying mechanisms at work. Hence, although the CDI best predicted mood (consistent with Nolen-Hoeksema et al, 1992), it is important to look at which variables predicted mood irrespective of previous mood in order to gain insight into the underlying cognitive mechanisms. In this respect, it appears that negative overgeneralising errors (in child specific domains such as academia) and positive overgeneral recall, as well as an unstable attributional style for positive events and negative schemas are all prime candidates for intervention. When controlling for previous mood only the CTI-C and CASQ predicted mood at follow up. This suggests that only these measures are tapping something discrete from the symptoms of depression. For example, 'attributional style' is not captured by any of the CDI items.
5.6.5. Other Mood related Feeling State Questions

Moreover a tenuous but nevertheless intriguing finding was that positive OGM at Time 1 predicted responses to statements regarding mood control (e.g. 'I find it difficult to control a bad mood' and 'when I'm in a bad mood it lasts for a long time'). This effect remained even after controlling for initial mood. Thus, children's statements endorsing failure to improve a bad mood and the enduring quality of their bad mood, was predicted by information regarding overgeneral positive memory gathered 8 months previously. Is this evidence in support of the potential mood regulating importance of specific positive recall? For example, Joorman & Siemer (2004) found evidence that non-depressed persons used specific positive recall to repair a bad mood whereas depressed individuals failed to do so. Similarly, present results show that reduced positive AMS predicted self-reported poor negative mood repair in children.

5.6.6. Valence

Moreover, a consistent valence specific pattern was found throughout the results of this study. All associative relationships were stronger for positive (as opposed to negative) recall, so that reduced positive AMS was associated with negative cognition. Also, only children's recall of positive memories was significant in terms of predicting depressive mood. The relationship between positive OGM and low mood found in children, mirrors that often found in depressed adults (e.g. Brittlebank, et al., 1993; Dalgleish et al., 2001; Puffet, et al., 1991; Williams & Broadbent, 1986). The result is also consistent with the results from Study 1 whereby dysphoric children, irrespective of age, demonstrated OGM to positive cues. In Study 2 the effects of clinical depression were found for both positive and negative recall.
This suggests a possible central role for biases in positive information processing in the psychopathological aetiology of depression.

5.6.7. Research Implications

One of the immediate practical implications of this work is that children who fail to disclose a possibly serious negative and pervasive mood could be highlighted through performance on cognitive measures. If strong correlations are found between certain cognitive measures and mood, the cognitive measures may offer better insight into the underlying mechanisms contributing to a depressed mood. Also, this work helps to locate vulnerable children, i.e. those who demonstrate negative self-beliefs and (long term-) dysfunctional OGM styles, but who do not report depressed mood. These may be ‘vulnerable’ children who in the course of life stress, may go on to develop depression. This is particularly salient given national government and local education authority investments in the UK, for example, into schemes such as ‘Positive People’ designed to intervene to teach psycho-emotional-social skills to vulnerable children. At present, children demonstrating ‘bad behaviour’ are selected for such in-house schemes. Given that depression in youth is often insidious and does not always manifest itself outwardly (e.g. Mash & Wolfe, 2005) a cognitive battery approach to target relevant children may prove more useful.

5.6.8. Caveats and Limitations

One limitation of the present study concerns the small numbers. Greater numbers would allow stronger conclusions to be drawn regarding the roles of the predictor variables. Another issue is the measurement of mood in children. Few scales are available for use with children,
which provide a good range of depressed mood scores (Pavuluri & Birmaher, 2004). This is an issue, which, though difficult, if resolved would vastly improve research potential in this area. A number of questions regarding feeling state were asked of children at Time 2, in addition to the CDI. A simple question of 'how sad are you on a scale of 1-10' correlated highly with the composite CDI score. Developing better means of assessing mood in children is crucial if steps are going to be taken to investigate influences (cognitive or otherwise) on children's mood and subsequent development of psychopathology. Also, Dalgleish et al. (2001) concluded that "the exact measure used to assess levels of depressive symptomology may be crucial" in terms of assessing the predictive value of OGM. The possibility that alternative depression measures may be more appropriate for demonstrating the predictive quality of OGM in children is still to be tested.

Moreover, school transition, though potentially highly stressful for any child, is a complex stressor in the sense that mixed feelings seem to be evoked as demonstrated by responses to feeling state questions, which showed some children to be excited, apprehensive and sad. Less complex stressors should perhaps be pursued in future, which do not generate mixed feeling states but are more exclusively negative. However, it is difficult to find a measurable, predictable stress in childhood that potentially affects all children, irrespective of individual vulnerability. In order to deal with this problem, therefore, school stressors could be continued to be pursued, but with significantly increased numbers, so as to separate groups into those who only find the event stressful and those who also have mixed or positive feelings about the life event. This should produce stronger data. In addition, future longitudinal studies in clinical child groups would be important.
5.7. In Conclusion

It is possible to predict emotional responses to a stressful life event in children from prior information regarding CS and AM recall style gathered 8 months previously. There is some support for the prediction for instance, that children who overgeneralize negative events and explain positive events by causes that are unstable are more likely to feel depressed during a stressful life event. There was also an association between these specific negative CS components and OGM in children. OGM had no predictive power once prior mood was controlled for, whereas CS still managed to predict additional variance in depressive mood. It is unclear what implications exist here in terms of the mechanisms through which AM affects mood. Further studies are needed to establish whether CS is more central to mood than memory style, or whether these effects are measure-specific. Work could also be developed looking at specific cognitive interventions tackling specific areas such as poor specific positive recall. If confirmed by future prospective studies, these valence findings suggest that primary prevention efforts could best be aimed, not at reducing negative information processing biases, but at building positive information processing, in children.

The final AM study in this thesis shifts the focus to the effects of trauma on AM style in children, independent of depressed mood (Study 5). This study also seeks to examine relationships between AM and other experimental and non-questionnaire measures of negative cognitive functioning. For this reason, the study reported in the next chapter (Study 4) represents a diversion from the series of AM studies, as it reports an attempt to validate another experimental measure of affective processing in young children which, along with the EF measure validated in Study 1, is used in Study 5 to give a broader index of affect-related processing in children.
Chapter 6 | Study 4 | The Effects of Age and Dysphoria on Labelling of Facial Emotion
Abstract 6 | Perception of facial information is one way in which cognition can be biased in adult depression. However there is less evidence concerning how depressed mood may influence children's processing of facial-affect. In this chapter, empirical evidence concerning the existence of biases in the processing of facial emotion in children and young adults is presented. Sixty-seven children (aged 6-11) and 33 young adults (aged 17-22) were asked to label the emotion in a series of 62 previously rated adult faces displaying happy, sad and neutral affect. Analyses focused on the effects of age and depressive symptoms on the correct identification of facial emotion. Both age and dysphoria were positively correlated with correct labelling of sad faces. Results are discussed in terms of the development of depression-related information processing biases.
6.1. Introduction

A characteristic of the research on OGM is that, to date, the effect has rarely been studied in the context of other information-processing biases associated with depression. As noted, in the General Introduction, depression can be characterized by the selective processing of negative stimuli. To what extent, therefore, does memory overgenerality relate to such negative biases? The current study reports the validation of an experimental task to examine biases in the processing of facial affect in children and its relationship to dysphoric mood. This is an important issue in its own right, as to date there have been no studies of the effects of naturally occurring mood on facial emotion processing in children. However, the broader aim is to validate a methodology for examining biases associated with emotion processing in dysphoric children for use in the final study of the thesis (Study 5) which will, amongst other things, examine the relationship between biased processing of facial emotion, OGM, and level of emotion focusing in a sample of children in residential care (Chapter 7).

6.1.1. Why a New Paradigm?

Rather than validate a new task, an alternative would have been to utilize an existing experimental paradigm that examines negative bias from the child depression literature. However, as noted in the General Introduction, few experimental studies exist and several of those seeking to validate standard adult methodologies such as the emotional stroop paradigm (Neshat-Doost, Taghavi, Moradi, Yule & Dalgleish, 1997) and the dot-probe task (Neshat-Doost, Moradi, Taghavi, Yule & Dalgleish, 2000) have generated non-significant results with respect to depression in children. Those studies, which have generated significant data have generally used memory tasks (e.g. Neshat-Doost, Taghavi, Moradi, Yule & Dalgleish, 1998).
There is some evidence from non-memorial tasks that (as with adults) underlying alterations may exist associated with the processing of and allocation of resources towards negative emotional information in paediatric depression. For example, depressed children were distracted by negative emotional stimuli (whereas controls were distracted by positive emotional stimuli) in keeping with adult depressed literature, in a selective attention task (e.g. Ladouceur, Dahl, Williamson, Birmaher, Ryan & Casey, 2005). Similarly, Bishop, Dalgleish & Yule (2004) found high-depressed children showed enhanced recall of sad emotional stories, relative to positive stories, compared to a low-depressed group. Thus, when child-oriented materials are used, depression-related biases towards negative information may be observable even in a non-clinical sample of children. However, most studies of the relationship between mood and cognition have used word paradigms to convey emotional content, in both children (Neshat-Doost et al., 1998; Bishop et al., 2004) and adults (e.g. Williams, Watts, Mathews & MacLeod, 1997; Bradley, Mogg, Millar & White, 1995).

The aim here therefore, was to find a child friendly task that was clearly different from the AMT but would also highlight possible biases associated with the processing of affective stimuli. We therefore decided to seek to validate a facial-affect processing task due to the use of faces for work in children and due to the promising results using such methodologies in depressed adults. In the following sections, the literature concerning facial affect processing is briefly reviewed, before developing the specific hypotheses involved in validating the face-emotion recognition task in children.
Faces can depict a range of emotions without recourse to verbal cues. This is important when testing children with low reading abilities. Facial stimuli are also ubiquitous, salient social stimuli relevant across all age ranges and cultures. Facial emotions are used as social tools to negotiate social encounters and do not just occur randomly but are more often directed at an audience (Fridlund, 1994). Moreover, the ability to decode facial expression is an important component of social interaction because of the significant role of accurate facial processing in the appropriate modification of social behaviours (Philippot & Feldman, 1990). With more than 50 different facial movements, the face offers a great diversity in social or interpersonal signals. Recognition of these facial signals “represents the early utilization of social cues on which subsequent interpretations and behavioural responses will depend” (Pollak, Cicchetti, Hornung & Reed, 2000; see also Herba & Phillips, 2004) Moreover, misinterpretation of facial signals may be of interest, especially when examining potential mood biasing effects or emotion avoidance tendencies.

Finally faces may induce a different type of processing compared to verbal stimuli. According to the ICS framework of Teasdale & Barnard (1993), processing of hot cognitions in depression involves the implicational meaning subsystem whereas cold processing is more likely to involve the propositional meaning subsystem. Affective faces may be more likely to invoke an implicational type of processing because they are rich in sensory/ proprioceptive properties, a key component in arousing hot cognition. Indeed, the importance of examining facial affect processing and depression in adults has already been recognized. This work is now reviewed.
6.1.3. Adult Depression and Facial Affect Processing

In adults, depression is associated with recognition errors across a range of facial expressions (Persad & Polivy, 1993). Depressed adults make more 'neutral as sad' type errors (Mandal & Bhattacharya, 1985) and, compared to non-depressed controls, also show subtle deficits in the correct identification of facial happiness (Surguladze, Young, Senior, Brebion, Travis & Phillips, 2004). Depressed adults have also been shown to rate emotional expressions as more sad on a sadness scale, compared to non-depressed adults (George, Huggins, McDermut, Parekh, Rubinow & Post, 1998; Gur, Erwin, Gur, Zwil, Heimer & Kramer, 1992).

There is also evidence that depression in adults is associated with heightened attention to negative facial emotion. Studies using faces in a dot probe task have found evidence of decreased attention to happy faces in dysphoric adults (Bradley, Mogg, Falla & Hamilton, 1998) and of selective attention towards sad faces in adults with major depressive disorder (Gotlib, Krasnoperova, Neubauer & Joorman, 2004). Dysphoric adults showed 'even handed' allocation of attention to angry faces in a dot probe task, using faces (Bradley, Mogg & Millar, 1997). However out of 15 depressed adults, 13 had co-morbid general anxiety disorder (GAD) in this study. Mogg, Millar & Bradley (2000) repeated this study in a carefully diagnosed sample of MDD adults (with no co-morbid anxiety). Depressed adults, in this study, demonstrated greater vigilance for sad faces compared to controls, i.e. they were relatively faster to detect dot probes when they appeared in the same location as a sad face. This is evidence consistent with a depressive bias, in favour of preferential processing of negative facial information relative to controls. A convincing body of evidence is therefore emerging to suggest depression in adults is associated with biases in processing of facial affect.
6.1.4. Developmental Face Studies in Early Childhood

Despite the work in adults, surprisingly little work has been replicated in children. Much of the literature has focused on examining how normal (non-depressed) children can recognize different emotions portrayed in faces, particularly in infant and pre-school periods. These studies show that even infants are able to discriminate between different facial expressions (for a review see Nelson & de Haan, 1997). However, infant methodologies rely on habituation and preference as the index of recognition and therefore may be measuring a different underlying construct to that investigated in adults. Thereafter, in preschool studies, children as young as 3 years demonstrate ability to correctly label emotion in faces (Ridgeway, 1985). In fact a number of studies have examined the onset of children’s ability to identify facial emotion in pre-school years (Pollack, Cicchetti, Hornung & Reed, 2000; Vicari, 2000; McClure, 2000).

The precise developmental trajectory regarding children’s improved ability to recognise emotion, however, is less well understood, as few studies have looked at age and the processing of facial affect systematically across a broad age range. The few studies, which have, have not found consistent patterns. Kolb, Wilson & Taylor (1992) found that the development of emotion facial emotion recognition was static between the ages of 6-9 and only subsequently improved. Gosselin & Laroque (2000) found increases in the ability to label facial expressions between the age groups 5-6 and 7-8 but not significant improvement thereafter. In contrast, MacDonald, Kirkpatrick & Sulivan (1996) found yearly increases in facial expression recognition ability between the ages of 3 and 6 years.
Therefore, there is evidence to suggest that ability to recognize discrete facial emotions does improve across age, (typically with recognition of happiness occurring first, followed by sadness or anger, and with identification of neutral faces remaining poor in early childhood; Gross & Ballif, 1991). However, no consistent age-related pattern is found across studies. This is possibly as a result of methodological inconsistencies. For example, some studies use verbal recognition of the stimulus images whilst others use stimulus matching to an appropriate word card, which is read aloud. Also, no consistent facial stimuli are used and varied skills are required, such as verbal, visuo-spatial, cognitive or attentional, which could affect results.

6.1.5. Performance of Children and Adults on the same task

Moreover, to my knowledge, only one study has directly examined the ability of children to process facial emotion, relative to adults, on the same task. From a visual science perspective, by De.Sonnerville et al (2002) tested children across a good age range (7-10 years) and in comparison with adults. Adults were faster and more accurate than children on a range of face discrimination tasks, especially for negative expressions. Speed of processing of negative faces improved with age. This valence specific effect is interesting and may offer clues in terms of understanding the development of depressive biases. For example, do normal children typically demonstrate poor interpretation of negative facial affect, relative to positive in others, and would the same apply to dysphoric children? To develop this work further information regarding the type of errors of interpretation would be of use, as would a consideration of ambiguous stimuli and mood.
6.1.6. Facial-Affect Processing in Depressed Children

To our knowledge no study has examined naturally occurring mood effects on the performance of children on a task of facial emotion recognition. One study however examined effects of induced mood and processing of facial affect information in children. Terwogt, Kraemer & Stegge (1991) induced mood in 6 year olds using a mental imagery procedure. Children completed three face tasks (a preference task; a labelling task; and a recall task). The main results indicated that all children showed a preference for happy faces. Happy-induced children labelled ambiguous faces as happy and sad-induced children recalled fewer faces overall, though this was not valence specific. Thus, some evidence of mood congruency in children was demonstrated in that happy-mood induced children rated ambiguous faces as happy. However, this effect did not extend to sad-induced children. A proviso regarding this study is that a non-validated mood induction procedure was used. Terminology such as 'which face looks nicest to you' also makes it difficult to know what exact criteria the children were using to judge the faces (e.g. were children judging niceness based on hair styles or facial affect?) Moreover, while all faces were judged 'ambiguous' by the authors, there is no explanation as to how this ambiguity was defined or established. Mixed stimuli were also used and ranged from drawings with 'irrelevant features' to photographs, which may be problematic in terms of restricting conclusions that can be drawn regarding the specific effects of face valence. For example, I believe some drawings included individuals wearing 'funny hats'. Nevertheless, this study is the first to provide useful evidence that mood can effect children's processing of facial affect.

6.1.7. Interpretation of Ambiguous Stimuli in Depression
Another important issue to consider when using facial stimuli and one central to the examination of face processing in this thesis is the idea of ambiguity. For example, negative interpretations of ambiguous faces are predictive of relapse and episode persistence in depressed adults, (Bouhuys, Geerts & Gordijn, 1999; Bouhuys, Geerts, Mersch & Jenner, 1996; Hale, 1998). Geerts & Bouhuys, (1998) found negatively biased interpretations of ambiguous faces were associated with depression, persistent after 6 weeks. The same index predicted relapse at 6 months (Bouhuys, Geerts & Gordlin, 1999). This bias was associated with relapse even after controlling for type of depression, severity of depression at baseline and residual symptoms at remission. Authors suggest a fundamental cognitive bias in the processing of nonverbal ambiguous interpersonal stimuli in depression.

Adult studies of interpretation of ambiguous non-facial stimuli and depression, though informative and interesting, remain disparate. Some findings are consistent with the hypothesis that depression is associated with a negative interpretative bias (e.g., Butler & Matthews, 1983) where as other studies have failed to find such a bias (e.g. Lawson & MacLeod, 1999). Differences may be related to the level of mood examined. For example, low-positive affect was related to neutral interpretations and high-positive affect was related to positive interpretation of ambiguous sentences in adults (Pury, 2004). Though use of ambiguous emotional stimuli to assess depressive biases is underused, neutral facial emotion may act as useful ambiguous emotional stimuli for the purposes of testing theories of depressive biases.

Based on these adult findings, one might also predict that dysphoric/depressed children would interpret ambiguous emotion stimuli, including faces, in a mood-congruent manner. However, to date, there have been few studies of such issues, and none examining facial processing.
Dineen & Hadwin (2004) investigated judgements of intention in ambiguous scenarios (in reference to either self or other) in anxious and depressed children aged 7-9. Consistent with cognitive theories of depression and with adult data, levels of depression in children predicted increased negative interpretations for 'self' but not 'other'. Similarly, Hadwin, Frost, French & Richards (1997) tested trait anxiety in children and interpretation of ambiguous stimuli, using a pictorial homophone task. Interpretations were significantly related to level of anxiety, i.e. anxiety resulting in more threatening interpretations. However this study did not look at depression. Likewise, Taghavi, Moradi, Neshat-Doost, Yule & Dalgleish (2000) examined the processing of homographs in children with general anxiety disorder. These are the only three studies known to have used ambiguous stimuli to assess negative bias in mood disorders, in children.

6.1.8. Impact of Negative-Information Processing

Finally, in order to highlight the potential affective significance of negative-information processing it is worth drawing attention to a fascinating and elegant experimental study by MacCleod, Rutherfords, Campbell, Ebsworthy & Holker (2002). In this study selective attention to emotional stimuli was manipulated in adults, using a modified dot probe task. Induced attentional bias towards negative stimuli resulted in emotional vulnerability. Emotional vulnerability was defined as increased self-reported negative mood ratings on anxiety and depression scales. Those trained to attend to negative probes (i.e. where targets were always in negative word location) demonstrated higher post-stress negative mood scores. It is particularly important that the attentional training procedure did not exert an effect on mood state per se. That is, immediately prior to an anagram stress task mood state was equivalent across the two groups. Differential mood effects were only found after a stressor. Thus attentional biases seem to impact emotional vulnerability rather than mood per
se. To a similar degree, individuals who were trained to avoid negative information showed reduced emotional vulnerability after the stressful anagram task. In fact, the extent to which individuals learned to avoid negative information was precisely correlated with their emotional reactions - those who better learnt to avoid negative information were less stressed. This has clear implications for the potential interaction between processing of negative information (such as sadness in faces) and subsequent vulnerability to depressed mood.

6.2. Study Rationale

Though there is clearly separate evidence to suggest that both age and mood affect children’s processing of emotional material as already noted, to my knowledge there is no literature specifically examining information processing biases for emotionally valenced facial material in naturally occurring depressed or dysphoric children. Moreover, strong conclusions about the effects of children’s age on their ability to recognise facial emotion is also constrained by methodological inconsistencies across studies. More importantly, for the present purposes, effects of mood have also not been considered. Most studies concentrate on accuracy. In testing depression related biases, however, we are also interested in the nature of inaccuracies i.e. the nature of errors and aberrant patterns associated with depressed mood in childhood. Given the existence of adult biases in processing of facial affect associated with adult depression and given experimental evidence that attention to negative stimuli may induce emotional vulnerability in otherwise healthy individuals, it is important to study potential biases in the processing of facial emotion in children. Several specific predictions regarding children’s mood related processing of facial emotion were therefore generated.
6.3. Hypotheses

1. Children will be able to categorize emotional facial expression appropriately.

2. Accuracy of face categorization will improve with age

3. Dysphoria will be associated with a) greater accuracy in identifying facial expressions of sadness; and b) a more marked tendency to label neutral emotional expressions as sad. In contrast non-dysphoric children are expected to rate more happy faces as happy and more neutral faces as happy in a mood congruent manner.

4. Dysphoria will account for a significant proportion of the variance in children's labelling of emotion, independent of any effects of age.

6.4. METHOD

6.4.1. Participants

There were 100 participants in this study (67 children and 33 adults). The children were aged between 6-11 years and were recruited from 3 age groups (6-7 years, 8-9 years, 10-11 years). This was felt to offer a broad age range without tackling adolescent populations. During pilot testing it was felt children younger than 6 struggled to concentrate on the task. Age six was therefore taken as the starting point increasing in increments until age 11. Overall there were 29 boys (43%) and 38 girls (57%). Children were excluded if they were known to have special educational needs such as autism, which would potentially interfere with their performance on the task. A young adult comparison group was also tested to make direct comparison with adult research possible and to verify adult ratings of the face stimuli. Thirty-three young adults were tested, aged between 17-22 years. These were volunteer undergraduate students, 52% male, 48% female. (Table 6.1)
Table 6.1. Age and Gender of the Child and Adult Samples

<table>
<thead>
<tr>
<th>Age (yrs)</th>
<th>(n)</th>
<th>Female: Male (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-7</td>
<td>25</td>
<td>56: 44</td>
</tr>
<tr>
<td>8-9</td>
<td>19</td>
<td>42: 58</td>
</tr>
<tr>
<td>10-11</td>
<td>23</td>
<td>70: 30</td>
</tr>
<tr>
<td>Adult</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17-22</td>
<td>33</td>
<td>48: 52</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>54: 48</td>
</tr>
</tbody>
</table>

6.4.2. Materials and Measures

Facial Emotion Recognition Task. A total of 62 grey scale photographic images of headshots of male and female adults showing happy, sad and neutral affect, were presented to children as a paper and pencil task. The photographs were arranged in groups of 4 per page in a booklet format. The presentation of faces was randomised for gender and expression. The stimuli in this study were drawn from Le Gal & Bruce (1999). See Appendix 6.1 for example faces. The faces were previously rated for emotion by a group of 100 adults and each face had achieved over 75% subjective-rater agreement as to the emotion being portrayed (Le Gal & Bruce, 1999). Correct identification of emotion was defined as labelling the emotion of the face consistent with this previous inter-rater agreement. The standard Ekman & Friesen (1987) face set was not used in this study because insufficient individuals were available (n=10) portraying the different facial emotions. The current stimuli set offers a wide range of individuals exhibiting the facial emotions of interest. This was deemed important in reducing the likelihood of results being explained in terms of facial distinctiveness. Happy, sad and neutral faces were used as those considered most relevant to assessing depression relevant biases given previous research in adults. Neutral faces reflected faces not rated as one emotion.
or another, i.e. they do not conform to any distinct emotional characteristic or type and are therefore considered ambiguous. Including a greater range of emotions (e.g. anger and fear) would have allowed an investigation of ‘positive’ and ‘negative’ valence effects, which would have been ideal. However, this would have resulted in a significantly larger stimulus set and with already 62 faces for children to rate, this was deemed impractical.

Photographs were labelled through use of a schematic labelling tool. Schematic drawings of 5 faces were in place below each photograph (see Appendix 6.2). Schematic faces were used to circumvent the problem of using verbal cues (a potential limitation of testing young children). Schematic faces made the task more child-friendly. These schematic faces were adapted from Wong & Whaley (1986) and consisted of a simple line drawing of a face with a highly schematised mouth. The schematic faces represented “very happy”, “quite happy”, “neutral”, “quite sad” and “very sad” facial expressions. As no differential effects were found for ‘quite happy-very happy’ or ‘quite sad-very sad’, a collapsed scoring scale was therefore used, whereby quite happy and very happy were collapsed into the category ‘happy’ and quite sad and very sad were collapsed to form the category ‘sad’.

Emotional face labelling tasks can vary in the type or depth of processing required. The current face task was designed to minimize the involvement of unnecessary visuo-processing skills that might impose cognitive and memory loads on the participant. The task was also designed to limit time/attention requirements and to be engaging for young children. These methodological decisions were made to make the task equitable across the widest possible age range. The task was also designed to be of use in examining biases in interpretation of an ecologically valid emotional stimuli. Specific task instructions can be found in Appendix 6.3.
Validity of Schematic Face Labelling Tool: In order to test participants' identification of emotion as denoted in the schematic face-labelling tool and to confirm participants' comprehension of the task, a simple preliminary task was included. The schematic scale was presented to participants and they were asked to verbalize what they thought was being represented in each face from left to right (very happy through to very sad). Correct labelling, correct labelling with prompts, and incorrect labelling responses were recorded. No participant incorrectly labelled or failed to label the faces.

Of the 67 children, 56 immediately correctly labelled the schematic faces. Eleven of the children tested needed to be prompted. Of the 11 children who did not spontaneously label the emotions, all the children still labelled along positive and negative dimensions for instance 'pleased' through to 'worried' but did not use specific reference to happiness and sadness. Of the 11 children who did not spontaneously label the faces on a happiness-sadness dimension, 8 were from the youngest age group aged 6-7, and 3 were from the older group aged 8-9. Of this group of children, 7 were female and 4 were male. A subsequent analysis of correct labelling of faces showed there were no significant differences between children who had (n=11) and those who had not (n=56) required prompting; \( F(1, 66) = 0.1, p = .75 \). All participant responses were therefore included in the analyses.

Measurement of Depression. As in Studies 1, 2, and 3, the CDI was used to assess depression in children. An a priori decision was made to also use this instrument with young adult participants to ensure comparability of results, since this measure is designed for use with 7-17 year olds (Kovacs, 1992). However, preliminary analyses revealed non-significant results for effects of dysphoria on facial emotion identification in young adults. This could be because depression was not well measured in this young adult group using the CDI. For the
purposes of all statistical analyses regarding the effects of dysphoria on processing, adult data were therefore excluded. This issue is discussed further in the final section.

6.4.3. Procedure

The participants were first asked to complete the facial-emotion task. The participants were instructed to label the photographs of individual faces by circling the relevant schematic drawing underneath. The task was completed on an individual basis with each participant. The participants were told there were no time constraints and no right or wrong answers, but that it was their opinion of each face that was important. Each participant was then asked to complete the CDI.

6.5. RESULTS

One sample t-tests were used to examine the first hypothesis that children’s labelling of each emotion would be greater than chance. Analysis of variance (ANOVA) was used to examine whether correct recognition of emotion varied as a function of emotion category, and the effects of age on accurate recognition. To test the third hypothesis, that mood influences labelling of emotion, non-parametric tests were used as the data were not normally distributed due to small sample sizes. Finally, a multiple regression analysis was used to compare the relative contributions of age and dysphoria in explaining variance in face labelling.
Hypothesis 1: Children will correctly label Facial Emotion above chance

To test the hypothesis that children would accurately label facial emotion as denoted in the methodology of this study three one sample t-tests were carried out on correct responses to happy, neutral and sad faces. Correct labelling of facial emotion was above chance for all three face-types (children correctly labelled 96% of Happy faces, $t(66) = 55.12, p < .001$; 64% of Neutral faces, $t(66) = 18.02, p < .001$; and 51% of Sad faces, $t(66) = 4.37, p < .001$) such that children were able to correctly discriminate facial emotion using the current paradigm.

Next, a one-way ANOVA was conducted on correct labelling of facial emotion with Face-type (happy, neutral and sad) as the within-subjects factor to examine differences in accuracy across face-type. There was a significant effect of Face-type on children’s labelling of emotion ($F(2, 92) = 100.37, p < .001, \text{Greenhouse-Geisser corrected}$). Paired t-tests revealed that children rated significantly more happy faces correct than sad ($p < .001$) and neutral faces ($p < .001$) and significantly more neutral faces correct than sad faces ($p = .003$). Children’s rating of face-type (with adult controls as a point of comparison) is illustrated in Figure 6.1.

Figure 6.1. Children’s Overall Correct Rating of Face-type relative to Adults’
Hypothesis 2: There will be an effect of Age on identification of facial emotion.

In order to examine the precise effects of Age and Face-type on labelling of emotion a 4 x 3 ANOVA was conducted on correct labelling involving Age-group (6-7, 8-9, 10-11 and 17-22) and Face-type (happy, sad and neutral). Results showed a significant main effect of Age-group \( (F(3, 96) = 12.94, p < .001) \), a significant main effect of Face-type \( (F(1, 136) = 134.34, p < .001, \text{Greenhouse-Geisser corrected}) \) and an Age-group by Face-type interaction \( (F(4, 136) = 2.75, p = .001, \text{Greenhouse-Geisser corrected}) \).

Figure 6.2. Effects of Age and Face-type on Correct Labelling of Facial Affect

Post hoc analysis confirmed that the Age-group by Face-type interaction was attributable to adults making significantly fewer sad errors compared to children in all age categories (adult vs. children 6-7; \( t(56) = 5.01, p < .001 \), adult vs. children 8-9; \( t(50) = 3.35, p = .002 \) and adult vs. children 10-11; \( t(54) = 2.44, p = .02 \)). In addition, only by age 10-11 did the significant
difference between correct labelling of sadness and neutrality in faces disappear (age 10-11 neutral vs. sad, \( t(22) = 1.21, p = .24, \text{n.s.} \)). Correct responses by Face-type and Age-group are shown in Figure 6.2.

The difference between adults and children on labelling of sad faces, was attributable to adults making significantly fewer ‘sad as neutral’ type errors \( (t(98) = 3.23, p = .002, \text{equal variances assumed}) \). Percentage correct FER responses and percentage FER errors by age-group are presented in Table 6.2.

**Table 6.2 Correct Face Recognition Responses and Errors of Recognition**

<table>
<thead>
<tr>
<th></th>
<th>HH</th>
<th>HN</th>
<th>HS</th>
<th>NH</th>
<th>NN</th>
<th>NS</th>
<th>SH</th>
<th>SN</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-7</td>
<td>92.88</td>
<td>4.84</td>
<td>2.36</td>
<td>6.20</td>
<td>61.88</td>
<td>32.12</td>
<td>9.04</td>
<td>47.44</td>
<td>43.76</td>
</tr>
<tr>
<td>8-9</td>
<td>97.05</td>
<td>3.05</td>
<td>0.00</td>
<td>6.26</td>
<td>66.47</td>
<td>27.58</td>
<td>7.95</td>
<td>40.05</td>
<td>52.37</td>
</tr>
<tr>
<td>10-11</td>
<td>98.61</td>
<td>1.48</td>
<td>0.00</td>
<td>10.43</td>
<td>65.30</td>
<td>24.43</td>
<td>7.87</td>
<td>33.57</td>
<td>59.00</td>
</tr>
<tr>
<td>total (child)</td>
<td>96.03</td>
<td>3.18</td>
<td>.88</td>
<td>7.67</td>
<td>64.36</td>
<td>28.19</td>
<td>8.33</td>
<td>40.58*</td>
<td>51.43*</td>
</tr>
<tr>
<td>Adult</td>
<td>98.55</td>
<td>1.52</td>
<td>0.00</td>
<td>4.97</td>
<td>68.48</td>
<td>26.76</td>
<td>2.06</td>
<td>26.45*</td>
<td>71.70*</td>
</tr>
<tr>
<td>Total</td>
<td>96.86</td>
<td>2.63</td>
<td>.59</td>
<td>6.78</td>
<td>65.72</td>
<td>27.72</td>
<td>6.26</td>
<td>35.92</td>
<td>58.12</td>
</tr>
</tbody>
</table>

*significant differences \((p < 0.05)\)

**Hypothesis 3: Mood will affect labelling of facial emotion in children.**

The previous hypothesis concerned effects of age on labelling of facial emotion, for which an adult comparison group were used. The present hypothesis considers the effect of mood on processing of facial emotion in children. Contrary to the mood congruent hypothesis regarding ambiguous stimuli, there were no between group effects of dysphoria on rating of
neutral faces in children. Mann Whitney U tests showed that dysphoric children did not make significantly more ‘neutral as sad’ type errors as predicted ($U = 134.00, n_1 = 6, n_2 = 61, p = .30$). Similarly non-dysphoric children did not make significantly more ‘neutral as happy’ type errors compared to dysphoric children ($U = 123.00, n_1 = 6, n_2 = 61, p = .20$). Rating of neutral faces though non-significant, was in the predicted mood congruent direction (see Figure 6.3a).

**Figure 6.3a. Effect of Mood on Children’s Labelling of Neutral Faces as happy (NH) as neutral (NN) or as sad (NS)**

Instead results showed that dysphoric children were significantly more accurate at labelling sadness compared to non-dysphoric children ($U = 89.00, n_1 = 6, n_2 = 61, p = .04$). Moreover, though results for non-dysphorics’ labelling of sad faces as neutral were non-significant ($U = 108.50, n_1 = 6, n_2 = 61, p = .10$) the means for non-dysphoric mislabelling sad faces as neutral were in the right direction (see Fig 6.3b).
Figure 6.3b. Effect of Mood on Children’s Labelling of Sad faces as happy (SH) as neutral (SN) or as sad (SS)

*significant difference (p < 0.05)

There were no significant between group effects on rating happy faces. Results were at ceiling level for this facial emotion (p > .05). (Figure 6.3c)

Figure 6.3c. Effect of Mood on Children’s Labelling of Happy faces as happy (HH) as neutral (HN) or as sad (HS)
Thus the effect of dysphoria on children’s processing of facial emotion was specific to sad face valence such that dysphoric children rated sad faces more accurately than non-dysphoric children, who tended to mislabel sad faces as neutral. Correlation analyses using the full range of CDI scores confirmed these results. Dysphoria (as a continuous variable) was significantly positively correlated with correcting rating of sad faces \((r(67) = .26, p = .034)\) and significantly negatively correlated with incorrect labelling of sad faces as neutral \((r(67) = -.24, p = .047)\). Dysphoria was not significantly associated with any other face-labelling category \((p>.05)\).

**Hypothesis 4: Dysphoria will contribute to variance in labelling of facial emotion above effects of age.**

Regression analyses were conducted to examine the effect of dysphoria on children’s accurate labelling of sad emotion. First an enter-stepwise multiple regression with correct labelling of sad face valence as the dependent variable was conducted. Age and Dysphoria were included as independent variables. Age was entered on a first step, and Dysphoria (as a continuous measure) was entered as a second step to assess whether dysphoria predicted unique variance in sad face labelling independent of age. Both Age and Dysphoria (as measured by t-scores) were included in model of best fit. Age predicted 8% of the variance in correct responses to sad faces \((\text{Adj}R^2 = .078)\). The addition of Dysphoria in the model resulted in a significant increment in explained variance \((R^2 \text{ change } = 6\%, F(1, 64) = 5.86, p = .018)\). Together Age and Dysphoria explained 14% of the response variance. The beta weights for Age \((\beta = .32, p = .007)\) and for Dysphoria \((\beta = .28, p = .018)\) were significant. The overall model significantly predicted variance in correct responses to sad face valence \((F(2, 66) = 6.49, p = .003)\).
A second enter-stepwise multiple regression was conducted following the same procedure as above, but with NS face recognition errors as the dependent variable. Again, both Age and Dysphoria were included in model of best fit. Age predicted 6% of the variance in correct responses to sad faces (AdjR² = .064). The addition of Dysphoria in the model resulted in a significant increment in explained variance (R² change = 6%, F(1, 64) = 4.97, p = .029). Together Age and Dysphoria explained 12% of the response variance. The beta weights for Age (ß = -.29, p = .014) and for Dysphoria (ß = -26, p = .029) were significant. The overall model significantly predicted variance in correct responses to sad face valence (F(2, 66) = 5.40, p = .007). Dysphoria did not account for variance over and above Age for any other face recognition response.

6.6. DISCUSSION

This study utilised a forced choice, schematic labelling tool to examine children’s labelling of facial emotion as portrayed in adult photographic images. The first aim was to determine whether children could successfully discriminate between happy, neutral and sad faces using the present methodology. The results confirmed that children on average correctly labelled 96% of happy faces: 64% of neutral faces and 51% of sad faces. Thereafter, the effects of age and mood on processing facial affect were examined.

6.6.1. Effects of Age

There was a significant difference between children and adults’ labelling of sad faces. Children’s labelling of sadness in faces was significantly poorer than adults’ with children
making more ‘sad as neutral’ type errors. The interaction between age and valence was significant, such that the ability to correctly label sad faces improved with age.

There was no significant effect of age on labelling of neutral faces. There was also no significant effect of age on labelling of happy faces with correct labelling of happy faces already near optimal by age six. Studies have found adult recognition of happiness to be around 100% (Vicari, 2000; Rideout et al., 2003). The expression of happiness may therefore be more salient from birth i.e. directing a child towards a caregiver. The present results are consistent with an innate predisposition in young children to better perceive happiness in faces. Children may therefore be better neuronally pre-disposed to encode happiness. Repeated presentation of happy stimuli from birth may lead to stronger representations and therefore sensitivities to this particular emotion. Alternatively, happy expressions may simply be easier to label in a purely visuo-spatial way.

The ability to correctly label sad faces increased with increasing chronological age in this study. One reason may be that sadness is a more perceptually difficult emotion to discriminate. For example, sadness as portrayed in faces, arguably has less distinctively circumscribed physical boundaries unlike happiness, which has a distinct ‘upturned’ mouth. Greater complexity in prototypes and neural pathways may therefore be required for accurate processing of sad facial stimuli. Additionally, young children may hopefully have less experience of sad faces relative to positive and may be trained on fewer ‘exemplars’. As a result, the development of a sensitivity to sad faces may be slowed. The importance of initial visual stimuli on the development of neural patterns from birth was evidenced in a study looking at the impact of bilateral congenital cataracts on the development face processing. Visual deprivation in infants during the first 7 weeks of life impaired some aspects of face
processing 8-10 years later (Geldart, Mondoloch, Maurer, Schonen & Brent 2002). Therefore it is possible that the patterns in experience of facial affect in early childhood may affect the developing visual system. A final possibility is that there may be some age related response bias, such that children are less likely to label faces as sad, irrespective of how they are perceived. Evidence to militate against this possibility is that children and adults did not significantly differ in their incorrect use of the response label ‘sad’ ($t(98) = .56, p = .58$). In summary, relative to adults children tended not to correctly identify sad faces as sad. However, as described in the next section, mood modified this result.

6.6.2. Effects of Dysphoria

The third and central aim of the study was to examine the effect of dysphoria on processing of facial emotion in children. It was hypothesized, according to a schema and mood congruent theory of depression that dysphoric children would tend to make more ‘neutral as sad’ errors compared to non-dysphoric children and that non-dysphoric children would make ‘neutral as happy’ type errors. This hypothesis was not confirmed. Though results were in the predicted direction, they did not reach significance. However, as predicted dysphoria was indeed associated with better labelling of sad faces as sad.

Dysphoric children were accurate in labelling sad faces as sad. It may be that dysphoric children see sad as sad because negative schema may lower the perceptual thresholds for elements (perceptual or conceptual) congruent with them. Evidence of accurate processing of negative information is consistent with Williams et al.’s (1997) elaboration theory of depression (see Chapter 1). Low dysphoria was also associated with children mislabelling sad faces as neutral. These results may, therefore, also be interpreted in terms of depressive
realism. Depressive Realism postulates that in some circumstances depressed and dysphoric individuals do not distort reality, but demonstrate more accurate perception than their non-depressed counterparts (Alloy & Abramson, 1979; Pacini, Muir & Epstein, 1998; Kapci & Cramer, 1998). The theory also contends that non-depressed individuals tend to positively distort their perceptions of themselves and/or other people (Albright & Henderson, 1995). Present results can be interpreted such that, non-dysphoric children were demonstrating a positive perceptual bias whilst dysphoric children were demonstrating accurate perception, in keeping with the theory of depressive realism (see figure 6.3 d).

Figure 6.3 d. Sample Sad Faces: Non-dysphoric children tended to rate sad faces as neutral while dysphoric children correctly labelled these faces as sad.

Of course, it is not necessary to assume a perceptual bias to explain the present results. The effect could instead reflect a response bias. That is, non-dysphoric children may be less willing to label a face as sad though not necessarily, not perceiving it as sad. It could then be argued that dysphoric children do not demonstrate this reluctance. However, an analysis of the percentages of inappropriate ‘sad’ responses by dysphoric and non-dysphoric children showed that dysphoric children did not endorse significantly more incorrect ‘sad’ responses.
than non-dysphoric children ($U = 137.50, n_1 = 6, n_2 = 61, p = .33$). This perhaps reduces the credibility of an exclusive response bias interpretation.

6.6.3. Dysphoria and Face Processing

In light of the reviewed literature, there may be implications with respect to cognitive and affective responses, depending on how a child decodes facial emotion. Initial accuracy of perception with respect to negative information in children, may affect mood. If a child more accurately perceives sadness compared to peers, this would likely affect developing schema, views of social interactions and subsequent behaviours (Herba & Phillips, 2004). Over time this could result in future distorted negative perception of reality.

One can speculate that accurate perception of sadness in young dysphoric children is illustrative of IP tendencies which may act to cause or maintain a dysphoric mood whilst in contrast, failure to perceive sadness in non-dysphoric children, may act as a buffer. Given what we know about information processing biases in depression and development (i.e. egocentric) young dysphoric children may be particularly prone to interpret sad faces as "my fault". The mechanisms through which dysphoria, age and processing of sad facial emotion might interact of course remains unclear but this study has identified fundamental differences in identification of basic emotional signals based on mood and age. There appears to be evidence of a differential effect of mood on processing of emotional material in children, consistent with adult literature dysphoria was associated with improved labeling of sad faces as sad. Age also influences the accuracy of facial affect recognition.
There are also a number of limitations concerning the present study, which for the sake of clarity will be discussed in individual sub-sections.

Small numbers

As evidenced, only a small number of children in a normal school setting reported significant depressive symptoms in this study. Though numbers of dysphoric children are small, the dysphoric children do behave in a predictable way and in ways indicative of depressed adults—suggesting that this extreme group may be representative of a sub-clinical depressed sample. Moreover the results with categoric data are complimented by analyses with continuous dysphoria scores (the regression analyses). There is evidence in the child depression literature that sub-clinical depressed mood has long lasting and pervasive negative effects on child’s functioning (Nolen-Hoeksema et al., 1992) therefore the effects of dysphoria should be taken seriously. It should however be acknowledged that the effects may not be stable and that negative perceptual biases may be found in clinically depressed children.

Use of the CDI with Adults

The second limitation was that the measure of depression used may not be suitable for all age groups studied. This needs to be examined by testing participants at the upper age limit of the measure. If the measure is found not to be suitable, then it should be replaced with an adult measure of depression in the adult group at the sacrifice of direct comparability with the measure used with children. We elected to use the CDI across all participants due to the fact that only some of the participants in the adult sample exceeded the upper recommended age
limit for the measure. In hindsight the CDI could have been used alongside an adult measure of depressed mood. As it stands, only 3 young adults reported depressive symptoms. It may be that there was no depressed mood in this particular sample, or that mood was not well measured in adults using the CDI. It was therefore considered prudent to exclude adult data from analyses concerning mood, especially since the literature already demonstrates a mood bias in perception of faces in adults. The primary goal of the study was to try to extend this work to a child sample. Adult rating of faces remained important as a benchmark against which to compare child performance but mood effects were only examined in the children.

Gender

Gender may have a role to play in decoding of facial affect however in this study gender differences were not examined due to sample size limitations. The conventional view is that females are more skilled in emotional processing than boys. Although a small but significant female advantage for facial emotion recognition has been found (McClure, 2000), the overall developmental literature on gender effects on emotion processing is inconsistent (Herba & Phillips, 2004). Given that this was a first in assessing natural mood effects and age in children, further delineations were avoided. Future studies can address these issues.

Choice of Labelling Tool

To our knowledge this is the first study to use a schematic labelling tool as a method for studying identification of facial emotion in children. To re-iterate, a central aim of the current thesis was to begin to develop methodologies, which could be utilised across age and to allow comparison of depression related biases and investigation of the origins of these biases at a lower age range. In doing so we attempted to use schematic faces to circumvent problems
with reading ability in very young children. The validity in terms of children’s understanding that the schematic faces depicted different emotions was examined using a free verbal response format, and proved successful. The validity of using this schematic method over and above that of verbal labels ‘happy’, ‘neutral’, ‘sad’ was not tested. However, it seems likely that the schematic tool has certain advantages e.g. removing cognitive load of vocabulary cues in young children. In added support for the schematic tool is the element of enjoyment and fun that the task affords. In testing children with limited attention and concentration this proved invaluable. All children completed identification of all 62 faces and all were engaged in the task. The importance of this when trying to secure child co-operation on various tasks should not be underestimated. On balance, we felt that the schematic labelling tool should be retained for Study 5 (Chapter 7)

Perceptual Matching Bias Explanation

One criticism levelled at this study is that results may reflect perceptual matching and tell us nothing about perception of emotion. That is, individuals may be matching the schematic faces to the physical features of the photographic faces rather than ‘extracting’ the emotional content. For example matching the appearance of the mouths rather than engaging in a more global assessment of the emotional properties. First, the schematic faces differed only in terms of the tilt of the mouth, so this would be the only varying characteristic available on which to feature match the faces. Certainly a proportion of both children and adults will have used this strategy. However, such ‘template matching’ as it is known, still allows for bias when there is no one-to-one matching of stimulus to template (Figure 6.4). Secondly, it is unlikely that such ‘feature discrimination’ can fully account for the results because the significant effects were only found for sad faces. So, for instance if it were the case that dysphoria was simply associated with being better able to discriminate between similar
stimuli irrespective of the nature of the stimuli (– a criticism inherent in the perceptual matching interpretation) then dysphorics would also be better at rating neutral faces relative to controls. This is not the case. The effect is not symmetric; dysphoric children perform better only for sad face valence. Dysphoric and non-dysphoric children perform equally well on identifying the perceptually similar neutral emotion.

Figure 6.4. Illustrating the difficulty in one-to-one mapping of faces to the schematic tool

![Figure 6.4](image)

As can be seen from a random sample of neutral faces, there is no straightforward one-to-one mapping of the photograph images to the schematic drawings. That is, some subjective judgment is required whether implementing a piecemeal or global labelling strategy.

Perceptual Similarity Bias Explanation

Another potential criticism is that ‘perceptual similarity’ accounts for the findings. That is, results for different faces may reflect perceptual similarity between sad and neutral faces relative to happy. At first glance this seems plausible i.e. that participants find discrimination between sad and neutral faces more difficult than discrimination of happy faces and that this
explains impaired labelling of these emotions. However, this argument cannot account for the fact that i) there is no effect with respect to neutral faces, rather, these faces are actually better rated than sad faces despite them arguably being more perceptually difficult to discriminate; ii) If the result was linked to perceptual similarity children would not be expected to mis-categorize neutral faces as happy. Instead, all participants should confuse neutral with (the perceptually more similar) sad faces. The fact that non-dysphoric children make this 'neutral as happy' error makes the perceptual similarity explanation questionable (Figure 6.5.)

Figure 6.5. Results Predicted from a Perceptual Similarity Interpretation

To explain results according to a perceptual similarity hypothesis mis-categorization of neutral faces should be in the direction of neutral-sad (shown by the solid arrow) and not in the direction of neutral-happy (as shown by the broken arrow). Some children (in particular non-dysphoric children) made this neutral-as-happy error, which perhaps suggests something other than or in addition to face similarity is in operation.
Response Bias

As already discussed, it is possible that effects are attributable to children demonstrating a preferred response style, e.g. dysphoric children making more sad responses and non-dysphoric children making more happy responses, in a mood congruent fashion. However, although dysphoric children made more sad response errors compared to non-dysphoric children (Figure 6.6) this difference was not significant ($U = 137.50, n_1 = 6, n_2 = 61, p = .33$). This somewhat discredits a response bias interpretation.

**Figure 6.6. Incorrect Sad Responses by Children**

In summary, it is not easy to distinguish between perceptual, interpretative, or response bias explanations given the present results. We do not know the location of the bias in terms of cognitive processes (i.e. at what stage the bias occurs) but we do know that irrespective of the location of the bias, dysphoria was associated with greater accuracy in labelling sad faces. In fact, an ICS approach to the study of cognition and emotion (see General Introduction) would
state that whether biases occur at the perceptual or implicational level of processing, either could affect subsequent emotional responses (Teasdale & Barnard, 1993). Mood is known to have perceptual effects, so no-matter at what level the bias is occurring such information processing systems feed into one another and reciprocally affect mood. Moreover, results from a similar study examining processing of facial affect in maltreated children found results were not attributable to biases at the visual perceptual level as demonstrated by a same/different discrimination task (Pollack, Cicchetti, Hornung & Reed, 2000). That is, the result was not attributable to children’s ability to detect physical differences between the facial expressions. A second study Frewen & Dozois (2005) also showed that facial emotion processing bias associated with depression in adults was more likely linked to interpretative rather than bottom up perceptual biases. In this study attributional style was linked to face-emotion processing suggesting “that dysphoria is related to facial expression processing at a conceptual or schematic level of analysis, rather than at a more basic bottom up level of information processing.” Indeed biases in depressed persons’ processing of facial affect may be increasingly prominent as the level of judgement of analysis increases, consistent with Williams et al’s (1997) strategic bias hypothesis and with Power & Dalgleish’s (1997) appraisal-based theory of emotion (see General Introduction section 1.10).

The rationale for this dimension of research into facial affect processing was to source a task that may reveal information processing biases associated with mood that did not involve memory, in order to act as a companion measure to an assessment of overgeneral memory and emotion focussing in the next study (Study 5). The face processing task meets these criteria. However, it is also important to speculate about potential future studies of face processing per se.
Future studies of facial affect processing should test a range of intensities of emotional expression to look more precisely at sensitivity to facial emotion in dysphoric and non-dysphoric children. Also, Harwood, Hall & Shinkfield (1999) found that people are better at recognizing facial emotion presented in animated form. It may therefore be more ecologically valid to present participants with faces animating from one valenced emotion to another. From a behavioural ecological perspective, Fridlund (1994) also theorised that facial expressions evolved to communicate social intents and contingencies. This theory was tested by Yik & Russell (1999) whereby participants were shown standard facial expressions of emotion and were asked to match them to a social message as predicted by theories of Ekman & Friesen (1976). Faces conveyed both social and emotional messages with high inter-rater agreement. This study was looking specifically for cultural differences in the interpretation of faces. No differences were found. This study therefore suggests that agreement on the social meaning conveyed by facial expression is universal. However, it would be interesting to repeat this experiment with depressed/dysphoric individuals to see if dysphoric individuals read the same social messages from faces as these non-dysphoric individuals. We know that depressed individuals can demonstrate poor social skills (Goddard, Dritschel & Burton, 1996), therefore it might be that depressed individuals do not interpret social signals in the same way as non-depressed individuals. Present results would support this prediction and it would be an interesting avenue of investigation.

A paradigm could also be used in which faces start at a positive or negative valence and participants have to make a face look neutral using a computer morphing technology which morphs the faces into various percentages of a particular emotion e.g. from 0% happy
through to 100% happy (e.g. Tiddeman, Burt & Perrett, 2001). This programme could be adapted to assess what participants perceive as sadness, happiness and neutrality, avoiding response biases. Reaction times could also be measured. It is possible that dysphoric participants may take longer to label faces overall, compared to non-dysphoric participants, due to psychomotor slowing. However, in addition a valence specific latency effect could be expected, such that dysphoric participants might take longer to process negative facial expressions, compared to happy and neutral faces, and compared to non-dysphoric participants. This would help test the proposition that depression is associated with biased elaboration rather than enhanced priming (Williams et al, 1997) and append recent work on sustained attention to negative faces in depression (e.g. Gotlib, Krasnoperova, Yue & Joormun, 2004).

6.7. In conclusion

The present study has illustrated the use of a simple method to test processing of facial emotion, as one means of investigating information processing biases related to depression in children. An aim of this study was to source an information-processing paradigm that would be used as a companion measure with the AMT and EF tasks. Differential labelling of sad face valence was revealed, depending on age and mood. To my knowledge, this is the first study to combine a systematic study of age, dysphoria and processing of facial affect in children. In so doing the importance of the development of valenced processing in children and its relationship with mood in investigating the possible origins of depressive biases has been highlighted.
Dysphoria seems to be a relevant component in the accurate processing of sad facial emotion in children in line with either the integration-elaboration theory of Williams et al. (1997) according to which depression is mostly associated with elaboration of negative information, relative to controls or with depressive realism interpretations (Alloy & Abramson, 1979). Noting of course that enhanced accuracy to negative emotional cues in dysphoria does not imply unbiased responses to, or memory for, such cues.

In the next study (Study 5) the present face-labelling task, the EF task (see Chapter 3) and the AMT were used as well as an additional measure of social problem solving, to further examine depressive biases in children.
Chapter 7 | Study 5. A Residential Study: Effects of Early Adversity on AMS and other aspects of Emotion-related Processing in Children aged 11-15 years
Abstract 7 | Williams (1996) posits that an overgeneral memory (OGM) style may result, in response to early childhood adversity, as part of an Affect Regulation (AR) mechanism. Though retrospective reports from adults have supported this AR claim, the hypothesis has not been directly tested in children. In addition, if we are to understand mechanisms underlying OGM, it is important to examine variables that may underpin such biases. Emotion processing variables have been neglected in this context. The current empirical study therefore examined autobiographical memory (AM) and other aspects of emotion-related processing known to be associated with adult depression, in a sample of 30 boys in long-term residential care, who had experienced serious life adversity. A group of 18 boys without any known history of abuse but from a similar socio-economic background acted as controls. The residential boys in this study were considered to be at high risk for developing depression, but were not con-currently diagnosed with any affective disorder. Results may help elucidate the temporal relationships between trauma, mood and valenced OGM. They also provide new empirical evidence regarding Emotion-Focusing and the relationship between OGM and other aspects of cognitive-affective functioning.
7.1. Introduction

The AMT studies 1-3 reported so far have looked at experience of depression in children. A key point in the ARRI is that experience of early adversity accounts for an individuals' motivation to adopt an OGM style. This study attempts to examine this hypothesis. That is, is there evidence of OGM in a child population who have clearly experienced negative life events? For the purposes of testing this theory a non-depressed residential population were approached – boys who had been placed in long term care for reasons pertaining to child protection. Would these children demonstrate reduced AMS as predicted by an AR account of OGM? A sample of non-depressed children with a history of adverse experiences was therefore administered the AMT, the EF task (from Study 1) and the face task that was validated in Study 4. In addition, a measure of social problem-solving was introduced to further contextualize the OGM bias and extend work on adults in this area (e.g. Raes, Hermans, Williams, Demyttenaere, Sabbe, Pieters & Eelen, 2005). In this introduction, the literature on OGM and trauma is reviewed in some detail (expanding on the summary comments from Chapter 2) and the rationale for investigating OGM in a residential sample is set out. Putative relationships involving these measures are then discussed.

7.1.1. Affect Regulation: A developmental Perspective

The primary motivation for the current study comes from Williams (1996) who suggested that in childhood, individuals who are either subject to numerous negative events or who have difficulty coping with negative affect, may develop an OGM style to minimize their experience of negative affect at recall. Acquiring the ability to inhibit categorical descriptors in order to be able to access specific information is a process, which is believed to take place
in early childhood (Nelson & Fivush, 2004). Traumatic life circumstances during this critical developmental period may have the capacity to impair the establishment of these inhibition processes. The reason is argued to be that specific emotional information is too painful to be remembered and so is defended against by individuals remaining at a categorical level of analysis. This is the Affect Regulation Hypothesis (ARH; Williams, Stiles & Shapiro, 1999). Within this context, the claim of the ARH that was introduced and discussed in Chapter 2, is that an OGM style becomes manifest as a result of some disruption to the normal developmental trajectory in favour of less specific memory retrieval, such that retrieval becomes 'locked' at an overgeneral level to avoid the affect generated from (more specific) painful memories. Work in adults reporting early adversity has given support for this developmental OGM theory but as yet the critical studies in trauma-exposed children have not been carried out – hence the present research.

As noted, evidence from adult trauma research supports the affect control hypothesis, in the sense that retrospective accounts of trauma are linked with reduced AMS in adults (McNally, 1995; McNally, 1994; Harvey et al 1998; Startup et al 2001; Henderson, Hargreaves et al 2002; Hermans, van den Broeck, Belis, Raes, Pieters & Eelen, 2004; Kuyken & Brewin, 1995; Burnside, Startup, Byatt, Rollinson & Hill, 2004). Kuyken and Brewin (1995) for example, found that women who reported a history of abuse as children demonstrated more overgeneral retrieval than those who did not. Reduced specificity has also recently been established as an associate of trauma in adolescents (de Decker, Hermans, Raes & Eelen, 2003; Orbach, Lamb, Sternberg, Williams & Dawd-Noursi, 2001; Meesters, Merckelbach, Muris & Wessel, 2000).
De Decker et al. (2003) looked specifically at trauma in diagnostically mixed adolescents. Higher scores of self-reported trauma were associated with more overgeneral memory. Again this was more marked in response to positive cues. Kuyken, Howell & Dalgleish (in press) have also recently found evidence of reduced AMS associated with depression (with no trauma) in adolescents. The inclusion of a group with trauma (co-morbid with depression) in this study was associated with less overgeneral recall than in the depressed-only group. Results clearly indicate that there are OGM effects associated with both depression and trauma in adolescence. The exact effects of trauma and depression in explaining the OGM effect, however, remain unclear. Results suggest that while depression results in greater overgenerality, trauma may result in increased specificity. However this finding needs empirical clarification.

Studies in depressed adolescent populations also lend some credence to the ARH. For example, Park et al. (2002) looked at clinically depressed adolescents (never depressed, first episode depressed and remitted groups). Currently depressed adolescents were more overgeneral compared to controls and remitted depressed adolescents. These adolescents were more overgeneral to positive cues compared to controls. The Park et al. result also highlights that OGM is unlikely to be a scarring effect from previous depressive episodes (since it occurred in first episode depression). In one further adolescent study, Swales, Williams & Wood (2001) found diagnostically mixed adolescents from a residential psychiatric unit (22% history of parasuicidal behaviours, 10% MDD) were more overgeneral than controls. In this study the parasuicidal subgroup showed increased specificity to cues. However this may be due to a repeated memory phenomena (or “chaining”), whereby some individuals in this subgroup gave the same memory to more than one cue. Of note, was that the OGM effect was
again more pronounced for positive memories than for negative in this group. However, work also needs to be replicated in child samples in order to better test hypotheses espousing developmental origins. This work has not been replicated in children. Moreover, it is unclear how AM functioning in children, who have experienced early adversity, may relate to their processing of affective information. A principle aim of the current chapter was to address these issues.

7.1.2. Limitations of Previous Research

While there is some evidence that overgeneral retrieval may result from the experience of early trauma, methodological limitations arising from retrospective investigations limit the conclusions that can be drawn. For example, in the studies looking at trauma in adult samples, the link between OGM and experience of the negative life events is remote; allowing ample time for events and experiences other than the trauma, to modify AM functioning. In addition, the data regarding trauma, is often confounded by self-report, which is open to bias and is not independently verifiable. Instead, verified abuse is needed to eliminate the confound of self-reported abuse reflecting psychological vulnerability (Dalgleish et al., 2003). That the process of overgeneral retrieval may be affected by objectively measured stress during childhood in children has not been tested. Furthermore, retrospective investigations make it difficult to disengage the temporal roles of trauma, depression and overgenerality. Finally, in many existing studies, depression and trauma are confounded. It is therefore important to examine traumatized child groups with little or no depression, matched on depression levels with suitable controls.
The second motivation for this study therefore comes from Dalgleish et al. (2003) who asserted that; “it seems essential to try to clarify empirically the relationship between adverse psychological experiences such as abuse and overgeneral memory and psychopathology.” Thus, studies are required in order to determine if overgenerality arises from adverse childhood experience and precedes the onset of early affective disorder. Consequently, motivation for this study comes jointly from Williams’ suggestion that one pathway for the origin of OGM may lie in childhood in response to negative life events. The second motivation comes from Dalgleish et al. who stress the importance of unravelling the causal relationships between adversity, OGM and the development of psychopathology. Thus, studies are required that examine OGM effects in children who have experienced trauma, yet have never been diagnosed with depression and who are not currently depressed. It was decided that children placed in residential care meet many of the criteria necessary, to begin to address these key research questions. First, they will have experienced significant verifiable trauma and second, they are a high-risk group for depression but they can be screened such that only those with no history of depression or current depression are included (see below). Such a residential sample can then be compared to a control sample, matched for depressed mood, but with no trauma.

7.1.4. Children in Care

Children placed in long-term residential care for child protection have suffered severe negative life experiences in order to warrant such intervention. A traumatic event is defined as an event that threatens the safety and well being of an individual. Almost by definition, those children who are removed from their families due to child protection meet this criterion. What
is particularly important is that these children are not self-presenting. Instead experience of adversity is independently verified.

Children in care are generally considered a high-risk population for future onset of affective disorders. For example, depression is the most common symptom reported by those who have been abused, and elevated depressive symptoms have been found to carry well into adulthood (Briere, 1992). Poor maternal care, physical or sexual abuse, parental mental illness or substance abuse have all been linked to childhood and adult depression (Burge & Hammen, 1991; Connell & Goodman, 2002; Hammen, Burge & Adrian, 1991). Additional evidence for the role of negative life events such as abuse, in depression (and therefore further support for using this group in high-risk hypothesis testing) comes from Brown, Cohen, Johnson, & Smailes (1999). Brown et al. investigated the magnitude and independence of the effects of childhood neglect, physical abuse, and sexual abuse on adolescent and adult depression and suicidal behaviour. A total of 776 randomly selected children were studied from a mean age of 5 years to adulthood during a 17-yr period. A history of abuse was determined by official abuse records and by retrospective self-report. Importantly, adolescents and young adults with a history of childhood maltreatment were 3 times more likely to become depressed compared to individuals without such a history. For instance, risk of repeated suicide attempts was 8 times greater for youths with a sexual abuse history. Therefore, risk for depression is an important factor for individuals who have been maltreated in childhood. What is important about the present sample is that these children have all experienced corroborated severe negative life events, are not currently depressed but are considered to be a high-risk group for depression according to epidemiological studies (e.g. Silverman, Reinherz & Giaconia, 1996; Toth, Manly & Cicchetti, 1992).
7.1.5. Valence Effects

Also of interest is the issue of cue-valenced memories. Overgenerality is sometimes carried by responses to positive cues (Williams & Broadbent, 1986; de Decker, 2003), at other times by responses to negative cues (Mackinger, Pachinger, Leibetseder & Fartacek, 2000) and sometimes the valence effect is absent altogether (Goddard, Dritschel & Burton, 1996). Far from being dismissed as an inconsistency- a by-product of the AM task- the valence effect raises important theoretical questions. It seems clear that there is a fundamental difference between a child who would respond overgenerally with, ‘All the time’ in response to the cue word ‘Happy’. Versus a child who would offer the same overgeneral response (‘all the time’) to the cue word ‘Sad’. The positive/negative cue word division may tell us something important about the underlying nature of the OGM bias. In Study 1 the OGM effect was more pronounced to positive cues and OGM to negative cues was not detected until late childhood (age 10-11). In Study 2, in contrast, clinically depressed children showed reduced specificity, in particular, to negative cues. This could signal a fundamental difference in valenced OGM as a function of age and depression severity. Finally, Study 3 showed consistently stronger effects for recall to positive cues. Reduced positive AMS was associated with a depressogenic cognitive style and increased positive OGM predicted depressive symptoms during a stressful life event. Results for AM recall to negative cues did not reach significance in this study.

It is a common assumption in the literature that OGM, even if it originates with overgenerality to negative events as a form of AR, will spread to include positive events as a consequence of the general retrieval bias. However the theoretical underpinnings of such a process is unclear and it is difficult to account for overgeneral positive recall in terms of affect regulation alone. Competing explanations of OGM have been introduced and discussed in Chapter 2. Although
there is evidence to suggest depressed individuals may find positive stimuli aversive (Dunn, Dalgleish, Lawrence, Cusack & Oligive, 2004) it is unlikely an OGM system would develop to minimize affect caused by specific positive recall. Instead, overgenerality may be explained by schema functioning rather than AR. Dalgleish et al. (2003) suggested that active self-schemas might be a source of OGM when cue words reflect the thematic content of such schema. Meaning irrespective of cue valence, cue words may trigger personal schema, which will result in OGM responses (e.g. if the cue word ‘Lonely’ maps onto a self schema maps of being ‘friendless and unlovable’ this will more easily result in an overgeneral response than if there was no relevant schema) The existence (or absence) of negative and positive schema may help elucidate valence effects in the OGM literature.

As a further point, it is perhaps preferable to view the experience of negative childhood events as a trigger to encode emotional features, or as the grounds for children to perceive negative life events as prototypical (schematic), rather than solely as the impetus for children to retrieve overgenerally. The positive overgeneral bias would thereby be explained in terms of positive specific events being less well encoded or recalled, as schema incongruent. It may be that the overgeneral effect rather than reflecting a defensive memory search strategy simply reflects the fact that some children are more sensitised to encode emotion early in childhood (possibly due to exposure to negative life experiences), which could have secondary consequences on memory.

7.1.6. EF and Memory

In this respect we are particularly interested in Emotion-Focusing (EF). Theories of OGM have hinted at the importance of EF as a possible explanation for the prominence of global
AMs in depression. Williams (1996) claimed that encoding emotion could lead to global memories. From this, it can be assumed that people who have a greater tendency to encode the emotional content of situations will demonstrate differential recall to those who do not encode situational emotion.

As described in Study 1, Chapter 3, EF is defined as individuals' predisposition to focus on the emotional features of their environment. In this way EF assesses what an individual may typically encode in a given situation and allows investigation of whether individuals preferentially describe, notice or encode emotion. It is well known that at encoding, only a subset of characteristic event features is actually encoded depending on feature salience, the encoder's expectation, attentional factors, and so on. Thus, people naturally focus on emotion to differing extents and this may have implications on their memory system especially given traumatic or difficult life experiences. As was demonstrated in Study 1, Chapter 3, EF is associated with increased AMS in children aged 7-11 years (Drummond, Dritschel, Astell, O'Carroll & Dalgleish, 2006). Higher levels of EF were associated with increased AMS especially to negative cues. The link between EF and specificity, in the aftermath of serious negative life events has not yet been investigated. There are however strong theoretical grounds for anticipating an interaction.

7.1.7. EF and Early Negative Life Events

An interaction between EF and early life adversity is anticipated. For example, as described in Chapter 3, Williams (1996) suggested that an individual who is emotionally sensitised, due to early adversity, would be overgeneral on an the AMT because focusing on emotion promotes schematic level encoding. That is, early adversity may effect EF such that it may predispose
children to become either emotionally avoidant (Low EF) or emotionally sensitised (High EF). If a child becomes emotion-avoidant they will likely be a low emotion focuser. A low emotion-focusing child may therefore struggle to retrieve AMs to emotional cue words because information is less likely to encoded/ stored or ‘tagged’ in terms of emotion in these avoidant children; hence poor access to emotional memories in these individuals. LEF children are therefore more likely produce OGMs to AMT cues. A child who becomes sensitised, a high emotion focuser, on the other hand will arguably produce specific memories (in contrast to William’s suggestions) to emotional cues because these children are focused on emotion and process it preferentially. Their memories are therefore dominantly labelled with emotional tags. Various theoretical models of cognition and emotion would support this prediction (Bower, 1981; Conway & Pleydell-Pearce, 2000; Power & Dalgleish, 1997; Teasdale & Barnard, 1993). Additional predictions from EF would assert that a low emotion focuser should be poorer on tasks related to emotion, compared to a high emotion focuser.

To re-iterate, under normal circumstances one would expect high emotion focusers to be specific and low emotion focusers not to be specific to emotional cues. Under stressful circumstances however, rather than low emotion focusing simply being a result of disinterest, it is more likely to be due to an affect avoidance strategy in keeping with Williams’ ARH (Williams, et al, 1999).

7.1.8. Other Emotion-related Measures

The final question addressed in this study concerns the relationship between OGM, EF and other facets of social-emotional processing known to be affected in depression. Individuals, who have experienced negative life events from early childhood when cognitive-affective
systems are developing, may well perceive emotion differently from other children. It is plausible that the emotional disorganisation and emotional disorder that belie those who have been victims of severe early negative adversity support the idea that there may be impairment in social-emotional processing. It is important to begin to try to understand the network of biases that may develop under such circumstances. It is also important to begin to evaluate the relationship between OGM effects and biases in information-processing (such as facial labelling) as previous studies of OGM have generally neglected to contextualize OGM effects within a broader framework of more prototypical depressive biases. Similarly, it is important to contextualize OGM within a broader social-interpersonal framework (such as social problem solving skill), as this work has not been replicated with respect to OGM in youth. To this end, the current study included a measure of perception of facial affect validated in Study 4, and a measure of social problem solving that has been used previously in the AM literature.

7.1.9. Facial Emotion Recognition (FER)

Depressed adults demonstrate a negative bias in their labelling of facial affect (e.g. George, Huggins, McDermut, Parekh, Rubinow & Post, 1998) and we saw in Study 4, Chapter 6, that dysphoria in children is associated with greater accuracy in labelling sad faces and a tendency to label neutral faces as sad. It may be the case that this bias is found in the current population and adds to mapping of the cognitive-affective profile of these residential children. Pollack, Cicchetti, Hornung & Reed (2000) also found that maltreated children's recognition of facial emotion is consistent with the idea that variance in emotional experience affects children's recognition and understanding of affective cues. This may offer some insight into why maltreated children tend to develop many social and emotional problems (Dodge, Bates, Pettit & Valente, 1995; Rogosch, Cicchetti & Aber, 1995). The emotional signals a maltreated child
receives, for example, may be complex and inconsistent as well as distressing. Maltreated children have a myriad of problems involving emotion recognition (Blair & Coles 2000; Cummings, Hennessy, Rabideau & Cicchetti 1994; Hennessy, Rabideau, Cicchetti & Cummings, 1994; Klimcs-dougan & Kistner, 1990). Of concern is the association between such difficulties and increased risk of development of psychological disorders (Cicchetti & Toth, 1995). We do not yet know what the relationship is between such affect processing and AM retrieval in children, hence the inclusion of the face task alongside the AMT in this study.

7.1.10. Social Problem-Solving

Another key finding in the literature is that OGM is related to impoverished social-problem-solving (SPS) (Goddard, Dritschel & Burton, 1996; 1997; 2001; Williams, Ellis, Tyers, MacLeod & Rose, 1996), as noted in Chapter 2. Research has shown a relationship between OGM and social problem solving in depressed (Goddard, Dritschel & Burton, 1996), non-clinically depressed (Goddard, Dritschel & Burton, 1997) and parasuicidal individuals (Evans, Williams, O'Loughlin & Howells, 1992; Pollock & Williams, 2001) such that reduced AMS is associated with difficulties in describing effective SPS strategies. Theoretical accounts of SPS emphasise the role of AM, for example, in the retrieval of specific records of previous successes and failures, used to guide new action-plans and direct behaviour (e.g. Conway & Pleydell-Pearce, 2000). The ability to access specific episodic memories is hypothesised to be key in the process of providing information for online schema. Inappropriate overgeneral retrieval should therefore impair effective SPS.

It is also theorized that SPS depends on the capacity to cope with interpersonal problems and that this depends on a complex combination of cognitive and emotional factors (Shure, 1997). For example, individuals have to consider emotion-related aspects of a situation; their
feelings, another's feelings, consequences of their actions on another's feelings, and elicit emotion-related memories of such instances in order to best direct behaviour, given such constraints. Impairments in emotional-related processing should therefore also affect SPS performance. Being unable to come up with effective solutions may not only aggravate problem situations but also fuel hopelessness and negative self-judgments feeding into a downward spiral of dysfunctional cognitions and sad mood (Nezu & Nezu, 1989). Unsurprisingly, individuals with affective disorders such as depression are known to show such SPS deficits.

It is proposed that depressed and parasuicidal individuals are poor at SPS because of their deficient access to specific ‘helpful’ memories (e.g. Williams et al., 2005). However, in the context of socially disadvantaged children this engenders the issue of whether specific memories are always facilitative, or whether they can actually be debilitative. For example, if children recall specific negative instances of witnessed or experienced SPS would this actually impair SPS? If effective SPS requires an appreciation of social and emotional dynamics, individuals who have negative social models, may find it difficult to think of positive social solutions (Dodge et al. 1995). Hamilton, Asarnow & Tompson (1997) found that depressed children demonstrated poorer social skills than controls, yet did not differ on cognitive or academic performance. Poor social problem solving was also highlighted as a moderator of the impact of negative life events on subsequent experience of depression in children aged 8-12 (Goodman, Gravitt, & Kaslow, 1995). Segrin (2000) also found social skills deficits in depressed children and adolescents, though the direction of causality in this study was unclear. Thus, while much of the available literature has focused on adult populations, there appears to be an emerging body of literature that demonstrates the relationship between poor social skills and depression in children.
7.1.11. Possible Interrelationships between Variables

Of further interest therefore, was whether AMS correlates with EF, FER and SPS. Is there a link between these emotion relevant tasks? Face labelling requires understanding emotion at a basic perceptual level. EF requires awareness and salience or preferential encoding, of emotion. The standard AM cuing task requires retrieval of emotionally labelled memories and SPS is both affected by emotion and by memories of emotional experiences. It would therefore not be surprising if performance on these tasks were related.

7.2. Study Rationale

This study was designed to test the Williams’ (1996) developmental hypothesis that children who experience early adversity adopt or continue to use a generic style in retrieving AMs, even in the absence of significant depression. Based on findings from the adult and adolescent literature and the suggested importance of early adversity in theoretical accounts of the development of OGM, this study was conducted to investigate the possible relationship between experience of negative life events and retrieval of specific memories in childhood. In addition, this study sought to examine any observed cue-valence effects on AM retrieval, introduce a new variable EF as an operationalization of Williams' emotion encoding hypothesis, and to broaden investigation of OGM in the context of other indices of emotion-related processing.
7.3. Hypotheses

1. Residential boys will demonstrate reduced AMS compared to controls and this effect may be valence specific.

2. EF will explain significant variance in AMS, especially in the residential group, with high EF being associated with increased AMS, as in study 1.

3. The residential group will exhibit impaired SPS and greater errors on the FER task.

4. There will be significant positive correlations between AMS, EF, FER, and SPS in the residential group, with performance on all 4 tasks correlating negatively with severity of abuse.

7.4. METHOD

7.4.1. Participants

All of the boys from a single residential care facility within the UK, aged 11-15 (mean = 13.87, SD = .076) were screened for testing (n= 40). A group of 18 boys of the same age range, similar socio-economic background and IQ acted as controls. Reasons for referral to the residential facility included physical, sexual and emotional abuse or neglect. In this study all boys had undergone some form of psychiatric/psychological assessment prior to entering the facility (though assessments vary). No boy tested in this study had a primary clinical diagnosis of depression or any other concurrent Axis I diagnosis. There was no current treatment of depression, and no known history of clinical depression or treatment of depression based on case records and in consultation with the lead clinician. Although all boys will experience depressed mood, there was nothing known, to warrant psychiatric attention. Seven boys in the residential group (23%) showed above average depressed mood scores on the CDI (raw score of 7 or above). This was matched in the control sample with
four boys (22%) demonstrating above average symptoms of depression. Hence there were no significant between group differences for depression, \( t(46) = 1.06, p = .30 \).

**Exclusion criteria:** Boys were excluded if there was ambiguity concerning referral, where the primary nature of the problem was unknown. For eight of the boys in residence, it was unclear whether child dysfunction as opposed to initial family dysfunction, was the primary cause for concern. These boys were therefore excluded. Non-cooperation on some tasks also led to data exclusion \((n = 2)\). The data from 30 residential boys were therefore included in the analyses. All relevant authorities approved this study. Specific permission was obtained from the primary carer of each young person prior to testing and permission from each individual was obviously sought on the day of testing. The overarching reason for placement in care was 'child protection'. Common reasons for referral into this care facility included failure of the family to protect. This encompassed physical abuse, parent alcohol and drug abuse, frequent and severe neglect, sexual exploitation, domestic violence, witnessing domestic violence, the parent deemed unsafe for criminal or psychiatric reasons, homelessness, child abandoned at birth, loss of parent, confused relations or inappropriate relations with parent or sexual abuse. Reasons for entry into this system were not based on family support or disability. Though some children do offend, this was not a primary reason for placement.

**The facility.** The facility is a residential school with a strong therapeutic influence. The facility accommodates a maximum of 40 boys. Children are placed in this school, mainly via social services as part of child protection measures. This is not a short stay facility. Funding for each student usually comes from local government or social services. The facility operates under a highly structured milieu-situational model of therapy. Psycho-educational programmes are in constant effect within the school. A highly trained consultant psychologist
is available on a weekly basis and oversees staff training regarding the therapeutic aspects of care. The principal ethos of the school is 'real life' therapy, conceptualised along a continuum of care across school, life, social and personal domains. Therapy is on a self-selection basis. All children are highly supervised. The nature of the trauma in this sample concerns severe, persistent developmental trauma, verified by social service reports as mandated by law, change of caregivers and prosecutions. The primary aim of the facility is education. Children with an active psychiatric disorder are not admitted to this school. It is a specialist, therapeutic, residential establishment for long term placements. All boys have had extreme negative experiences. This facility is one degree away from a secure unit.

**Rating of Abuse.** In order to gain an objective measure of severity of abuse within the residential group experienced care staff independently rated severity of negative life experience for each boy. The care staff manager, in charge of overseeing the care and well being of all boys, was asked to rate 'severity of life experience(s)' on a scale of 1-10 (with 1 as the least severe and 10 as the most severe), with the worst case as a reference point. This rating was compared with ratings from four unit managers, who each gave ratings for the 10 boys under their immediate care. These five individuals were chosen as having the most inclusive knowledge of the boys. Key staff rating of severity was considered to have good face validity and enabled objective comparison across all boys. At no point was there a discrepancy of more than 1 between the two staff ratings. Where there was a discrepancy of 1 (n = 4), the lead clinician's decision on verifying all ratings, was primary. Thus, a score of 1-10 was allocated for each boy ($M = 7.43$ SD = 1.55, range 4-10). All ratings were based on in depth knowledge of the boy's case histories and disclosure of personal experiences. It is fair to assume that impact of severity was also being taken into consideration by the care staff.
Age of onset of abuse and estimated duration of abuse were ascertained from case records and were also recorded.

Controls. The control group were selected from a local youth group, with the same (low) socio-economic group and age range (mean = 13.67, SD = .84). Age and backward digit span matched controls were used to ensure similar IQ levels. Matching children on verbal IQ measures would have resulted in unacceptable age comparisons. This is due to the (to be expected) poor educational opportunities in the residential group resulting in between group differences in reading ability. Due to the low socio-economic background of these control children, hardship was present but not supra-normal. No trauma or mental health history was disclosed for any boy by the parent or guardian at consent. For ethical reasons children were not directly questioned regarding experience of trauma/abuse. It was felt that absence of social service intervention was persuasive of lack of adversity equitable to that found in the residential sample.

Age. Finally, this particular age range (11-15) was considered optimal for investigating the impact of early negative life events on AMS, as results from Study 1 suggest it may be difficult to distinguish OGM bias from a natural age appropriate general memory style in children below the age of 10.

7.4.2. Materials and Measures

AM. The standard Autobiographical Memory Test (AMT; Williams & Broadbent, 1986) was used as outlined in Chapter 3, section 4.2. All participants demonstrated specific recall on at least 2 of practice words. An example of an OGM response to the cue word 'Lonely' was,
"When I'm in my room at night". A specific memory response to the same cue was, "When I got sent to my room as punishment last week even though I didn't do much wrong."

**EF.** The EF task was administered and scored as outlined in Chapter 3, section 4.2. Where emotion was implied but an emotional adjective was not directly used, for example, 'being shouted at' in response to an image description card, it was again decided that a strict criterion would be used and only a clear emotional descriptive would result in an emotion response classification.

**Face Emotion Recognition (FER).** The FER task was administered as described in Chapter 6, section 4.2. Children were asked to label the emotion in happy, sad and neutral faces. Identification of facial affect was done using schematic drawings of happy, neutral and sad faces. Correct recognition was considered labelling consistent with previous over 75% inter-rater agreement as to the emotion being portrayed (Le Gal & Bruce, 1999).

**Child Depression Inventory Short Form (CDI-S, Kovacs, 1992).** This measure was administered as outlined in Chapter 3, section 4.2.

**The Means-Ends Problem-Solving Task (MEPS; Platt & Spivack, 1975).** This is one of the most frequently used measures of social problem solving ability in the AM literature (Williams et al, 2005). The MEPS is a hypothetical social problem-solving task, consisting of vignettes. This measure has been shown to correlate with real life social problem solving skill (see Williams et al, 2005). Participants were presented with social-problem scenarios describing an initial situation and the desired end outcome. After a practice item in collusion with the experimenter, individuals were given 5 hypothetical social problems, which they
were asked to verbally solve to reach the prescribed goal. The problems involve social-relational conflict. Problems were modified slightly for the residential group to make them apposite e.g. not getting along with 'some-one you care about' to replace 'a parent'. Each participant was asked to verbally describe ways of resolving the problem e.g. 'making up with some-one you have fallen out with', 'making friends in a new school' (see Appendix 7.1). Participants were encouraged to make as many suggestions as possible and to draw on their experiences or to imagine helping some-one else through the situation, if that facilitated ideas. Problems were also presented in the first person to encourage self-reflection and thereby presumably enhance the self-relevance of responses.

Due to the fact that a lot of the boys face difficulties in writing due to educational disadvantages, the test was administered in an interview format. The experimenter recorded all responses to ensure consistency and to avoid a 'no-response' due to problems with reading and writing comprehension, rather than because of failure to social problem-solve. The same method of recording social problem-solving was used with controls. For each problem scenario, mean ratings of effectiveness on a 1-7 point scale (1 = not at all effective to 7 = extremely effective) and the number of relevant means (active problem-solving steps) are calculated.

The Backward Digit Task: The Backward Digit Span task is a resilient measure of IQ. Immediately following the oral presentation of a series of numbers the participant is required to repeat the numbers out loud but in the reverse order to that in which they were presented (i.e. last through to first). The list starts at 2 and goes up to 7, producing a maximum possible score of 36. Additional numbers are added to the set in increments until the participant makes three consecutive errors. The length of numbers for which backward spans can be generated
without errors is the backward digit span. The task requires children to store and manipulate
the digit sequence. This task is considered to be a good guide to mental age. In this study the
digit span task was used to indicate that any deficits on the Schonell Reading Test (see below)
were a result of educational impairment not intellectual impairment. The backward digit span
is a good indicator of central executive function, effortful working memory, mental double
tracking, normal cognitive function and language processes (Bender, 1979) and has been used
successfully with children (Pickering & Gathercole, 2001). If residential children were
intellectually impaired, they would show deficits on this task, relative to controls. Instead, age
matched controls were used as no impairment was found.

The Schonell Reading Test (Newton & Thomson, 1976): This test consists of a list of words
which are to be read out loud by the participant and which increase in difficulty as the reader
progresses (see Appendix 7.2. for word list). The reader is asked to stop once he or she has
mispronounced a word. An indication of reading ability and therefore IQ can be extrapolated
by reference to the Schonell conversion table, which converts the number of words
pronounced correctly into a score. As mentioned the backward digit span task was also
included which provides a measure of central executive functioning independent of
educational ability. The prediction in the present study was that the residential children would
perform more poorly than controls, matched on backward digit span.

Distractor Task. A short mood repair distraction task was included at the end of the testing
session. This involved a standard electronic pinball game and was included to dissipate any
induced negative mood or negative rumination caused by the nature of the study tasks or
performance thereon. It was felt this task would be enjoyable and would also be something on
which the boys would perform well.
Participants were tested individually and face-to-face, in a private testing room within the school environment. Participants were first asked to complete the AMT, followed by the EF tasks, the FER task and the MEPS. The CDI, Schonell Reading Test and Backward Digit Span task were then completed, ending the session with the distractor task. The order of tasks was fixed to maximize co-operation from the boys (i.e. easiest/ most enjoyable first) and also to minimize the possible confounding effects of the emotional tasks. Once the participants had completed all tasks, they were thanked for their participation and fully debriefed. No individual child was paid for his participation but a small donation was made collectively, to spend on group recreational activities once testing was completed. No child was aware of this prior to testing.

Table 7.1 shows the demographic data for the residential and control groups. There were no group differences on backward digit span ($t(46) = 1.09, p = .28$); Age ($t(46) = .85, p = .40$); CDI scores, $t(46) = 1.06, p = .30$; Dysphoria ($\chi^2 = .008, df = 1, p = .93$) or EF ($\chi^2 = .096, df = 2, p = .95$). The significant difference in Schonell scores ($t(46) = 2.24, p = .03$) was expected and has been discussed above in the methodology section. There was however no correlation between verbal IQ scores and AMS in either the residential ($r = -.08, n = 30, p = .68$) or the control group ($r = .31, n = 18, p = .21$) and when a subset of 13 residential boys were matched precisely (within 2 points of their verbal IQ score) with 13 controls, AMS still distinguished between the groups ($F(1, 25) = 14.93, p < .001$). Therefore verbal IQ did not affect AMS in
any obvious way in this study. There was also no correlation between depression scores, verbal IQ ($r = .07, n = 30, p = .66$) or performance on the digit task ($r = .07, n = 30, p = .63$)

Table 7.1. Demographic Variables

<table>
<thead>
<tr>
<th></th>
<th>Residential (n = 30)</th>
<th>Control (n = 18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>SD.</td>
<td>Mean</td>
</tr>
<tr>
<td>Age</td>
<td>13.87</td>
<td>0.76</td>
</tr>
<tr>
<td>Backward Digit Span</td>
<td>113.03</td>
<td>16.96</td>
</tr>
<tr>
<td>Schonell reading score</td>
<td>77.93*</td>
<td>15.57</td>
</tr>
<tr>
<td>CDI-scores</td>
<td>4.20</td>
<td>3.51</td>
</tr>
<tr>
<td>Dysphoric: Non-dysphoric</td>
<td>7:23</td>
<td></td>
</tr>
</tbody>
</table>

*significant difference between groups ($p < 0.05$)

Hypothesis 1: Residential boys will show reduced AMS and this effect may be valence specific

The AMS data for the residential and control samples are shown in Figure 7.1. A 2 x 2 ANOVA involving Group (residential vs. control) and Valence (positive vs. negative) was conducted on the AMS data. Results confirmed the predicted main effect of Group, $F(1, 46) = 12.87, p = .001$, such that residential children (who have experienced severe negative adversity) showed reduced AMS. There was no significant Valence effect, $F(1, 46) = 1.11, p = .30$, indicating that overall children responded to positive and negative cues with comparable specificity. There was also no Group x Valence interaction, $F(1, 46) = 2.04, p = .16$, so that residential and control children produced similar responses to valenced cues.
Across all ten cue-words all participants produced a mean number of 4.46 specific responses ($SD = 2.77$, range 0-8). The mean number of specific positive memories in the residential group was 1.7 ($SD = 1.62$) and controls, 3.28 ($SD = 1.07$). The mean number of specific negative memories recalled by residential children was 1.77 ($SD = 1.38$) and for controls, 2.83 ($SD = 1.15$). The overall mean number of specific responses in the residential group was 3.47 and was 6.11 in the control group. This difference was significant ($t(46) = 3.59, p < .001$).

**Figure 7.1. AMS scores for the Residential and control samples**

The absence of any valence effect given the residential/ control division was unexpected and contrary to hypothesis. Of interest, given previous adult and adolescent literature in the field, was therefore whether mood, rather than the experience of a negative life event, would account for valence effects. To test this post-hoc hypothesis we looked at the relationship between dysphoria and valenced specificity. The total sample (residential and control combined) was divided into dysphoric ($n = 11$) and non-dysphoric ($n = 37$) according to national averages ($t$-score above or below 60). A 2 x 2 ANOVA Group (dysphoric vs. non-dysphoric) by Valence (positive vs. negative) was again conducted on the number of specific
AMs retrieved. When data were re-analysed in this form, there was no significant main effect of Dysphoria, $F(1, 46) = .97, p = .32$, and no Group x Valence interaction, $F(1, 46) = .42, p = .52$. However, the between group means for total and for positive valenced recall remained in the anticipated direction, i.e. the dysphoric group were less specific overall but in particular to positive cues (mean dysphoric positive specific memories = 1.73; mean non-dysphoric positive memories = 2.46; $t(46) = 1.4, p = .19$, equal variances not assumed) (Figure 7.2).

**Figure 7.2. AMS scores for Dysphoric vs. Non-dysphoric groups**

![AMS scores for Dysphoric vs. Non-dysphoric groups](image)

**Hypothesis 2: EF will explain variance in AMS**

**Table 7.2 Residential and Control Children in Low, Medium and High EF categories**

<table>
<thead>
<tr>
<th>N (and %)</th>
<th>LEF</th>
<th>MEF</th>
<th>HEF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential: (n = 30)</td>
<td>18 (60)</td>
<td>6 (20)</td>
<td>6 (20)</td>
</tr>
<tr>
<td>Controls: (n = 18)</td>
<td>11 (61)</td>
<td>3 (17)</td>
<td>4 (22)</td>
</tr>
</tbody>
</table>
The second study hypothesis concerned the role of EF in explaining variance in AMS. To test this hypothesis a $3 \times 2 \times 2$ ANOVA involving EF (high, medium and low) x Group (residential vs. control) x Valence (positive and negative) was conducted. The numbers of children in the EF categories are shown in Table 7.2. A main effect of Group remained, $F(1, 42) = 6.18, p = .02$, such that residential children were less specific than controls. Across all participants EF showed no main effect on AMS, $F(2, 42) = 2.19, p = .13$. In addition, there was no main effect of Valence ($F(1, 42) = 2.48, p = .12$), no Group x Valence interaction ($F(1, 42) = 1.43, p = .24$), no EF x Valence interaction ($F(2, 42) = 1.12, p = .34$) and only a Group x EF trend ($F(2, 42) = 2.74, p = .08$). However, these non-significant 2-way interactions were qualified by a significant 3-way Group x EF x Valence interaction, $F(2, 42) = 4.10, p = .02$. In order to deconstruct this 3-way relationship, two $3 \times 2$ ANOVAs were conducted with EF x Group, on positive and negative valenced memories separately.

**Positive AMS.** As can be seen from Figure 7.3, results showed that for positive recall there was a main effect of Group ($F(1, 42) = 7.43, p < .01$), no main effect of EF ($F(2, 42) = 1.60, p = .21$), but a Group x EF interaction ($F(2, 42) = 4.93, p < .01$) such that there was no effect of EF in the control group ($F(2, 42) = .69, p = .52$) but a significant effect of EF on positive AM in the residential group ($F(2, 42) = 6.50, p < .01$). High emotion-focusers in the residential group were more specific to positive cues than either medium or low emotion-focusers in this group. These differences were significant (Tukey HSD = .047 and .004, respectively). Thus, higher EF was associated with increased positive specific recall in the residential group relative to lower levels of EF.

**Negative AMS.** Regarding the analysis of negative specific recall, there was no main effect of Group ($F(1, 42) = 2.92, p = .01$), no main effect of EF ($F(2, 42) = 2.36, p = .11$) and no EF x
Group interaction ($F(2, 42) = 1.00, p = .38$). Although the results for negative AM were non-significant, the pattern was in the expected direction as can be seen in Figure 7.3. Hence, EF affects AMS but only in the residential group and in particular for positive recall.

**Figure 7.3. The effect of EF on AMS across Residential and Control groups**

![Bar graph showing the effect of EF on AMS across Residential and Control groups](image)

LEF = low emotion focusing, MEF = medium emotion focusing, HEF = high emotion focusing
Positive = responses to positive AMT cue words, Negative = responses to negative AMT cue words

**Hypothesis 3: Residential children will demonstrate impaired Social Problem Solving and deficits on the Facial Emotion Recognition Task.**

*Facial Emotion Recognition.* The data on emotion facial recognition across the residential and control groups are shown in Table 7.2. A 2 x 3 (Group x Face-type) ANOVA was conducted on numbers of correct responses to neutral, sad and happy face valence. Results revealed a main effect of Group ($F(1, 46) = 28.96, p < .001$), a main effect of Face-type ($F(2, 92) =$...
CHAPTER 7 A RESIDENTIAL STUDY

95.33, \( p < .001 \) and a Group x Face-type interaction \( (F(2, 92) = 5.12, p < .01) \). This significant interaction was expounded by a series of t-tests, showing that the residential group were worse than controls on correct recognition of sad face valence \( (t(33) = 2.93, p = .01) \) and also on neutral face valence \( (t(46) = 4.34, p < .001) \), with a trend for worse performance on correct recognition of happy face valence, \( t(46) = 1.83, p = .07 \). Errors of emotion-recognition were then analysed using Mann-Whitney U, to allow for small numbers of category data. For analyses testing the a priori hypotheses that the residential group would make more neutral as sad errors an uncorrected level of alpha = .05 was used. For all other comparisons a corrected alpha level = .01 was employed. There were significant between group differences for ‘neutral as sad’ \( (p = .036) \), ‘neutral as happy’ \( (p < .001) \) and ‘sad as happy’ \( (p < .001) \) errors; all greater in residential group. The residential group also made more errors of the type ‘sad as neutral’ and ‘happy as neutral’, though these did not differ significantly from controls \( (p = .12 \) and \( p = .11, \) respectively).

Social Problem Solving. The data for SPS performance across groups are presented in Table 7.2. For the measure of SPS, the mean number of relevant steps and the mean effectiveness scores were calculated for each participant, from performance across all five problems. A one-way ANOVA on group data for relevant means showed that residential children demonstrated marked deficits compared to controls, \( F(1, 47) = 59.91, p < .001 \). In terms of effectiveness, a one-way ANOVA also showed residential group deficits on average effectiveness of social problem solving, \( F(1, 47) = 70.77, p < .001 \). When examined individually deficits significant to the level of \( p < .001 \) were found, for means and for effectiveness, on all five problems. Overall (across all five problems) residential children produced an average 6.53 means compared to 27.61 in the control group. Residential boys scored an average effectiveness rating of 7.5. The control group scored 22.67 on the same scale.
Table 7.3. Group Differences for Face Emotion Recognition and SPS

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<th>Controls</th>
<th>P-value</th>
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<td>% Correct Face Recognition-</td>
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SPS, problem with:

1. Some-one you care about
   means
   effectiveness
   2. A teacher
   means
   effectiveness
   3. Friends
   means
   effectiveness
   4. Making friends
   means
   effectiveness
   5. A false accusation
   means
   effectiveness
   Total SPS
   means
   effectiveness

ANOVA
Hypothesis 4: There will be positive correlations between AMS, FER, EF and SPS in the residential group

The final hypothesis was that there would be a significant relationship between AMS and the other emotion-related variables. Analyses examining hypothesis four were conducted with residential data only as it is only within this group that biases on these tasks were predicted. The emotion relevant tasks included EF, FER and SPS. In addition to this, certain factors characterizing abuse in the residential group were recorded such as duration of abuse, onset of abuse and severity of abuse. Emotional task performance was also correlated with the abuse data. Reported duration and onset of abuse were not found to be significantly associated with AMS or any other dependent variable (ps > .05) and were therefore excluded. Objectively rated severity of abuse, however, was correlated with some of the emotion-related tasks and was therefore included in the following descriptions. The data are presented in Table 7.4. As can be seen, a number of positive associations were found between the emotion-related measures. A priori hypotheses were examined with an uncorrected level of alpha = .05. All other correlations were subjected to a corrected level of alpha = .01.
Table 7.4. Correlations within the Residential Group (2-tailed)

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No FER-errors were significantly correlated with any variable of interest and were therefore excluded.

Parametric correlations were conducted for all variables except EF, which is a categorical variable. Correlations reported for EF are therefore non-parametric. In contrast to hypothesis total AMS was positively correlated with severity of trauma ($p = .02$) so that the more abused boys were more specific (less overgeneral). As predicted, AMS was also negatively correlated with SPS (means; $p = .003$ and effectiveness; $p = .001$) so that reduced specificity was highly associated with poor social problem solving thus replicating previous adult findings. The...
association between AMS and accuracy of emotion-recognition was suggestive for total specificity ($p = .087$) and was significant for positive specificity ($p = .05$), where reduced AMS to positive cues was especially associated with low correct-responses to happy face valence, $p = .044$. In contrast to our prediction, there was no significant correlation between accuracy of sad face processing and AMS. Associations between AMS and other aspects of face processing did not reach the corrected level of significance. Also as predicted, there was a significant correlation between EF and AMS, such that increased EF was associated with increased specificity in line with the results of Study 1. Though true for both negative and positive valence, this correlation was more pronounced for positive cues. EF was also positively correlated with accurate emotion-recognition. Finally, EF was positively associated with severity of negative life experience such that the most severely abused boys tended to fall into the High EF category. A diagrammatic representation of these associative relationships is offered in Figure 7.4.

Figure 7.4. Associative Relationships between Residential Group Variables

[Diagram showing relationships between variables: EF (Emotional Functioning), Severity of Abuse, AM Specificity, Facial-Emotion Recognition (FER), Social Problem Solving (SPS). The diagram includes arrows indicating correlations with significance levels: Total FER, $p = .08$; Happy FER, $p = .05$.]
The present study sought to investigate AM functioning and related socio-emotional processing in maltreated boys, to directly test the developmental-origins hypothesis of OGM and secondly to investigate the possible inter-relationships between these variables in children. Boys were tested on the standard AM cuing task, a measure of EF, facial affect recognition and a measure of social problem solving ability. The results of these tasks are discussed and subsequent implications are considered.

### 7.6.1. Child OGM and Adversity

Salient points emerging from the results of this study are first that experience of early negative life events is associated with reduced specific retrieval in children who are not significantly depressed. Typical cued responses were: angry: ‘all the time’, hurt: ‘every weekend’, lonely: ‘in my room at night’. In fact, overall only 35% of memories retrieved by maltreated boys were specific. The boys were more overgeneral than is typically observed in depressed or traumatized adult populations (where on average some 50% of memories recalled are specific; Hermans et al, 2004; Dalgleish et al, 2003). To my knowledge, to date this is the most marked evidence of OGM in the literature. Chronic developmental trauma may therefore have greater impact on AMS than one off traumatic events, or the trauma in this population may have been particularly severe. Alternatively, trauma may more severely impact children’s retrieval style, relative to adults. In adults there is perhaps more time and opportunity for cognitive damage-repair. Results are also consistent with adolescent studies showing an association between overgenerality and self-reported trauma (e.g. de Decker et al. 2003). This is the first study to demonstrate the link between early adversity and
overgenerality in childhood, and to my knowledge, the first in any age group to use independently verified reports of trauma. Results are consistent with Williams' (1996) Affect Regulation Hypothesis.

7.6.2. Valence

There was no main effect of cue valence on AMS. This was not expected given previous research, which demonstrated cue-valence effects and with the previous AMT valence effects in Studies 1, 2 and 3. Several possible reasons for the absence of a main valence effect can be offered. Especially in the residential population, where there is significant disturbance in emotion processing (as indexed by performance on the emotion-related tasks), and where boys are heralding from an emotionally complicated past, valence cues may not reflect the valence of the actual memories retrieved. Instead many cues may elicit mixed-valence memories, evoking negative as well as positive thoughts and associations. For instance, several of the boys gave memories directly pertaining to 'family', in response to the cue word 'happy'. These memories were not negative in content, but given what we know about the family-perpetrated abuse histories of these boys, it is doubtful that these memories were not also triggering some negative or mixed emotions. So although the cue word was positive the memories elicited may not necessarily be exclusively so.

The same issue applies when the boys for instance gave memories of 'the school', meaning the residential school facility, in response to the cue word 'safe'. Though these memories were of being safe, they are unlikely to be purely positive and not also evoke some negative thoughts, such as 'I am not with my family or 'my family don't make me feel safe'. Thus, the nature of the complex emotional lives of these children perhaps makes it difficult to make
assumptions about the valence of the memories recalled. In effect, non-verified valence cuing may prove redundant in some populations. Asking the boys to state the valence of each memory on a dimensional scale may help. However, this in itself is a difficult introspective task, especially in light of afore mentioned emotional complexity of many of the boy’s autobiographical events.

The second explanation proffered here is that mood, as opposed to trauma, may determine valence effects in the AM literature. The fact that in these groups, matched on dysphoric mood, there was no sign of valence effects may be telling. When the sample was split into dysphoric and non-dysphoric no significant effects were found. However the between group means for positive specific recall were in the anticipated direction, such that dysphoric children retrieved inappropriately overgeneral positive memories. Although overgenerality occurs independent of mood or in remission from depression in some studies (e.g. Spinhoven et al., 2005), there is some reason to suspect that depression still affects accessibility of positive information (e.g. Park et al., 2002; adolescents demonstrated OGM to positive cues, even in remission from depression). Hence, trauma may dictate the extent of overgenerality, as evidenced in this study, while depression might shape valence effects by its influence on the accessibility of mood or schema incongruent material. In this study mood and valence effects were not significant, most likely due to small sample sizes in the dysphoric group. Nevertheless, there is some indication that valenced recall is being affected in a predictable direction (dysphoric individuals overgeneral to positive cues). That is, dysphoric children were less able to access specific positive information. Again, this is consistent with other adolescent studies of OGM and depression (Park et al., 2002; Kuyken et al, in press), where the effect of depression on AM was most pronounced for retrieval of specific positive memories.
7.6.3. EF, OGM and Abuse

We then move to the results of EF. This is a relatively new concept and one that appears to offer an interesting insight into individual encoding and/or information storage preferences. EF was positively correlated with AMS and with FER as predicted. Furthermore, there was an interaction between EF and group such that LEF was associated with reduced specificity and HEF was associated with increased specificity in the residential group. This interaction only occurred in the presence of a life stressor otherwise EF had no group level effect on specificity. It appears that EF may be functioning as a measure of avoidant and sensitised coping in the residential group, such that individuals who have experienced severe life adversity fall into emotionally avoidant (LEF) or emotionally sensitised (HEF) groups, resulting in reduced and heightened specificity, respectively. Theoretically this makes sense based on the coping literature (e.g. Lazarus & Folkman, 1984). For example it may be that LEF is associated with a repressive coping style whilst HEF is associated with vigilance, in the context of stress or abuse. The association between reduced AMS and avoidance is consistent with results from Hermans, Defranc, Raes, Williams and Eelen (2005) and Kuyken, Howell and Dalgleish (in press) who both found links between reduced AMS and avoidant coping in depressed groups. It is interesting to note that the effect of EF on AMS was again stronger for positive cues, further supporting the idea that differential cognitive bias may hinge on the processing or retrieval of positive information in youth.
Moreover, EF and AMS were correlated with severity of abuse in the residential group. This was an interesting and unexpected result. With increased objectively rated abuse severity there was increased likelihood of high EF classification, and increased AMS. This may reflect a survival-based mechanism akin to hypervigilance (Mathews & MacCleod, 1994) i.e. the more highly abused boys by necessity may have had to be more vigilant of socio-emotional signals hence high EF. Thus, heightened EF with increased abuse severity in the residential group, may account for the surprising result that ran counter to the hypotheses, that increased abuse severity in the residential group was associated with increased AMS. Furthermore, an examination of the nature of the specific memories recalled by these most highly abused boys, reveals that they were recalling predominantly recent memories to cue words. For example in response to the cue word happy: ‘today when I was splashing in the puddle’ or ‘yesterday when I was talking to you’. This focus on the recent past may also explain why they were more specific than less-severely abused peers. This would perhaps suggest an adaptive memory search strategy, which concentrates on the recent ‘safe’ past to avoid an extremely unpleasant and problematic more distant past. However the implications of such a short-term memory strategy are poor in terms of long-term goal formulation and developing a positive identity of self (see Conway, 2005 for a review). It may also be that these more severely-abused boys are instigating a boundary delimited strategy in keeping with the observations made by Conway & Pleydell Pearce (2000) who remind us that lifetime period themes may be linked to higher order themes such as ‘work’, or ‘school’ or self-evaluative knowledge of life time periods such as ‘when things weren’t going well’. Present results may suggest that the more disturbed boys, with more disturbed abuse histories, once removed from the negative life circumstances, may have delimited that period. Kuyken et al., (in press) also found less
overgenerality to positive cues associated with trauma in their adolescent population. It is unclear whether any evidence of ‘recency’ exists in these data. Cuing autobiographical memories from across the lifespan would help address this recency issue.

7.6.5. Facial Emotion Recognition (FER)

Boys in the residential group showed considerable deficits on the facial emotion recognition task. This deficit applied to sad, neutral and almost also to happy face valence. It is rare in the visual science literature to find deficits on recognition of happy face valence as this is considered a very basic perceptual skill. To contextualize the severity of the recognition errors found here, in Study 4, errors of this magnitude were only demonstrated by school children aged 6-7. There are clearly serious implications for socio-emotional functioning in these boys given such fundamental deficiencies in the processing of basic social communication signals. Cicchetti, Hornung & Reed (2000) also investigated the effects of atypical experience on recognition of emotion in faces in children. Results also suggested that maltreated children show biases in their interpretation and understanding of emotional signals. Neglected children evidenced a response bias with a lower standard for selecting sad faces than other children for instance. This is consistent with the present data, where the residential children more readily classified neutral faces as sad compared to controls. Therefore maltreatment may affect children’s understanding or interpretation of particular emotion displays. This result (deficits in recognition of salient and ubiquitous social-interpersonal stimuli) is perhaps augmented by the results of the social problem-solving task, arguably a related but downstream, higher order social-emotional task.
Residential children exhibited markedly impaired social problem-solving ability. "Hit", "Stab them", "Don't know", "Hurt myself", "Run away" were some of the worst-case examples of solutions offered to social problems by the residential boys. Despite heavy prompting, these children failed to offer steps to solve typical social problems. In some cases boys offered negative steps, which would be deemed likely to worsen the social problem by principally resorting to violence or aggression. It was almost impossible for these boys to elaborate on any suggested solution. For example 'Don't know- talk to them' was a typical response, and all suggestions likewise tended to be single step solutions. Given the boys' high-level cooperation on all other tasks, it is considered highly unlikely that non-cooperation could account for results on this task. The deficit may however be task specific.

MEPS vignettes have a beginning and a positive end. This may have been a problem for the boys who have not experienced a positive end to a social problem. It is possible that the provision of a positive end outcome was therefore disabling for these boys and better responses would perhaps have been evoked given open-ended questions. The boys may also simply think 'What is the point?'. Cognitive appraisal is often survival based in severely abused children, so there may be less motivation to think of nice ways to resolve the relatively minor conflicts depicted in MEPS. Also, in severely abused children sequential, cognitive processing is often lost and such children are often time-integration deficient due to living in a very 'here and now', moment-to-moment based existence. If so, it is not surprising there are deficits on a social-emotional task requiring these skills. Although these boys have been intensively coached regarding positive/ pro-social behaviours and conflict resolution, this has seemingly had little to no impact on their self-world models as indexed by the MEPS. Perhaps
negative schemas render it difficult for these boys to conceive of positive social strategies and outcomes. It would therefore appear that rather than psycho-educational strategies, "direct experience" may be needed to change dysfunctional thinking; something suggested by Phillipot et al. (2004) and which has clear implications for practically-based therapies and interventions.

7.6.7. Inter-relationships

This study sought to compare AMS with other emotion-related processing in children, in order to observe the patterns in relationships between these measures. As predicted, reduced AMS was associated with impaired FER, deficits in SPS and with lower EF in the residential group. There was also some relationship between AMS and abuse severity. Moreover, there were links between EF and abuse severity and between EF and performance on the other tasks. EF appeared to play a pervasive role, associating with several of the measures. This highlights the need to further explore and to broaden our explorations of the mechanistic relationships between OGM and other facets of cognitive-affective processing. Further research is required to underpin these relationships.

7.6.8. Temporal Order

One specific study aim was to shed some light on the temporal dynamic between biases such as overgenerality and depression, by demonstrating the possible existence of such cognitive biases in a population at high risk of developing the disorder. Theories of depression have traditionally debated the direction of causality between disorder and cognitive bias. OGM is one such factor that has been discussed as a vulnerability factor for depression. Findings from this study support the proposition that cognitive biases such as OGM may precede depression. Indeed blind rating of the residential group by the consultant
clinician in terms of likelihood of developing future serious affective disorder, specifically depression, showed that out of the 13 boys named, 10 demonstrated the highest relative overgenerality in the sample.

7.6.9. ARH

Regarding AR and the developmental hypothesis (Williams, 1996), early adversity does seem to result in overgeneral recall. However, rather than children trying to regulate emotion by retrieving overgenerally, instead they may recall overgenerally because they see those memories as prototypical, operating at level of schema and not because this is less emotive. These abused children may operate at a schematic level because they are regularly trying to make sense of difficult situations. If life events were reasonably straightforward, a-b, and all is right with the world, then there would be no need for a young child to heavily engage an implicational/schematic level of thinking (Teasdale & Barnard, 1993; Power & Dalgleish, 1997). But when an individual is confronted with ongoing and severe social-emotional conflict, s/he will have to habitually and heavily engage an abstract system to try to 'make sense' of their world. If so, this would function to facilitate overgeneral thinking and resultant OGM. This induction of schematic level processing in trying to 'make sense' of unpleasant experiences, ties in with ruminative tendencies in the OGM depressive literature (e.g. Watkins & Teasdale, 2001) and with problems of assimilation, associated with trauma (e.g. Williams, Stiles & Shapiro, 1999). Therefore although the existence of OGM in children who have experienced negative life events supports an ARH, only a study designed to specifically test affect generated in children recalling general versus specific memories would support or refute the specific affect regulating claim regarding OGM (see Philippot, Schaefer, & Herbette, 2003 for an examination of this in adults). Moreover, while the expected main OGM group effect was found for the residential boys, boys who were more severely abused
(as objectively rated) were in fact less overgeneral. Thus, abuse severity may be one factor, which moderates the nature of adopted AM styles.

7.6.10. Caveats and Limitations

Caveats of the present study include the fact that there was no participant rating of the valence of memories retrieved, which may have shed light on the absence of valence main effects. Participants could also rate the self-referential nature of cues, suggesting that cue words rated as more self-referent may reflect relevant schema. If so, this may elucidate schematic based interpretations of overgenerality, i.e. highly self-relevant words may be more or less likely to elicit OGM responses.

In addition, diagnostic assessment and a more formal assessment of trauma should be ascertained in future. More broadly, the relationship between trauma and impact of trauma is uncertain and is a difficult issue to assess. For example, the boys were almost without exception totally un-cooperative when asked to complete cognitive style questionnaires, such that these measures were entirely dropped from the study protocol. It is likely that this form of questioning was too obvious and felt to be intrusive. The AM, EF, FER and SPS measures in contrast, were well received and the information gleaned, though less direct, offers arguably more candid insight into the social-emotional functioning of these boys. Hence, information-processing tasks appear to offer a valuable inroad into investigating difficult aspects of emotion processing in sensitive groups (Drummond, Dritschel & Dalgleish, 2005).
7.7. In conclusion

The theoretical motivation for studying this particular population was that they met the difficult criterion combination of having experienced severe, objectively measured, independently corroborated negative life events and thus being at high risk for depression, but also not currently being depressed. Within this group it was possible to select children who were placed in care solely because of child protection issues. Cases where child protection was not the primary cause of referral (e.g. initial conduct disorder or criminal behaviour) were excluded. The control group were also carefully matched, so conclusions regarding differences in AM functioning can be reasonably attributed to significant early childhood trauma, rather than socio-economic hardship, non-verbal IQ or mood.

The mechanism through which negative life experience impacts AMS is still an open issue, but it does seem that early childhood adversity results in overgeneral recall, with the qualification that in the most severely abused cases, less overgenerality emerges, perhaps reflective of a survival based coping strategy as discussed. EF has proved useful as a marker of AMS, as it was in Study 1, and of performance on other emotion-related tasks, and warrants further investigation. Even the correlation between EF and the theoretically more remote SPS, was suggestive, noting of course that EF correlations and interactions were only significant in the residential group. Hence for example, low EF was only associated with poorer performance on tasks related to emotion, in the maltreated youth. It is hoped the examination of this high-risk population on several related tasks may help facilitate our understanding of the temporal ordering and possible interactions between OGM and emotional processing skill deficits, and depression.
"Within a developmental perspective, maladaptation is viewed as evolving through the successive adaptations of persons in their environments. It is not something a person "has" or an ineluctable expression of an endogenous pathogen. It is the complex result of a myriad of risk and protective factors operating over time...Just as personality or the emergence of competence involves a progressive, dynamic unfolding in which prior adaptation interacts with current circumstances in a ongoing way, so too does maladaptation or disorder." (Sroufe, 1997, p. 251-252)
Abstract 8 | The central theme of this thesis has been to examine cognitive biases associated with depression, in childhood, which may mirror or differ from those biases found in adult depression. This body of research has principally involved the extension of AM work to child samples. Part I of this general discussion focuses on the main results of the five empirical studies and the central theses advanced. Part II reviews the thesis results in light of theory and Part III presents methodological limitations and future directions, followed by a final thesis summary.
As outlined in Chapters 1 and 2, the IP approach to depression has yielded important findings concerning depressive biases in adults. However the IP approach has not been as extensively utilized in child populations. The main aim of this thesis was to expand our existing knowledge base concerning depression-related IP biases in children. In particular, the aim was to investigate the phenomenon of OGM in childhood since this phenomenon had hitherto not been studied in this age range.

**PART I | Main Empirical Findings and Central Theses Advanced**

In Part I of this General Discussion, the first five sections offer empirical chapter summaries covering the main findings of the thesis. In the subsequent five sections I would like to propose five central theses as derived from this cumulative body of research. The theses advanced are; ‘Child AM Matters’, ‘Age Matters’, ‘Focus Matters’, ‘Style Matters’ and finally, ‘Valence Matters’.

**8.1. Empirical Chapter Summaries**

**8.1.1. Development of AM Specificity**

This study was the first to demonstrate an OGM bias in children. Moreover, results perhaps tell us something about susceptibility of positive information to bias. Dysphoric children irrespective of age failed to retrieve specific positive memories, while the negative bias, only emerged later in development between ages 10-11. This supports the idea that biases associated with depression may emerge initially with problems with positive information
processing but spread to include negative information over time, and presumably with continued negative mood, consistent with Nandrino et al 2004 and Dozois & Dobson, 2003. This study also introduced a new measure of Emotion-Focusing which significantly predicted AMS. EF results highlight the importance of studying biases in encoding as a factor contributing to OGM.

8.1.2. A Clinical Study

The second study was the first study to allow a direct comparison of depressed adult, adolescent and child AM functioning with respect to overgenerality. It is also the first study to examine OGM bias in clinically depressed children. Thus, extending a long literature of work in adult clinical populations. In addition this study allows us to compare the effects of dysphoria with the effects of clinical depression in childhood and to observe whether there are any differences in the severity of associated bias. Depressed children demonstrated reduced AMS. The OGM effect was stronger for memories to negative cues than to positive in the child-depressed group but OGM was significant to both positive and negative cues in the older depressed groups. Results can be interpreted as support for AR and schema accounts of OGM. The fact that there was no significant difference between the extent of OGM across the three depressed age groups strongly emphasizes the importance of studying OGM in youth. The differences between depressed and dysphoric children’s AM styles were also of note.

8.1.3. A Longitudinal Study

The longitudinal study was the first to examine the relationship between biases in CS and OGM in children. This is also the first study to use a diathesis-stress design in the
investigation of OGM. Evidence of a link between an overgeneral thinking style and OGM was of particular interest. To date, no study has documented a relationship between an overgeneral thinking style and OGM. OGM was also associated with a negative attributional style for positive events. This finding suggests that further attention should be paid to the link between causal attribution and OGM. This study also allowed an examination of the predictive value of these variables. CS predicted depressed symptoms during a stressful life event. Overgeneral retrieval to positive cues also predicted depressed symptoms, but not above that of previous mood. The depression measure used may be crucial in studies of the predictive value of OGM. Results were more pronounced for recall to positive (as opposed to negative) cues consistent with previous research in adults (e.g. Brewin et al, 1999). Although various schema-based interpretations of OGM exist, to my knowledge, this is the first direct evidence of the link between negative self-world schema and OGM. Results support a depression cognitive vulnerability hypothesis in children.

8.1.4. A Face Study

The aim of face processing study was to highlight the usefulness of information processing approaches to study mood related biases in affective processing in children and to validate a child appropriate measure of IP for use in children to compliment the AMT. As predicted, dysphoria was positively associated with accurate labelling of sad faces. The study revealed mood related bias in the way children process ecologically valid stimuli- which may have implications for future maladaptive biases. This study was the first to demonstrate mood related biases in children’s processing of facial affect. Results were discussed in terms of cognitive bias and depressive realism.
Emotion-related processing in children in a high-risk population for depression was examined. Children in residential care who had experienced severe life adversity showed various emotion-processing deficits. This included reduced AMS, poor face emotion-recognition, and severe deficits on an index of social problem solving ability. EF was significantly correlated with many of the measures. In addition, EF interacted with negative life events to affect AMS so that boys who had experienced negative life events and who were low emotion-focusers were particularly vulnerable to OGM. This finding is interpreted as suggestive of an avoidant coping style consistent with Hermans et al, 2005. Results provide evidence of depression related cognitive biases in children preceding the development of clinically recognized depression.

8.2. Central Theses

8.2.1. Depression, Trauma and Child Autobiographical Memory Matters

It appears OGM operates in childhood (Studies 1, 2, 3 and 5). Children from the ages of 7-16 were tested across four AMT studies. In each study, there was evidence of reduced AMS associated with dysphoria/depression or trauma, as predicted by adult research (see Chapter 2). The presence of OGM in children supports the developmental aspects of the theory of AR, which states that the origins of OGM may lie in childhood. Moreover, as with previous adult literature (e.g. Brittlebank et al, 1993; Brewin et al, 1999) the longitudinal value of OGM in predicting 24% of the variance in depressive symptoms in children, was demonstrated (Study 3). OGM predicted depression symptoms during a stressful life event 8 months later.
However, OGM did not predict depression above the predictive value of previous mood scores. This result may be measure specific i.e. the CDI may not be sufficiently sensitive to mood change. This interpretation is supported by the fact that positive OGM did predict responses to several feeling state questions at Time 2, independent of previous mood. A counter argument however is that unlike in adulthood (Mackinger et al., 2000; Spinoven et al., 2005) OGM may be highly mood dependent in children. Further research is needed to address this issue. Nonetheless OGM appears to play some role in experience of depression in childhood.

Further evidence of the potential significance of OGM as a depressive bias in youth comes from the fact that there was a significant relationship between OGM other depression-associated biases. For example, previous work in adults has demonstrated a relationship between reduced AMS and poor SPS (Goddard, Dritschel & Burton, 1996). Conway & Pleydell-Pearce (2000) would suggest poor memory of specific positive events would impair effective on-line social problem solving. Consistent with this view, residential children showed SPS deficits associated with reduced AMS (Study 5). Likewise, a face-processing paradigm was introduced (Study 4) to attempt to investigate depressotypical biases in children, using a child-friendly methodology, since depression in adults is associated with biased facial processing (e.g. George et al., 1998).

Finally, OGM was found in children who were not displaying current levels of depression but who had experienced significant life stress (Study 5). Residential boys who had been placed in long-term care for reasons pertaining to child protection recalled only 35% specific memories. To my knowledge this is the most severe record of OGM in any clinical population to date. This pronounced effect may be because of the severity of trauma experienced. It may
also be due to a combination of age and experience of trauma e.g. closer temporal proximity to traumatic events may be related to greater memory overgenerality. The fact that this OGM bias is in evidence in a traumatized group at high risk for depression, but without any present depressive diagnosis, or known history of depression, may be suggestive in terms of the temporal relationships between trauma, depression and OGM in the childhood.

All the AMT results are consistent with the hypothesis that once activated negative schema (believed to be central component of depression) influence the filtering, encoding, processing, interpretation, storage or retrieval of information as proposed by Clark, Beck & Alford (1999). In terms of AM it appears depression in childhood is associated with errors of memory overgenerality to positive and/or negative cues. Indeed a modified version of Breuer and Freud’s (1895) model of autobiographical memory, presented in Power and Dalgleish (1997) pp 69, states that:

“One or more early traumatic events, thoughts or wishes can form a “pathogenic nucleus” around which later associated memories become attached according to a number of rules. First, there is a linear chronological order, with the oldest memories running in sequences to the newer memories. There may however be multiple pathways or themes that can be traced back to the original nuclear memory. Second, the themes are stratified around the nucleus such that older strata are resisted....Third, logical chains run through the material to the nucleus; these logical linkages meet at memory nodes and may connect across themes as well as within them. Activation of one of the memory nodes leads to a spread of energy through the linkages to the nucleus...."
Hence negative experiences early in development may be crucial in underpinning OGM, especially if the AMT cues map onto a pathogenic nuclear theme. It will also be harder to change earliest themes because these themes are well buffered amongst all the associated memories, acting as evidence. What this argument suggests is that the system can become engaged in a life long pattern of disregarding information inconsistent with these initial negative experiences. This suggests the spotlight of research efforts and therapeutic efforts should be placed squarely on early experiences and subsequent developing patterns of cognition. The fact that depressed children, adolescents and adults all demonstrated OGM (Study 2) and that early experience of abuse affected memory in the residential study (Study 5) would support this argument.

8.2.2. Age Matters

Age effects were demonstrated across samples. Study 1 was the only AMT study to systematically examined two age groups of children. (Study 2 looked at children, adolescents and adults, Study 3 was a longitudinal design and Study 5 looked at sample of boys in late childhood). In Study 1, age was a significant predictor of AMS. Specificity improved with increasing chronological age, between 7-11 years. Improved specificity with age is consistent with predictions derived from developmental literature (e.g. Howe & Courage, 1997) indicating better AM strategies, storage capacity and detail with age. To my knowledge, this is the first study to demonstrate improved specificity with age in children using a standard cuing methodology.

Interestingly, when AMS was investigated over a wider age range (Study 3), AMS was found to improve across age (adults were more specific relative to adolescents and children).
However, this was only in the non-depressed groups. Depressed AMS did not significantly improve across age group. This finding is consistent with results from Study 1, in that dysphoric children's negative AMS style did not improve with increased age unlike non-dysphoric counterparts'. There are clear implications here in terms of the impact of depression on a developing memory system. It is tempting to speculate that early experience of depression leaves a lasting impairment on the AM system.

In a further comment about age, irrespective of the mechanism at work, the extent of OGM across depressed child, adolescent and adult groups was not significantly different. That is, depression appeared to operate similarly across age (Study 2). Depressed children were just as overgeneral as depressed adults. Given the association between OGM, hopelessness and suicidality in adults (e.g. Williams, et al, 2005), this has significant implications in terms of the seriousness with which researchers and clinicians approach OGM in youth. Moreover, core beliefs develop from early childhood. Self-concept formation begins around the age of 5 (Howe & Courage, 1993) therefore if negative self-beliefs can begin to influence the developing system from this point, there is further reason to pay attention to this phenomena early in youth. OGM may offer a direct target for preventative therapeutic intervention.

8. 2. 3. Focus Matters

With respect to what aspects of IP are contributing to the OGM effect, a neglected area of research has been encoding. This thesis introduced a new measure of Emotion-Focusing (EF) to address this deficit. More specifically, would children who encode the 'emotion' content of situations be better at retrieving specific AMs? EF was therefore coined as a term to represent the extent to which children focus on emotion in the environment. EF was investigated in
Studies 1 and 5 and in both studies EF significantly predicted unique variance in AMS. In Study 1 children who were more likely to encode emotion demonstrated increased AMS so that OGM was associated with low EF. It is conceivable that the association between low emotion focusing and OGM points to an avoidance tendency consistent with results from Hermans, Defranc, Raes, Williams & Eelen (2005). Hermans et al showed that a cognitive avoidant coping style was associated with reduced AMS. This cognitive avoidance ties in with reduced AMS and reduced AMS is associated with 'avoidance' of emotional descriptors in the EF task. Thus, EF may be tapping a global index of avoidant vs. sensitised processing styles. There was a main effect of EF for negative cues and an age and EF interaction for positive cues in Study 1. Most children struggled to recall specific negative memories. High EF children on the other hand, were able to produce specific negative memories, irrespective of age. It appears that if events are encoded in emotional terms an emotional cue will be more likely to activate the memory representation. Contrary to predictions, there was no significant relationship between dysphoria and EF in this study. It is unclear what the implications therefore exist in terms of EF and depression.

In Study 5, EF was again associated with AMS. EF interacted with group such that in the presence of significant life adversity low EF was associated with OGM and high EF was associated with specific recall. EF was also significantly related to abuse severity in this group such that the more (objectively rated) abused boys were more likely to fall into the high EF category. It is suggested that this may be part of a survival mechanism akin to hypervigilance (Mathews & MacCleod, 1994). Furthermore, the result was specific to positive AMS, so that highly abused children were able to produce more specific positive memories relative to less abused children in the lower EF groups. This counterintuitive finding was given some consideration. When the AMS data from the most highly abused boys was
examined, it appears that these boys were producing highly specific positive memories, de facto by producing very recent memories to positive cues. This recency effect has not been highlighted in the research to date and could again reflect an extreme avoidant memorial coping strategy, which could have a bearing on OGM results.

Williams (1996) suggested that a predisposition to focus on emotion should result in OGM as a result of schematic level processing. Instead EF was associated with increased AMS, in accordance with various theories of cognition and emotion (Beck et al. 1979; Power & Dalgleish, 1997; Teasdale & Barnard, 1993). Low EF is associated with OGM in the residential groups. However EF was not related to depression scores. EF can assess the relative extent to which individuals focus on emotion. However, the stimuli are not yet designed to tackle 'over-sensitivity' to emotional cues. That is a stimulus set needs to be developed in which the emotional content of the cues varies systematically to assess whether certain individuals are hypersensitive to emotion. It could be that assessment of hypersensitivity to emotion is required before this relationship will emerge, or that the self-referential nature of the EF stimuli is important in testing depression effects. Thus, EF is a novel measure and a novel construct. However, there is clearly much scope to develop this measure further to index what individuals are attending to in the environment and what implications this may have on further information-processing and memory.

8. 2. 4. Style Matters

A significant relationship was identified between CS and OGM (Study 3). To my knowledge this is the first evidence of a significant relationship between a negative CS and OGM in the literature. In particular OGM was associated with a tendency to overgeneralize. OGM was

*I would like to acknowledge Mark Williams for his personal communication of this important observation.
also associated with a negative attributional style. Hence, a child who made errors of overgeneralization for negative events and who believed positive events were unstable (i.e. likely to change over time) were more likely to demonstrate OGM to positive cues. Bearing in mind, that this was not a clinical population, this is a strong result. The theoretical links between overgeneralizing (Beck et al, 1979) and OGM (Williams, 1996) are clear however no account of OGM has explicitly considered this CS as a key contributing factor. Attributional style appears to be involved in the way events are encoded and retrieved in childhood. The salience attributed to events may be partly governed by the way in which they are causally viewed for instance. If an event is deemed unstable it is perhaps less useful as information on which to form higher order judgements or base goals, and so on. Therefore unstable events may be less likely to be recorded than stable events. Attributional style was related to OGM and was able to predict depressive symptoms independent of previous mood. As with EF, future studies could address these IP styles in greater detail to investigate their role in OGM. OGM was not associated with catastrophizing, selective abstraction, or internalising. It may be that these cognitive errors/styles are less prevalent in childhood or that they only come into play later in childhood or with greater severity of depression.

8. 2. 5. Valence Matters

One of the overarching aims of this thesis was to examine cue valence effects with respect to OGM. On the whole, irrespective of depression, children were less likely to recall specific negative memories relative to positive (in all AMT studies). This main effect suggests that on the whole, children are predisposed to better recall (or encode) specific positive events from their lives relative to negative, in keeping with a literature on positive bias in normals (e.g. Taylor & Brown, 1988; Mezulis, Abramson, Hyde, & Hankin, 2004). The results of the facial
emotion recognition task in non-dysphoric children perhaps also support this positive bias hypothesis in that normal non-dysphoric children tended to make sad as neutral errors.

Dysphoric children showed reduced positive AMS (Studies 1 & 3 in school samples). In clinical samples, the effects of OGM were more stable for recall to negative cues, although effects were also present for positive cues. This may suggest that the recall of positive information is particularly susceptible to the effects of mood in terms of OGM. That is, it was difficult for dysphoric/depressed children to access specific positive memories. Moreover, when dysphoric and non-dysphoric children are compared, non-dysphoric children show a bias in favour of specific positive recall (relative to negative), while dysphoric children show balanced specific recall (i.e. similar means for positive and negative AMS). The implications in terms of schema are that dysphoric children lack positive self-schema, relative to controls. Thus positive information is less well retained. Moreover, when less positive information is accessible this has implications for a person’s sense of self and future goal planning (Conway, 2005). This in turn may well affect mood (e.g. ICS, 1993; SPAARS, 1997). Dysphoric children demonstrated similar means for positive and negative AMS consistent with the number of memories typically recalled by individuals in a happy or sad mood (Power and Dalgleish, 1997). It is important to track this valence effect across development to see what future role it may play in depression.

In the traumatized population (Study 5) valence effects were noticeably absent. The absence of valence effects in the residential study may be linked to the fact that groups were matched on mood. Since, splitting this data into dysphoric and non-dysphoric showed means in the anticipated direction i.e. dysphorics less specific to positive cues. In addition, in the discussion of Chapter 7 (section 6.2) it was posited that valence cues in the residential group
may have elicited ‘mixed’ valence responses, as judged by the content of the memory responses e.g. memories of an abusive parent in response to the cue ‘happy’. Emotion related processing is complicated in these children, as evidenced by their performance on all emotion-related tasks, therefore the absence of valence effects in this population should be interpreted with this in mind.

Moreover, clinically depressed children demonstrated reduced AMS to negative cues, consistent with the idea that if more negative schema are in operation not only positive, but in addition, negative event memory may be affected. Indeed, with increased depression negative schema are posited to exert greater influence on processing (Beck et al, 1979). In depressed children it is possible that negative themes of ‘sad’, ‘lonely’ etc, as presented by the AMT cues words, trigger central, active themes, which result in a propositional readout (Dalgleish et al, 2003) or that negative events have become prototyped. Alternatively, the activation of negative affect caused by negative cues may inhibit a successful memory search (Philippot et al, 2004) or OGM to negative cues may reflect cognitive avoidance (Williams, 1996). Direct investigation of the affect inducing effect of cue words, the self-referential nature of AMT cue words, generalizing tendencies, as well as in depth interviews about coping with painful memories would help decode which theory better accounts for the OGM responses.

There was also a relationship between age and valence. Dysphoric children aged 7-8 were more specific to negative cues than same age counterparts but dysphoric children aged 10-11 were less specific to negative cues, relative to controls. That is, negative AMS did not improve across age-group in the dysphoric sample (Study 1). This may be mechanistically important. Longitudinal studies are clearly required to better test the development of OGM across age. Nonetheless, the present results suggest that early experience of dysphoria effects
AM such that by age 10-11 an OGM style to negative cues as well as positive is established. It may be that dysphoria/depression effect positive and negative recall through different underlying mechanisms. Positive OGM could occur more through a mood congruent mechanism (relatively independent of age) whereas negative OGM may be more schema dependent (see Chapter 3, Study 1 section 6.3).

Subtle valence differences may offer an important mechanistic insight into the operations underlying OGM. For example, there were no significant differences between AMS in the depressed and dysphoric child groups. However, the within group valence patterns and the valence differences between these groups and their controls, were intriguing. Depressed children differed from controls for negative AMS. Dysphoric children differed from controls for positive AMS. More precisely, dysphoric children demonstrated similar AMS for positive and negative cues, while controls produced greater positive AMS. In contrast, depressed children produced fewer specific negative AMs, than positive. Further studies are required to replicate these valence patterns and to specifically target an investigation of possible mechanisms involved.

It is unclear why valence effects in the literature are mixed i.e. some studies find the OGM with negative cues (Dalgleish et al, 2001; Mackinger et al, 2000; Burnside et al, 2004), other studies, including the ones in this thesis (Studies 1, 3, 4), find that the OGM effect typically lies with responses to positive cues (de Decker et al 2003; Moore, Watts & Williams, 1988; Park et al 2002; Puffet et al, 1991; Williams & Broadbent, 1986; Williams & Dritschel, 1988). It would appear from the results of this thesis that age, depression severity and experience of trauma may influence the valence effects observed. It may also be the case that overgeneral memories are elicited when cues reflect a particular autobiographical theme,
irrespective of the cue valence (Dalgleish et al, 2003). Valence effects would therefore vary
across studies as a function of how closely cue word valence mapped onto the relevant
schema in memory. In explaining valence effects, it is likely though that more than one
mechanism, bias or effect is in operation at any given time i.e. proto-typicality, affect
regulation, affect arousal or schema congruency (see Chapter 2). It may be that “No
theoretical rationale can be given to account for these divergent results [or that]...the effect of
valence is merely a spurious effect” (de Decker et al, 2003). Otherwise, valence effects may
be attributable to several stable factors in predictable ways.

In summary, the consistent demonstration of OGM to positive cues and the significant effects
relating to positive OGM through out this thesis is consistent with a meta-analysis of AM
effects (Van Vreeswijk & de Wilde, 2004), reporting that OGM is more often to positive not
negative cues. Indeed, the origins of depressive biases, including OGM, may be with
impairment in the processing of positive stimuli. This is important, in terms of therapy where
focusing on interpretation of negative events may be far less relevant, if at all relevant,
compared to therapy focusing on the interpretation, evaluation, appraisal, or memory for
positive information. For example, in the context of depression, “The patient generally does
not pay attention to or does not assimilate the meaning of events which disconfirm his
depressing view.” (Beck, Rush, Shaw & Emery, 1979). This may lead to refined clinical
interventions, which specifically target disruptions to positive information processing. Indeed,
evidence of a depression-associated bias away from specific positive information (consistent
with positive OGM) rather than towards negative information processing, has been
documented across various domains of processing.
Valence and Depression more generally

For example, Dunn, Dalgleish, Lawrence, Cusack & Ogilvie (2004) found that MDD patients reported less arousal, less pleasantness and increased sadness in response to positive images. There was no increased sadness rating to negative stimuli. Likewise, from a behavioural perspective, Hopko, Armento, Chambers & Lejuez (2003) found mildly depressed individuals failed to perceive or acknowledge the positive benefits of pleasure yielding behaviours, with immediate or distal positive potential. Curry & Craighead (1990) found that depressed adolescents differed from psychiatric controls on positive event attribution. Similarly depressed women showed deficits for emotional responses only to pleasant facial expressions (Sloan, Strauss & Wisner, 2001) Also, in depressed youth inpatients, impaired processing of hedonic information (lower rates of positive adjective endorsement and lower rates of positive adjective recall) were observed, which were specific to depression and were not associated with anxiety. No effect of negative information processing was associated with depression. (Gencoz, Volez, Gencoz, Petit & Joiner, 2001). Mitterschiffthaler, et al (2003) also reported decreased activation in the medial frontal cortex when depressed females were shown positive stimuli.

Moreover, Nandrino, Dodin, Martin & Henniaux (2004) conducted a fascinating study into processing of emotional information in first episode, recurrent and remitted depression. Increased or decreased P300 amplitudes, in response to positive and negative words, were measured*. First-episode depressed patients showed impairment for positive stimuli

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*Amplitudes of event-related evoked potentials (ERPs) may reflect; resource allocation (Deldin et al 2001); strength of response to stimuli such that higher P300 amplitudes indicate confirmed participant expectations (Nandrino et al 2004); or the activation of stored memories required to process a stimulus (Johnson et al, 1993).
hyperesthesia for negative stimuli (increased P300). This may be consistent with the present thesis AMT results found for dysphoric and depressed children. After clinical improvement, the positive deficit remained in the first-episode group while the negative bias disappeared in the recurrent group. Results strongly indicate that a depressive deficit with respect to positive information processing exists in the early stages of depression, which may form the basis for subsequent negative information processing biases in recurrent depression.

Dozois & Dobson (2003) also tested the interconnectedness of depressive self-schema on a computerized task whereby individuals placed positive and negative interpersonal trait adjectives into a matrix depending on how self-descriptive and how positive or negative the words were believed to be. Inter-stimulus distance was calculated controlling for adjective endorsement. Individuals with more recurrent depression demonstrated significantly greater organization of negative content (i.e. less inter-stimulus distance) and less interconnectedness of positive content (i.e. greater inter-stimulus distance) than those with less recurrent depression. ‘Separated’ organization of positive information is thought to reflect poor positive self-schema. This could underlie poor retention, retrieval, encoding or assimilation of positive information in depressed individuals. Thus, evidence from the wider depressive literature is consistent with the valenced AMT data results found here, indicating initial positive-information biases, spreading to negative-information biases.
So far we have discussed the importance of age and depression status in accounting for valence specific results. There may also be different valence patterns associated with different clinical groups. In addition, it is clear that specific and overgeneral valenced memory retrieval can have different implications depending on the passive (or active) motivation behind of the preferred retrieval style. Future studies could specifically consider this issue. For example, a negative specific memory can reflect more than one thing such as an intrusive negative memory, an avoidant trivial or recent memory, or simply non-avoidant task compliance. (see Table 8.1)
Table 8.1. A Sample of Possible Underlying Explanations for Valenced AM Responses

<table>
<thead>
<tr>
<th>AM RESPONSES TO VALENCED CUES</th>
<th>(proposed nature of effect)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific negative</strong></td>
<td></td>
</tr>
<tr>
<td>1. Negative memories trivial, recent, harmless (functional)</td>
<td></td>
</tr>
<tr>
<td>2. Negative memories commonplace so too many to choose from*</td>
<td></td>
</tr>
<tr>
<td>3. Intrusive memory (dysfunctional – but not synonymous with depression) trauma related~</td>
<td></td>
</tr>
<tr>
<td>4. Events encoded as negative when perhaps not (dysfunctional-synonymous with depression)**</td>
<td></td>
</tr>
<tr>
<td><strong>Overgeneral negative</strong></td>
<td></td>
</tr>
<tr>
<td>1. Negative events seen as schematic (dysfunctional)</td>
<td></td>
</tr>
<tr>
<td>(a) Because frequent (dysfunctional but unbiased) *</td>
<td></td>
</tr>
<tr>
<td>(b) Because significant (dysfunctional)**</td>
<td></td>
</tr>
<tr>
<td>(c) Because viewed as prototypical (dysfunctional)**</td>
<td></td>
</tr>
<tr>
<td>2. Participant is a child (N/A)</td>
<td></td>
</tr>
<tr>
<td><strong>Specific positive</strong></td>
<td></td>
</tr>
<tr>
<td>1. Access to lots of positive memories (functional)</td>
<td></td>
</tr>
<tr>
<td>2. Specific positive retrieval recent or trivial (dysfunctional –link with trauma)~ x</td>
<td></td>
</tr>
<tr>
<td><strong>Overgeneral positive</strong></td>
<td></td>
</tr>
<tr>
<td>1. Positive events seen as schematic (largely functional)</td>
<td></td>
</tr>
<tr>
<td>(a) Because frequent (functional)</td>
<td></td>
</tr>
<tr>
<td>(b) Because significant (less functional) x</td>
<td></td>
</tr>
<tr>
<td>(c) Because viewed as prototypical (possibly functional but biased) x</td>
<td></td>
</tr>
<tr>
<td>2. There are no specific positive memories to choose from (dysfunctional but not biased) *</td>
<td></td>
</tr>
<tr>
<td>3. Positive specific events exist but are not retrieved or encoded as such (highly dysfunctional)**</td>
<td></td>
</tr>
</tbody>
</table>

Note: Content analysis and participant report of typicality and AM significance required
** Memory style synonymous with depressive bias
* Perhaps indicative of Depressive Realism
~ Trauma related
x Positive Bias
As can be seen in Figure 8.1, the styles of interest to a cognitive psychologist investigating depressive bias are evident and do not blanket encompass overgeneral (or specific) retrieval.

**Depressive bias:** Overgeneral negative (because viewed as prototypical or significant)

  Overgeneral positive (because not retrieved or encoded as such)

  Specific negative (because encoded as such)

Where specific or overgeneral memory is deemed justified (i.e. roots currently experiential) this is not classed as depressive bias. This would be classed as depressive realism and is marked (•).

**Depressive Realism:** Specific negative (because so many to choose from)

  Overgeneral negative (prototypical because frequent)

There are also several styles, which may prove typical of a trauma population. Since trauma and depression are often co-morbid, it is unsurprising that styles perhaps more critically associated with trauma have been classified as depression-associated in the AMT literature. (denoted by −)

**Trauma Related:** Specific negative (because intrusive)

  Specific positive (when trivial or recent)

Something which is rarely discussed in the literature, but which is surely as scientifically noteworthy as is depressions' polar sister; positive bias.

**Positive Bias:** Specific positive (when trivial or recent but individual not traumatized)

  Overgeneral positive (because viewed as significant)

  Overgeneral positive (because viewed as prototypical)
So is OGM always Over-generalizing?

It is not clear that positive and negative OGM echo the same cognitive process. OGM to negative cues in depression may reflect the operation of negative schema, prototypicality or overgeneralization judgements consistent with a typical depressive categoric style (Beck et al 1979). OGM to positive cues in depression, on the other hand, may reflect the fact that specific positive information has been dismissed due to cognitive dissonance. Thus, OGM to negative cues may occur because there are multiple exemplars, which have been given a general classification. OGM responses to positive cues may indicate an absence (rather than abundance) of positive memories. If this is the case, positive and negative OGM in depression do not reflect the same underlying memorial search-retrieve processes.

Positive OGM would reflect a task failure whereas negative OGM would reflect overgeneralising in the true sense. That is, a depressed person doesn’t say ‘I’m happy all the time’ because they have accessed lots of happy memories and have generalised them. They may however say ‘I’m happy sometimes’ because they fail to locate a specific memory. Both responses are classified as OGM but the implications in terms of memory-search-retrieval are different. Perhaps a simple task to accompany the AMT would shed light on this issue. For example, asking individuals to list as many good and bad memories as possible in a fixed time period might give an indication of the availability of negative vs. positive memories, to compliment the overgenerality data. If valenced OGM is as proposed, one would expect many more ‘negative’ memories to be listed than ‘positive’. In essence, depressed OGM to positive cues may not reflect overgeneralizing, that is, the cognitive principle of spreading semantic meaning across several elements (de Bonis, 1998) but rather poor positive information processing.
8.3. Problems, Alternatives and Additions to the Theory of Affect Regulation

Though the theory of Affect Regulation (AR), (Williams, 1996) has generated substantial research interest in the field of AM and affective disorders (see Chapter 2) and has fuelled numerous creative and productive theoretical debates in the literature (e.g. Dalgleish et al., 2003; Philippot et al, 2004) which have undoubtedly advanced our understanding of the underpinnings of depressive cognitive (memory) style. It grows increasingly likely that AR cannot adequately account for the wide-ranging findings in the literature. It remains highly likely that a cognitive avoidant style plays some role in the development and/or maintenance of overgeneral recall. However, the following sections highlight the main, emerging shortcomings of AR. The second part of this section deals with alternative theories to account for OGM in depression and traumatized groups.

8.3.1. Multiple Interpretations e.g. Prototypicality

Regarding AR and the developmental hypothesis (Williams, 1996), early adversity does seem to result in overgeneral recall. However, rather than children trying to regulate emotion by retrieving overgenerally, instead they may recall overgenerally because they see those memories as prototypical, operating at level of schema and not because this is less emotive. Under normal circumstances people use generic memory because of the efficiency it affords in summarizing large numbers of individual episodes and events. General memories can give quick access to information. However general memories are formed not merely as a frequency effect, i.e. the more frequent an event the more likely it is to become generic. Instead, one off events are often generalized if they are viewed as typical by the individual. Importantly then,
CHAPTER 8: GENERAL DISCUSSION

individual events can become generic in a person’s memory if they are seen as paradigmatic or representative, as governed by an individual’s ‘cognitive agenda’. Our retrieval systems deliver what is seen as typical and what is considered ‘typical’ by an individual is effected by their current schema and scripts. Thus overgeneral recall may feasibly be considered a consequence of prototypical appraisals governed by underlying schema unmotivated by an affect regulation mechanism.

Children may operate at this schematic level if they are regularly trying to make sense of difficult situations. If life events were reasonably straightforward, then there would be no need for a young child to heavily engage an implicational/schematic level of thinking (Barnard & Teasdale, 1993; Power & Dalgleish, 1997). However, when an individual is confronted with stress, for example in the case of trauma or depression, s/he will habitually and heavily engage an abstract system to try to ‘make sense’ of their world. If so, this would function to facilitate overgeneral thinking and resultant OGM. This induction of schematic level processing in trying to ‘make sense’ of unpleasant experiences, ties in with ruminative tendencies in the OGM depressive literature (e.g. Watkins & Teasdale, 2001) and with problems of assimilation, associated with trauma (e.g. Williams, Stiles & Shapiro, 1999).

Therefore although the existence of OGM in children who have experienced negative life events or depression, supports an ARH, only a study designed to specifically test affect generated in children recalling general versus specific memories would support or refute the specific affect regulating claim (see Philippot, Schaefer, & Herbette, 2003). Moreover, while the expected main OGM group effect was found in traumatized boys (Study 5), boys who were more severely abused were in fact less overgeneral. This effect has also been been demonstrated by Kuyken, Howell & Dalgleish (2005). The current ARH cannot singularly account for this type of complexity in the OGM data.
8.3.2. AR’s problem with Valence

Another problem with the theory of AR in explaining OGM is the existence of overgeneral positive memory in depression. The theory of AR, if correct, can account for why depression is associated with a propensity to produce overgeneral negative memories, i.e. the avoidance of specific (painful) negative memories. This theory comes unstuck, or at best must stretch to account for cases of overgeneral positive recall. Continuing with an AR hypothesis, one could only argue that overgeneral positive recall exists because (a) the AM system becomes indiscriminately overgeneral or (b) searches for specific positive memories triggers thoughts of “I don’t have specific positive memories” which results in the experience of negative affect and thus overgeneral recall. Either way, the mix of overgeneral negative and positive memories found in clinically relevant populations, makes it difficult to conceive of how these qualifications would systematically work. For example, if OGM is viewed as an attempt to avoid specific negative memories, we must assume individuals demonstrating overgeneral recall to positive cues are trying to avoid remembering specific positive memories. This is only coherent if one assumes that positive personal memories are adverse to some individuals. This may well be in the case in depression (e.g. Dunn, Dalgleish, Lawrence, Cusack & Olgivie, 2004). It is slightly more difficult to explain in remission from depression, as individuals in a good mood should not find positive memories adverse.

8.3.3. Are Specific Memories Actually More Emotionally Evocative?

Indeed, are specific memories actually more emotionally evocative than general? The theory of AR rests on the assumption that they are. However, recent work by Phillipot and colleagues (Philippot et al, 2002; Philippot et al, 2003; Schaefer & Philippot, 2005) has suggested that under some circumstances specific recall may be less emotionally evocative
than general. Furthermore, distinctions must be made between different types of emotion generation. Specific memories can certainly trigger physiological emotion reactivity as details of a traumatic or unpleasant or unwanted memory come to mind (e.g. Brewin, 2001). However, at the same time, generic memories can generate emotion, but emotion perhaps of a different quality. The emotion generated by overgeneral negative remembrance- causes the individual to ‘feel’ depressed, hopeless, powerless, and vulnerable i.e. triggers emotion perhaps via a more schematic route (e.g. Power & Dalgleish, 1997). This type of distress may be harder for individuals to quantify and introspect about so participants’ rating of emotional intensity may be confounded by this complexity. This type of abstract thinking is not necessarily associated with high physiological arousal but it is, in essence, associated with long-term dysfunctional affect.

8.3.4. The Extent of Overgenerality in a given Population or Patient

Another problematic aspect of the Williams’ (1996) model is its dependence on a disruption to the normal development of the memory system in childhood. As Dalgleish et al. (2003) pointed out, a developmentally disrupted memory system would result in a high incidence of overgeneral memories but this is not the case. Overgeneral memories are the exception rather than the rule; typically 75% of memories retrieved on the AMT are specific. In support of the AR theory in terms of importance of childhood experience on the developing AM system, current results show that severe negative life events in early childhood results in extreme overgenerality (35% specificity in Study 5). It is simply that, this may not be only (or largely) due to AR processes. Instead it may just as easily be associated with the impact of early adversity on developing schema.
8.3.5. Alternatives to Affect Regulation: Temporary Memory System Disruption

An alternative theoretical analysis of the overgenerality bias might be that the memory system is developmentally normal but that individuals fail on the task on a relatively small number of trials because the memory system is temporarily disrupted for some reason. This Temporary Memory System Disruption hypothesis (TMSD) is proposed by Dalgleish et al, (2003). The source of this disruption could be the presence of personal schemas, “conflating across positive or negative aspects of past experience”. Certain cue words might map closely onto the content of such schemas thereby causing them both to become further activated and to attract processing resources. This would mean that either a propositional read-out of activated schema would be given, or that processing would be truncated as resources are directed elsewhere. This might also explain why anxiety is not typically associated with overgeneral AM; anxiety-related negative schemas are about the world not about the self. Asking anxiety patients to generate specific memories about the threatening content of the world may result in overgeneral errors.

Similarly if viewing OGM as an inhibitory control problem, Hasher & Zacks (1979) proposed that depressed individuals have difficulty inhibiting interfering cognitive material when seeking to perform cognitive tasks. Within a hierarchical AM framework this would lead to vulnerability to OGM because specific retrieval requires appropriate inhibition of mnemonic material from other stages of the memory hierarchy. Deficits in this ability to inhibit interfering information may contribute significantly to OGM errors. Moreover it has very recently been demonstrated that AM retrieval appears particularly vulnerable to executive failures of inhibitory control. Dalgleish et al. (2005) argued that, if a central problem in
specific memory retrieval is a failure to inhibit interfering information, then numbers of over-general memories on the AMT should be associated with errors of performance on executive tasks that require inhibition of irrelevant information. In a series of studies in dysphoric individuals Dalgleish et al. demonstrated that this was the case. Levels of OGM were correlated highly with levels of inhibitory task errors on a range of executive paradigms with little or no relationship to autobiography, memory or emotion.

Overgeneral positive recall may also be explained with reference to negative schema. In effect depressed individuals may underplay positive specific memories because of strong negative schema making the recollection of specific positive memories incongruent with the self. Alternatively, the absence of positive schema (rather than the presence of negative schema) in some individuals (for examples dysphorics) could explain poor specific positive recall. In addition, a negative self-schema (e.g. ‘I am a failure’) could be activated by both negative-schema congruent (e.g. ‘Sad’) and positive-schema incongruent (e.g. ‘Success’) cues. In the first instance the schema will be activated and the depressed individual will quickly be able to give a response be it specific (because they can think of multiple examples) or generic (because they view sad events as prototypical). In the second instance, being made to think about success may make a depressed person think of all the ways in which they are not successful thus triggering negative self-schema. It will be difficult to suppress the influx of these ‘non-successful’ memories to provide a counterexample. The individual may now give a general response. Hence, active self-schemas are likely to be a source of cognitive intrusion when cues reflect the thematic content of these schema (Dalgleish et al, 2003).
8.3.6. Developmental Schema Memory Impact Theory (D-SMIT)

I would trouble to go one step further, and combine elements of AR with TMSD and suggest that the developmental memory system is not normal, but *is* impaired, but that the impairment is not affiliated with AR mechanisms. I would argue that due to the effects of early childhood trauma or adversity (an AR element), the memory system is biased to:

(a) Encode events as negative (because sensitised to negative information)
(b) See negative events as prototypical (because the event(s) happened early in life they will have heavily influenced schema development)
(c) Filter out positive events as schema incongruent (consistent with schema theory)

Thus, there is heightened sensitivity to negative information (due to the AR early adversity element) followed by subsequent overgenerality caused by a combination of schema congruent vs. incongruent mechanisms and prototypicality bias. This means schema *are* causally involved in the retrieval of overgeneral memories (the TMSD element). However, the developmental impact of adversity on schema, is such that it accounts for why it is in depressed individuals that this overgeneral effect is predominantly observed

We all have schema. Yet the schema of normal mood individuals, are not activated by AMT cue words, or if activated, the schema do not appear to have strong effector links with the memory system (no resulting overgeneral memory). This may be because difficult childhood memories are key to OGM in the sense that early childhood adversity establishes close links between developing schema and developing memory and emotion, and thereby the systems
can exert greater (than normal) influence on each other. This argument, in short, is the developmental-schema memory impact theory (D-SMIT).

Schema-memory and emotion links in childhood-traumatized individuals will be strong. Less traumatic or less significant negative events early in childhood will only moderately if at all evidently, impact developing schema and will not be accompanied by strong affect links. Schema are less malleable in adulthood, which is why concentrated therapeutic effort is often required to modify or qualify schema after a negative event. Childhood adversity on the other hand, will far more easily impact developing schema. In fact early experience functions as the very blueprint for such schema. Early experience guides the newly developing schema, hence early negative experience has significant implications on self, world and future schema as there is little backlog of experiential information in children to offer contradictory or competing evidence. Children’s schema are new and like carte-blanc; impressionable. Early in life children who have experienced trauma and/or adversity believe that ‘bad things happen to me and I can’t prevent it’. This has subsequent effects on mood, information processing, and a developing memory system. The schema of non-depressed/non-traumatized children on the other hand may develop in a more piecemeal, integrative, functional way, encompassing multiple (and less emotive) event memories and appraisals. It is early adverse experience, which results in ‘pathogenic nuclear themes’ (Breuer & Freud, 1895).

This is arguably why the theory of TMSD holds true for depressed individuals but not for controls. This is also why the theory of AR holds true, in the sense that early childhood trauma is of causal significance in the development of the OGM bias. Whereas, TMSD neglects to explain why disruption only occurs in depression and AR, I propose, gets the implications of childhood adversity wrong (i.e. avoiding specific negative memories as
opposed to forming negative schema). Combined however, and with the addition of the stress on development of strong schema-memory-emotion links (thus the ensuing vulnerability of the schema and memory systems to each other), it becomes easier to account for many of the results in the valenced AM depressive literature. Also as with anything pertaining to plasticity in the brain, there is likely to be a critical period during development whereby the impact of negative information is more severe than otherwise. One could argue that this period is during early childhood when cognitive schemas are being developed and formed.

8.3.7. Congruence and Inhibition

Recently, Dalgleish and colleagues (2005) have shown that self-rated depression was associated with specific errors when the task instructions were reversed. It is felt that inhibition is therefore also key to understanding the nature of OGM responses. Clinical groups fail to inhibit task inappropriate responses and therefore so far have looked to be overgeneral but are overspecific if they are required not to be. This makes sense in terms of the clinical groups that are effected i.e. depression and trauma and OCD and eating disorders all have problems with intrusive negative information and 'control'. Hence, we can infer, that a problem with inhibiting unwanted information may be relevant to OGM.

8.3.8. Importance of self-concept to OGM

The importance of self-concept is also an under-researched area of OGM. In adolescence, memories best recalled as contributing to life stories were organized around clear themes and personality traits, with high levels of congruency and consistency (Habermas & Bluck, 2000). Therefore it seems likely that organization of self-concept effects AM. Howe & Courage
(1993) state that with the emergence of the self we witness the emergence of AM. They argue that AM does not depend on language for its existence but does require a cognitive sense of self. So is it possible that self-concept is less sophisticated in depression and that this can account for OGM? Beck et al, (1979) would certainly assert that the self-concept in depression is over-simplistic, one-dimensional and fixed e.g. 'I am fearful' - as opposed to the multidimensional 'I am sometimes fearful, but I am also strong and kind'. This could contribute to OGM errors in depression.

8.4. Thesis Results in terms of Information-Processing

Results of this thesis suggest that one IP style mediating the relationship between life experience and experience of depression in childhood may be OGM (Figure 8.1).

Figure 8.1. IP and OGM

Reduced AMS was associated with EF, FER, SPS and a range of negative CS measures. OGM also predicted depressive symptoms in childhood during a stressful life event and was present in children who had experienced trauma. EF as a measure of encoding preferences, FER as a measure of emotion interpretation, and OGM as a memorial bias were all associated with depression in childhood. The interrelationships between these variables was also investigated and indicated that children's processing can be biased in ways equivalent to those
found in adult depression. (Figure 8.2.) Future work should further consider the pattern of avoidant (or selective) processing of valenced emotional information as a feature of child depression (across attentional/interpretative, memorial and schematic domains). Further studies are also needed to underpin the interrelationships between these IP preferences.

**Figure 8.2. Summary of IP Thesis Findings in Childhood**

*Bold connectors denote empirical relationships as evidenced by the present thesis results.*

8.5. Thesis Results in terms of Cognition and Emotion

Williams et al (1997) highlight the importance of memorial biases in characterizing depression in adults. The AMT results from this study supports this characterization in
depressed children. Poor specific positive recall relative to negative is consistent with previous work showing depressed children's poor recall of positive self-descriptors (e.g. Gencoz et al, 2001; Hammen & Zupan, 1984; Neshat-Doost, et al, 1998) and improved recall of negative descriptors (e.g. Timbremont & Braet, 2004). High dysphoric children also showed better recall of sad stories relative to positive (Bishop, Dalgleish & Yule, 2004). This thesis extends the evidence of depression-related memorial bias in children towards negative information and away from positive, by demonstrating this bias in the recall of specific personally relevant autobiographical memories.

Results would perhaps support the proposition made by Williams et al (1997) that depression is characterized by resource allocation/sustained strategic attention towards negative information, in that dysphoric children demonstrated accurate recognition of sad faces relative to controls (Study 4) and greater negative AMS compared to controls (Study 1). However, one refinement in keeping with this theory may be that the bias for negative information is preceded by impairment in positive information processing, as reviewed in section 8.2.5.

In terms of Beck's cognitive theory of depression, the thesis results support the contention that schema-based processing with its capacity for bias and selective recall exists in childhood and may play a role in vulnerability to depression. Predicted links between negative schema and depression in children were demonstrated. Moreover, these factors were associated with OGM recall in children. Poor recall of positive events could contribute to the perpetuation of negative beliefs and mood state such that depressed children are known to demonstrate negative schematic self-beliefs (e.g. Zupan, Hammen & Jaenicke, 1987; Schniering & Rapee, 2004) and reduced positive specific recall was associated with such negative self-schema in this thesis.
According to Conway & Pleydell-Pearce (2000) remembering is a goal directed activity and there is a strong relationship between self, goals and memory. Moreover, memory is distorted under two guiding principals of correspondence and coherence. Coherence can be utilized to explain why the memory system may become biased against the assimilation of positive information in depression i.e. in an effort to maintain a coherent negative self-view. It appears this mechanism may already be in effect in childhood, as evidenced by the paucity of specific positive self-related memorial information retrieved by depressed/dysphoric children.

In addition, consistent with a depressive realism interpretation, mildly depressed individuals (dysphorics) were more balanced in their specific valenced recall, whereas non-depressed individuals actually retrieved greater numbers of positive specific memories relative to negative. Results in clinically depressed and dysphoric children also suggest different underlying schema or mechanisms. For instance, there is evidence that dysphorics are less self-devaluative compared to depressed persons although they are similar in terms of affective components (Teasdale & Cox, 2001). Therefore dysphoric children may demonstrate poor positive AMS due to mood incongruence, whereas OGM effects in clinically depressed children may be more governed by negative self-beliefs. Noting of course that the activation of emotion-related schema should not facilitate the recall of information specific to a unique episode (Schaefer & Philippot, 2005).

It is proposed that emotion provides a guiding principle around which development is organized, including the development of the self (Power & Dalgleish, 1997). This rings true in terms of the AMT findings here. AM is central in defining the self and depressed/dysphoric children show poor recall of specific positive AMs. If these children have poor organisation of positive information in memory it will be hard for them to access and retrieve positive
memories from their past. Furthermore, results suggest that dysphoria affects AMS in children not by increasing availability of negative memories but by decreasing availability of positive memories. This is consistent with the SPAARS model, which asserts that in a negative mood, depression prone individuals may find it difficult to access positive information due to un-integrated positive and negative aspects of the self.

Results from the residential children also demonstrated the impact of early adversity on emotion-related processing. If goals are hierarchically arranged and are important to processes of cognition and emotion, what kind of goals do abused children have and how are they hierarchically arranged e.g. ‘don’t get killed by mum then do my homework.’ What implications does this have for cognitive and emotion processing? According to SPAARS (1997) cognition-emotion cycles occur in levels or cycles with each cycle leading to the event being appraised in a more sophisticated way. Abused children may stop short in appraisal cycles and not go further than basic survival orientated processing, and hence this may in part, result in deficits on tasks such as the MEPS.

In summary, this body of work was approached from central theories of cognition and emotion and from established cognitive models of depression. Existing affect-cognition theories are largely based on adult data (Williams et al 1997; ICS, 1993; SPAARS, 1997). However, work with children clearly has theoretical as well as applied implications and may give insight into the development of the biases or systems espoused by these theories.
PART III | Methods, Future Studies and Conclusions

8.6. Methodological Issues in Pushing Forward this Research

One of the main limitations of the AMT is that it is unclear what is motivating responses to these cues. Overgeneral errors on this task are historically viewed as reflecting dysfunction. However there is more than one possible motivation for retrieving an overgeneral memory. For example, positive events happen all the time and are viewed as prototypical, or there are large periods of time where the individual just felt happy and it is difficult to single out one; in contrast to an OGM because the individual can’t think of a specific memory because they don’t have any to access. As researchers we need to start examining the motivation behind valence-specific OGM recall.

Another issue is that a common definition of AM involves memories that are “relevant for the self-concept because they form the individual’s history of life” (de Decker et al, 2003). Swales et al (2001) also give a similar definition. However, the AMs produced in the AMT are not necessarily informing individuals’ self-concept. Indeed it is worth considering the criticism that ‘current work on autobiographical memory does not take the term autobiographical seriously enough’ (Bluck & Habernas, 2000). In this view, only memories that are linked to the self through their motivational or emotional significance over one’s life are truly autobiographical. Therefore many of the memories retrieved on the AMT may not be autobiographical in the strictest sense, i.e., meaningful, highly self-reverent, contributing to a sense of self or life story. It is difficult to find a way around this methodologically, apart from requesting memories from more distant time frames or perhaps asking individuals to give...
important' memories. Therefore, I think it is important to acknowledge that the AMT samples the retrieval style of an individual but that we must caution about talking about the memories as being autobiographical in the strictest sense. Indeed, Williams (1996) highlights two studies by Singer and Moffitt (1992) whereby students were given instructions to provide 'self-defining' memories. This instruction resulted in more than double the number of categoric memories retrieved to cue words. This shows that the 'significance' of the memory retrieved by the participant will have a bearing on the specificity of the memory retrieved. No study has examined the significance of the content of memories retrieved in this sense, i.e. whether they represent memories of higher personal meaning or relate to a life lesson. The extent to which an individual offers significant as opposed to more trivial memories will influence the overgenerality of their memories. This is not taken into account in the AMT.

Another criticism of the AMT methodology is simply a general criticism of cuing paradigms in general. This has drawbacks including its stimulus limitability. Words have to be matched for word frequency and emotionality, which is a difficult task. Word stimuli also have limited applicability to subjects of low reading ability. However, the point here is that very little work has been conducted into the nature of this cuing e.g. work in the cognitive literature in general has looked carefully at the effect of self-referencing and personal relevance of memory cue words but no such studies have examined the possible effect of these factors on cuing AM. Perhaps most importantly, the imageability of the words needs to be properly tested, as words high in imageability are more likely to produce specific memories than words low in imageability. This could affect the specificity of responses (Williams, Healy & Ellis, 1999)

Coding instructions could also be revised e.g. responses such as 'my mum' 'home' can be viewed extreme forms of overgeneral memory rather than be excluded as semantic associates.
Participants could also be asked to rate the valence of the memories recalled to try to clarify valence effects in the literature. Furthermore, many possible moderators of OGM (such as personality, age and culture) could be examined systematically to gain a more thorough understanding of stable contributing factors.

Finally, many different cue words have been used throughout the AMT literature. Also different instructions are used. The neutral words used can be problematic for instance one study used ‘bread’ and ‘grass’ as a neutral cues. These words are very different to cuing with emotional words. For instance, one can wonder how many people have self-defining memories involving bread? Also, in the AMT, some cue words are dispositional e.g., ‘happy’ whereas other words are occurent, e.g., ‘excited’. Occurrent emotion tends to reflect something ‘here and now’ whilst dispositional cues would perhaps be more likely to trigger more general responses. Again this has not been systematically considered in the literature.

With respect to other possible improvements to the methodologies used throughout this thesis, the FER could be improved by using faces rated more carefully e.g. on a likert-scale and adding other negative emotions such as anger, or disgust (Sprengelmeyer, et al, 1997). Measurements of cognitive vulnerability also appear to lack precision, for example there was overlap between the CS measures. The MEPS has also been criticised on the grounds that it measures hypothetical social problem solving ideas but not solution implementation (D’Zurilla & Maydeu-Olivares, 1995). Future studies could address MEPS measures alongside observer report of implemented social skill. EF could also be studied with neutral AMT cues, could be developed with a greater range of depicted emotions, and also with varying extremes of emotion. The state vs. trait nature of EF could also be explored.
The availability of measures of depressed mood in children are also a clear area for improvement. Better discriminating measures of mood in children are needed. For example, a pure depressed clinical sample was difficult to obtain and low base rates of dysphoria in normal populations meant small numbers. It is also unclear what the precise relationship is between dysphoria and depression. In addition, studies that rely on depression measures with high negative affect content (such as the CDI) may not detect important effects relating to low positive affect. By way of example, the CDI in Study 3 correlated highly with ‘how sad are you right now’ but did not negatively correlate with ‘how happy are you right now’. It would be interesting to incorporate a measure of low positive affect in addition to measures of high negative affect to perhaps better capture depressive populations. With increased numbers interactions between factors and possible mediational relationships between variables could be examined. Alternatively, negative mood measures with better spread might help deal with this problem.

8.7. Future Directions

AM recency could be examined. Is recency a typical memorial coping style of highly abused individuals or is this a normal memorial strategy employed on the AMT? This would be assessed through content analysis and participant report. Further studies specifically investigating negative self-schema in association with OGM are required. Depressed individuals may retrieve overgenerally because negative affect generated by the cue words may impairs memory search processes, resulting in automatic ‘schematic’ responses. Studies investigating the association between affect arousal and OGM are therefore required. Children could also be asked to rate the valence and significance of memories retrieved to assess the extent to which these factors are associated with overgenerality.
Future work could investigate the absence of mood effects with respect to neutral face stimuli in childhood. For example, is the problem stimulus dependent? Also, Yik and Russell (1999) concluded from their work that facial expressions signal the same social message across culture. It would be of interest to examine whether mood has any bearing on the interpretation of social messages of facial expression. It may be that depression is less associated with inaccurate labelling of emotions but more associated with higher order appraisals of the social-interpersonal meanings of such facial expressions. Timing the latencies to respond to valenced faces may also yield interesting results regarding whether depressed children spend longer attending to negative information (in keeping with Williams et al, 1997).

Research to date has also paid remarkably little heed to gender differences in AM functioning. Davis (1999) examined memory for childhood events in adult men and women remembering back to childhood. The overall pattern of findings obtained was consistent with the proposition that gender-differential socialization processes influence the content and complexity of representations of autobiographical emotional events in memory. OGM was not investigated, but it is likely an effect would be found, given females recall more emotionally valenced material than males. Gender effects could therefore be investigated. In addition, previous studies of OGM have sporadically examined the relationship between OGM and IQ measures with mixed outcomes (e.g. Dalgleish et al, 2005; Park et al, 2002; Wessel et al, 2001; Williams & Dritschel, 1992). In this thesis no relationship was found between IQ and AMT results. However these results may be measure dependent and so future work could concentrate more specifically on the relationship between executive functioning and OGM in children and adults.
Attempts could also be made to modify OGM with a diary study. Children could be assigned to AMS and control conditions and asked to fill in a diary of events over several weeks. Will active attempts to encode/rehearse specific positive events improve subsequent memory retrieval at follow up and even more interestingly, would this have any impact on mood or self-esteem? More broadly, teaching children functional cognitive skills prior to puberty/adolescence has already proven useful (e.g. Gilham, et al, 1995; de Cuyper et al, 2004). Gilham, Reivich, Jaycox & Seligman (1995) embarked on a depression prevention study with school children, followed over 2 years. Treatment children were taught cognitive and social problem solving skills. At 2 year follow up moderate to severe depressive symptoms were halved. This would support the possibility that psychological immunization against depression in children can occur if children are educated regarding cognitive emotio-social information processing. Would tackling a range of information processing skills such as accurate facial affect recognition, specific AM recall, and increasing awareness of overgeneralizing tendencies or attributional errors, improve long-term mood in children?

8.8. Practical Implications

If OGM is agreed to be dysfunctional, researching developmental time lines will inform how and when to intervene. For example results of this thesis indicate that OGM retrieval is a typical retrieval style of children aged 7-8, but thereafter deviations in specificity may be more mood related. Throughout this thesis I attempted to select information processing tasks that would translate easily into implications for everyday functioning e.g. face processing, personal memory recall. The residential study highlights basic skill deficits in processing of emotion and notable OGM in children who have experienced extreme negative life events but are not demonstrating affective disorder. The deficits in the residential group were severe and
fundamental. Suggestions were made regarding improvement to current intervention 
strategies for children in care. For example, this might include, basic skills training on 
identifying basic emotion and tasks aimed at extending the recall frame for positive event 
memories. Direct experience may be needed to reduce the influence of negative schema on 
information processing. Performance on the tasks may reflect a product of ‘moment to 
moment’ survival based thinking. However, if a long-term memorial style is impaired these 
children are failing to develop a positive bank of long-term memories to draw from in terms 
of self-identity, social problem solving, and goal formation. Conway (2005) points out such 
‘recent’ memories are on a forgetting trajectory because they are unlikely to be rehearsed and 
unlikely to be significant to long-term goals. For example - ‘splashing in a puddle yesterday’.

Patterns in the memory responses e.g. ‘in my room at night’ was a common response to the 
cue word ‘Lonely’ this could also offer information regarding a vulnerable period to target for 
boys in care. Findings from this study support the proposition that cognitive biases such as 
OGM may precede depression. Indeed blind rating of the residential group in terms of 
likelihood of developing future affective disorder, specifically depression, showed that out of 
the 13 boys named, 10 demonstrated the highest relative sample overgenerality. Finally, the 
OGM bias in childhood was not more pronounced in a clinical group compared to a sub-
clinical group and overall the extent of OGM was the same in depressed children as in adults. 
Therefore efforts should be made to address this bias in youth.

8.9. Thesis Summary and Conclusions

There exists a limited literature on emotion-related cognitive processing in children. Dalgleish 
et al (1998) stated that there is “almost no research examining ways in which depressed
children perceive, attend to, remember, think or make judgements about emotional material”.
This thesis was looking to address this deficit. In depressed adults cognitive bias tends to occur at an elaborative stage of processing i.e. during the interpretation, recognition and recall of information, a type of memorial bias was therefore principally investigated.

8.9.1. Contribution of the Thesis

This thesis has contributed to: an understanding of child AM specificity, an understanding of development of valenced emotion processing, an appreciation of the affects of mood and age on information-processing in children, an understanding of possible causal relationships and the interrelationship between multiple cognitive measures in children including memory and mood. The thesis has also enabled comparisons between child and adult depression related processing and has contributed a new measure of Emotion-Focusing. This thesis has demonstrated for the first time: OGM in depressed and dysphoric children; a link between OGM and CS; the relationship between depressed mood and processing of facial affect in children; the importance of emotion encoding to OGM and OGM in abused children. In terms of originality in approach – the concept of EF had not been empirically tested. This offers a new approach to the study of OGM and explained statistically significant unique variance even above dysphoria. EF may have clinical, as well as theoretical relevance. The work on SPS then replicates adult findings and highlights one of the possible downstream consequences of OGM in children. The demonstration of associations between OGM and the other emotion-related measures sets OGM in the context of other prototypical depressive biases. The AM findings in this thesis are consistent with, but expand upon the accepted knowledge in the field as indicated by adult studies.
8.9.2. Relevance to a Professional Audience

This doctoral work was presented at a special interest meeting on AM in Oxford in 2004 and at a British Psychological Society conference on child psychology in Edinburgh, 2005. The work on EF has been presented at a university department specifically interested in emotion processing. The residential work was presented at a Clinical Professional Development Training Day at the Institute of Psychiatry, London. A written summary of some of this work was also requested for the British Psychological Society publication of Service and Practice Update- a journal distributed to child and adolescent practitioners within the UK (Appendix 8.1). A publication of Study 1 is also in press, for a Special Edition of Cognition and Emotion on Autobiographical Memory and Psychopathology (Appendix 8.2). Colleagues in Wales and Australia are now using the measure of EF to inform their studies on child AM. Thus, the work is of some interest to a clinical-cognitive audience.

8.9.3. Importance of the Work

Depression is considered one of the most costly and devastating of psychological problems. Concentrating research on adults who are already suffering from depression can tell us a lot about what depressed persons do and feel. It helps less, in discovering the cognitive causes of depression. It helps even less if any attempt is to be made at preventative research. Testing children whether vulnerable or not, to examine the existence of known depression-related cognitions seems central to uncovering the development of depression from a cognitive perspective. This research has confirmed for me the extent of similarities between children and adults in terms of cognition. My first administration of the child depression inventory, in which several 7-8 year old children endorsed statements such as ‘I am ugly’, ‘I do everything wrong’, ‘no-one really loves me’ made me stop and think. For all the children (or adults) who
fall below any clinical criteria for depression, there is still an immense amount of suffering going on. Moreover, when you sit in front of a 7 year old child, and say the word ‘happy’ and they look back at you confused, pause, frown in concentration, grapple with themselves, yet still can’t produce a ready happy memory - this is fundamentally sad. Anything we can do as researchers to improve our understanding of depressive thinking, or more precisely, how to improve functional thinking- is important.
References:


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rumination and ineffective social problem-solving in major depression? Journal of Affective Disorders, 87(2-3), 331-335.


REFERENCES


REFERENCES


REFERENCES


Appendix 1.1. Main features of DSV-IV-TR Diagnostic Criteria for Major Depressive Episode

Five (or more) of the following symptoms are present during the same 2-week period and represent a change from previous functioning; at least one symptom is either (1) depressed mood or (2) loss of interest or pleasure. Do not include symptoms that are clearly due to a general medical condition, or mood-incongruent delusions or hallucinations.

(1) Depressed mood most of the day, nearly every day, as indicated by subjective account (e.g., feels sad or empty) or observations by others (e.g. appears tearful).

Note: in children and adolescents, can be irritable mood.

(2) Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated by subjective account or observations by others).

(3) Significant weight loss when not dieting or weight gain (e.g., a change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day.

Note: in children, consider failure to make expected weight gains.

(4) Insomnia or hypersomnia nearly every day.

(5) Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings or restlessness or being slowed down).

(6) Fatigue or loss of energy nearly every day.

(7) Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick).

(8) Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others).

(9) Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or specific plan for committing suicide.

Appendix 1.2


<table>
<thead>
<tr>
<th>SCHEMA-BASED</th>
<th>PROPOSITIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic Processes</td>
<td>Controlled Processes</td>
</tr>
<tr>
<td>Parallel</td>
<td>Sequential</td>
</tr>
<tr>
<td>Modular</td>
<td>Dependent/interactive</td>
</tr>
<tr>
<td>Fast</td>
<td>Slow</td>
</tr>
<tr>
<td>Effortless</td>
<td>Effortful</td>
</tr>
<tr>
<td>Low awareness</td>
<td>High awareness</td>
</tr>
<tr>
<td>Inflexible</td>
<td>Flexible</td>
</tr>
<tr>
<td>Difficult to modify</td>
<td>Easy to modify</td>
</tr>
<tr>
<td><strong>Emotion generating</strong></td>
<td><strong>Emotion inhibiting</strong></td>
</tr>
</tbody>
</table>
Appendix 3.1. Sample Coded Child AMT Responses

Specific Positive:

Happy:
Today playing a game...

Surprised:
Coming here.
When my tooth fell out....
When my parents got a new car- it was a people carrier.
Last Christmas when I got a bike...

Successful:
Today when I finished a Christmas card...
When I completed a game...
When I completed a science lesson....
When I learnt my 10 and 20 times tables

Safe:
When my brother looked after me when I got lost in Boots in Croydon...

Interested:
When I saw my first tarantula at the zoo.
There was a fire in my house... I was interested in that.
In dinosaurs...(child goes on to give an excited and elaborate account of a recent visit to a dinosaur museum)

Overgeneral Negative:

Sad:
I feel sad a lot.
When my mum shouts.
When my brother hits me.
When friends won't play with me.
When I get beaten up.
When my mum is sad.
When I'm not allowed things.

Angry:
At my sister...
At my mum...

Hurt:
All the time.
When x makes fun of me.

Careless:
I drop things all the time.
Sometimes at school.

Lonely:
When I have no one to play with.
All the time.
When I hide behind the shed and cry.
In the playground - all the time.
I have no one to talk to at school.
Overgeneral Positive:

Happy:
When I am with my family
When friends play with me
When I am at home
When I save penalties

Surprised:
When I get a present
At Christmas when I get presents

Successful:
When I do a good piece of work

Safe:
When my sister used to give me a bath
When I am at home
When I'm in the school
When I am in bed

Interested:
When I am watching television, I like watching James Bond
When I read books about science
When I draw pictures, I am interested in art

Specific Negative:

Sad:
When I saw mum and dad hitting each other
When I found my fish and it was dead
Mum’s accident....
Two days ago I didn’t get to see my aunty

Angry:
When my brother annoyed me so I kicked him
When my bike got stolen
When x lied on me and was saying bad things about me....
Last week when x threw a roller blade at me

Hurt:
When my friend said she didn’t like me

Careless:
When I dropped a glass
When I accidentally wasn’t watching my sister and she fell off the bed

Lonely:
Like yesterday when there is nothing to do.
When I got sent to the punishment room...
When my mum went away to my aunties for the night and I felt lonely.
Appendix 3.2. Sample EF Face Stimuli
Appendix 3.3. Sample EF Images
Appendix 3.4. The Child Depression Inventory (CDI-S; Kovacs, 1992)

While a plethora of instruments are available for measuring depression in adults, there are few corresponding measures available for use with children. The CDI is the most widely used in child depression research. For this reason, the CDI was chosen as the depression measure used in this body of research.

The CDI-short form was used throughout this thesis for two reasons. The short form cuts out many problematic questions such as 'I want to kill myself', which are inappropriate for community-based child testing. Secondly the short form was used due to time constraints. Working with young or vulnerable populations, with limited attentional capacity and often with several cognitive measures or tasks to be completed, meant reducing the acceptable number of items (or trials), where appropriate, was always a methodological consideration.

The short and long versions have high correlation and comparable diagnostic power ($r = 0.89$, alpha reliability $= 0.80$). The CDI-S requires the lowest reading ability of any depression measure. The CDI has shown good test-retest, internal consistency, and construct validity, especially in non-clinical populations (see Twenge & Nolen-hoeksema, 2002), it has good predictive validity (Haavisto et al, 2004; Mattison, Handford, Kales, Goodman & McLaughlin, 1990) and in previous studies scores on the CDI were moderately correlated with psychiatrists ratings of level of depression (e.g. Kadzin, 1989). The CDI-S was felt to be the best measure to meet the study aims.
### Appendix 3.5. CDI-S

<table>
<thead>
<tr>
<th>Item 1</th>
<th>Item 2</th>
<th>Item 3</th>
<th>Item 4</th>
<th>Item 5</th>
<th>Item 6</th>
<th>Item 7</th>
<th>Item 8</th>
<th>Item 9</th>
<th>Item 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am sad once in a while.</td>
<td>Nothing will ever work out for me.</td>
<td>I do most things O.K.</td>
<td>I hate myself.</td>
<td>I feel like crying everyday.</td>
<td>Things bother me all the time.</td>
<td>I look O.K.</td>
<td>I do not feel alone.</td>
<td>I have plenty of friends.</td>
<td>Nobody really loves me.</td>
</tr>
<tr>
<td>I am sad many times.</td>
<td>I am not sure if things will work out for me.</td>
<td>I do many things wrong.</td>
<td>I do not like myself.</td>
<td>I feel like crying many days.</td>
<td>Things bother me many times.</td>
<td>There are some bad things about my looks.</td>
<td>I feel alone many times.</td>
<td>I have some friends but I wish I had more.</td>
<td>I am not sure if anybody loves me.</td>
</tr>
<tr>
<td>I am sad all the time.</td>
<td>Things will work out for me O.K.</td>
<td>I do everything wrong.</td>
<td>I like myself.</td>
<td>I feel like crying once in a while.</td>
<td>Things bother me once in a while.</td>
<td>I look ugly.</td>
<td>I feel alone all the time.</td>
<td>I do not have any friends.</td>
<td>I am sure that somebody loves me.</td>
</tr>
</tbody>
</table>

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CDI-S answer sheet
The items offer three possible statements, which reflect; a depressive symptom, mild depressive symptom or no depressive symptom. A higher score on the CDI reflects higher depressive symptoms. Scoring is in the range 0-20. A raw score of 7 or above denotes significantly above average depressive symptoms on the basis of past research and as recommended by the authors of the measure (Kovacs, 1992). T-scores above 65 are generally considered clinically significant.

<table>
<thead>
<tr>
<th>T-score</th>
<th>An Interpretative Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;70</td>
<td>very much above average</td>
</tr>
<tr>
<td>66-70</td>
<td>much above average</td>
</tr>
<tr>
<td>61-65</td>
<td>above average</td>
</tr>
<tr>
<td>56-60</td>
<td>slightly above average</td>
</tr>
<tr>
<td>45-55</td>
<td><strong>Average</strong></td>
</tr>
<tr>
<td>40-44</td>
<td>slightly below average</td>
</tr>
<tr>
<td>30-34</td>
<td>much below average</td>
</tr>
<tr>
<td>&lt;30</td>
<td>very much below average</td>
</tr>
</tbody>
</table>
Appendix 3.6. Mean Positive and Negative AMS (and standard deviations) within EF, Age and Dysphoric subgroups

<table>
<thead>
<tr>
<th>Dysphoria</th>
<th>Age/yrs</th>
<th>ND</th>
<th>D</th>
<th>Negative</th>
<th>SD</th>
<th>Positive</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW</td>
<td>7-8 (n=12)</td>
<td>(n=11)</td>
<td>(n=1)</td>
<td>.55</td>
<td>.03</td>
<td>2.40</td>
<td>1.03</td>
</tr>
<tr>
<td></td>
<td>10-11 (n=7)</td>
<td>(n=5)</td>
<td>(n=2)</td>
<td>2.45</td>
<td>.00</td>
<td>4.60</td>
<td>.89</td>
</tr>
<tr>
<td></td>
<td>Total (n=19)</td>
<td>(n=16)</td>
<td>(n=3)</td>
<td>1.13</td>
<td>1.14</td>
<td>3.13</td>
<td>1.54</td>
</tr>
<tr>
<td>MEDIUM</td>
<td>7-8 (n=16)</td>
<td>(n=14)</td>
<td>(n=2)</td>
<td>.79</td>
<td>.71</td>
<td>4.45</td>
<td>.82</td>
</tr>
<tr>
<td></td>
<td>10-11 (n=14)</td>
<td>(n=11)</td>
<td>(n=3)</td>
<td>3.00</td>
<td>2.00</td>
<td>4.63</td>
<td>.50</td>
</tr>
<tr>
<td></td>
<td>Total (n=30)</td>
<td>(n=25)</td>
<td>(n=5)</td>
<td>2.40</td>
<td>1.14</td>
<td>3.72</td>
<td>1.20</td>
</tr>
<tr>
<td>HIGH</td>
<td>7-8 (n=7)</td>
<td>n=4</td>
<td>n=3</td>
<td>2.50</td>
<td>3.67</td>
<td>4.81</td>
<td>(1.91)</td>
</tr>
<tr>
<td></td>
<td>10-11 (n=14)</td>
<td>n=11</td>
<td>n=3</td>
<td>4.25</td>
<td>2.00</td>
<td>4.27</td>
<td>(.96)</td>
</tr>
<tr>
<td></td>
<td>Total (n=21)</td>
<td>n=15</td>
<td>n=6</td>
<td>4.20</td>
<td>2.91</td>
<td>4.26</td>
<td>(.96)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>7-8 (n=35)</td>
<td>(n=29)</td>
<td>(n=6)</td>
<td>.93</td>
<td>2.00</td>
<td>4.22</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td>10-11 (n=35)</td>
<td>(n=27)</td>
<td>(n=8)</td>
<td>2.97</td>
<td>1.67</td>
<td>4.48</td>
<td>1.27</td>
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<tr>
<td></td>
<td>Total (n=70)</td>
<td>(n=56)</td>
<td>(n=14)</td>
<td>2.51</td>
<td>2.57</td>
<td>3.70</td>
<td>1.32</td>
</tr>
</tbody>
</table>

*ND = non-dysphoric D = dysphoric
Appendix 4.1.

Strengths and Difficulties Questionnaire

The scores are grouped into four bands so that in the general population roughly 80% of children score close to average, 10% score slightly raised, 5% score very high. The exception is the pro-social scale, with roughly 80% close to average, 10% slightly low 5% low and 5% very low.

NAME OF CHILD GENDER D.O.B. UNIQUE ID

Parent Questionnaire date

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total difficulties score:</td>
<td>26 (20-40 is VERY HIGH)</td>
</tr>
<tr>
<td>Emotional Symptoms score:</td>
<td>9 (7-10 is VERY HIGH)</td>
</tr>
<tr>
<td>Conduct problems score:</td>
<td>7 (6-10 is VERY HIGH)</td>
</tr>
<tr>
<td>Inattention-hyperactivity score:</td>
<td>7 (6-7 is slightly raised)</td>
</tr>
<tr>
<td>Peer problems score:</td>
<td>3 (3 is slightly raised)</td>
</tr>
<tr>
<td>Pro-social score:</td>
<td>3 (0-5 is VERY LOW)</td>
</tr>
</tbody>
</table>

Impact score: -1

THESE ANSWERS ARE BASED ON X'S BEHAVIOUR AT HOME, PRIMARILY WITH HER SISTER

Teacher Questionnaire date

Total difficulties score:  
Emotional Symptoms score:  
Conduct problems score:  
Inattention-hyperactivity score:  
Peer problems score:  
Pro-social score:  
Impact score:  

Self-Report Questionnaire date

Total difficulties score:  
Emotional Symptoms score:  
Conduct problems score:  
Inattention-hyperactivity score:  
Peer problems score:  
Pro-social score:  
Impact score:  

Diagnostic Prediction:

Any psychiatric disorder:  
Emotional disorder:  
Oppositional Conduct disorder:  

ADHD/Hyperkinesis:
Appendix 4.2

The Autobiographical Memory Test for Children (AMT-C) Test Instructions

(Drummond, 2005):

I am interested in your memories for things that have happened to you in your life. You have lots of memories of things that have happened to you don’t you? (Pause for child to think and acknowledge). I am going to read and show you some words on some cards. For each word I want you to think of a memory that happened to you, which the word reminds you of. So I show you a card and you think of one of your memories. Does that make sense? So, I want you to tell me the memory you think of when you see or hear the word. Is that ok?

But there is one another thing...the memory has to be specific. Do you know what that means? (acknowledge child’s response). It means the memory had to happen on one day, one time. So if I say “good” it would be ok to say ‘when I went to Nicola’s party’ because Nicola’s party happened on one day. But it would not be ok to say ‘when I go to parties’ because that is memory for lots of times, lots of parties. Does that make sense? Ok. So you give me a word (any word) and I’ll tell you my specific memory (engage child with this example).

One more thing, do you think you could give me a different memory for each word? Don’t give me the same memory more than once. Now lets practice some words before we start:

<table>
<thead>
<tr>
<th>Bored</th>
<th>Cold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hungry</td>
<td>Funny</td>
</tr>
</tbody>
</table>
• If a child gives an overgeneral response prompt with 'Can you think of one time?'

• Prompt once for clarification if given a general memory or a semantic associate.

• A semantic associate is coded as a non-memory if child can’t retrieve an autobiographical (event) memory.

• If a child fails to give any memory response code as omission.

• If a child repeats a memory to more than one cue ask him/her to think of another memory but note this on the record sheet.

• Give the child 60 seconds to retrieve a memory.
APPENDICES

Appendix 5.1

Feeling State Questions

Adapted Birelson:

1. I feel like crying*
2. I feel sad*
3. I feel worried*
4. I feel lonely*
5. I feel bored
6. I like to go out
7. I can stick up for myself
8. I enjoy a lot of things
9. I look forward to a lot of things
10. I sleep ok
11. I am easily cheered up
12. I have lots of energy

Mood control:

13. It is easy to improve a bad mood
14. When I am in a good mood it stays for a long time
15. I find it difficult to control a bad mood**
16. When I am in a bad mood it lasts for a long time**
17. When I feel good I allow myself to feel that way totally**

Rating of Life Stress

18. I think changing schools is a big deal*
19. I am concerned about changing schools*
20. I am nervous about the new school*
21. I am happy right now**
22. I am pleased with my SAT exam results
23. I am looking forward to secondary school**

Feeling state questions correlated with CDI scores* or positive OGM** at Time 2.
Appendix 5.2. Gender Analyses

Depression prevalence rates for girls and boys in pre-adolescence are different (i.e. they are higher for boys; Angold & Rutter, 1992). This shifts in adolescence such that significantly more females report depression (e.g. Nolen-Hoeksema, 1991). There is specific evidence that cognitive style variables, such as negative inferences about the self, may mediate gender differences in depressive symptoms in adolescents (Calvete & Cardenoso, 2005). For this reason, possible gender differences in cognitive style (or AM recall) were examined in this study, though it is stressed that there are insufficient numbers to address these kind of gender issues properly.

There were no significant gender differences in responses across the various cognitive measures, including AM, according to ANOVA. Boys reported slightly more dysfunctional attitudes on the DAS (average 120 vs. 140) and produced slightly more overgeneral memories (average 1.86 vs. 2.56 to positive cue words and 1.57 vs. 1.69 to negative cue words) compared to girls but these differences were not significant (DAS, $F(1) = 2.19, p = .15$; positive OGM, $F(1) = 2.76, p = .11$; and negative OGM $F(1) = .045, p = .83$). Consistent with psychiatric statistics boys were more likely to report a dysphoric mood at baseline than girls of the same age, $t(30) = 2.55, p = .017$) however this difference was not significant at Time 2 during a stressful life event, $t(30) = 1.68, p = 1.04$. Therefore there were no significant gender differences in CS or AM, which could easily account for reported depressed mood. Any gender results however must be treated with great caution as larger sample sizes are required to adequately assess gender effects.
Appendix 5.3 Inter-relationship between CS measures

<table>
<thead>
<tr>
<th></th>
<th>DAS</th>
<th>CTI-C</th>
<th>CASQ</th>
<th>CNCEQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAS</td>
<td>1</td>
<td>-.356</td>
<td>-.206</td>
<td>-.387*</td>
</tr>
<tr>
<td></td>
<td>-.356</td>
<td>.053</td>
<td>.275</td>
<td>.035</td>
</tr>
<tr>
<td>CTI-C</td>
<td>1</td>
<td>.657**</td>
<td>.564</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.657**</td>
<td>.000</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>CASQ</td>
<td>1</td>
<td></td>
<td>.249</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>.185</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNCEQ</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

* indicates significance at the 0.05 level.
Appendix 5.4. Zero \((r)\) and Partial \((pr)\) Correlations between CS and AM at Time 1.

\[
\begin{array}{cccccccc}
\text{CS} & \text{AM} & \text{Overgeneral} & \text{Specific} & \text{Positive} & \text{Negative} & \text{Positive} & \text{Negative} \\
 & & \text{r} & \text{rp} & \text{r} & \text{rp} & \text{r} & \text{rp} \\
\hline
\text{DAS} & .56 & .37 & .35 & .31 & -.42 & -.23 & -.16 & -.09 \\
\text{p} & .00 \checkmark & .04 & .06 & .10 & .02 & .22 & .40 & .64 \\
\text{CTI-C} & -.59 & -.45 & -.30 & -.25 & .63 & .53 & .24 & .19 \\
\text{p} & .00 \checkmark & .02 & .10 & .19 & .00 \checkmark & .00 & .21 & .33 \\
\text{CASQ} & -.44 & -.31 & -.41 & -.38 & .52 & .43 & .43 & .41 \\
\text{p} & .02 & .11 & .02 \checkmark & .04 & .00 \checkmark & .02 & .02 \checkmark & .03 \\
\text{CNCEQ} & -.39 & -.09 & -.19 & -.10 & .37 & .15 & .20 & .14 \\
\text{p} & .03 & .62 & .32 & .60 & .04 & .43 & .26 & .46 \\
\end{array}
\]

\(\checkmark\) = significant correlations after controlling for mood.
Appendix 5.5 Graphical depiction of Significant CS and AM relationships

**Negative Schema (CTI-C)**

- **Scores**
  - **Low**
    - Fewer -ve views of self, world, future
    - Negative views of self, etc.,
  - **High**
    - Fewer -ve views of self, world, future
    - Negative views of self, etc.,

- **Scores**
  - **Low**
    - Low OGM functional
    - Low AMS dysfunctional
  - **High**
    - High OGM dysfunctional
    - High AMS functional

**Stable Attributional Style (CASQ)**

- **Scores**
  - **Low**
    - Stable +ve event attributions
    - Unstable +ve event attributions
  - **High**
    - Stable +ve event attributions
    - Unstable +ve event attributions

- **Scores**
  - **Low**
    - Low OGM functional
    - Low AMS dysfunctional
  - **High**
    - High OGM dysfunctional
    - High AMS functional

**Overgeneralizing (CNCEQ)**

- **Scores**
  - **Low**
    - Fewer errors of overgeneralization
    - Greater errors of overgeneralization
  - **High**
    - Fewer errors of overgeneralization
    - Greater errors of overgeneralization

- **Scores**
  - **Low**
    - Low OGM functional
    - Low AMS dysfunctional
  - **High**
    - High OGM dysfunctional
    - High AMS functional
Appendix 5.6.

Zero ($r$) and Partial ($pr$) Correlations between CS, AM and Mood Measures at Time 2

<table>
<thead>
<tr>
<th>CDI</th>
<th>CDI</th>
<th>+ve Sp</th>
<th>-ve SP</th>
<th>+ve OG</th>
<th>-ve OG</th>
<th>DAS</th>
<th>CTI-C</th>
<th>CASQ</th>
<th>CNCEQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>$r$</td>
<td>.79</td>
<td>-.42</td>
<td>-.04</td>
<td>.51</td>
<td>.16</td>
<td>.51</td>
<td>-.61</td>
<td>-.26</td>
<td>-.65</td>
</tr>
<tr>
<td>$p$</td>
<td>.00</td>
<td>.02</td>
<td>.83</td>
<td>.00</td>
<td>.39</td>
<td>.00</td>
<td>.00</td>
<td>.16</td>
<td>.00</td>
</tr>
<tr>
<td>$pr$</td>
<td>-</td>
<td>-.16</td>
<td>.13</td>
<td>.21</td>
<td>.04</td>
<td>.09</td>
<td>-.38</td>
<td>.06</td>
<td>-.31</td>
</tr>
<tr>
<td>$p$</td>
<td>-</td>
<td>.41</td>
<td>.51</td>
<td>.28</td>
<td>.84</td>
<td>.64</td>
<td>.05</td>
<td>.74</td>
<td>.10</td>
</tr>
</tbody>
</table>

Partial correlations controlling for mood at Time 1.
Appendix 5.7. Correlation between Feeling State Questions and Mood at Time 1

<table>
<thead>
<tr>
<th>Questions at time 2.</th>
<th>Correlation with CDI (Time 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
</tr>
<tr>
<td>I am happy right now (on a scale of 1-10)</td>
<td>-.262</td>
</tr>
<tr>
<td>I am concerned about changing schools (on a scale of 1-10)</td>
<td>.336</td>
</tr>
<tr>
<td>I think changing schools is a big deal (on a scale of 1-10)</td>
<td>.410</td>
</tr>
<tr>
<td>When I'm in a bad mood it lasts for a long time (never, sometimes, often)</td>
<td>.408</td>
</tr>
<tr>
<td>I find it difficult to control a bad mood (n, s, o)</td>
<td>.594</td>
</tr>
<tr>
<td>When I'm in a good mood it stays for a long time (n, s, o)</td>
<td>-.298</td>
</tr>
<tr>
<td>When I feel good I allow myself to feel that way totally (n, s, o)</td>
<td>-.539</td>
</tr>
<tr>
<td>I feel like crying (n, s, o)</td>
<td>.452</td>
</tr>
<tr>
<td>I like to go out (n, s, o)</td>
<td>-.321</td>
</tr>
<tr>
<td>I can stick up for myself (n, s, o)</td>
<td>-.145</td>
</tr>
<tr>
<td>I feel sad (n, s, o)</td>
<td>.719</td>
</tr>
<tr>
<td>I feel worried (n, s, o)</td>
<td>.719</td>
</tr>
<tr>
<td>I feel lonely (n, s, o)</td>
<td>.719</td>
</tr>
<tr>
<td>I am looking forward to going to secondary school (1-10)</td>
<td>-.287</td>
</tr>
</tbody>
</table>
Appendix 6.2. Schematic Face labelling tool

![Schematic Face Labelling Tool](image-url)
Appendix 6.3. Face-Emotion Labelling Task Instructions

I am going to show you some photographs of people’s faces (indicate front page of the booklet). There are lots of people’s faces in here.

First I want to show you some cartoon faces (participant presented with copy of the schematic labelling tool). What do you think this face is showing? (point to far right hand schematic face) And what is this face? (far left hand face) And this face? (centre face). If the participant fails to give any response prompt with ‘Are all these cartoon faces the same? What is different about them?’ Participant responses recorded. If participant fails to give adequate response describe logic of the schematic tool.

I want you to try to match the photograph of the person to one of these cartoon drawings (points to schematic tool). I want you to tick or circle whichever face you think best matches the person in the photograph. There is no right or wrong answer. I am just interested in what you think.
Appendix 7.1. Means-Ends (Social) Problem Solving (MEPS)

Practice Example

Two friends have asked you to meet up at the weekend. One wants you to go and play football the other wants you to go to the cinema (or let participant make a second suggestion). You have said yes to both of them but can’t do both. Now you have to choose. End: Both friends are happy with you.

The Five Social Problems and Desired Outcomes

1. You’re not getting along with someone you care about. End: you’re getting along with each other again fine.
2. You’re having difficulties with a particular teacher. End: you and the teacher are getting along. There is no problem.
3. Your friends seem to be ignoring you. End: your friends like you again.
4. You have moved to a new school so you don’t have any friends there. End: you have new friends at the school.
5. You have accidentally broken a window but the unit manager (youth group leader) thinks you did it on purpose. End: they believe you that is was an accident.

Scoring

Responses are scored along two dimensions: 1) Mean-Ends; the mean number of relevant individual steps suggested to solve the problem. 2) Mean-Effectiveness; the overall effectiveness rating of the responses per problem. This rating is conducted on a 7 point Likert scale where 1 = not at all effective and 7 = extremely effective. MEPS rates indications of awareness of obstacles and time references in an effectiveness rating. An effective solution is one that achieves the problem solving goals while maximising positive outcomes and minimizing negative outcomes. The relevant outcomes involve long term as well as short-term goals.
Appendix 7.2. The Schonell Reading List

- tree
- little
- milk
- egg
- book
- school
- sit
- frog
- playing
- bun
- flower
- road
- clock
- train
- light
- picture
- think
- summer
- people
- something
- dream
- downstairs
- biscuit
- shepherd
- thirsty
- crowd
- sandwich
- beginning
- postage
- island
- saucer
- angel
- ceiling
- appeared
- gnome
- canary
- attractive
- imagine
- nephew
- gradually
- smoulder
- applaud
- disposal
- nourished
- diseased
- university
- orchestra
- knowledge
- audience
- situated
- physics
- campaign
- choir
- intercede
- fascinate
- forfeit
- siege
- recent
- plausible
- prophecy
- colonel
- soloist
- systematic
- slovenly
- classification
- genuine
- institution
- pivot
- conscience
- heroic
- pneumonia
- preliminary
- antique
- susceptible
- enigma
- oblivion
- scintillate
- satirical
- sabre
- beguile
- terrestrial
- belligerent
- adamantine
- sepulchre
- statistics
- miscellaneous
- procrastinate
- tyrannical
- evangelical
- grotesque
- ineradicable
- judicature
- preferential
- homonym
- fictitious
- rescind
- metamorphosis
- somnambulist
- bibliography
- idiosyncrasy

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worrying given that facial emotion is typically well recognized even in very young children (see Herba & Phillips, 2004). Though, we are all aware that a chronic adverse environment affects the ability to process and interpret emotion, this task demonstrates the extent to which basic interpretation of ubiquitous social signals is disturbed in this group. The implications in terms of social and interpersonal interaction may be profound.

TASK 2. EMOTION-FOCUSBING

Boys were asked to ‘Tell me what you see’, in response to eleven socio-emotional pictorial cue cards. The cards depicted a range of settings for instance, ‘a mother and father figure with a baby, smiling’ or ‘a female figure bending down to tend to the leg of a boy who appears to be hurt’ or ‘a girl sat on a bed alone with her head in her hands looking downcast’. Children’s descriptions of the cards were recorded and later coded for emotional content. That is, we were interested in whether the boys described the pictures in terms of emotion. Would some boys be sensitised to emotion in the cards whilst others avoid it?

Previous results with this task have indicated that some individuals focus on emotion, so in the above examples they would respond with descriptors such as ‘happy’; ‘hurt/caring’; ‘sad’. These individuals would be categorised as High-Emotion-Focusters. In contrast, other children will fail to describe the cards in terms of emotional content. In the above examples the individual will respond instead with; ‘a man and a woman and a baby’; ‘a boy has fallen off his bike’; ‘a girl’. These individuals would be classified as Low-Emotion-Focusters. Previous research has shown that these groups are not distinguishable in terms of gender, age or IQ (Drummond, Dritschel, Astell, O’Carroll & Dalgleish, in press).

Interestingly, results showed that compared to controls, the residential group did not show more (or less) vigilance to the emotional content of the cue cards. The same proportion of high EF and low EF categorization was found across both groups. Thus, negative life experience was concluded, not to have affected the degree to which children focused on emotion in their environment as demonstrated by this task. However, what was observed was that unlike the control group, the implications of EF in the residential group were very different in terms of memory functioning. We will discuss this result in the next section.
TASK 3. CUED AUTOBIOGRAPHICAL MEMORY RECALL

Over the last 20 years a substantial literature has accumulated in the field of cognitive-experimental-clinical psychology looking at a phenomenon, now commonly referred to, as Overgeneral Memory (OGM; see van Vreeswijk & de Wilde, 2004 for a recent review). A failure to retrieve specific events from the past in response to various cue words has been robustly associated with various forms of psychopathology, perhaps most notably depression in adults. Mark Williams, now at the Centre for Suicide Prevention, Oxford, was the originator of this work and his observations in a clinical setting and subsequent work, have been the impetus for what is now an established area of memory research and psychopathology. This body of work has not been replicated with children despite hypotheses implicating early trauma as an impetus for OGM as a form of affect regulation (Williams, Stiles & Shapiro, 1999). Would the boys in this sample demonstrate OGM? Failure to be able to access and retrieve specific positive events from the past has been linked to poor mental health outcomes (Brittlebank, Scott, Williams & Ferrier, 1993), poor social problem solving (Williams, Barnhofer, Crane & Beck, 2005) and poor anticipation of positive events in the future (Williams et al., 1996). The phenomenon is investigated using a standard cuing procedure (see Williams & Broadbent, 1986 or contact L. E. Drummond led@st-andrews.ac.uk for details).

Unfortunately, the boys in this study showed significant levels of OGM as demonstrated by the cued recall task. They failed to be able to retrieve specific events from the past in response to the cue words happy, sad, angry, lonely, interested, surprised, hurt, safe, careless or successful. Even when heavily prompted the boys failed to retrieve specific events and instead demonstrated script-like, OGM recall as typically observed in the adult depressive literature.

One proviso to the result is that the more abused boys (as objectively rated by care staff and confirmed by case reports) were more specific than their less abused residential counterparts. Closer inspection of this result revealed that the most highly abused boys, rather than retrieving events from their distant past, were concentrating on a very recent time frame, within the last week. Producing such recent memories has the (arguably incidental) effect of specificity. It is intriguing that this possible short term ‘protective memory strategy’ existed in the most maltreated boys. There are however serious implications in terms of impaired positive self-identity and long-term goal formation given this narrow, recent recall memory strategy (see Conway, 2005).

In a similar vein, this task may be useful in highlighting particular areas of concern for children in care. For instance, patterns in responses to the cue words can be mapped across the sample. In response to the cue word ‘lonely’ for example, almost all boys gave the OGM response ‘in my room at night’. The lack of variability in response to this cue word suggests that there may be an issue here in terms of care structure and that particular therapeutic attention could be paid to this particular experience and vulnerable period for children in care. Equally, other responses elicited by the cue words were telling, for example, anger at a particular care-worker or happiness (as opposed to distress) about seeing a particular family member. This has clear potential to offer insight into the boys’ attitudes and appraisal without recourse to direct questioning, which can meet with resistance.

As mentioned in the previous section, there was no trend for the residential boys to fall into either high or low EF categories as might have been expected. Rather, they were similarly distributed across EF categories to the control boys. Perhaps suggesting that an EF tendency reflects a temperamental cognitive-attentional style relatively immune to life experience. However, the implications of EF in this group were very different from that of the control group with respect to OGM. The extent of EF in the control group (i.e. whether a child responded with ‘happy, loving, excited’ or ‘just a man, woman and baby’) was not associated with memory recall. In the residential group however, low EF (those boys who failed to give emotion descriptions) were the ones who demonstrated the dysfunctional OGM style. Boys who were high EF on the other hand showed heightened memory specificity. Results have been interpreted in line with sensitised vs. avoidant coping styles (Drummond, Dritschel & Dalgleish, manuscript in preparation). Meaning, in response to stress some boys appear to engage in emotion avoidance and the resultant memory style is overgeneral, whilst other boys engage in sensitised emotion processing and this is associated with increased specific recall for emotional memories.

As yet, no judgement can be made with respect to the adaptive vs. maladaptive nature of EF, as its functional nature will no doubt depend on many other factors such as context, personality, coping resources and social-support. But it is worth highlighting that these two tendencies appear to be in operation and that there are memorial implications attached to both. Perhaps most importantly those who show an emotion avoidance tendency are most vulnerable to an OGM style known to be highly and robustly associated with adult psychopathology.
TASK 4. SOCIAL PROBLEM SOLVING

Impaired social problem solving is a block for many young people trying to overcome negative past experiences and develop new improved ways of interacting with others and their environment. But what are the underlying mechanisms that result in poor social problem solving in maltreated youth? Crick and Dodge (e.g. Crick & Dodge, 1994) and colleagues have long argued that it is the underlying schema which have been damaged in abused children and this results in difficulties formulating positive interpersonal strategies. Of relevance here, is also OGM. Research has shown that OGM is linked to poor social problem solving (e.g. Goddard & Dritschel, 1996). The reason is possibly that failure to retrieve particular positive social problem solving instances such as ‘the day Charles said sorry to Jane and she smiled and they made up’ will reduce the number of positive strategies a person can bring to mind to deal effectively with a similar, current social problem.

The Means-Ends-Problem Solving task (MEPS, Platt & Spivack, 1975) is a standard and widely used measure of social problem solving ability. Present results using this measure showed severely impaired social problem solving in the residential boys. In keeping with autobiographical memory interpretations of impaired social problem solving, this impairment was associated with OGM in residential boys. That is, boys who failed to retrieve specific positive memories on the previous task also fared worse on this social problem solving task. Effectiveness scores and the mean number of relevant problem solving steps are the variables of interest in this task. Effectiveness and means scores between 6-10 are not uncommon in the literature. Boys in this sample were scoring an effectiveness rating of 2 and a means score of 1. In effect, this means that these boys failed to show any form of sophisticated, time appropriate, other-aware, social problem solving skill. This is despite concentrated and impressive efforts at social skills training within the school and care environment.

Two interpretations come to mind. Either MEPS is not an adequate method of measuring social problem solving in youth - perhaps it is insufficiently engaging or relevant. Alternatively, social problem solving is an area of particular concern for children in care and special effort is required and new tactics must be developed, to improve skills in this area. We feel that the demonstration of severely impaired face processing, emotion avoidance and poor specific autobiographical memory may go some way to explain or underpin some of the deficits in social problem solving found here. If a child fails to recognize emotion in faces, fails to focus on emotion (be it positive or negative) and fails to be able to retrieve specific positive events from the past, this will impair their social processing and interpersonal strategy planning. Irrespective of training, is these core cognitive building blocks are missing it will be difficult for a child to generate positive social problem solving strategies.

CLINICAL IMPLICATIONS

Confused face processing could make effective interpersonal communication difficult. Similarly, cognitive therapies relying on the processing of emotion could prove more difficult when dealing with emotion avoidant children, and this could be taken into consideration. Emotion-Focusing also seems to be associated with memorial style. Children who failed to focus on emotion were those most likely to demonstrate dysfunctional OGM. In addition, those abused children who managed to produce specific memories did so from a very narrow time frame. This could again reflect an avoidant strategy, focusing on the ‘here and now’ to avoid a painful and difficult past. Assuming confirmation of the above results and following substantiation of the negative outcomes of such processing, both OGM and recall from narrow time frames could be targeted for intervention in the future. Finally, effective social problem solving is important in terms of allowing children to move away from previous negative models of thinking and behaviour. It may be that paying therapeutic attention to more basic information processing biases may prove fruitful in the amelioration of more complex socio-emotional skills.

References:


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Drummond, L.E., Dritschel, D. & Dalgleish, T. Testing the Assumptions: Autobiographical memory specificity and related emotion-processing in boys in residential care (manuscript in preparation)


Effects of age, dysphoria, and emotion focusing on autobiographical memory specificity in children

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Ronan E. O’ Carroll

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Tim Dalgleish

Medical Research Council, ?? UK

Overgeneral autobiographical memory (OGM) is strongly associated with depression in adults and appears to reflect a stable cognitive bias. However, it is not known whether this bias exists in children or what factors contribute to its development. We examined the roles of age, dysphoria, and a new variable, emotion focusing (EF), on the production of specific autobiographical memory (AM) in children, using the standard Autobiographical Memory Test (AMT; Williams & Broadbent, 1986). Results show that older children are more specific than younger children, irrespective of cue valence. Dysphoria was linked to less specific retrieval of positive memories in children. A three-way interaction between age, valence, and dysphoria was also found, such that older dysphoric children demonstrated a difficulty in retrieving specific negative memories. In addition, emotion focusing was associated with specific AM recall, especially to negative cues. Results are discussed with reference to the development of depressogenic biases.

Depression in adults is reliably associated with an overgeneral autobiographical memory (OGM) retrieval style (van Vreeswijk & de Wilde, 2004). Evidence suggests that overgeneral retrieval exists as part of a stable, dysfunctional cognitive style and is somewhat independent of current mood (e.g., Brittlebank, Scott, Williams, & Ferrier, 1993; Mackinger, Pachinger, & Leibertzeder, 2000). This has led a number of theorists to assert that the roots of this bias may lie in...
childhood. Williams (1996) proposed that an OGM style may develop from early childhood as a means of coping with negative affect. Individuals, for example, who have experienced trauma during childhood, have greater difficulty in retrieving specific memories in adulthood, even for events unrelated to the trauma (e.g., Kuyken & Brewin, 1995). Adolescents exposed to family violence during childhood, and reporting comorbid depression, also exhibit an OGM bias as evidenced in interview data concerning family conflict (Orbach, Lamb, Sternberg, Williams, & Dawud-Noursi, 2001). Although links between development of an OGM style and depression have been made in theory, to date there are no studies examining OGM bias in children. Importantly, if overgeneral recall does reflect a stable bias, it could be a useful marker of cognitive vulnerability to depression in children.

We have some insight into the development of the OGM bias from investigations involving adolescents (de Decker, Hermans, Raes, & Eelen, 2003; Park, Goodyer, & Teasdale, 2002; Swales, Williams, & Wood, 2001). In these studies, as expected from the adult literature, clinically depressed adolescents are more overgeneral in their responses to cue words than nondepressed controls. However, in the Swales et al. study there was also a positive correlation within the clinical population, with the more depressed and hopeless adolescents demonstrating greater specificity to negative cues. This is in the opposite direction to that which would be expected from previous findings with depressed adults (van Vreeswijk & de Wilde, 2004). Post hoc analyses attributed this finding to a repeated memory phenomenon, whereby a subset of parasuicidal adolescents recalled the same negative traumatic event to more than one cue word. The researcher was the therapist in this study, which may also be pertinent to the result. Repeated specific recall can be addressed with clear participant instruction to prevent or judge repetition.

Existing studies examining AM retrieval in children have tended to concentrate on the onset of AM recall in preschool to early school age children and have used different methodologies from those used in the adult literature. This developmental literature reveals that specific questions can yield specific AM responses even in very young children. However, overall, young children's preferred mode of memory reporting is general (Nelson, 1993). Greater detail, structure and reference to temporal markers are then observed in AMs as a function of increasing age (Howe & Courage, 1997). These findings are discussed in terms of language acquisition (Nelson, 1993) and self-concept formation (Howe & Courage, 1997) rather than in terms of specificity or generality per se. However, improvement in knowledge base, strategy use, language skill, self-concept, and storage capacity, with age (for a full review see Howe & Courage, 1997), are likely to facilitate AM response specificity. By age 7 the quality of children's AM recall is considered comparable with adult functioning (Gathercole, 1998). The present study therefore sought to test an early to middle-school age child population on the standard AMT cueing task in order to bridge...
the gap in the AM and depression literature, and to look for evidence of the development of or onset of an overgeneral retrieval style prior to its establishment in adolescence. The use of the AMT cuing methodology then makes direct comparison between child and adult retrieval styles possible, providing a clear baseline from which to examine any effects of mood.

We considered that age and dysphoria might also interact to affect AM production. In a 5-year longitudinal study of 8 to 13-year-olds, Nolen-Hoeksema, Girgus, and Seligman (1992) found that as children age, cognitive style as measured by the Children's Attributional Style Questionnaire (Kaslow, Tannenbaum, & Seligman, 1978), became a significant predictor of depression. In contrast, only negative life events predicted depression in the younger group. Authors suggest the reason for this apparent increasing role of cognitive style in depression with age may be due to cognitive capacities increasing with age, or because cognitive styles become more stable across later childhood. Similar data exist, showing an increasing relationship between depression and mood congruent memory bias with age (Neshat-Doost, Taghavi, Moradi, Yule, & Dalgleish, 1998). If age, mood, and cognition do interact in this way, the association between dysphoria and overgeneral retrieval may manifest itself differently in younger as opposed to older children.

A further factor that might interact with age and dysphoria to influence AM retrieval is cue valence. In the adult literature, overgeneral recall can occur more in response to positive (as opposed to negative) cue words (e.g., Williams & Broadbent, 1986) or it can show the reverse effect (e.g., Mackinger, 2000). Inconsistent valence effects in depressed groups may be attributable to variance in the relative casual contribution of affect regulation (Williams, 1996), temporary memory system disruption caused by schema activation (Dalgleish et al., 2003) or mood congruency (see Williams, Watts, MacLeod, & Matthews, 1997). All are likely to play a role. It is also possible that age further influences this valence effect. Drummond, Dritschel, Astell, and O’Carroll (2005) tested children aged 6–11 years and a young adult comparison group on perception of facial affect. Ability to recognise facial emotion increased with increasing chronological age in this study. The results showed that there was no significant difference between adults and children on recognition of happy or neutral faces. However, there was a significant difference between children and adults on rating of sad faces. Children were significantly poorer than adults on identification of negative facial affect. Children made many “sad as neutral” type errors, suggesting there might be an important developmental effect of processing of negatively valenced material in children. An aim of the present study was to further investigate this issue.

Finally, this study is the first to introduce the idea of emotion focusing (EF) as a possible additional variable influencing the overgeneral effect. Motivation for studying this variable comes from Williams (1996) who argued that OGM may in part, be attributable to preferential encoding of situations according to their
emotional content. Williams, Teasdale, Segal, & Soulsby (2000) restated that trauma in early childhood may result in a cognitive style in which individuals habitually focus on, or are hypersensitive to, the affective features of events. The extent to which individuals focus on (encode) the emotional features of their environment is an important factor that has hitherto been neglected in both child and adult investigations of AM retrieval. EF was therefore used in this study to denote individuals' predisposition to focus on the emotional features of their environment. For example, given a typical scenario of a university library during an exam period, one individual may encode the fact that several students at their desks look terrified and tearful, while another individual, viewing the same scene, may notice instead that there is a pile of precariously stacked books against a chair leg. The first individual will be effectively cued to remember the library event by the word "fear" while the second individual would be better cued by the phrase "safety hazard" and would probably not remember the event based on an emotional descriptor.

Regarding AM predictions concerning EF, Williams (1996) suggested that people who have a greater tendency to encode the emotional content of situations would be more likely to demonstrate overgeneral recall than those who do not. This argument is based on the assumption that focusing on emotion promotes schematic level encoding. OGM would then result in individuals who were sensitised to emotion during childhood and therefore may encode emotion preferentially, for example, in the case of early childhood trauma. This hypothesised link between EF, overgeneral recall, and vulnerability to depression has not as yet been investigated.

Other theoretical accounts of cognition-emotion relations may however, make different predictions. For example, cognitive theories of depressed mood and/or AM (Beck, Rush, Shaw, & Emery, 1979; Bower, 1981; Conway & Pleydell-Pearce, 2000; Foa & Kozak, 1986; Power & Dalgleish, 1997; Teasdale & Barnard, 1993) would suggest that, to the extent that a specific autobiographical event is encoded in emotional terms, the presence of a congruent emotional cue word (such as in the AMT) would be more likely to elicit retrieval of that event from memory. The rationale here is that retrieval of AMs is facilitated by the presence of any information that maps on to the underlying representational content of that memory. Consequently, because high EF individuals would habitually lay down AM representations with a greater proportion of emotional content, the presentation of emotional cues should be more likely to activate those representations leading to facilitated generation of specific memories. An alternative hypothesis for the effect of EF on AM retrieval is therefore, that individuals' predisposition to focus on the emotional features of their environment may result in more specific AM recall to emotional cue words. People who are depressed may preferentially encode negative affective aspects of events, such that depressed high emotion-focusers would be highly specific to negative cues. It is currently not known whether EF is associated with
overgeneral or specific valenced recall. The final aim of the present study was therefore to investigate the influence of EF, and the putative interactions of EF, age, valence, and dysphoria, on AM retrieval in children.

Although OGM is characteristically discussed as a retrieval phenomenon, it is also useful to consider it as a possible encoding phenomenon. It is not clear that children or adults encode all information in a given context and then later suppress specific aspects at retrieval. Instead, some individuals may avoid or preferentially encode specific features (or emotional features) of events such that it effects specific representations in memory. This would mean that both encoding and storage (not just retrieval) are important in understanding the overgeneral bias. Whether considered in isolation or interacting with other factors, such as age, dysphoria, or valence, EF may significantly influence the nature of AM recall and thereby, the development of depressive associated biases.

In sum, the overall aim of this study was to extend the adult AM literature to a child population. To our knowledge, no one study has looked at the interaction of age, dysphoria, and valence as factors known to influence AM. Nor has any study looked at child AM using the standard cueing task, or considered EF as a contributing factor. The specific hypotheses were therefore as follows.

**Hypothesis 1**

Age, valence, and dysphoria will interact to influence AM specificity in children. Younger children will be less specific than older children. Age and valence will interact such that young children will demonstrate reduced specificity especially to negative cue words. Dysphoria in children will be associated with reduced specificity and the effects of dysphoria will be valence specific. The effects of dysphoria may increase with age. These effects will remain after controlling for any effects of general scholastic ability.

**Hypothesis 2**

Emotion focusing will explain a significant proportion of the variance in AM specificity. EF will be associated with either increased or reduced AM specificity. EF will also interact with age, valence or dysphoria, factors already known to influence AM retrieval. The effects of EF will occur independent of scholastic ability or age.

**METHOD**

**Participants**

A total of 70 children (35 girls) took part in this study. Of the participants, 35 were aged 7–8 years ($M = 7.86, SD = 0.40$). The remaining 35 participants were aged 10–11 years ($M = 10.6, SD = 0.72$). The gender ratio across age groups was
similar with 17 females in the younger group and 18 females in the older group. As previously discussed, children aged 7-8 years were chosen as the youngest age group for which AM retrieval is believed to be commensurate with adult functioning. Children aged 10–11 were then chosen to provide a discrete age comparison group and to form a good bridge with previous adolescence literature (e.g., Park et al., 2002). These two age groups ensured the best chance of detecting any deviance in normal child AM development, if any exists. There were 14 dysphoric participants (8 from the younger group and 6 from the older group). The remaining participants (27 and 29 respectively) were categorised as nondysphoric. "Dysphoric" in this study means reporting a depressive mood (as indicated by a score of 7 or above on the Child Depression Inventory; Kovacs, 1992, see the next section).

All participants were volunteers recruited from a London, UK junior school. The school was initially contacted to sanction the research proposal. Research approval was then obtained from the relevant ethical bodies. Permission to conduct research was sought from individual classroom teachers, followed by a letter of consent to parents and finally written consent from the children themselves. The sample was ethnically mixed. No individual with special educational needs was included in this study. No child with any known history of trauma or emotional disturbance, as established from school records and teacher reports, was included. We elected to use this criterion since a history of trauma is known to influence AM recall (e.g., de Decker et al., 2003) and there would have been insufficient children with a history of trauma to examine any such influences systematically.

Materials and measures

*Autobiographical Memory Test* (AMT; Williams & Broadbent, 1986). The task comprised 10 emotional words, 5 positively valenced (happy, surprised, safe, successful, interested) and 5 negatively valenced (sad, lonely, hurt, careless, angry). Words were presented to participants on 120 mm × 100 mm laminated cards and participants were asked to retrieve a specific memory for each cue word. All participants completed three practice trials involving neutral words, with feedback, to ensure that all participants understood and were able to complete the requirements of the task. Every child retrieved at least one specific memory during the practice trial. Participants were informed that that they would be prompted to provide a specific memory if an overgeneral response was given (i.e., a memory that was not of a particular event on a given day). In addition, clear instruction was given requesting the child not to give the same memory to more than one cue word, to avoid the phenomenon of "repeated memories" discussed earlier. The presentation of cue words was mixed across valence. Participants were given 60 s to retrieve a memory. Failure to respond
was coded as an omission; failure to retrieve a memory was coded as a "no memory". Failure to retrieve a specific memory resulted in the allocation of an overgeneral response categorisation for that cue word. All participant responses were recorded on audiotape and later coded for specificity.

Two independent raters coded the AM responses as either specific, overgeneral (OGM; extended or categoric; where an extended memory is of a single event lasting more than one day and a categoric memory is a generic collection or class of events) or as "no memory". The mean numbers of specific first response memories for each child, as a proportion of all responses, were used as the data for analysis. An example of scoring of an OGM response to the cue word "Lonely" was, "When I was in Year Two I used to sit on the lonely bench every playtime". This was coded as overgeneral because it is a categoric memory. A specific memory response to the same cue was, "On Friday – When I was at home. I had no-one to play with 'cause my brothers were out at a friends and I wasn't allowed to go". This memory was coded as a specific response because the memory is of a particular place and time (of less than 1 day). Over 85% interrater reliability was achieved on coding of these responses. This reliability estimate is comparable to reliability rates found in the adult literature (e.g., Williams & Broadbent, 1986).

Validity of the AMT for use in children was established in several ways. No child failed to retrieve a specific AM to at least one practice cue word and some of the experimental cue words. Some children in the youngest age group were unsure of the meaning of the words "successful" or "careless" (N = 4). In these instances, the experimenter explained the meaning of the word by invariably saying "good at something" or "clumsy". This was sufficient for all children to acknowledge their understanding of the word and quickly retrieve a valid memory (specific/overgeneral). There were only seven "no memory" responses in total, which were distributed across age (three from older children) and cues. There were no omissions or memory repetitions. Content validity was also examined by having two raters judge whether the content of the reported memory was appropriate to the cue word used to elicit the memory. All children recalled appropriate content memories. High content validity was confirmed by over 95% interrater agreement on memory content appropriateness on a random 50% of the sample.

**Emotion focusing (EF).** A measure of EF was constructed using combined results from two tasks: Card Sorting and Image Description. The Card Sorting Task consisted of a set of 12 cards (90 mm × 60 mm) each portraying an adult face displaying one of three different emotional facial expressions (happy, neutral, or sad). The faces were arranged in a 6 × 2 formation and consisted of an equal gender mix, mixed age, and appearance (e.g., hair length, colour). The faces were not of mixed race due to limited availability. All photographs were
drawn from a sample set of faces, which had previously been used and received over 75% interrater agreement concerning the emotion being portrayed (Le Gal & Bruce, 1999). First, the experimenter verified that each child understood the nature of grouping and physically demonstrated that the cards could be sorted into two groups, using gender as the most obvious sorting category. Once established, the cards were then replaced and the children were required to sort the cards according to their own sorting category, verbalising the decision as soon as one was made. A score of 1 was given when the child sorted the faces according to affect (emotion). A score of 0 was given for any other (nonemotional) sorting category. The sorting categories suggested by children were emotion (happy and sad faces), hair colour, hair length, age, face shape, and subjective attractiveness.

The second EF task was the Image Description Task. This involved a picture-cueing methodology. A series of 11 photographic images of socioemotional behavioural settings (e.g., family laughing around a dinner table; child being admonished by parent figure), were drawn from a developmental psychology stimulus pool. The 11 images were presented to the participants as 200 mm × 150 mm laminates, and depicted for example, “Parents standing over a baby, smiling”. All but one of the cards involved a child protagonist. Protagonists were of mixed age and race. Participants were simply asked to “Tell me what you see” in response to being shown each pictorial card. The participant responses were recorded and later coded for emotional description. Subjects were given a score of 1 if an emotional adjective or adverb was used in the description of the card, for example “happy, excited, loving”. A score of zero was given for each card where no emotional description was given, for example “a baby, a mum and a dad”. Two raters examined participant responses in terms of these categories. When emotion was implied but an emotional adjective was not directly used (e.g., “running hard” or “dad is making up with son for missing him play football”), it was decided that a strict criterion would be used and only an emotional descriptive would result in an emotional classification. That is, inference of emotion was not sufficient to classify as an emotional description. Using this criterion, 100% interrater category agreement was achieved.

From these two tasks a combined measure of EF was constructed whereby the sample was divided into high, medium, or low emotion-focusers according to the following criteria. The criteria for low EF was that the participant neither sorted the cards by emotion nor used emotion descriptions in over 75% of the images in the image description task. The criteria for medium EF was that the participant either sorted the cards by emotion or described over 75% of the images in terms of emotion. The criteria for high EF required the participant to both sort the cards by emotion and describe over 75% of the images in terms of emotion. This classification was considered statistically reasonable in the absence of any other theoretical or empirical constraints.
Child Depression Inventory (CDI-S). The shortened version of the Child Depression Inventory (CDI-S; Kovacs, 1992) was completed. This measure consists of 10 mood-related items with three possible responses per item. Participants are directed to indicate which of each of the three statements best applies to them over the last 2 weeks. The statements are read out loud to the participants and participants are required to tick the most appropriate statement to them. According to CDI guidelines (Kovacs, 1992) participants with a CDI score of 7 or above are classed as dysphoric and those with scores below 7 are classed as nondysphoric. The word "dysphoric" is used in this study rather than "depressed" simply to stress that the current authors felt the measure best reflects a depressive mood or emotional state characterised by depression, which can be transient, rather than a depression disorder, which should be formally diagnosed.

General Ability A measure of scholastic ability was constructed for each child using a combination of teacher report and age appropriate National Curriculum Attainment levels. This is a method of ability grouping commonly used in British primary school education. From these two sources, children were divided into high, medium, and low ability groups. Where discrepancy existed between groupings based on optional SAT levels (e.g., high attainment in maths but medium attainment in English), the teacher's summative assessment on overall ability was used as the final criterion. Although Standard IQ measures are more commonplace and therefore easier to interpret across studies, the measure of scholastic ability was favoured to respect testing time constraints, to avoid unnecessary stress caused to individuals by IQ testing in a young and partly dysphoric sample, and to utilise teacher reports of child potential for an arguably stronger index of actual ability.

Procedure
Participants were tested individually and face-to-face, in a quiet testing environment within the school. Participants were first asked to complete the AMT, followed by the two EF tasks and the CDI. Task order was fixed to avoid possible contamination effects of the CDI or EF on the AMT. Once the participants had completed all four experimental tasks they were thanked for their participation and fully debriefed. After the testing session an indicator of general scholastic ability was obtained from school records and in consultation with the appropriate class teacher.

RESULTS
The numbers of specific autobiographical memories (AMs) by age, dysphoria, and cue valence are shown in Table 1. In keeping with predictions, the data in Table 1 indicate that young nondysphoric children are less specific to negative
TABLE 1
Means and (standard deviations) of positive and negative specific autobiographical memories (AMs) recalled by dysphoric and nondysphoric children, grouped by age

<table>
<thead>
<tr>
<th>Cue valence</th>
<th>7–8 years ((n = 35))</th>
<th>10–11 years ((n = 35))</th>
<th>Total ((n = 70))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nondysphoric</td>
<td>2.97</td>
<td>0.93</td>
<td>3.90</td>
</tr>
<tr>
<td>((n = 56))</td>
<td>(1.27)</td>
<td>(1.25)</td>
<td>(2.08)</td>
</tr>
<tr>
<td>Dysphoric</td>
<td>1.67</td>
<td>2.00</td>
<td>3.67</td>
</tr>
<tr>
<td>((n = 14))</td>
<td>(1.21)</td>
<td>(2.37)</td>
<td>(3.14)</td>
</tr>
<tr>
<td>Total</td>
<td>2.74</td>
<td>1.11</td>
<td>3.86</td>
</tr>
<tr>
<td>((n = 70))</td>
<td>(1.34)</td>
<td>(1.51)</td>
<td>(2.24)</td>
</tr>
</tbody>
</table>

A three-way ANOVA with Age (7–8 yrs and 10–11 yrs), Dysphoria (high and low), and Valence (positive and negative) was conducted to examine this assumption. General Ability (high, medium, and low) was initially included as a covariate but was not significant, \(F(1, 65) = 1.56, p = .22\). Reported analyses are therefore without this covariate. The ANOVA revealed a significant main effect of Age, \(F(1, 66) = 38.80, p < .001\), such that older children were more specific than younger children. Results also revealed a main effect of Dysphoria, \(F(1, 66) = 7.38, p = .01\), such that overall dysphoric children were less specific than nondysphoric children. There was also a Valence trend, \(F(1, 66) = 3.77, p = 0.056\), in that children tended to recall fewer specific negative memories than positive. However, these main effects were qualified by a three-way interaction between Age \(\times\) Valence \(\times\) Dysphoria on AM recall, \(F(1, 66) = 4.4, p = .04\).

In order to deconstruct this three-way interaction, 3 two-way ANOVAs were conducted. The first examined the relationship between Age and Dysphoria on recall to positive cues, the second looked at the relationship between Age and Dysphoria on recall to negative cues. A third ANOVA was conducted to directly examine the relationship between Age and Valence on AM recall. In the first 2 \(\times\) 2 ANOVA (Age \(\times\) Dysphoria) on specific positive recall there remained a main effect of Age, \(F(1, 65) = 8.25, p < .001\), such that younger children recalled...
fewer specific positive memories than older children and a main effect of Dysphoria, $F(1, 65) = 20.75$, $p < .001$, such that dysphoric children recalled fewer specific memories to positive cues than nondysphoric. There was no significant interaction between Age and Dysphoria on positive recall, $F(1, 65) = \cdot 26, p = .63$.

In the second $2 \times 2$ ANOVA (Age x Dysphoria) on specific negative recall there remained a main effect of Age, $F(1, 65) = 27.31$, $p < .001$, such that younger children recalled fewer specific negative memories than older children. There was no main effect of Dysphoria, $F(1, 65) = 0.04, p=.85$. However, there was a significant interaction between Age and Dysphoria, $F(1, 65) = 7.79, p = .007$, such that nondysphoric children’s recall of negative memories significantly improved across age, $t(54) = 10.21, p < .001$, while dysphoric children’s negative specific recall, though higher than non-dysphorics in the younger group, stayed static across age, $t(12) = 0.97, p = .35$. Moreover, by age 10–11 years, dysphoric children recalled significantly fewer specific memories to negative cues than their nondysphoric age equivalents, $t(33) = 2.4, p = .02$, in keeping with an OGM bias.

In order to directly examine the relationship between Age and Valence a $2 \times 2$ ANOVA (Age x Valence) was conducted. Results show a main effect of Age, $F(1, 68) = 74.92, p < .001$, a main effect of Valence, $F(1, 68) = 20.17, p < .001$, and a significant interaction between Age and Valence, $F(1, 68) = 13.22, p < .001$, such that older children were more specific than younger children to both positive, $t(68) = 4.77, p < .001$, and negative cues, $t(68) = 8.32, p < .001$. However, children in the younger group recalled significantly fewer memories to negative cues compared to positive, $t(34) = 5.45, p < .001$. This valence difference was not significant in the older group, $t(34) = 0.64, p=0.53$.

In summary, and as can be seen in Table 1, age affected positive and negative recall such that older children were more specific to both. Dysphoria exerted a main effect on positive recall such that dysphoric children retrieved fewer specific positive memories than nondysphoric children. The three-way interaction above was attributable to age and dysphoria interacting to influence the recall of negative memories. Young nondysphoric children showed low specificity to negative cues. Older nondysphoric children showed relatively high negative specificity. In contrast, young dysphoric children showed higher specificity to negative cues than their same age counterparts and yet specificity to negative cues in the older dysphoric group was comparatively low.

The following analyses addressed the second study hypothesis, which was that EF would contribute to AM specificity and may interact with other factors to influence specificity. This is the first study to examine EF. It was therefore important to first establish that EF was not simply a correlate of another variable, such as age or scholastic ability, which would reduce the usefulness of EF as a measure. There was, however, no correlation between EF and Age ($r_1 = .13$, $p = .13$).

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Subsequently, an enter-stepwise regression model was conducted on total specific AMs such that Age and Dysphoria were entered in a first step and EF was added in a second step, to investigate whether EF accounted for unique variance in AM specificity, over and above any effects of age and dysphoria. Age and Dysphoria accounted for significant variance in AM specificity, $F(2, 69) = 45.69, p < .001$, Adjusted $R^2 = .56$. The inclusion of EF resulted in a significant additional 12% of variance being explained ($R^2$ change = .12, $F = 25.05, p > .001$). The final model included Age as the best independent predictor of specificity ($r = .72, n = 70, \beta = .66, p < .001$), followed by EF ($r = .47, n = 70, \beta = .35, p < .001$), and then Dysphoria ($r = .07, n = 70, \beta = .27, p < .001$). All three variables contributed to a significant final model accounting for 68% of the variance in specificity, $F(3, 69) = 49.75, p < .001$, Adjusted $R^2 = .68$. There was no collinearity between variables (VIF < 2).

Given that EF was shown to be an important predictor of AM specificity, we repeated the analyses used to test Hypothesis 1, this time including EF as an additional factor. Two 3 × 2 × 2 ANOVAs with EF (high, medium, and low), Age (7–8 yrs and 10–11 yrs), and Dysphoria (dysphoric and nondysphoric) were therefore conducted, first for positive and then for negative valence. This was done to test the hypothesis that EF would interact with other factors known to influence AM performance.

Once again results of the analysis of positive recall showed the main effects of Age, $F(1, 58) = 18.68, p < .001$, and Dysphoria, $F(1, 58) = 28.95, p < .001$. As can be seen in Table 2, there was no main effect of EF on positive recall, $F(2, 58) = 1.79, p = .18$. However, a significant interaction was found between EF and Age on positive recall, $F(2, 58) = 4.29, p = .018$, such that older children were more specific than younger children in the low and medium EF categories, $t(17) = 3.04, p = .007$, and $t(28) = 4.13, p < .001$, respectively. However, in the high EF group there was no significant difference between younger and older children's specific positive recall, $t(19) = 0.91, p = .38$. Young children are just as likely to produce a specific positive memory as older children in this group. There was no significant three-way interaction between EF, Age and Dysphoria, $F(2, 58) = 0.25, p = .78$, and no interaction between EF and Dysphoria, $F(2, 58) = 1.02, p = .37$.

When EF was included in an analysis of specific negative recall, there remained a main effect of Age, $F(1, 58) = 35.18, p < .001$, with no main effect of Dysphoria, $F(1, 58) = 1.41, p = .24$. However, EF exerted a main effect on negative recall, $F(2, 58) = 17.02, p < .001$, such that high emotion-focusers were more specific to negative cues compared to low, $t(38) = 6.12, p < .001$, or medium, $t(48) = 3.70, p < .001$, emotion-focusers. EF did not interact with Age to affect negative recall, $F(2, 58) = 1.74, p = .18$, nor was there any three-way interaction between EF, Dysphoria, and Age, $F(2, 58) = 1.22, p = .30$. Of interest
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TABLE 2
Means and (standard deviations) of positive and negative specific AMs recalled by children within emotion focusing (EF) and age categories

<table>
<thead>
<tr>
<th>Emotion focusing (EF)</th>
<th>Low (n = 19)</th>
<th>Medium (n = 30)</th>
<th>High (n = 21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs)</td>
<td>7–8 (n = 12)</td>
<td>10–11 (n = 16)</td>
<td>7–8 (n = 7)</td>
</tr>
<tr>
<td></td>
<td>10–11 (n = 7)</td>
<td></td>
<td>10–11 (n = 14)</td>
</tr>
<tr>
<td></td>
<td>Total (n = 19)</td>
<td></td>
<td>7–8 (n = 14)</td>
</tr>
<tr>
<td></td>
<td>Total (n = 21)</td>
<td></td>
<td>7–8 (n = 14)</td>
</tr>
<tr>
<td>Negative</td>
<td>0.5 (1.00)</td>
<td>2.42 (1.27)</td>
<td>0.75 (0.86)</td>
</tr>
<tr>
<td>Positive</td>
<td>2.25 (1.42)</td>
<td>4.14 (1.06)</td>
<td>2.87 (1.15)</td>
</tr>
</tbody>
</table>

to us was whether EF and Dysphoria would interact significantly to influence negative specificity, however, no such interaction was found, $F(2, 58) = 1.68, p = .20.$

DISCUSSION

The results of this study show that age, dysphoria, and cue valence interact to influence AM specificity in children. Older children are more specific than younger children especially to negative cues. Dysphoric children are overgeneral to positive cues and there is an interaction between age, dysphoria, and cue valence such that older dysphoric children are also overgeneral to negative cues. Regarding EF, high emotion-focusers produce specific AMs and EF significantly predicts unique variance in AM specificity. Each of the main findings is discussed in turn and possible mechanistic implications are considered.

First, as predicted, older children were able to produce a specific memory more readily than younger children. This suggests that between 7 and 11 years of age, a child's autobiographical recall develops from a general to a more specific memory style. This is consistent with the finding in the developmental literature that memorial ability develops with age (Howe & Courage, 1997; Nelson, 1993). As predicted, this effect of age on specificity was further influenced by cue valence. Younger children produced fewer specific memories in response to negative cues than to positive. This difference was not apparent with the older children, who presented approximately equal numbers of positive and negative specific memories. This age by valence effect has not been previously demonstrated and it suggests that it is particularly children's specific negative recall, which improves with age. It is clear that the development of cognitive processing of valenced stimuli in children is an interesting and
previously neglected area of research, which could hold clues to the origins of information processing biases associated with depression. In addition, if AM in a normal population develops from a general to a specific retrieval style with age, the question remains whether in a depressed population memory fails to develop into a specific style or whether depressed individuals regress back to an over-general style.

Our results are the first to provide direct evidence that dysphoria is linked to OGM in children. Dysphoric children retrieved significantly fewer specific positive AMs than non-dysphoric children, irrespective of age. This is consistent with the well-documented adult AM literature, and with adolescent findings in general. Moreover, age and dysphoria interacted to affect specific negative retrieval, such that there was an effect of dysphoria on negative recall in the older group. Dysphoric children in the older group retrieved significantly fewer specific negative memories compared to their non-dysphoric age equivalents. What is more, when we examined the pattern of negative AM retrieval across groups more closely, we found that the younger dysphoric children retrieved more specific negative memories than their nondysphoric age-group counterparts. However, while nondysphoric negative recall significantly improved across age group, the same was not true for dysphoric children. By age 10–11 years, therefore, dysphoric children were retrieving significantly fewer specific negative memories than nondysphoric older children. Thus, though dysphoric children demonstrate reduced specificity for both negative and positive cues, the effects of dysphoria on negative recall are only really apparent in the older group.

It may be that dysphoria affects positive and negative recall through different underlying mechanisms or processes. For instance, dysphoria may be affecting positive recall via mood congruency, which is a relatively autonomous mechanism based on spreading activation and therefore less dependent on age or cognitive ability than other possible mechanisms. In contrast, the impact of dysphoria on negative recall may be more schema dependent, and therefore its effect on recall is not observed until later in childhood when schemas are more firmly in place. In keeping with this schema explanation, repeated experience of dysphoric mood may allow negative biases to become more engrained and better established in older dysphoric children. In younger dysphoric children, however, negative schemas may be less well defined and therefore exert less influence on information processing. This interpretation though speculative, is supported by results from Nolen-Hoeksema et al. (1992), which showed that effects of cognition on depression increased with increasing age. This interpretation is also consistent with results from Neshat-Doost et al. (1998) who found evidence suggestive of an age-related increase in the elaboration of negative self-referent schematic representations in depressed youth. Predictions from kindling and sensitisation theory would also lend credence to this type of interpretation (see for example, Segal, Williams, Teasdale, & Gemar, 1996).
Alternatively, it may be that a young child's negative AM response style is already so highly overgeneral that dysphoria can exert little additional effect. It would therefore not be until later in childhood, when children have typically developed a more specific retrieval style, that the overgeneral effect of dysphoria on negative recall would become apparent. Interestingly, this relative difficulty in retrieving specific negative memories in older dysphoric children is not in keeping with the finding that depressed adolescents demonstrate highly specific recall to negative cues (e.g., Park et al., 2002). Further research is needed to track the evolution of the OGM bias and to clarify the differences in valence specific AM styles in children, adults, and adolescents.

Our study has also introduced the idea of emotion focusing as a potential vulnerability marker for depression. EF significantly contributed to predicting variance in AM specificity, even above the predictive value of age and dysphoria. Our results indicate that high emotion-focusers demonstrate specific memory recall to emotional cue words. Thus, an emotion-focuser who preferentially focuses on emotion in the environment may form memory representations with relatively high emotional content. When these individuals are then asked to recall events in response to emotional cue words, specific retrieval is then relatively easy for these individuals. EF could be important, especially if attempts are made to assist people in recalling specific AM information, something that is a core component of some cognitive-based clinical treatments.

Emotion encoding does not appear to correspond with overgeneral retrieval as expected by Williams (1996). However, it is proposed that with the addition of an environmental stressor, EF may emerge as a vulnerability factor for depression, more in keeping with the trauma-induced EF hypothesis proposed by Williams. EF is clearly a meaningful new measure for use with children and adults and warrants further investigation.

It is important to note that EF was not correlated with any measured independent variable in this study. Although there was an interaction between age and EF on positive recall, there was no colinearity with this variable. EF was not a product of age nor was there any correlation between scholastic ability or dysphoria, and EF. Therefore the variability accounted for by EF in this study is clearly not attributable in any straightforward way to the effects of dysphoria, age, or ability. Further longitudinal studies are required to look more closely at the relationship between negative life events, EF, and AM retrieval over time. It may be, for example, that EF interacts with ruminative style to affect AM and depressive mood.

Furthermore, in order to develop the measure of EF a greater range of stimuli could be added to the image description element, or a more sophisticated coding system could be introduced, whereby different levels of description are recognised. It might also be helpful under some circumstances to accept inference of emotion if it is found, for example, to be a typical descriptive style of some groups. In addition, high emotion focusing was associated with AM specificity.
It would be interesting to test individuals on nonemotional cue words (in addition to emotional cue words), to test whether high EF individuals still demonstrate specific recall outwith their area of focal interest. EF is a new measure so no data are available to validate its use and the division used here to differentiate high, medium, and low EF was selected only as a prudent statistical division. In future, more sophisticated coding and classification categories could be explored.

Regarding other caveats or limitations of the present study, it was important in investigating the possible mechanisms through which overgeneral recall may develop and act as a vulnerability marker for the etiology or maintenance of depression, that we test a sample vulnerable to clinical depression but not suffering from it. However, it is not clear in the literature what the precise relationship is between dysphoria and depression. We would also anticipate that with the addition of clinical data and larger sample sizes, interactions, such as that between age and dysphoria, may become significant and a relationship between EF and depression would perhaps emerge. Although the present results are nonetheless interesting, replication with greater sample sizes would add to the strength of the findings; for example, some subgroups in the $3 \times 2 \times 2$ ANOVA design were small, thus leading to reduced power in our investigation of the higher order EF interactions. Finally, as noted, this is the first study to use the standard AMT in this age range. Although all children retrieved appropriate content memories to all cue words and were able to produce specific memories to at least some cue words, the lack of established validity and reliability data for this measure in children should be acknowledged as a limitation of the study.

In conclusion, this study highlights the importance of testing AM in children. Present results also demonstrate the usefulness of testing children with valenced emotional stimuli. As already highlighted, a key finding was that younger children tended to retrieve relatively fewer specific memories, particularly in response to negative cue words, whereas dysphoric children demonstrated reduced specific positive recall. It may be of interest in future studies to track this valence effect through development to see what role it may play in the later onset of depression. An understanding of the nature and development of normal valenced biases in childhood clearly has important implications for understanding the development of depressogenic biases. This study has attempted to examine the development of valenced AM specificity as one such bias. Looking at AM specificity from this developmental perspective should help us better understand the existence of OGM in adults and in psychopathology. The results of the current study also suggest that dysphoria affects AM in children, not by increasing availability of negative memories but by decreasing the availability of specific positive memories. It is unclear what underlying processes are responsible for such effects in the AM literature. It is likely though that more than one mechanism, bias, or effect is in operation at any given time. Further work is needed to unravel the contributions and roles of associated variables.
Moreover, examining differential bias across age is essential. It may be, for example, that such depressive biases originate with deficits in processing of positive information but spread to include negative information processing biases with age, or failing intervention.

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REFERENCES


