The Implications of Autobiographical Memory Style for the Deficits associated with Borderline Personality Disorder

Tamar Reid

BA (Psychology), Hons 1A

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I hereby certify that the work embodied in this thesis is the result of original research and has not been submitted for a higher degree to any other University or Institution.

(Signed): ……………………………………………………………………………………...
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Overgeneral autobiographical memory is thought to be a clinically meaningful phenomenon which is related to affect regulation, problem solving ability, and treatment outcome in clinical populations (see J. M. G. Williams et al., 2007, for review). Individuals with Borderline Personality Disorder (BPD) are thought to be particularly prone to developing an overgeneral style of memory due to their temperamental difficulties in controlling affect (J. M. G. Williams, 1996). However, research in this population has so far yielded inconsistent findings. In a series of three studies, this thesis addresses the question whether overgeneral memory is associated with BPD, as well as exploring the relationship between memory specificity, affect regulation, problem solving ability, and response to treatment in this population. Findings indicate that individuals with BPD display reduced autobiographical specificity relative to controls, however, this appears to be a reflection of differences in cognitive ability as IQ and education mediated the association between specificity and diagnosis. Reduced specificity was not associated with Borderline traits in a non-clinical sample. Results failed to confirm the hypothesis that autobiographical memory specificity would be related to affect regulation in individuals with BPD, although there was some indication that memory specificity is associated with reduced rates of deliberate self-harm. Specificity was related to problem solving performance in individuals with BPD, although this relationship did not extend to self-reported problem solving ability. Memory specificity also appeared to change significantly over the course of treatment in a year-long Dialectical Behavior Therapy program, however, there was little indication that change in memory specificity was associated with the observed improvement in symptomatology, affect regulation or problem solving ability.
Lastly, an experimental study with university students found no relationship between memory specificity and affect dysregulation, although low specific students reported greater reductions in positive affect following a negative event than individuals with a specific style of autobiographical recall. The assimilation model is considered as a framework for conceptualising these results.
Chapter 1: Introduction

1 Overgeneral Autobiographical Memory and Borderline Personality Disorder

Overview

The aim of this thesis is to investigate the implications of overgeneral autobiographical memory for the clinical difficulties associated with Borderline Personality Disorder. This investigation is comprised of three main studies, each addressing individual research questions. Firstly, research will be outlined exploring the relationship between memory specificity, emotion regulation, problem solving ability, and self-harm in individuals with Borderline Personality Disorder compared to community controls. Secondly, an investigation will be presented detailing change in autobiographical memory specificity in response to a treatment program for Borderline Personality Disorder, known as Dialectical Behaviour Therapy. Lastly, an experimental investigation of the function of overgeneral memory and its relationship to Borderline traits in a nonclinical sample will be described. The present chapter will provide an overview of the literature regarding overgeneral autobiographical memory and Borderline Personality Disorder pertinent to these studies.
Autobiographical Memory

“It seems, then, that we owe to memory almost all that we either have or are; that our ideas and conceptions are its work, and that our everyday perception, thought, and movement are derived from this source. Memory collects the countless phenomena of our existence into a single whole; and, as our bodies would be scattered into the dust of their component atoms if they were not held together by the attractors of matter, so our consciousness would be broken up into as many fragments as we have lived seconds but for the binding and unifying force of memory.”

(Hering, 1920, p 75)

When we use the term ‘memory’ in common vernacular, the type of memory which we are most often referring to is autobiographical memory (Rubin, 1996). Autobiographical memory is that form of memory which unifies the events of our past life into a coherent personal biography (Ross, 1991). At its core, autobiographical memory is defined as memory for the events of one’s life (Conway & Rubin, 1993). It involves the recollection of people, objects and events that an individual has personally encountered (Cohen, Eysenck, & LeVoi, 1986).

Autobiographical Memory is one of the oldest and most complex areas of psychological inquiry (Rubin, 1996). In fact, the concept of autobiographical memory formed the subject of philosophical contemplation long before psychology was established as a discipline (Robinson, 1986). However, autobiographical memory did not fully emerge as a scientific
concept until the writings of cognitive psychologist Endel Tulving in 1972. As a forerunner in his field, Tulving was one of the first to refine the thus far unitary concept of “memory”, postulating that our memory comprises a number of distinct and individual memory systems. In particular, Tulving proposed that our conscious, or declarative memory is composed of two memory systems, known as episodic and semantic memory (Tulving, 1972). Tulving believed that episodic and semantic memory represented two unique memory systems in that they were concerned with different types of information and appeared to differ in their basic operational processes (Tulving, 1983).

Tulving described his binary model of declarative memory in the following way:

“Episodic memory is concerned with unique, concrete, personal experiences dated in the rememberer’s past; semantic memory refers to a person’s abstract, timeless knowledge of the world that he shares with others” (Tulving, 1983, p V).

Tulving’s definition of episodic memory was innovative in that it represented the first real attempt to differentiate the concept of autobiographical memory from the many other forms of memory which were being studied at the time. According to Tulving, autobiographical memory, which he considered to be synonymous with episodic memory, was a distinctive form of memory which could be delineated by the fact that it involved memory for past events which an individual had personally experienced (Tulving, 1983). In many ways, Tulving’s definition of episodic memory has served as the foundation for the way in which autobiographical memory is defined today.
However, more recent conceptualisations of autobiographical memory have tended to move away from the equation of autobiographical memory with Tulving’s episodic memory, with theorists now pushing for a more refined definition of autobiographical memory (see Brewer, 1986; Nelsen, 1993). This trend is based on a growing consensus that the concept of episodic memory fails to clearly differentiate autobiographical memory from other forms of memory in that the definition is so coarse that it incorporates both personally relevant autobiographical memories and various forms of impersonal knowledge including rote verbal learning in experimental paradigms (Brewer, 1986; Nelsen, 1993).

Autobiographical memory is now seen as representing one unique aspect of the blanket term “episodic memory” (S. F. Larsen, 1992). Specifically, autobiographical memory is considered to be that aspect of episodic memory which involves information relating to the self (Brewer, 1986). That is, rather than referring universally to personally experienced events (as encompassed by the term episodic memory), the term “autobiographical memory” is only applied to memory for events which are of significance to the individual’s self-concept and which form part of the individual’s life-history (de Decker, Hermans, Raes, & Eelen, 2003). Defining “autobiographical memory” in this way parcels out depersonalised components of episodic memory and clearly differentiates autobiographical memory as a natural class of memory (Brewer, 1986). Being primarily defined as memory pertaining to the self, the term autobiographical memory is also used in a broader sense to encapsulate personal semantic information, that is memory for facts about the self, in addition to personal episodic memory (Brewer, 1986).
Properties of Autobiographical Memories

The concept of autobiographical memory can be more fully elucidated by an exploration of the core features which autobiographical memories exhibit. Although these individual features, if considered independently, are not necessarily unique to autobiographical memories, it is the combined pattern of these characteristics which differentiates autobiographical memory from other forms of memory (Conway, 1990).

The primary feature which serves to identify autobiographical memories is their point of reference. Autobiographical memories are, by nature, memories which are self-referent (Conway, 1990). That is, all autobiographical memories relate to and are located in one’s own personal past (Tulving, 1972). As stated by William James: “Memory requires more than mere dating of the fact in the past. It must be dated in my past. In other words, I must think that I directly experienced its occurrence” (James, 1890, p 650). For a memory to be autobiographical it must originate from the self as an experiencing entity and thus will always directly involve the rememberer in its content (Brewer, 1986; Cohen, 1989; Conway, 1992). In this sense, it can be said that autobiographical memory requires self-consciousness or self-awareness. This self-awareness is not necessary in semantic memory which involves recollection apart from the sense of self-experience in a specific past (Nelsen, 2003).

But more than this, autobiographical memories are self-referent because it is these memories which are the source of self. This notion is clearly expressed by Baddley, who stated that autobiographical memory is “a record of the experiences of a lifetime that go
together to create myself as a person” (Baddeley, 1997, p 4). An individual’s sense of self, his belief that he exists as a human being with a unique identity is critically related to the existence of autobiographical memories. It has been suggested that it is the relationship to self which is the core feature which distinguishes autobiographical memories from other forms of memory (Brewer, 1986). In autobiographical memory, self is both the source and the product of the experiences being recalled (Cohen, 1989). Without self, there would not be an experiencing being to create autobiographical memories, and yet without autobiographical memories, our sense of self as enduring unique individuals, would not exist.

A second fundamental feature of autobiographical memory is the conscious awareness of the experience of remembering that typically accompanies the process of recollection. Whenever one recalls an autobiographical memory, this recollection almost always produces in the rememberer the sensation of remembering, or a sense that the event being recalled has occurred to you at a specific time and place in your past (Bahrick, 1998; Tulving, 1983, 2002). Tulving aptly referred to this feature of autobiographical memory as mental time travel (Tulving, 2002). Autobiographical recollection allows us, in a sense, to turn back time. When we recall an autobiographical memory, we are able to travel back to the past in our own minds and experience again, although somewhat differently, an event that we have experienced in the past (Tulving, 1983).

The third feature of autobiographical memories which differentiate them from other forms of memory is the degree of contextual information which they contain. Autobiographical memories, whether they pertain to one particular event, to a general class of events, or to a
whole lifetime period, are a record of events which the individual has experienced at
particular times and places (Brewer, 1986). They are memories of the “what” “where” and
“when” (Tulving, 2002). Autobiographical memories are unique in that this temporal-
spatial information is recorded along with other information pertaining to the event
(Tulving, 1972). To illustrate this point, let us consider the memory: “Freud is a well-
known psychologist”. This memory is not a memory that one would typically consider to
be an autobiographical memory. Rather it is an abstract memory that involves my
knowledge of the world – it is a semantic memory. However, if I were to add some
contextual information to this memory so that it stated: “I recall sitting in the lecture hall
for my first psychology lecture where I learnt that Freud was a well-known psychologist”,
this memory now resembles what we would call an autobiographical memory because
instead of referring to a decontextualised fact, it now refers to an event which I have
experienced.

The contextual nature of autobiographical memory does not mean that one must be able to
assign an absolute date and location to the memory for it to be considered autobiographical,
but rather that the memory must be experienced as referring to an event or events which
occurred in a unique context (Brewer, 1986). That it, the contextual information must
identify the knowledge being recalled as referring to a specific event which the rememberer
was present for and personally experienced (S. F. Larsen, 1992). Thus contextual
information is critical for differentiating autobiographical memories from semantic
memories (S. F. Larsen, 1992). The inclusion of contextual data is one of the core features
of autobiographical memory.
Thus in summary, autobiographical memory can be defined as memory for the events of one’s life (Conway & Rubin, 1993). These memories originate from the self, and in turn define self as the product of one’s experiences. They are memories which involve a sense of turning back time or reliving and whose contextual detail evoke the feeling that the individual has experienced this specific event at a particular time and place.

**Overgeneral Autobiographical Memory**

Due to the fundamental role which autobiographical memory plays in defining the self, understanding the interaction between memory and psychological functioning has been viewed as of great importance (Bluck, Alea, Habermas, & Rubin, 2005; Nelsen, 2003). In particular, much emphasis has been given to understanding the impact which autobiographical memory abnormalities have on psychological well-being. One such abnormality which has become the focus of recent research in this area is the autobiographical memory bias known as “overgeneral memory”. Overgeneral memory refers to the tendency to produce inappropriately general memories as the result of difficulties encoding and/or retrieving specific details of discrete episodes from one’s own personal past. Rather than referring to the content of the memory, the label “overgeneral” refers to the fact that these memories do not pertain to a precise place or time (Peeters, Wessel, Merckelbach, & Boon-Vermeeren, 2002).

The overgeneral memory phenomenon was discovered serendipitously by Williams and Broadbent (1986) during the course of their exploration into mood-congruent memory recall. The aim of their study was to determine whether suicide attempters, who inevitably
also have a significant level of negative mood, demonstrate a bias in their recall towards memories of a valence consistent with their mood. To explore biases in recall, they utilised a cue-word paradigm based on Francis Galton’s cue-word method as adapted by Robinson (1976). In this task, now known as the Autobiographical Memory Test (AMT), participants are asked to retrieve specific personal memories in response to a number of positive and negative cue words (for example: happy, sorry, safe, angry). A memory is considered to be specific if it pertains to an event which occurred at a particular place and time and did not last longer than 24 hours (J. M. G. Williams, 1996).

In line with the pattern of results previously observed in mood-memory research, the results of Williams and Broadbent’s study supported the mood-congruent hypothesis with suicidal inpatients retrieving negative memories at the same rate as controls, but taking longer to retrieve positive memories. What was most interesting about this result, however, was the discovery that much of the delay in recalling positive memories was due to what Williams and Broadbent termed “inappropriate retrieval strategies”. In particular, they discovered that when asked to retrieve a specific autobiographical memory to a positive cue word, the suicidal individuals found it difficult to do so, and instead tended to retrieve general memories. For example when given the cue word “happy” suicidal individuals tended to give general responses such as “when I am playing soccer” or “during my last year of school” rather than specific responses such as “last Saturday when I went to the beach with my family”. The results of this study have since been replicated and the results provide confirmatory evidence of reduced specificity in suicidal individuals (Evans, Williams, O'Loughlin, & Howells, 1992; Pollock & Williams, 2001; J. M. G. Williams & Dritschel, 1988; J. M. G. Williams et al., 1996).
The pattern of recall which Williams and Broadbent observed has since been termed “overgeneral autobiographical memory”. There are two main forms of overgeneral recall: (1) *categoric recall*: where the individual summarises series of events into categories without distinguishing between individual events, for example “when I eat out at restaurants”, or “when I fight with my wife”; and (2) *extended recall*: where the individual refers to events which occur over a prolonged period of time, for example “when I was in high school”, or “when I lived in Sydney” (J. M. G. Williams, 1996). Subsequent studies have indicated that these two forms of overgeneral recall are functionally independent and that the overgenerality typically displayed by emotionally disturbed individuals tends to be categoric recall rather than extended recall (J. M. G. Williams, 1996).

**Overgeneral Autobiographical Memory in Clinical Groups**

William and Broadbent’s (1986) seminal study led to a burgeoning interest in the field of overgeneral autobiographical memory. Over the years since, a vast number of studies have been conducted exploring this memory phenomenon in numerous and varied populations, ranging from: clinical depression (J. M. G. Williams & Scott, 1988), to anxiety disorders (Arntz, Meeren, & Wessel, 2002; Wessel, Meeren, Peeters, Arntz, & Merckelbach, 2001), eating disorders (Dalgleish et al., 2003), psychosis (Iqbal, Birchwood, Hemsley, Jackson, & Morris, 2004), Alzheimer’s disease (Moses, Culpin, Lowe, & McWilliam, 2004), and cancer patients (Brewin, Watson, McCarthy, Hyman, & Dayson, 1998). The evidence arising from the bulk of this research indicates that overgeneral memory is not a feature of psychopathology in general, but rather that it appears to be related to a distinct set of clinical factors (de Decker et al., 2003).
Chapter 1: Introduction

Primarily, empirical evidence suggests that overgeneral memory is related to clinical depression. A substantial number of studies have now been conducted exploring levels of specificity in individuals with clinical depression and the pattern of results observed in these studies indicate that individuals with Major Depressive Disorder display a level of overgeneral memory on par with suicidal individuals, producing significantly less specific memories than both psychiatric and non-psychiatric controls (Goddard, Dritschel, & Burton, 1996; Kuyken & Brewin, 1995; Kuyken & Dalgleish, 1995; R. G. Moore, Watts, & Williams, 1988; Park, Goodyer, & Teasdale, 2002; Puffet, Jehin - Marchot, Timsit - Berthier, & Timsit, 1991; Wessel et al., 2001; J. M. G. Williams et al., 2007; J. M. G. Williams & Scott, 1988). Similar patterns of overgeneral recall have also been evidenced in individuals with Bipolar Affective Disorder (Scott, Stanton, Garland, & Ferrier, 2000), and postnatal depression (Croll & Bryant, 2000), providing further support to the notion that overgeneral memory is by some means related to depression. However, while research has consistently revealed an association between overgeneral memory and clinical depression, it has just as consistently failed to find an association between overgeneral memory and self-reported severity of depression (Dalgleish, Spinks, Yiend, & Kuyken, 2001; Hermans et al., 2004; Iqbal et al., 2004; Jones, Startup, Swales, Williams, & Jones, 1999; Kuyken & Brewin, 1995; Mackinger, Loschin, & Leibetseder, 2000; Merckelbach, Muris, & Horselenber, 1996; Watkins et al., 2000; Wessel et al., 2001). This differential association has been generally thought to indicate that overgeneral recall is not related to current mood state (Watkins et al., 2000), although some authors have suggested that this finding is due a reliance on self-report measures of depression which focus on cognitive symptoms of depression rather than somatic-vegetable symptoms (Dalgleish et al., 2001). However, in
general, research results appear to suggest that overgeneral memory is related to a diagnosis of depression, rather than to self reported depressive symptomatology.

In addition, research indicates that overgeneral memory is associated with a history of trauma. Studies based on individuals with trauma related disorders, such as Post Traumatic Stress Disorder (McNally, Lasko, Macklin, & Pitman, 1995; McNally, Litz, Prassas, Shin, & Weathers, 1994; Schönfeld & Ehlers, 2003, 2006), and Acute Stress Disorder (A. G. Harvey, Bryant, & Dang, 1998), indicate that these individuals demonstrate significantly higher levels of overgeneral recall than individuals without these diagnoses. Moreover, exposure to trauma early in life appears to be related to overgeneral memory, with research demonstrating a link between overgeneral memory and childhood: sexual abuse (Henderson, Hargreaves, Gregory, & Williams, 2002; Kuyken & Dalgleish, 1995), emotional abuse (Raes, Hermans, Williams, & Eelen, 2005), and physical abuse (de Decker et al., 2003; Hermans et al., 2004). It appears that the more trauma an individual has experienced during childhood, the fewer specific autobiographical memories they recall (Dalgleish et al., 2003; de Decker et al., 2003). A recent review of the relationship between trauma and autobiographical memory suggests, however, that post traumatic symptoms rather than trauma exposure per se, is associated with overgenerality (S. Moore & Zoellner, 2007). The association between trauma and overgeneral memory appears to be robust, even when the presence of depressive symptomatology is taken into account (Raes et al., 2005).

However, it does not appear that an overgeneral autobiographical memory style is simply a feature of psychopathology, as it has been demonstrated to be notably absent in a number of clinical populations. Primarily, overgeneral recall is not evidenced in anxiety-disordered
populations, including individuals with: Generalised Anxiety Disorder (Burke & Mathews, 1992), Social Phobia (Wenzel, Jackson, & Holt, 2002), undifferentiated Anxiety Disorders (Arntz et al., 2002; Wessel et al., 2001), or highly anxious community members (Richards & Whittaker, 1990). Nor is overgeneral memory a cognitive feature of angry individuals (Wenzel & Jordan, 2005). Research on individuals with Obsessive-Compulsive Disorder indicates that reduced specificity is only observed in those individuals with comorbid Major Depressive Disorder, indicating that the overgenerality observed is associated with levels of depression rather than anxiety (Wilhelm, McNally, Baer, & Florin, 1997). The distinctive regularity with which overgeneral recall is found in particular clinical populations suggests that overgeneral memory may be an epiphenomenon of depression and trauma (de Decker et al., 2003).

Clinical Significance

There are a number of indicators which suggest that overgeneral memory is a clinically meaningful phenomenon. Firstly, a clear relationship has been observed between overgeneral autobiographical memory and social problem solving. A study on suicidal individuals revealed that those who had the greatest difficulty producing specific memories also had the most difficulty producing effective problem solutions on the Means-Ends Problem-Solving Procedure (Evans et al., 1992). This result has been confirmed in a number of subsequent studies (Beaman, Pushkar, Etezadi, Bye, & Conway, 2007; Goddard et al., 1996; Goddard, Dritschel, & Burton, 1997; Kaviani, Rahimi-Darabad, & Naghavi, 2005; Pollock & Williams, 2001; Scott et al., 2000; Sidley, Whitaker, Calam, & Wells, 1997). In addition, research suggests that overgeneral memory may impair problem solving
ability by detracting from the individual’s ability to imagine the future in detail (J. M. G. Williams et al., 1996), and by influencing problem-solving orientation (Goddard et al., 1996). The effect which overgeneral memory has on problem solving is critical as research suggests that problem solving deficits can lead to hopelessness which in turn may lead to suicidal ideation and behaviour (Dixon, Heppner, & Rudd, 1994).

Secondly, there is some indication that overgeneral memory may in fact be a stable cognitive trait related to clinical prognosis. A longitudinal study by Brittlebank et al. (1993) found that in a group of clinically depressed individuals, memory specificity remained stable across time, and individuals who responded with less specificity to positive cues at baseline were significantly less likely to recover from depression over a period of seven months. This suggests that autobiographical memory specificity is predictive of the course of a depressive episode. Similar findings have been demonstrated in individuals with Major Depressive Disorder (Peeters et al., 2002), and Seasonal Affective Disorder (Dalgleish et al., 2001). Thus it appears that overgeneral memory may be a trait marker indicative of a vulnerability to persistent depression (Brittlebank et al., 1993).

Thirdly, research indicates that overgeneral memory may be a clinical factor which influences response to treatment. Wahler and Afton (1980) conducted a study on women undergoing parent training. They found that initially, all of the mothers displayed an inability to give specific details about stressful events in their lives. However, over treatment, some women developed the ability to give more detailed descriptions of problematic interactions. It was these women who displayed a favourable treatment
outcome. Thus it appears that greater specificity is related to a more favourable treatment outcome (Brittlebank et al., 1993; Wahler & Afton, 1980).

Pertinent to the clinical significance of the overgeneral memory phenomenon is the related finding that overgeneral memory can be altered by therapy. Williams, Segal, Teasdale, & Soulsby (2000) conducted a randomised study comparing the effects of mindfulness-based cognitive therapy versus treatment as usual on overgeneral recall in individuals with remitted Major Depressive Disorder. The results indicated that those who underwent mindfulness based cognitive therapy demonstrated significant reductions in level of overgeneral recall. Kremers and colleagues (2003) also demonstrated the effect of therapy on overgeneral recall in their study comparing psychoanalytic transference focused psychotherapy and schema focused cognitive behaviour therapy in the treatment of borderline personality disorder. Both forms of therapy were found to be effective in reducing overgeneral recall, but improvement in specificity was exclusive to those individuals with comorbid depression (that is, those with high initial levels of overgeneral recall). The findings of these two studies are further supported by the results of laboratory studies which indicate that overgeneral recall can be effectively modified through the use of distraction and decentering tasks, and when individuals are encouraged to focus exclusively on what is being experienced (Watkins & Teasdale, 2001; Watkins et al., 2000). Thus evidence suggests that overgeneral memory can be effectively modified through therapeutic intervention, although it is important to note that longitudinal work is required to determine how long-lasting these effects are.
Mechanisms underlying Overgeneral Memory

In seeking to understand the process by which overgeneral memory occurs, theorists have suggested that overgeneral memory may be a function of the structure of the autobiographical memory database and the process of memory retrieval (Conway & Pleydell-Pearce, 2000).

The Structure of Autobiographical Memory

The autobiographical memory system is believed to be highly structured (Anderson & Conway, 1993). The emerging consensus in research is that the autobiographical memory database is organised into a hierarchy of knowledge where each level of the hierarchy contains increasingly more specific information (Conway & Bekerian, 1987). As outlined in Figure 1, it is generally proposed that there are three main levels in the hierarchy of autobiographical knowledge: lifetime periods, general events and specific events (Anderson & Conway, 1993).

![Figure 1.1 Hierarchy of Autobiographical Memory](image-url)
The uppermost level of the hierarchy pertains to *lifetime periods* which are considered to be the most general or abstract level of autobiographical knowledge. Lifetime periods refer to distinct periods of times, usually years in length, with identifiable beginnings and ends, such as: “When I was studying at University” or “When I lived with X” (Conway & Pleydell-Pearce, 2000; Conway & Rubin, 1993). These constructions are considered to be the most abstract level of autobiographical knowledge because they contain thematic information which refers to common features of that period and is independent of individual events (Anderson & Conway, 1993; Conway, 1990). There may be multiple overlapping lifetime periods for any given period of time (Conway, 1996). The existence of lifetime periods has been confirmed by a large number of studies (Barsalou, 1988; Conway & Bekerian, 1987; Linton, 1986).

The second level in the hierarchy contains information relating to *general events*. The degree of event knowledge contained in this tier is more specific than that seen in lifetime periods in that it typically references a more restricted set of time periods or events. However, rather than referring to discrete events, memories in this level pertain to smaller periods of time (usually days, weeks or months in duration), such as “studying for the HSC” or “when I went on a holiday to Asia”; or summaries of repeated events, such as “playing soccer” or “fighting with my sister” (Conway & Rubin, 1993). These two forms of memory clearly correspond to the “categoric” and “extended” forms of overgeneral recall which Williams and Broadbent identified in their autobiographical memory research.

The third level of the hierarchy consists of memories for *specific events*, which represent the most specific level of autobiographical knowledge. Specific events refer to discrete
episodes that can be measured in units of seconds, minutes or possibly hours, for example, “my first date with Y” or “my graduation ceremony” (Conway, 1996). Information at this level of memory typically references the sensory – perceptual aspects of an event such as images, feelings and highly specific sensory details (Conway & Pleydell-Pearce, 2000). Recollection at this level of the hierarchy results in the recall of a specific autobiographical memory, as defined by Williams and Broadbent (1986).

The tiers of the autobiographical memory hierarchy are nested within each other, such that information from subordinate levels is subsumed in superordinate levels (Barsalou, 1988). Thus all event specific knowledge is contextualised within a general event, which in turn is associated with a lifetime period (Conway & Pleydell-Pearce, 2000; J. M. G. Williams, 1996). This nested hierarchical structure means that information at more abstract levels of the hierarchy can be used to index information in more specific tiers, such that lifetime periods can index general events which in turn can index specific events (Anderson & Conway, 1993; Conway & Bekerian, 1987). Thus retrieving a specific memory involves moving fluently through the hierarchy of autobiographical knowledge (Kremers, 2004b).

**Retrieval**

Specific autobiographical memories can be produced through two different forms of retrieval: generative and direct retrieval (Conway & Pleydell-Pearce, 2000). Generative or top-down retrieval involves the recollection of memories through a search process which is intentional, effortful and elaborate (M. D. Williams & Hollan, 1981). The most comprehensive account of generative autobiographical memory retrieval to date is offered
in the “Generate-search-verify” model proposed by M.D. Williams and colleagues (M. D. Williams & Hollan, 1981; see also Norman, 1979). In this model, memory retrieval is hypothesised to occur in a three-stage cyclic process. The first stage involves the *generation* of a description of the memory which is the target of the retrieval process. This description is a partial or general account of the target memory based on information available through the retrieval task and cues available in the retrieval environment. In the second stage, the memory description is used to *search* the memory database for specific candidate memories with features that match the description. In the third stage, candidate memories are compared to the original task demands to *verify* if they fulfil the requirements of the retrieval task. If a retrieved memory is judged to be appropriate for the task demands, then the search will be terminated. However if the retrieved information is found to be unsuitable, then the retrieval process will be repeated with the output of each cycle serving as the input for successive cycles. Numerous executions of the retrieval cycle may be necessary before the desired information is retrieved, or the search is terminated (M. D. Williams & Hollan, 1981). A memory search may be terminated prior to successful memory retrieval either because it is concluded that the information being sought does not exist or because the effort required to continue the search is deemed greater than appropriate (Norman & Bobrow, 1979). If the search is terminated prior to successful memory retrieval, then the memory system will output the partial or general memory description currently in the system as the final memory yield (J. M. G. Williams & Dritschel, 1988).

In contrast, it is posited that specific memories may also be accessed directly, through a bottom-up retrieval process (Conway & Pleydell-Pearce, 2000). Direct memory retrieval is
thought to arise when cues activate event-specific knowledge directly. In particular, it is posited that event specific information is accessed automatically when the individual is in a context which is similar in some way to that of the memory (Brewin, Dalgleish, & Joseph, 1996). An example of direct retrieval is the “flashbacks” frequently experienced by trauma survivors, where cues reminiscent of the trauma will trigger highly detailed recollection of the trauma memory (Brewin et al., 1996). Because direct retrieval is automatic and unconscious, it is thought to be less vulnerable to processing capacity limitations or deliberate editing than generative retrieval (Brewin et al., 1996).

Overgeneral Memory as a truncated memory search

From within the framework of a hierarchically organised autobiographical memory database, the overgeneral memory phenomenon appears to be best conceptualised as a memory retrieval error whereby the generative memory search is terminated prior to the retrieval of an appropriately specific memory. In fact, this is exactly the idea proposed by Williams (J. M. G. Williams, 1996; J. M. G. Williams et al., 2007) who claims that overgeneral memory represents a truncated memory search. He suggests that when individuals with an overgeneral style of recall are searching through the tiers of memory descriptions, they are able to successfully access the intermediate general descriptions but stop short prior to the recall of specific memories.

However, rather than a pattern of undifferentiated early termination, it appears that the memory system in these individuals founders particularly at the categoric descriptions stage of autobiographical memory retrieval. It is hypothesised that this occurs because self-
referent categoric descriptions tend to activate other self-descriptions, causing the retrieval search to move across the hierarchy rather than down to more specific levels (J. M. G. Williams, 1996; J. M. G. Williams et al., 2007). When this process is repeated over time, it can lead to an over-elaborate network of categoric descriptions where intermediate descriptions automatically activate other intermediate self-descriptions rather than accessing event specific information. Williams coined the term “mnemonic interlock” to describe this process. According to Williams, it takes a considerable amount of effort to override mnemonic interlock, meaning that individuals with reduced working memory or supervisory attentional capacity, will find it particularly difficult to inhibit the categoric cycle and access specific memories (J. M. G. Williams, 1996).

As can be seen from this brief consideration of the ‘generate-search-verify’ model of memory retrieval, there are three main processes which are thought to underlie overgeneral memory, namely: rumination, executive function, and affect regulation. Each of these hypotheses will be briefly considered.

**Executive Control Hypothesis**

As previously outlined, generative retrieval involves the recollection of memories through a search process which is intentional, effortful and elaborate (M. D. Williams & Hollan, 1981). The process of generative retrieval requires the use of executive resources and control processes, including the ability to: hold a retrieval model in working memory, inhibit irrelevant autobiographical knowledge during the search, and sustain the final search results in working memory (J. M. G. Williams et al., 2007). Interfering with or impairing...
these processes will result in retrieval that stops short of its target, resulting in the production of categoric or overgeneral memories (J. M. G. Williams et al., 2007; Conway & Pleydell-Pearce, 2000). In line with this hypothesis, it has been suggested that overgeneral memory occurs in clinical populations because these conditions involve a level of brain impairment, either as a result of structural damage, trauma, or rumination and distraction processes, which affect executive control (J. M. G. Williams, 1996). This brain impairment is posited to negatively affect working memory capacity such that the individual is no longer able to inhibit the production of categoric memories in aid of moving down the memory hierarchy to produce event specific information (J. M. G. Williams, 1996). A large body of evidence is accumulating in support of the notion that overgeneral memory is associated with deficits in executive control (Dalgleish et al., 2007).

Rumination Hypothesis

The “rumination hypothesis” (Watkins & Teasdale, 2001; Watkins & Teasdale, 2004; Watkins et al., 2000; Williams, 1996), suggests that overgeneral memory is the product of a truncated memory search which results from ruminative self-focus. Rumination is defined as “behaviours and thoughts that focus one’s attention on one’s depressive symptoms and on the implications of those symptoms” (Nolen-Hoeksema, 1991, p 569). As such, rumination can be thought of as a form of perseveration which encourages a focus on abstract self conceptualisations. Rumination is thought to impair the memory search process by increasing the likelihood that intermediate descriptions (which are conceptually based abstract self-representations) will activate other self-descriptions, causing the retrieval search to move across the hierarchy rather than down to more specific levels.
Individuals with emotional disorders are thought to be particularly prone to this difficulty as they frequently display highly activated emotion related self-representations, or schemas, which foster rumination (J. M. G. Williams et al., 2007). A growing body of evidence, arising from both correlational and experimental research supports the notion that overgeneral memory is associated with rumination (Williams, 1996; Watkins et al., 2000; J. M. G. Williams et al., 2007; Barnard, Watkins, & Ramponi, 2006).

Affect Regulation Hypothesis

The ‘affect regulation hypothesis’ (J. M. G. Williams, 1996), suggests that overgeneral memory is a cognitive avoidance strategy which individuals use to protect themselves against the emotions associated with distressing memories. This theory is based on the premise that autobiographical memory recollection involves the reactivation of the emotions experienced during the original event and that the intensity of emotions experienced during recall is directly related to the specificity of the memory recalled (Conway & Pleydell-Pearce, 2000). That is, specific recall will increase the degree to which the acute emotions associated with personal memories will be reactivated, while maintaining a more general or abstract level of processing will decrease reactivation. Thus, overgeneral memory can be viewed as a cognitive avoidance strategy that is reinforced by the avoidance of painful emotions (J. M. G. Williams, Stiles, & Shapiro, 1999).

The notion that overgeneral memory may protect against negative affect has received a considerable amount of support within the research literature. Firstly, overgeneral memory
has been found to be significantly correlated with measures of avoidant coping and thought suppression, indicating that this style of recall may be used as a form of cognitive avoidance (Hermans, Defranc, Raes, Williams, & Eelen, 2005). Secondly, research has demonstrated that in some populations, overgeneral memory appears to be protective against negative outcomes. For example, a study on women who had been sexually abused as children demonstrated that those who had not gone on to experience depression were the ones who tended to recall overgeneral memories to negative cues (Burnside, Startup, Byatt, Rollinson, & Hill, 2004). Similarly, in a sample of individuals with Borderline Personality Disorder, it has been demonstrated that individuals with an overgeneral style of recall display lower rates of self-harming behaviour (Startup et al., 2001). These studies seem to imply that, in these populations at least, overgeneral memory is capable of protecting against distress. However, more recent experimental research has yielded results in opposition to this, leading to the “strategic inhibition hypothesis” which suggests that the more specific the recall, the more highly inhibited is the link between the memory and the emotions and thus the less intense the emotions which are activated (Philippot, Schaefer, & Herbette, 2003; Raes, Hermans, Williams, & Eelen, 2006).

It has been suggested that the adoption of an overgeneral memory style may be related in some way to experiences that occur during childhood. This notion is based on evidence that an overgeneral categoric style of retrieval occurs naturally during cognitive development. Research on young children (ages 3-5) indicates that when asked about the past, children of this age tend to give general summaries of events despite demonstrating the ability to retrieve specific information when sufficient cueing is provided (K. Nelson & Gruendel, 1981). This suggests that a general mode of memory processing may precede the
development of specific autobiographical memory capabilities, and that for some time
during development, general recall is the preferred mode of recollection (K. Nelson, 1988).
Building on this finding, Williams (J. M. G. Williams, 1996) suggested that individuals
who experience trauma during their childhood, may persist in using this naturally occurring
generic retrieval mode as a way of avoiding the negative emotions associated with their
experiences. While being primarily aimed at minimizing negative affect, overgeneral recall
then becomes a habitual processing style, resulting in general recall of both negative and
positive memories (Henderson et al., 2002). Moreover, it has been suggested that negative
life events may lead to a cognitive style that focuses on the affective aspects of events,
which tend to be the more general dimensions, meaning that new events are also encoded at
a more general level (Merckelbach et al., 1996). Thus overgeneral memory becomes a self-
perpetuating system with both encoding and recall of memories occurring at a general level
(J. M. G. Williams, 1996).

Over the years since its initial inception, the affect regulation hypothesis has been modified
from its initial standpoint, which linked the development of overgeneral memory
exclusively to negative experiences during the first four years of life. On the basis of
emerging research in this field, the affect regulation theory was extended to include
overgeneral memory as a cognitive strategy applied by individuals who experienced
negative events later in life as well as individuals who are particularly sensitive to negative
events and individuals who have temperamental difficulties in controlling affect (J. M. G.
Williams, 1996). Williams suggests that in a similar way to individuals who have
experienced negative childhood events, these individuals may also learn to retrieve
memories in a generic fashion as a means of controlling affect (J. M. G. Williams, 1996).
Chapter 1: Introduction

One population to which this theory could be justly extended is Borderline Personality Disorder.

**Borderline Personality Disorder**

**Clinical Picture**

Borderline Personality Disorder is a chronic mental disorder characterised by an enduring pattern of instability in: affect regulation, behavioural control, self-image, and interpersonal relationships (Skodol, Gunderson et al., 2002). Early reports of the disorder, some dating back to 1938, identified a cluster of individuals who demonstrated markedly unstable affect, and a failure to respond to conventional treatments (Grinker, Werble, & Drye, 1968; Krawitz & Watson, 2003; Zetzel, 1971). The term “borderline” was first applied to this group in 1953 by Robert Knight, based on the then-current notion that these patients were on the border between neurosis and psychosis (Gunderson, 2001). Yet despite its long history in psychiatry, Borderline Personality Disorder was not officially recognised in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association) until 1980. Since this time, understanding and recognition of the disorder has increased, and it is now the most commonly diagnosed personality disorder in clinical practice (Gunderson, 2001).

The diagnostic criteria for Borderline Personality Disorder, as outlined in the DSM-IV-TR (American Psychological Association [APA], 2000, see Table 1.1), reflects a pervasive pattern of dysregulation in multiple domains of functioning, including: affective, behavioural, cognitive, and interpersonal (Linehan, 1993a; Yen, Zlotnick, & Costello,
Emotionally, these individuals are unstable and reactive, responding to environmental stimuli with intense episodic dysphoria, anxiety or irritability, and inappropriate displays of temper. Feelings of emptiness are also a chronic component of their emotional landscape. Interpersonally, they alternate between idealizing and devaluing significant others, and make frantic efforts to avoid abandonment. Behaviourally, they are impulsive and risk-taking, and frequently engage in potentially harmful behaviours, including self-harm and suicidal gestures. Cognitively, they have a persistently unstable sense of self and can experience transient, stress-related paranoid ideation or dissociation.

Table 1.1 DSM-IV-TR Diagnostic Criteria for Borderline Personality Disorder

<table>
<thead>
<tr>
<th>DSM-IV TR Diagnostic Criteria for Borderline Personality Disorder</th>
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<tr>
<td>A pervasive pattern of instability of interpersonal relationships, self-image, and affects, and marked impulsivity beginning by early adulthood and present in a variety of contexts, as indicated by five (or more) of the following:</td>
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<tr>
<td>1. Frantic efforts to avoid real or imagined abandonment</td>
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<tr>
<td>2. A pattern of unstable and intense interpersonal relationships characterised by alternating between extremes of idealization and devaluation</td>
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<tr>
<td>3. Identity disturbance: markedly and persistently unstable self-image or sense of self</td>
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<td>4. Impulsivity in at least two areas that are potentially self-damaging</td>
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<td>5. Recurrent suicidal behaviour, gestures, or threats, or self-mutilating behaviour</td>
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<tr>
<td>6. Affective instability due to marked reactivity of mood (e.g. intense episodic dysphoria, irritability, or anxiety usually lasting a few hours and only rarely more than a few days)</td>
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<tr>
<td>7. Chronic feelings of emptiness</td>
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<tr>
<td>8. Inappropriate, intense anger or difficulty controlling anger (e.g. frequent displays of temper, constant anger, recurrent physical fights)</td>
</tr>
<tr>
<td>9. Transient, stress-related paranoid ideation or severe dissociative symptoms</td>
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</tbody>
</table>
To qualify for a diagnosis of Borderline Personality Disorder, an individual must display at least 5 of the 9 possible criteria. This polythetic criteria set means that there are 151 possible combinations of criteria with which an individual may receive the label of Borderline (Skodol, Gunderson et al., 2002). This highlights the considerable degree of heterogeneity within Borderline Personality Disorder.

Borderline Personality Disorder is now the most common personality disorder in clinical practice, affecting 1-2% of the general population, 10% of psychiatric outpatients, and 15-20% of inpatients (Skodol, Gunderson et al., 2002; Torgersen, Kringlen, & Cramer, 2001; Widiger, Frances, & Trull, 1989). Seventy five percent of those diagnosed are women (Linehan, 1993a), and many have a history of trauma, particularly sexual abuse (Herman, Perry, & van der Kolk, 1989; Ogata et al., 1990). Comorbidity is high within this population, with approximately 70% of those diagnosed with Borderline Personality Disorder also meeting the criteria for another Axis I or Axis II disorder (Stone, 1989). Frequently, Major Depressive Disorder is also present (Bateman & Fonagy, 1999; Linehan & Koerner, 1993).

Typically, Borderline Personality Disorder emerges in early adulthood and persists into later life (Oldham, 2005). Longitudinal research indicates that the majority of individuals with Borderline Personality Disorder will experience substantial reductions in their symptoms in 2-6 years, and 90% will recover by the age of 50 (Zanarini, Frankenburg, Hennen, & Silk, 2003). In those who do recover, reoccurrences are rare (Zanarini, Frankenburg et al., 2003). However, despite this documented improvement in symptoms, evidence suggests that over time, Borderline patients remain more symptomatic than
individuals with Axis I disorders, and functional impairment appears to persist even after improvements in symptoms (Skodol, 2005; Skodol, Siever et al., 2002; Zanarini, Frankenburg et al., 2003).

In terms of clinical presentation, Borderline Personality Disorder is associated with severe functional impairment, substantial treatment utilization, and a high rate of mortality by suicide (Skodol, Gunderson et al., 2002). They are also considered to be one of the most difficult populations to treat, due to their difficulties with interpersonal interactions, their marked impulsivity, and their high rates of suicidal behaviour (Paris, 2005).

Borderline Personality Disorder and Overgeneral Memory

From a theoretical perspective, individuals with Borderline Personality Disorder have been hypothesised to exhibit a significant level of overgeneral memory. Williams (1996) suggests that individuals with Borderline Personality Disorder are particularly prone to developing an overgeneral style of memory due to their temperamental difficulties with affect regulation, positing that they learn to rely on this memory style as a form of cognitive avoidance to regulate emotion. Moreover, individuals with Borderline Personality Disorder display many of the characteristics which have been found to be related to overgeneral recall, such as: clinical depression (Bateman & Fonagy, 1999), recurrent parasuicidal behaviour (Soloff, Lis, Kelly, Cornelius, & Ulrich, 1994), problem solving deficits (Berk, Jeglic, Brown, Henriches, & Beck, 2007; Bray, Barrowclough, & Lobban, 2007; Douglass, 2000), and childhood trauma (Henderson et al., 2002; Zanarini, Dubo,
Lewis, & Williams, 1997). However, empirical support for the association between BPD and overgeneral memory has so far been lacking.

A total of four studies have now investigated the specificity of autobiographical memory in individuals with Borderline Personality Disorder. The first of these was a study by Jones, Heard, Startup, Swales, Williams and Jones (1999) which compared 23 individuals with Borderline Personality Disorder to 23 matched controls on measures of autobiographical memory, current mood, and dissociation. They found that the group with Borderline Personality Disorder produced significantly more general responses (41%) than controls (11%), and that overgeneral memory was related to dissociation, but unrelated to current mood. The results of this study provide preliminary evidence of an overgeneral memory style in Borderline Personality Disorder. However, the results are far from conclusive given that this study did not control for comorbid disorders, nor include a psychiatric control group, leaving it unclear as to whether the overgeneral recall observed was a function of Borderline Personality Disorder per se, or simply a reflection of the co-occurrence of Major Depressive Disorder and Post Traumatic Stress Disorder in this population (Arntz et al., 2002).

In an attempt to clarify whether the overgeneral memory observed in Jones’ study was specific to Borderline Personality Disorder, Arntz, Meeren and Wessel (2002) compared recall specificity in a mixed sample of 29 psychiatric participants, including 9 individuals with Borderline Personality Disorder. The sample was assessed for the presence of both Axis 1 and Axis 2 diagnoses, as well as childhood trauma. The results of this study indicated that neither Borderline Personality Disorder, nor anxiety disorders, nor childhood
trauma were related to the tendency to produce overgeneral memories. However, Major Depressive Disorder was found to be associated with a less specific mode of recall. These results suggest that it may be the presence of clinical depression, rather than childhood trauma or Borderline Personality Disorder which is predictive of overgeneral memory, and that the overgeneral memory observed in Jones et al.’s Borderline sample may have been a result of high levels of comorbid depression. However, given the small sample size in this study, these results must be treated with caution until confirmed by a study with more power.

The third study was a comparison between Borderline Personality Disordered individuals, with and without comorbid depression, depressed controls, and non-psychiatric controls (Kremers, Spinhoven, & Van der Does, 2004). These groups were compared on measures of memory specificity, trauma, thought intrusions/avoidance, mood, and dissociation. The results indicated that both depressed individuals, and individuals with Borderline Personality Disorder and comorbid depression, reported fewer specific memories than Borderline individuals without comorbid depression, or controls. Moreover, they found that within the Borderline sample, specificity was not related to trauma, dissociation, thought intrusions/avoidance, or current mood. This pattern of results is consistent with Arntz et al.’s (2002) study, suggesting that it is presence of clinical depression rather than Borderline Personality Disorder per se which is predictive of overgeneral recall, and that the overgeneral memory observed in Borderline samples can likely be attributed to comorbid depression.
However, the latest study, a comparison between Borderline inpatients, depressed inpatients, and non-clinical controls, has revealed a slightly different pattern of results (Renneberg, Theobald, Nobs, & Weisbrod, 2005). Consistent with past findings, individuals with clinical depression were found to be more categoric than controls and individuals with Borderline Personality Disorder. However, no difference was observed between specificity of recall in controls and individuals with Borderline Personality Disorder. This finding is interesting as 63% of the Borderline Personality Disorder sample in this study fulfilled criteria for current Major Depressive Disorder. Furthermore, within the Borderline sample, results indicated that number of specific memories was not related to presence of Major Depressive Disorder or Post Traumatic Stress Disorder. Neither was there any relationship between overgeneral memory and dissociation, current mood, or self-harm. In fact, the only feature of memory retrieval which differentiated the Borderline group from controls was a higher rate of retrieval of unpleasant memories (equal to depressed).

Thus it is clear that past research has so far been inconsistent in regards to the relationship between overgeneral memory and Borderline Personality Disorder. Whilst some evidence suggests that overgeneral memory is a feature of Borderline Personality Disorder, other evidence suggests that this is related to presence of comorbid Major Depressive Disorder, whilst still other research suggests that overgeneral memory is not a feature of Borderline Personality Disorder even when Major Depressive Disorder is also present. This thesis will seek to clarify this issue and further explore the relationship between overgeneral memory and factors such as problem solving and affect regulation within this population.
Methodology

This thesis comprises three main studies. The first is a cross-sectional study comparing Borderline individuals, both with and without a comorbid depressive disorder, to non-depressed controls. These groups were compared on several core variables including autobiographical memory style, problem solving ability, suicidal behaviours, affect intensity and affect control as well as possible mediating variables including hopelessness, dissociation, intrusive memories and trauma history. Details and results of this study are detailed in Chapters 2 through 4.

The second study is a longitudinal study exploring change in levels of overgeneral memory in Borderline individuals over treatment. A sample of Borderline individuals were assessed on regular occasions throughout treatment in a year long Dialectical Behaviour Therapy Program to assess whether change in variables such as problem solving and affect regulation was related to change in levels of overgeneral memory and to assess which components of the Dialectical Behaviour Therapy program were most effective in producing change in these variables. Details from this study are presented in Chapter 5.

The third study was an experimental study exploring the relationship between overgeneral memory, borderline traits, and affect regulation in a non-clinical sample. The study design involved experimental manipulation of overgeneral memory through tasks which increased rumination or mindfulness. Participants were then exposed to a distressing film clip, and emotional response to this stimulus was assessed. Details and results from this study are presented in Chapter 6.
Introduction

Overgeneral autobiographical memory has been demonstrated to occur in a number of clinical populations (see J. M. G. Williams et al., 2007). Theoretical accounts of this phenomenon suggest that clinically disordered individuals may persist in using overgeneral memory, which occurs naturally during early development, as a cognitive avoidance strategy to protect them against the emotions elicited by the specific recall of distressing memories (J. M. G. Williams, 1996). It is suggested that individuals who have experienced trauma during their childhood, individuals who are particularly sensitive to negative events, and individuals who have temperamental difficulties in controlling affect, are especially prone to developing an overgeneral style of memory (J. M. G. Williams, 1996). One particular clinical population to which this theory has been applied is Borderline Personality Disorder. Williams (1996) suggests that individuals with Borderline Personality Disorder are prone to developing an overgeneral style of memory due to their temperamental difficulties with affect regulation, positing that they learn to rely on this memory style as a form of cognitive avoidance to regulate emotion.
Past research lends further validity to the theoretical proposition that individuals with Borderline Personality Disorder will display an overgeneral style of autobiographical memory. Evidence indicates a clear association between overgeneral autobiographical memory and three main factors: clinical depression (e.g. Goddard et al., 1996; Park, Goodyer, & Teasdale, 2002; J. M. G. Williams et al., 2007; J. M. G. Williams & Scott, 1988); suicidality (e.g. Leibetseder, Rohrer, Mackinger, & Fartacek, 2006; J. M. G. Williams & Broadbent, 1986), and trauma related disorders (S. Moore & Zoellner, 2007). These factors also occur in the Borderline population at a high rate. Firstly, evidence suggests that Borderline Personality Disorder and clinical depression frequently co-occur, with recent estimates suggesting that as many as 70% of individuals with Borderline Personality Disorder also meet criteria for current Major Depressive Disorder (Bateman & Fonagy, 1999; Linehan, Heard, & Armstrong, 1993; Linehan & Koerner, 1993). Secondly, individuals with Borderline Personality Disorder frequently report a history of trauma, with estimates suggesting that over half of individuals with BPD have comorbid PTSD (Zanarini et al., 1998). Thirdly, deliberate self-harm is present in approximately 75 - 81% of individuals with Borderline Personality Disorder (Linehan, 1993a; Zanarini, Frankenburg et al., 2003). Given these associations, individuals with Borderline Personality Disorder can also be expected to demonstrate significant levels of overgeneral memory.

Despite this persuasive theoretical grounding, empirical evidence has failed to conclusively confirm the relationship between Borderline Personality Disorder and overgeneral autobiographical memory. A handful of studies have now investigated the specificity of autobiographical memory in individuals with Borderline Personality Disorder, and results have so far been somewhat inconsistent. Whilst preliminary evidence suggested that
overgeneral memory was indeed a feature of Borderline Personality Disorder (Jones et al., 1999), further evidence has suggested that this is related to presence of comorbid Major Depressive Disorder (Kremers et al., 2004), whilst still other research suggests that overgeneral memory is not a feature of Borderline Personality Disorder regardless of depressive comorbidity (Arntz et al., 2002; Renneberg et al., 2005).

The reason for these discrepant results is as yet, unclear. However, a number of possible explanations are apparent from a brief review of the studies involved. Firstly, there appears to be some methodological variation between the four studies in regards to the administration and coding of the Autobiographical Memory Test (AMT), which may have had some influence on the pattern of results observed. In the administration of the AMT, participants are presented with a series of cue words and are allowed a set period of time during which they are required to recall a specific memory in response to the particular cue. The time limit provided varied between the four studies with Jones et al (1999) allowing participants 30 seconds in which to respond, compared to the 60 seconds allowed in the other three studies. This is of importance as a recent meta-analysis indicates that maximum amount of time in which to respond was a moderator of performance on the AMT (van Vreeswijk & de Wilde, 2004). The authors of the meta-analysis suggest that the longer the time limit in which to respond, the easier it is to produce the required specific response (van Vreeswijk & de Wilde, 2004). Thus, the difficulties which the BPD participants had in producing responses in Jones’ study relative to the other three studies may be due to the shorter time frame allowed for memory recall.
There were also differences between the four studies in the coding of responses. In Jones et al.’s study (1999), responses were scored as either specific, general (including both categoric and extended memories) or omissions. The results of this study, which suggested that the BPD group was more overgeneral than controls, were based on an analysis of this hybrid general category as the measure of overgeneral memory. Arntz and colleagues (2002) also coded their AMT responses as either general or specific, however, their analysis was based on number of specific memories. In contrast, Kremers (2004) differentiated between categoric and extended memories in scoring, as well as including a category for “does not comply”. Her analysis was based on number of specific responses as the measure of overgeneral memory. Renneberg (2005) also differentiated between specific, categoric, and extended memories and analysed both specific and categoric responses in the assessment of group differences. The way in which responses are coded and analysed is critical in the interpretation of results as omitting or combining categories (such as the hybrid general category used in Jones’ study) can artificially inflate scores (van Vreeswijk & de Wilde, 2004). Moreover, analysis involving specificity scores cannot be directly compared to analysis of general responses as the two scores are not directly related due to the different handling of omissions, extended memories and non compliant responses (van Vreeswijk & de Wilde, 2004). These methodological differences may go someway towards explaining the different results observed in past research on overgeneral memory in Borderline Personality Disorder.

A second explanation for the discrepant results observed is possible group differences in the samples upon which the four studies were based. The Borderline samples included in these studies were recruited from widely differing sources, including: local mental health
services (Jones et al., 1999), outpatient clinics (Kremers et al., 2004) and inpatient services (Arntz et al., 2002; Renneberg et al., 2005). It may be that recruiting participants from such varying sources resulted in samples which differed in symptom severity and current mental state which may have affected their ability and/or motivation to participate in research. Evidence supports this hypothesis, with a meta-analysis indicating that memory deficits vary according to severity of symptoms and inpatient versus outpatient status (Burt, Zembar, & Niederehe, 1995).

Thirdly, it is possible that the differing findings are the result of some other independent variable which has not been consistently accounted for in previous research. Cognitive ability is a clear example of this. Past research has indicated that autobiographical memory is related to various factors which fall under the broad heading of cognitive ability, including: executive function (Dalgleish et al., 2007), general intelligence (e.g. Scott et al., 2000), and years of education (Wessel et al., 2001). Indeed, within the BPD research, three of the four studies assessed years of education (Arntz et al., 2002; Jones et al., 1999; Kremers et al., 2004) and two found this to be significantly related to overgeneral memory and were therefore able to control for this in further analysis (Arntz et al., 2002; Kremers et al., 2004). However, none of the studies have assessed level of general cognitive ability or accounted for the effect which cognitive ability has on memory recall. The importance of IQ in autobiographical memory is recognised by Jones et al (1999) who suggest that the significant results observed in his study may be accounted for by group differences in IQ.

A second variable which may have affected the results observed is comorbidity within the Borderline population. In particular, results may have been affected by comorbid Major
Depressive Disorder, which occurs in a majority of Borderline individuals (Bateman & Fonagy, 1999; Linehan & Koerner, 1993) and has been found to be closely linked with memory impairments (Burt et al., 1995). Evidence suggests that clinical depression is strongly related to overgeneral memory (van Vreeswijk & de Wilde, 2004), with a recent meta-analysis suggesting that diagnosis of depression is a moderator of specificity of negative autobiographical memories (van Vreeswijk & de Wilde, 2004). Moreover, the presence of comorbid clinical depression is posited to account for the overgenerality observed in a number of other populations, including Obsessive Compulsive Disorder (Wilhelm et al., 1997). Jones and colleagues’ (1999) findings of significant levels of overgeneral memory in their Borderline sample can be called into question due to their failure to control for diagnosis of comorbid depression as it is unclear whether the results were due to the high rate of clinical depression within the population, or to Borderline Personality Disorder per se. Kremers’ (2004) findings that overgeneral recall was only found in Borderline participants with comorbid depression appears to support the speculation that overgeneral memory within the Borderline population is due to comorbid depression. However, Renneberg (2005) failed to replicated this result, leaving the relationship between BPD, clinical depression and autobiographical memory far from clear.

The study outlined in this chapter will seek to clarify the relationship between Borderline Personality Disorder and overgeneral autobiographical memory, by comparing memory specificity in individuals with Borderline Personality Disorder, both with and without comorbid depression, to a sample of community controls. On the basis of past research, it is hypothesised that Borderline Individuals will be more overgeneral than controls but that
this overgenerality will be mainly due to comorbid depression, that is, depressed Borderline individuals will be more overgeneral than non-depressed Borderlines, or controls.

The impact of several other relevant variables on autobiographical memory within this population will also be explored, including: intelligence, childhood abuse, dissociation, and thought suppression. Firstly, given that past research indicates that cognitive ability is somehow related to performance on the AMT (Dalgleish et al., 2007; Scott et al., 2000), it is hypothesised that autobiographical memory specificity in the Borderline population will be positively associated with intelligence and level of education. If this relationship is confirmed, intelligence and education will be entered as a covariate into analysis to ensure that cognitive ability does not account for between group differences. Secondly, it is hypothesised that the association between childhood trauma and reduced memory specificity which has been observed in past research (e.g. Burnside et al., 2004; Dalgleish et al., 2003; de Decker et al., 2003; Henderson et al., 2002; Hermans et al., 2004; Kuyken & Brewin, 1995; Raes et al., 2005), will be confirmed in this population. Thirdly, in line with the theory that overgeneral memory serves to regulate emotion through cognitive avoidance, it is hypothesised that reduced specificity will be associated with other forms of behaviour, including thought suppression, dissociation, and deliberate self harm, which are known to be methods of experiential avoidance within this population (Chapman et al., 2006; Linehan, 1993a).
Method

Subjects

Thirty-one volunteers meeting criteria for Borderline Personality Disorder were recruited from the Centre for Psychotherapy, Newcastle, which runs an outpatient treatment program specializing in the treatment of Borderline Personality Disorder. The sample consisted of 24 females and 7 males, aged between 18 and 60 (M= 25.94, SD=9.58). Diagnostic assessments on the Borderline participants were conducted by an experienced psychiatrist and career medical officer as part of the routine assessment procedure for determining eligibility for treatment at the Centre for Psychotherapy. Patients were considered eligible for admission to the treatment program if they had a current diagnosis of Borderline Personality Disorder according to the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID II: M. B. First, Spitzer, Gibbon, & Williams, 1997), were eighteen years or over, and had engaged in at least three episodes of self-harming behaviour in the last 12 months. Patients were excluded from the treatment program if they presented with a disabling organic condition, severe substance abuse, schizophrenia, bipolar affective disorder, melancholic or psychotic depression, excessive anti-social behaviour or a developmental disability. During the recruitment period, a total of 50 individuals were accepted into the treatment program and all were invited to participate in this research (62% of those approached participated). All assessments were conducted prior to the commencement of therapy.

A control sample, consisting of thirty-two non-Borderline participants, was recruited from a community volunteer panel coordinated by the Hunter Medical Research Institute,
Newcastle. The control sample was matched to the clinical sample in terms of gender and age. All controls were screened for Borderline Personality Disorder and depressive symptomatology using the McLean Screening Instrument, and screening items from the Major Depressive Episode module of the SCID-CV to ensure that there was no overlap between the clinical and control samples. Three participants were excluded on the basis of results from these screening tests, exhibiting either a moderate level of Borderline symptomatology, positive responses on the MDD screening items, or both. The remaining control sample thus consisted of 23 females and 6 males, aged between 18 and 44 (M = 25.83, SD = 5.23).

Measures

A comprehensive battery of tests was administered to participants, including: the Structured Clinical Interview for DSM-IV Axis I Clinician Version (SCID-CV) and Axis II (SCID-II) disorders, McLean Screening Test for Borderline Personality Disorder, Borderline Symptom List, National Adult Reading Test, Beck Depression Inventory –II, Beck Hopelessness Inventory, Lifetime Parasuicide Count, Autobiographical Memory Test, Affect Intensity Measure, Affect Control Scale, Means – Ends Problem Solving Procedure, Social Problem Solving Inventory – Revised, Dissociative Experiences Scale, Childhood Trauma Questionnaire, and White Bear Suppression Inventory. However, only a selection of these measures are pertinent to the research question being addressed in this chapter and thus only these scales will be detailed below. The remainder of the measures were included to address additional research questions and will be detailed in Chapters 3 through 5.
Diagnostic Information

Borderline diagnosis was assessed within the clinical sample using the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID II: Michael.B. First, Gibbon, Spitzer, Williams, & Benjamin, 1997). The SCID II is a semi structured diagnostic interview designed to assess the 10 personality disorders outlined in the Diagnostic Statistical Manual fourth edition (Avoidant, Dependent, Obsessive-Compulsive, Paranoid, Schizotypal, Schizoid, Histrionic, Narcissistic, Borderline, Antisocial) as well as the provisional categories of Passive-Aggressive, Depressive, and Personality Disorder not otherwise specified. The SCID-II is appropriate for use in both clinical and research settings and can be used in its entirety as a comprehensive assessment tool, or in portions to confirm particular diagnosis. In this study, the Borderline Personality Disorder module of the SCID II was administered independently to confirm diagnosis of Borderline Personality Disorder. The SCID-II has demonstrated good internal reliability, test-retest reliability and validity (Michael.B. First, Spitzer, Gibbon, Williams, & et al., 1995), and evidence indicates that it is a reliable diagnostic instrument for Borderline Personality Disorder (Intraclass correlation = .82: Fogelson, Nuechterlein, Asarnow, Subotnik, & et al., 1991). The SCID is appropriate for use in individuals aged 18 and over, and can be used for assessing adults receiving psychiatric or general medical care, or in non-patient groups (Spitzer, Williams, Gibbon, & First, 1990).

The control sample was also screened for Borderline Personality Disorder using The McLean Screening Instrument for Borderline Personality Disorder (Zanarini, Vujanovic et al., 2003). The McLean Screening Instrument is a brief, 10 item, self-report questionnaire designed to provide a preliminary screen for the presence of Borderline Personality
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Disorder. This scale is based on the Borderline Module of the Diagnostic Interview for DSM-IV Personality Disorders and assesses all 9 of the diagnostic criteria for Borderline Personality Disorder. Individuals are required to respond “yes” or “no” to a range of questions assessing interpersonal, emotional, and behavioural features of BPD (sample items include: “Have any of your closest relationships been troubled by a lot of arguments or repeated breakups?” and “Have you been extremely moody?”). Research demonstrates that the McLean Screening Instrument is able to adequately identify and discriminate Borderline Personality Disorder, with high levels of sensitivity and specificity (.81 and .85 respectively). The scale’s sensitivity and specificity is even higher in younger subjects (up to .90 and .93 for those under 25), indicating that this tool is particularly useful in adolescents or young adults (Zanarini, Vujanovic et al., 2003). To ensure that no Borderline individuals were included in the control sample, a conservative cut-off of 3 positive responses was used as the limit for determining eligibility for inclusion in the control sample. The McLean has demonstrated validity as indicated by significant correlations between criteria met according to the McLean and criteria met according to the DIPD-IV (phi coefficients ranging between .30 and .59). The scale also demonstrates adequate internal consistency (.74). The McLean takes approximately 5 minutes to complete, and is appropriate for use in adults aged 18-60.

Diagnosis of Major Depressive Disorder was assessed in this study through the use of the Structured Clinical Interview for DSM-IV Axis I Disorders Clinician Version (SCID CV: M. B. First et al., 1997). The SCID CV is a comprehensive, standardised diagnostic interview designed to assess Axis I mental disorders according to the criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994). The scale
covers six main areas, namely: Mood Episodes, Psychotic Symptoms, Psychotic Disorders, Mood Disorders, Substance Use Disorders, and Anxiety and Other Disorders. The SCID-CV can be administered in its entirety as a screening tool, or individual modules can be used autonomously to confirm a particular DSM-IV diagnosis (M. B. First et al., 1997). In the current research project, the Mood Disorder module was administered in its entirety to the Borderline sample to determine whether Major Depressive Disorder was present. The control sample was screened for clinical depression using the first two questions from the Major Depressive Episode module, which pertain to the two criteria necessary (though not sufficient) for diagnosis of Major Depressive Disorder. Research suggests that the SCID has adequate reliability, ranging from .70 to 1.00 (M. B. First et al., 1997), with diagnosis of Major Depression demonstrating excellent reliability (.93). The SCID-IV is appropriate for use in individuals aged 18 and over.

**Borderline Symptomatology**

The Borderline Symptom List (BSL: Martin Bohus et al., 2001) was used to assess level of symptomatology in the Borderline sample. The BSL is a 95 item, self-report, Likert style questionnaire based on the diagnostic criteria for BPD as outlined in the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV), and on the Diagnostic Interview for Borderlines. It includes several subscales: self perception, affect regulation, self destruction, dysphoria, loneliness, intrusions and hostility; as well as producing an overall summary score. Evaluation of the BSL suggests that it has good internal consistency, reliability and validity (Martin Bohus et al., 2007; Martin Bohus et al., 2001). Preliminary evidence also suggests that the BSL is sensitive to therapeutic change in Borderline
symptomatology (Martin Bohus et al., 2007). The BSL takes approximately 10 minutes to complete.

**General Intelligence**

A measure of general intelligence was included in this study as evidence suggests that autobiographical memory specificity is associated with intelligence (e.g. Scott et al., 2000). Intelligence was estimated using the National Adult Reading Test first edition (NART: H. E. Nelson, 1982). The NART consists of a list of 50 irregularly pronounced words presented in increasing difficulty. The participant is required to read the words aloud and is scored according to the number of errors made. From this score, verbal, performance and full-scale IQ can be predicted. Research indicates that NART scores correlate highly with IQ, accounting for 66% of the variability in full-scale IQ as assessed by the Weschler Adult Intelligence Scale (John R. Crawford, Parker, Stewart, Besson, & et al., 1989). Studies have shown that the NART has good split-half reliability (.93), interscorer reliability (.88), and test-retest reliability (98) (Smith, 1998) and is valid for use in individuals aged 20-70.

**Depressive Symptoms**

Depressive symptomatology among the Borderline participants was assessed using the Beck Depression Inventory second edition (BDI II: Beck, Steer, & Brown, 1996). The BDI-II is a 21 item, self-report inventory that assesses the severity of depressive symptoms experienced during the past two weeks. It has shown excellent reliability (.92 to .93 for outpatient and student samples respectively) and test-retest reliability (.93 over 1 week). The BDI-II has also demonstrated adequate validity through correlations with the Hamilton Psychiatric Rating Scale for Depression-Revised (.71 in psychiatric outpatients), the SCL-
90-R Depression subscale (.89), the Beck Hopelessness Scale (.68). The BDI-II is suitable for use in individuals aged 13 years and over, and takes 5-10 minutes to complete.

**Autobiographical Memory**

The Autobiographical Memory Test (AMT: J. M. G. Williams & Broadbent, 1986) is a scale designed to assess autobiographical memory specificity. The test consists of a number of orally presented cue words to which participants are instructed to recall specific events from their past, where a specific event is defined as an event which occurred at a particular place and time and did not last longer than 24 hours (J. M. G. Williams, 1996). Instructions specified that the memories produced had to be related to events which took place more than one week ago. The present study utilised a version of the AMT consisting of a total twelve cue words, 6 positive and 6 negative, which were matched for emotionality and frequency. Participants were given three words on which to practice prior to commencing the test, and were prompted with the phrase “can you think of a particular time, one specific event?” if they respond in an ambiguous non-specific manner. Participants were allowed 60 seconds in which to respond to each cue word and the memory recalled was recorded verbatim to be later coded for specificity. Responses were coded as either *specific*: involving an event which occurred at a particular place and time and lasts less than one day; *categoric*: a summary of repeated events; *extended*: involving an event that lasted longer than one day; *non memories*: the information recalled is not a memory but a semantic associate etc; or *omissions*: no response is given or time-limit exceeded. Memory repetitions were not counted. Coding was carried out by the PhD candidate, and fifty percent of responses were re-coded by a trained independent rater in order to assess interrater reliability. Analyses were conducted (Cohen’s Kappa) to determine inter-rater
agreement for categorising responses into all different categories (e.g. non memories, omissions, categoric, extended and specific). The level of agreement between raters was good: Cohen’s overall Kappa = .89 ($p < .001$), with Kappa’s for individual cue words on the AMT ranging between .77 and 1.00 ($p$’s all <.001).

This study formed the baseline component of a longitudinal study (reported in Chapter 5) and, due to the counterbalancing requirements of this longitudinal study, autobiographical memory within the current study was assessed using 5 parallel forms of the AMT (word lists shown in Appendix 1). Four of these word lists were drawn from Brittlebank et al (1993), while the additional word list was compiled by the student researcher from the Affective Norms for English Words (ANEW) list (Bradley & Lang, 1999). The additional word list was matched to the original four in terms of valence, arousal and frequency. Within the current study, the five AMT versions were counterbalanced between the three subject groups as much as possible, however, given the unequal size of the groups, the effectiveness of this counterbalancing is limited. Preliminary analysis indicated that there were no significant differences between the groups in terms of the versions administered ($\chi^2 = 3.90, p = .87$), however, form will be included in the main body of analysis to ensure that differences in AMT form does not influence results. The AMT has shown good inter-rater reliability (.92 and .85 for clinical and control groups respectively) (Swales, Williams, & Wood, 2001). The AMT has also demonstrated adequate test-retest reliability (.53 to .68). Although these test-retest coefficients are only moderate, the study from which they are taken varied the procedures between testing occasions (oral versus written), therefore the test can be seen as a parallel forms reliability check which is a more stringent test of reliability (Raes, Hermans, Williams, & Eelen, Unpublished),
Trauma History

Trauma history was assessed using the Childhood Trauma Questionnaire (CTQ: D. P. Bernstein & Fink, 1998). The Childhood Trauma Questionnaire is a 28 item retrospective, self report questionnaire. It assesses five forms of childhood maltreatment, namely: physical abuse, sexual abuse, emotional abuse, physical neglect, and emotional neglect. Item’s are rated on a scale from 1 (never true) to 5 (very often true) to indicate how often the individual experienced these forms of abuse during childhood. The CTQ produces individual scores for each of the forms of abuse independently, while research also supports the validity of a summary score, which quantifies the severity of overall childhood maltreatment (Scher, Stein, Asmundson, McCreary, & Forde, 2001). In general, the CTQ has shown good internal consistency, the alpha coefficients for each of the scales ranging from .80-.95, although the physical neglect scale demonstrates only marginal consistency (median .66). It has also demonstrated good test-retest reliability (.79 to .86 over 4 months) (D. P. Bernstein & Fink, 1998), and convergent validity with both a clinician-rated interview of childhood abuse and therapist abuse ratings (D. P. Bernstein, Ahluvalia, Pogge, & Handelsman, 1997; D. P. Bernstein & Fink, 1998; Fink, Bernstein, Handelsman, Foote, & Lovejoy, 1995). The CTQ is valid for use in individuals aged 12 and over, requires a sixth grade reading level, and takes 5 minutes to complete.

Thought Suppression

The White Bear Suppression Inventory (WBSI: Wegner & Zanakos, 1994) was included as a measure of the individual’s tendency to suppress thoughts (Muris, Merckelbach, & Horselenberg, 1996). This self-report scale consists of 15 items, such as: “There are things I prefer not to think about” and “I have thoughts I cannot stop”, to which subjects are
required to respond on a 5 point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Research suggests that the WBSI may not be a unidimensional scale, but rather includes items which assess both thought suppression and thought intrusions (Rassin, 2003). However, recently, a sub-set of 6 items (items 3, 6, 9, 12, 13 and 15) has been identified as providing a pure measure of “thought suppression” (Palm & Strong, 2007). As such, analyses pertaining to this measure will assess both the total WBSI score and the 6 item subset score (identified as WBSI –thought suppression). Research suggests that the WBSI has good internal consistency (.89) and adequate test-retest reliability (ranging between .69 and .92 over a three month period) (Muris et al., 1996; Wegner & Zanakos, 1994). The validity of the WBSI is also demonstrated through significant correlations between this scale and the Unwanted Intrusions Questionnaire, the Maudsley Obsessive Compulsive Inventory, the State-Trait Anxiety Inventory, and the Beck Depression Inventory (Muris et al., 1996).

**Dissociation**

The Dissociative Experiences Scale (DES: E. M. Bernstein & Putnam, 1986) is a 28 item self report scale designed to measure dissociation, including a lack of integration of thoughts, experiences and emotions into consciousness and memory (Fischer, 1994). Items, such as “Some people have the experience of finding themselves in a place and not knowing how they got there”, are rated on a percentage scale to indicate how often the individual has experienced that type of event. The DES has good split half reliability (.71-.96) and test-retest reliability (.84 over four to eight week periods) (Fischer, 1994). In addition, the DES has good validity, as evidenced by non-correlations with theoretically unrelated variables such as socio-economic status and gender, and by the degree to which
item scores are able to differentiate diagnostic groups (Fischer, 1994). The DES has been used in “normal” as well as clinical groups, including individuals with personality disorders. It has been validated for use with individuals over 18 years of age, and takes 5-10 minutes to complete.

**Procedure**

The current study was conducted in accordance with procedures approved by the University of Newcastle’s research ethics committee (reference number: H-952-0205), and the Hunter New England Research Ethics Unit (reference number: 04/12/08/3.21). Borderline participants were recruited from the wait list for the Dialectical Behaviour Therapy program running at the Centre for Psychotherapy. Initial diagnosis of Borderline Personality Disorder and Major Depressive Disorder were confirmed by the Centre’s psychiatrists during routine clinical assessments using the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID II) and the Structured Clinical Interview for DSM-IV Axis I Mental Disorders – Clinician Version (SCID CV). Each of the participants then met with the student researcher individually to complete the battery of psychological measures included in this research. All participants were assessed prior to commencing the therapy program being run by the Centre for Psychotherapy.

Control participants were recruited through the volunteer panel of the Hunter Medical Research Institute. To ensure that the control and Borderline samples were consistent in terms of age and gender, only volunteers who matched the gender / age profile of the Borderline sample were approached to participate in this study. Volunteers who agreed to
participate then met individually with the student researcher to complete the battery of tests outlined above.

Results

Participants

Table 2.1 Characteristics of Participant Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>BPD + MDD</th>
<th>BPD – MDD</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N= 22</td>
<td>N= 9</td>
<td>N=29</td>
</tr>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Age</td>
<td>25.95 (10.78)</td>
<td>25.89 (6.27)</td>
<td>25.83 (5.23)</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Education</td>
<td>13.09 (2.35)</td>
<td>14 (2)</td>
<td>15.93 (2.42)</td>
</tr>
<tr>
<td>IQ</td>
<td>108.82 (5.46)</td>
<td>105.67 (6.42)</td>
<td>111.83 (3.58)</td>
</tr>
</tbody>
</table>

The demographic characteristics of all groups are shown in Table 1. There was no difference between groups in terms of age $[F(2,59) < .01, p = .99]$ or gender ($\chi^2 = .03, p = .98$). However, one-way analyses of variance (ANOVA) revealed significant differences among groups in terms of IQ $[F(2,59) = 6.38, p < .01]$ and years of education $[F(2,59) = 9.58, p < .01]$. A post hoc analysis of these results was conducted to determine where the group differences in these variables lay. The Hochberg’s GT2 test was selected as the most appropriate form of post hoc analysis for this data as it is considered to be the most accurate test when sample sizes are unequal (Field, 2005). The GT2 test will be used for all further post hoc analysis of between group differences. Results indicated that the control
participants had significantly higher IQ than the Borderline non-depressed participants \((p < .01)\), and significantly more years of education than depressed Borderline participants \((p < .01)\).

Demographics in relationship to memory specificity

Given that IQ and education differed significantly between groups, the influence of these variables on autobiographical memory was explored. One control participant was removed from this section of the analyses as a significant outlier, with a memory specificity score over 3 S.D.’s from the group mean. To explore the effects of IQ and education on memory specificity, separate multiple regression analysis were conducted with specificity score as the dependent variable (see Aiken & West, 1991). The group membership variable was dummy coded so that each of the groups (controls, BPD – MDD and BPD +MDD) could be tested against the other groups, and the interaction between group and IQ /education accounted for. These regressions were hierarchical, such that dummy coded group variables were entered in the first step, IQ or education in the second step, and the interaction terms in the third step. Results indicated that IQ was significantly related to memory specificity \((R^2_{\text{change}} = 0.16, F (1,57) = 10.66, p < .01)\) although the interaction between IQ and group, was not significant \((R^2_{\text{change}} = 0.04, F (2,53) = 1.23, p = .30)\). Education was also significantly related to memory specificity \((R^2_{\text{change}} = 0.15, F (1,57) = 10.10, p < .01)\) although again the interaction between education and group, was not significant \((R^2_{\text{change}} = 0.04, F (2,53) = 1.40, p = .26)\).

As IQ and education represent theoretically similar constructs, further analysis was conducted to determine whether these variables, and thereby their relationship to
Chapter 2: Memory Specificity and BPD

Specificity, were sufficiently independent so as not to represent redundant variables.

Pearson correlation analysis indicated a moderate relationship between education and IQ ($r = .39, p < .01$). However, when the two variables were entered in separate steps into a multiple regression analysis with specificity as the dependent variable, results indicated that education was a significant predictor of memory specificity independently of IQ ($R^2_{\text{change}} = 0.06, F (1,56) = 4.04, p = .05$). Multicollinearity diagnostics also indicated that the relationship between education and IQ is not sufficient to bias a regression analysis (VIF’s = 1 – 1.24, and Tolerance statistics of .80-1). Given these findings, IQ and years of education will both be entered into all further analysis as covariates.

Autobiographical Recall

Table 2.2 Autobiographical Memory Means and Standard Errors According to Group

<table>
<thead>
<tr>
<th>% responses</th>
<th>BPD + MDD N= 22</th>
<th>BPD – MDD N= 9</th>
<th>Controls N = 29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific</td>
<td>Mean (SE)</td>
<td>Mean (SE)</td>
<td>Mean (SE)</td>
</tr>
<tr>
<td>Specific</td>
<td>67.42 (4.28)</td>
<td>59.26 (7.54)</td>
<td>76.19 (2.93)</td>
</tr>
<tr>
<td>Categoric</td>
<td>12.12 (2.10)</td>
<td>17.59 (5.28)</td>
<td>7.74 (1.54)</td>
</tr>
<tr>
<td>Extended</td>
<td>7.58 (1.21)</td>
<td>14.81 (2.70)</td>
<td>7.74 (1.54)</td>
</tr>
<tr>
<td>Non-memories</td>
<td>3.79 (1.52)</td>
<td>4.63 (2.45)</td>
<td>3.87 (2.39)</td>
</tr>
<tr>
<td>Omissions</td>
<td>9.09 (2.04)</td>
<td>3.70 (1.46)</td>
<td>4.46 (1.69)</td>
</tr>
</tbody>
</table>

Means and Standard Error terms for each of the autobiographical memory variables, according to group, are presented in Table 2.2. Due to the small numbers of non-memories and omissions, and the theoretical similarities between these two variables (being both
failures to produce a memory of some description) these two variables will be combined and referred to collectively as omissions in all subsequent analysis.

To assess whether the three groups differed in terms of autobiographical memory specificity, a 3 (group: BPD depressed, BPD non-depressed, and Controls) x 5 (AMT version: A, B, C, D, and E) analysis of variance was conducted with specificity score as the dependent variable. Analyses for the remaining AMT outcome variables (i.e. categoric, extended, and omissions) were conducted using Generalized Linear Models based on the Poisson distribution with log link function, as preliminary analysis indicated that these variables were non-normally distributed. AMT version was included as a dependent variable in all of these analyses as counterbalancing measures were restricted by unequal group sizes and it was therefore necessary to ensure that differences in AMT versions did not affect the results observed.

Results indicated that the three groups of participants were significantly different from one another in terms of memory specificity \[ F(2,45) = 4.23, p = .02 \]. In planned comparisons, the depressed BPD group were found not to differ significantly from the BPD non-depressed group \( p = 0.22 \), and the controls did not differ significantly from the BPD depressed group \( p = 0.08 \), however, controls had significantly higher specificity scores than the non-depressed BPD group \( p = 0.01 \), and significantly higher specificity scores than the combined BPD groups \( p = 0.01 \). AMT version was significantly related to specificity score \[ F(4,45) = 4.76 \ p < .01 \], however, the interaction between group and AMT version was non-significant \[ F(7,45) = 1.31, p = .27 \], indicating that AMT version does not account for the group differences in specificity scores.
Chapter 2: Memory Specificity and BPD

There was no difference between the three groups of participants in terms of categoric recall [$\chi^2 (2) = 3.52, p = .17$]. AMT version was significantly related to number of categoric memories [$\chi^2 (4) = 13.10, p = .01$], but the interaction between group and AMT version was non-significant [$\chi^2 (7) = 5.28, p = .63$].

The three participant groups did not differ in terms of number of extended memories [$\chi^2 (2) = 4.18, p = .12$]. AMT version was not related to number of extended memories [$\chi^2 (4) = 2.16, p = .71$], nor was the interaction term significant [$\chi^2 (7) = 3.80, p = .80$].

There was no difference between the three groups of participants in terms of number of omissions on the AMT [$\chi^2 (2) = 2.04, p = .36$]. AMT version was not related to number of omissions [$\chi^2 (4) = 1.09, p = .30$], nor was the interaction significant [$\chi^2 (7) = 1.79, p = .41$].

As AMT version did not differ significantly with group ($\chi^2 = 3.90, p = .87$), and there were no significant interactions between group and AMT version for any of the AMT outcome variables, (p’s all > 0.27), AMT version will not be included in any further analysis.

**Autobiographical Memory, IQ and Education**

Given that IQ and education differed significantly between groups, and were also found to be associated with autobiographical recall, the analysis between group and memory specificity was repeated with IQ and years of education entered as covariates. Results indicated that the main effect of group was no longer significant [F (2,43) = 1.15, p = .33]. Group estimated marginal means and standard errors after accounting for IQ and years of education are presented in table 2.3.
Table 2.3  Autobiographical Memory Estimated Marginal Means and Standard Errors (controlling for IQ and education)

<table>
<thead>
<tr>
<th></th>
<th>BPD + MDD</th>
<th>BPD – MDD</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N= 22</td>
<td>N= 9</td>
<td>N = 29</td>
</tr>
<tr>
<td>Specific</td>
<td>71.28 (3.85)</td>
<td>61.33 (5.79)</td>
<td>72.43 (3.39)</td>
</tr>
</tbody>
</table>

To test whether the relationship between diagnostic status (BPD versus controls) and autobiographical memory specificity was mediated by the effects of IQ and education, two mediational models were tested using regression analyses as specified by Baron and Kenny (1986). According to Baron and Kenny (1986), mediation is said to have occurred if the following conditions are met: 1) the independent variable is correlated with the outcome variable, 2) the independent variable is correlated with the mediator, and 3) The mediator affects the outcome variable when the independent variable is controlled for. Full mediation is said to have occurred if the independent variable has no effect on the outcome variable once the mediator has been accounted for.

The first mediational model tested the hypothesis that IQ would mediate the relationship between diagnostic group and autobiographical memory specificity. The results indicate that all of the conditions for full mediation were met. That is, diagnostic group significantly predicted autobiographical memory specificity ($\beta = -.29, p = .02$), diagnostic group significantly predicted IQ ($\beta = -.39, p < .01$), and IQ significantly predicted specificity after controlling for group ($\beta = .33, p = .01$). Moreover, as the relationship between diagnostic...
group and specificity was no longer significant after controlling for IQ ($\beta = -.16, p = .22$), results indicate that IQ fully mediates the relationship between diagnostic group and memory specificity. An estimate of the indirect effect in this mediational model was tested for significance using a bootstrapping procedure recommended for smaller sample sizes (see Preacher & Hayes, 2004, for SPSS macro). 5,000 bootstrap re-samples of the data were performed with replacement, and statistical significance was set at alpha = .05, as indicated by the 95% confidence intervals not crossing zero. Results indicated that IQ was a significant mediator of the relationship between diagnosis and autobiographical memory specificity (SOBEL = -.59, SE = .31, 95% confidence intervals = -1.22, -1.13).

The second mediational model tested the hypothesis that years of education would mediate the relationship between diagnostic group and autobiographical memory specificity. Again results indicate that all of the conditions for full mediation were met. Diagnostic group significantly predicted autobiographical memory specificity ($\beta = -.29, p = .02$), diagnostic group significantly predicted education ($\beta = -.49, p < .01$), education significantly predicted specificity after controlling for group ($\beta = .32, p = .03$), and the relationship between diagnostic group and specificity was non-significant after controlling for education ($\beta = -.14, p = .34$). Analysis of the indirect effect in this model using bootstrapping procedures, indicated that education was a significant mediator of the relationship between diagnosis and autobiographical memory specificity (SOBEL = -.73, SE = -.21, confidence intervals = -1.40, -.21).

Given that IQ and education represent theoretically similar constructs, are significantly correlated ($r = .39$), and were both found to be significant mediators of the relationship
between diagnostic group and specificity, further analysis was conducted to determine the relevant importance of each of these variables. A regression analysis was conducted with specificity as the dependent variable, and years of education and diagnostic group as the predictor variables. When IQ was added as a second step in this analysis, there was a near significant increase in $r$ ($R^2$ change = .05, $p = .06$), indicating that IQ is a unique predictor of specificity over and above education. In contrast, adding years of education to a regression including IQ and diagnostic group did not result in a significant change in $r$ ($R^2$ change = .04, $p = .11$), indicating that education does not account for a significant portion of variance in specificity independent of its association with IQ. When IQ and education were entered simultaneously in a regression along with diagnostic group, the resulting part correlations indicated that IQ was the greatest unique predictor of specificity ($r = .23$), followed by years of education ($r = .20$), while diagnostic group accounted for almost none of the variance in specificity ($r = -.06$). Notably, the common variance for these predictors accounted for the greatest proportion of specificity ($r = .35$), explaining 12% of the models total 22%. This indicates that some shared component of IQ and education accounts for most of the variation in specificity, while IQ explains some additional unique variance, and education accounts for a small, but insignificant independent proportion of the variance in specificity.

**Correlates of Autobiographical Memory in BPD**

Exploratory analyses were carried out to determine whether autobiographical memory within the Borderline sample was related to any of a selection of variables identified on the basis of theory and past research. These included: depressive symptomatology, thought suppression, childhood abuse, dissociation, IQ and level of education. Preliminary analysis
of these variables indicated that DES and childhood sexual abuse scores were positively skewed so natural logarithm transformations were performed on these variables. The transformed scores were utilised in subsequent analysis pertaining to memory specificity scores. Analyses pertaining to categoric recall were conducted using non-parametric correlations as this variable could not be transformed due to the predominance of zero scores. It should be noted at this point, that the analysis of the relationship between autobiographical memory and childhood trauma was based on a smaller number of borderline participants (n= 24) as in the interests of rapport building, the CTQ was administered at a later stage during the longitudinal component of the study and was therefore affected by natural attrition of participants from the treatment program.

Results indicated that the only variable to correlate significantly with memory specificity was years of education ($p = .02$). There were no significant associations for categoric recall. These results are shown in Table 2.4.

**Table 2.4** Correlation Coefficients for Specific and Categoric Memories.

<table>
<thead>
<tr>
<th></th>
<th>BDI</th>
<th>WBSI</th>
<th>WBSI (thought suppression)</th>
<th>CTQ</th>
<th>CTQ (sexual abuse)</th>
<th>DES</th>
<th>IQ</th>
<th>Edu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific</td>
<td>0.22</td>
<td>-0.22</td>
<td>-0.16</td>
<td>-0.16</td>
<td>0.02</td>
<td>0.03</td>
<td>0.31</td>
<td>0.41*</td>
</tr>
<tr>
<td>Categoric</td>
<td>-0.08</td>
<td>0.10</td>
<td>0.12</td>
<td>0.09</td>
<td>-0.01</td>
<td>-0.03</td>
<td>-0.16</td>
<td>-0.21</td>
</tr>
</tbody>
</table>

* $p < .05$    ** $p < .01$    *** $p < .001$

To assess whether any of these variables made an independent contribution to the prediction of memory specificity within the Borderline sample, a series of multiple...
regression analyses were conducted. A statistical and theory driven manual stepwise approach was applied to the predictor variables as the small sample size necessitated parsimony. IQ and education were the first predictor variables to be explored in this model in order that cognitive ability could be accounted for in later analysis of the relative impact of psychological variables in determining autobiographical specificity. Education was entered first as it demonstrated the largest zero-order correlation with memory specificity ($r = .41$). Education alone was found to account for 14% of the variance in memory specificity (based on adjusted $R^2$ due to the small sample size). Adding IQ as a second predictor did not improve the model significantly ($R^2$ change = .93, $F(1,28) = 1.00, p = .33$), and IQ was therefore removed as its high degree of multicolinearity with education ($r = .44, p < .01$) would result in a substantial inflation of error in the model. Next, BDI, WBSI, and transformed DES scores were added as predictor variables. These variables were chosen for inclusion in the model on the basis of theory and past research in this area (see Chapman, Gratza, & Brown, 2006; Hermans et al., 2005; Hermans et al., 2004). Adding these variables resulted in a near significant change in the overall model ($R^2$ change = .20, $F(3,26) = 2.73, p = .06$), accounting for an additional 13% of the variance in memory specificity. Statistics relating to each of the individual predictors are displayed in Table 2.5. Results indicated that years of education and thought suppression (WBSI) were independently related to memory specificity, while self-reported depression (BDI) and dissociation (transformed DES) were not. Substituting the WBSI thought suppression 6-item subset in place of the full WBSI score did not alter these results appreciably, with both education and thought suppression remaining the only significant predictors ($p$’s < .01, and .02 respectively). BDI was removed from subsequent analysis as these results confirm past
research, indicating that self reported depression is not related to memory specificity (e.g. Dalgleish et al., 2001; Hermans et al., 2004).

### Table 2.5 Results of Regression Analysis of Specific Memories

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>t</th>
<th>p</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zero-order</td>
<td>Partial</td>
</tr>
<tr>
<td>1</td>
<td>Education</td>
<td>.41</td>
<td>2.41</td>
<td>.02*</td>
<td>.41</td>
</tr>
<tr>
<td>2</td>
<td>Education</td>
<td>.55</td>
<td>3.32</td>
<td>&lt; .01**</td>
<td>.41</td>
</tr>
<tr>
<td></td>
<td>BDI</td>
<td>.24</td>
<td>1.41</td>
<td>.17</td>
<td>.22</td>
</tr>
<tr>
<td></td>
<td>WBSI</td>
<td>-.39</td>
<td>-2.26</td>
<td>.03*</td>
<td>-.22</td>
</tr>
<tr>
<td></td>
<td>Trans DES</td>
<td>.16</td>
<td>0.85</td>
<td>.41</td>
<td>.03</td>
</tr>
</tbody>
</table>

* *p < .05  ** *p < .01  *** *p < .001

Next, this analysis was repeated with scores on the Childhood Trauma Questionnaire included as an additional predictor variable. Childhood trauma was included in the model on the basis of theory and past research (Henderson et al., 2002; Kuyken & Brewin, 1995). However, CTQ scores were added in a separate regression analysis to the other psychological variables as CTQ data was only available for a portion of subjects and thus substantially decreases the sample size / power for the analysis (n=24). Results indicate that adding CTQ to the model did not improve the model (R² change = .02, F (1,19) = .67, p = .42). This variable was excluded from the overall model.

The final model, therefore, included years of education, thought suppression (WBSI), and dissociation (DES). This model was significant (F(3,27) = 4.21, p = .02), and accounted for a total of 24 % of the variance in memory specificity (based on adjusted R² due to small sample size). Statistics relating to each of the individual predictors are displayed in Table 2.6. Results indicated that education was a unique predictor of memory specificity within
the Borderline sample, such that higher levels of education were associated with higher levels of specificity. Thought suppression, as measured by both the full WBSI score and the 6-item thought suppression subset score, was also a unique predictor of memory specificity, although the relationship was negative, indicated that higher levels of thought suppression were associated with reduced memory specificity. Interestingly, the partial correlation for thought suppression was substantially larger than the zero-order correlation, indicating that education may have been acting as a suppressor of the effect between thought suppression and memory specificity. Dissociation was not a significant predictor of autobiographical memory specificity.

**Table 2.6** Results of Regression Analysis of Specific Memories

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>t</th>
<th>p</th>
<th>Correlations</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zero-order</td>
<td>Partial</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Education</td>
<td>.41</td>
<td>2.41</td>
<td>.02*</td>
<td>.41</td>
<td>.41</td>
</tr>
<tr>
<td>2</td>
<td>Education</td>
<td>.54</td>
<td>3.22</td>
<td>&lt;.01**</td>
<td>.41</td>
<td>.53</td>
</tr>
<tr>
<td></td>
<td>WBSI</td>
<td>-.41</td>
<td>-2.36</td>
<td>.03*</td>
<td>-.22</td>
<td>-.41</td>
</tr>
<tr>
<td></td>
<td>Trans DES</td>
<td>.26</td>
<td>1.51</td>
<td>.14</td>
<td>.03</td>
<td>.28</td>
</tr>
</tbody>
</table>

* p < .05  ** p < .01  *** p < .001
Discussion

Overgeneral autobiographical memory has been demonstrated to occur in several clinical populations (for reviews see J. M. G. Williams, 1996; J. M. G. Williams et al., 2007). Theoretical accounts of this phenomenon suggest that clinically disordered individuals use overgeneral memory as a cognitive avoidance strategy to protect them against the emotions elicited by the specific recall of distressing memories (J. M. G. Williams, 1996). Individuals with Borderline Personality Disorder are considered to be particularly prone to developing an overgeneral style of memory due to their temperamental difficulties in controlling affect (J. M. G. Williams, 1996). However, research to date has yielded inconsistent findings in this regards (Arntz et al., 2002; Jones et al., 1999; Kremers et al., 2004; Renneberg et al., 2005). The present study aimed to provide further clarification of the relationship between autobiographical memory specificity and Borderline Personality Disorder.

The results of this study indicate that individuals with Borderline Personality Disorder are less specific than non-clinical controls in their recollection of autobiographical memories, however, the relationship between autobiographical memory specificity and Borderline diagnosis was fully accounted for by group differences in IQ and education. Exploration of the memory responses of the Borderline participants in this study indicate that individuals with Borderline Personality Disorder display a higher rate of specificity than normally observed in clinical populations. Where specificity rates for various clinical populations, including clinically depressed individuals and trauma survivors, generally range between 41 – 60% (Croll & Bryant, 2000; Goddard et al., 1996; McNally et al., 1995; R. G. Moore
et al., 1988; Swales et al., 2001; J. M. G. Williams & Scott, 1988), the Borderline individuals in this study recalled a specific memory to 65% of cue words (BPD + MDD = 67%, BPD - MDD = 59%). This rate appears to be more consistent with specificity rates observed in normative samples, which typically range between 69 and 83%. The majority of past research on Borderline Personality Disorder has demonstrated comparable rates of autobiographical specificity to those observed in this study, with evidence suggesting that individuals with BPD generally respond specifically to between 59 and 70% of cue words (Kremers et al., 2004; Renneberg et al., 2005). This suggests that Borderline individuals do not display overgeneral memory to the extent observed in other clinical populations.

The finding that Borderline Personality Disorder was not related to overgeneral memory over and above IQ and education, counters William’s theoretical proposition that individuals with Borderline Personality Disorder are particularly prone to developing an overgeneral style of memory (J. M. G. Williams, 1996). While Borderline individuals may display some degree of reduced specificity, this appears to be an epiphenomenon of low IQ and poor education in this population, rather than a result of Borderline diagnosis per se. This result also appears to be in direct contrast with findings from Jones et al.’s seminal study on autobiographical memory in Borderline Personality Disorder which found that Borderline individuals were significantly more overgeneral than a sample of control volunteers (Jones et al., 1999). However, more recent research in this population has also indicated that Borderline individuals do not display an overgeneral style of autobiographical memory (Arntz et al., 2002; Renneberg et al., 2005).
The findings of this study emphasise the key role which intelligence and education play as mediators of the relationship between autobiographical specificity and Borderline Personality Disorder. This is inline with past research which has demonstrated a relationship between memory specificity and: verbal intelligence (Schönfeld, Ehlers, Bollinghaus, & Rief, 2007), and level of education (Wessel et al., 2001). More specifically, however, the findings of this study indicate that there is some common factor in IQ and education which accounts for over half of the total variance in memory specificity. Given that performance on IQ measures and educational attainment both depend, to a greater or lesser extent, on cognitive ability, these results suggest that cognitive ability may be the underlying factor which drives the observed relationship between Borderline diagnosis and memory specificity in this study.

Of the various cognitive abilities, the element most commonly hypothesised to be associated with overgeneral memory is executive functioning (Dalgleish et al., 2007). The executive functions refer to the “the set of cognitive processes that are responsible for the planning, initiation, sequencing, and monitoring of complex goal-directed behaviour in the face of distracting information” (Dalgleish et al., 2007, p 25). Executive functioning is posited to be related to performance on the autobiographical memory task as these cognitive processes are involved in maintaining or applying task instructions during performance, instigating effective retrieval strategies during the memory search, and inhibiting inappropriate (that is, overgeneral) candidate responses (Dalgleish et al., 2007). Executive control is one of the three key processes which has been hypothesised to underlie the production of overgeneral memory (J. M. G. Williams et al., 2007). Indeed, some authors have suggested that differences in executive control may account for the widely
reported relationship between clinical states and reduced autobiographical memory specificity (Dalgleish et al., 2007). More specifically, it is hypothesised that clinical populations may display poor executive control, either as a result of structural damage, trauma, or rumination and distraction processes, which impair their ability to carry out the memory search process and inhibit the production of categoric memories in aid of moving down the memory hierarchy to produce event specific information (J. M. G. Williams, 1996).

Past research provides empirical support for the notion that overgeneral memory is associated with impaired executive control. In a series of studies exploring the relationship between autobiographical specificity and executive control capabilities, Dalgleish and colleagues (2007) found that overgeneral recall was associated with poor verbal fluency, poor fluid (nonverbal) intelligence, and the tendency to generate errors on executive control tasks, all independent of depressed mood. Moreover, analysis indicated that executive control mediated the relationship between autobiographical memory specificity and psychopathology/ depressed mood (Dalgleish et al., 2007). Further to this, Dalgleish and colleagues (2007) found that manipulating executive control demand, through increasing or decreasing mental load and distraction, influenced the magnitude of the relationship between depressed mood and autobiographical specificity, indicating that diminished executive control may drive the relationship between depression and overgeneral memory. Recent research in individuals with Major Depressive Disorder has also supported the link between executive function and memory specificity, finding significant associations between reduced specificity and poor working memory, poor source memory and reduced attention (Raes, Hermans, Williams, Demyttenaere et al., 2006).
Further evidence of the centrality of executive functions in autobiographical memory functioning is provided by an experiment exploring the association between clinical states and performance on a reversed edition of the AMT (Dalgleish et al., 2007). In this study, participants were required to recall categoric memories in response to cue words and specificity scores were therefore considered to be the measure of error. Results indicated that depression was associated with increased specificity and lower levels of controlled attention, while lower levels of controlled attention resulted in greater numbers of specific memories (errors) recalled. Thus it appears that when the AMT is reversed, clinical populations continue to have higher rates of errors on this task, however, this is in the opposite direction, recalling more specific memories. The differential association between memory specificity and task parameters indicates that performance on the AMT is most likely the result of poor executive functioning, rather than a memory retrieval style developed to avoid retrieving distressing event specific information (Dalgleish et al., 2007).

The results of the present study could be considered to be consistent with an executive function explanation of overgeneral memory. As previously stated, results indicate that a factor common to IQ and education accounts for the variation in memory specificity observed in Borderline individuals relative to controls. It is plausible that this common factor may be representative of a cognitive ability such as executive function. Although the measure of intelligence utilised in this study (the NART) is not a direct measure of executive control, it provides a measure of crystallised (verbal) intelligence which is now accepted to be an accurate index of executive control (Friedman et al., 2006). Similarly, years of education could be seen as a rough estimate of executive functioning as individuals
with poor executive function would be less likely to have good educational attainment (Meltzer, 2007). Thus it may be that poor executive functioning accounts for the relationship between memory specificity and psychopathology in this study.

A cognitive ability explanation of overgeneral memory may go some way towards explaining the apparent discrepancy between Jones et al.’s seminal study and more recent research on autobiographical memory in BPD. The results of the former indicated that there were significant differences in autobiographical memory specificity between Borderline individuals and controls. However as this study did not include any measure of cognitive ability or intelligence, it is unclear whether some component of the group differences observed were due to cognitive ability. Indeed, Jones and colleagues themselves suggest that the poorer performance of the BPD sample on the AMT could be due to lower intelligence, rather than to clinical diagnosis per se. The findings of this study favour this proposal, suggesting that the reduced specificity may be due to impoverished cognitive functioning.

However, if reduced autobiographical memory specificity is to be accepted as an epiphenomenon of cognitive ability rather than an affect regulation strategy, then one must ask the question as to why individuals with Borderline Personality Disorder are more likely to display reduced autobiographical specificity than controls. Several hypotheses can be raised in response to this question. Firstly, perhaps the environmental factors posited to be part of the etiology of the disorder (i.e. an invalidating early home environment often involving childhood abuse and/or neglect) are associated with lower-socio economic status groups, resulting in an overrepresentation of lower IQ and less educated individuals in the
Borderline population. Indeed, research has consistently identified low socio-economic status as a substantial risk factor for childhood abuse and neglect (Berger, 2005; Schumacher, Slep, & Heyman, 2001). Secondly, perhaps the symptoms of Borderline Personality Disorder interfere with working memory and attention, thereby impacting on ability to recall specific memories, as well as impairing performance on measures of IQ and academic achievement. This could occur either directly through consuming cognitive capacity (e.g. via dissociation or thought intrusions) or indirectly by the effects which symptoms have on the stability of the individuals lifestyle and therefore continuity at educational institutions. Indirect support for this hypothesis is provided by past research identifying working memory deficits in BPD (Stevens, Burkhardt, Hautzinger, Schwarz, & Unckel, 2004). Thirdly, perhaps the combination of low IQ and traumatic early life experiences promotes an overgeneral style of thinking which impairs the individuals ability to assimilate problematic experiences within their self-schema, resulting in a symptom profile identified as Borderline Personality Disorder (e.g. intense affect, thought intrusions, dissociation etc). The assimilation hypothesis and its relationship to Borderline Personality Disorder will be discussed in more depth later in this discussion as well as in the general discussion of this thesis (Chapter 7).

Although there appears to be a clear association between memory specificity and cognitive ability, it is unlikely that differences in cognitive ability can fully account for the findings of Jones et al.’s seminal study (1999) as the borderline individuals in that study were notably less specific than the Borderline individuals in subsequent studies, responding with a specific memory to only 44% of cue words. It also appears unlikely that differences in executive functioning can fully explain the often observed association between clinical
states and overgeneral memory as a number of studies have found an effect of psychopathology on autobiographical recall over and above intelligence or cognitive ability (de Decker et al., 2003; Park, Goodyer, & J.D., 2002; Scott et al., 2000; Wessel et al., 2001; J. M. G. Williams et al., 1996). Furthermore, several studies have failed to confirm the association between autobiographical memory specificity and various measures of cognitive ability, including: categorical fluency or processing speed (J. M. G. Williams & Broadbent, 1986), working memory as assessed by the digit span task (Schönfeld et al., 2007), or performance on a computational span task (de Decker et al., 2003). Indeed some results even suggest a negative association between reduced autobiographical specificity and cognitive ability (word fluency task) (J. M. G. Williams & Dritschel, 1992). These results suggest that although cognitive ability may play an important role in determining an individual’s performance on the AMT, it does not fully account for the overgeneral memory phenomenon observed in some clinical populations.

The association between overgeneral memory and cognitive ability which has been observed in this study warrants further investigation. In particular it would be useful to explore the role which rumination plays in the association between overgeneral memory and cognitive ability in BPD. Rumination has been postulated to be a fundamental process underlying overgeneral memory as ruminative self focus is thought to increase the likelihood that intermediate memory descriptions (which are conceptually based abstract self-representations) will activate other self-descriptions, causing the retrieval search to move across the hierarchy rather than down to more specific levels (Williams, 1996; J. M. G. Williams et al., 2007; Conway & Pleydell-Pearce, 2000). A large body of evidence is accumulating in support of the notion that overgeneral memory is associated with
rumination (Williams, 1996; Watkins et al., 2000; J. M. G. Williams et al., 2007; Barnard, Watkins, & Ramponi, 2006). In line with this evidence, it is possible that rumination may account for the association between overgeneral memory and cognitive ability in the current study. It is one of the limitations of this study that a measure of rumination was not included to explore this hypothesis.

Another possibility is that overgeneral memory in Borderline Personality Disorder can be accounted for by the presence of comorbid clinical depression. Evidence suggests that clinical depression is strongly related to overgeneral memory (van Vreeswijk & de Wilde, 2004), and also occurs concurrently in the majority of individuals who meet the diagnosis for BPD (Bateman & Fonagy, 1999; Linehan & Koerner, 1993). As Jones and colleagues did not control for comorbid depression in their study, it is possible that the high levels of overgeneral recall observed in their Borderline individuals were due to an elevated rate of depression in this sample. Indeed, a recent study found that individuals with Borderline Personality Disorder are more overgeneral than controls, but only when comorbid depression is present (Kremers et al., 2004). However the results of the present study and research by Renneberg and colleagues (2005) contradict this theory, suggesting that even in the presence of comorbid depression, Borderline individuals do not display an overgeneral style of autobiographical recall.

The failure to find a relationship between comorbid depression and overgeneral memory in the present study is difficult to explain given that it appears to be contrary to a large body of evidence suggesting that reduced specificity is associated with clinical depression (e.g. Goddard et al., 1996; Park, Goodyer, & Teasdale, 2002; J. M. G. Williams & Scott, 1988).
It is possible that such a relationship was not observed due to the relatively small sample size, as the present study included twenty two Borderline depressed participants, but only nine non-depressed Borderline participants. However given that the direction of the results indicated that Borderline depressed participants tended to be more specific rather than less specific compared to their non-depressed and control counterparts, it seems unlikely, even with increased power, that a significant relationship between clinical depression and overgeneral memory would have been observed in this sample.

A possible explanation for this result may be the influence of past episodes of depression in our currently non-depressed Borderline sample. Research has shown that overgeneral memory is characteristic of both currently depressed individuals and recovered depressed patients (Brittlebank, Scott, Williams, & Ferrier, 1993; Mackinger, Pachinger, Leibetseder, & Fartacek, 2000; Mackinger, Loschin, & Leibetseder, 2000) though the research findings are not completely consistent on this issue (Burnside et al., 2004). Due to the high rates of comorbid clinical depression in BPD, it seems likely that most, if not all, of our currently non-depressed patients had been depressed in the past. This may explain the lack of difference between the two Borderline groups. It is one of the limitations of the present study that past episodes of depression were not assessed so that this hypothesis could not be tested. Past episodes of depression were not assessed in this research as the organisation of the clinical service from which participants were recruited necessitated a reliance on routine assessment procedures which included assessment of current MDD, but not past MDD. However, it is important to note that past research by Kremers et al. (2004) found an association between overgeneral memory and current depression in BPD, and past episodes of clinical depression were not screened. Moreover, the findings of this study indicate that
the difference in autobiographical memory specificity between BPD subjects and controls was fully mediated by years of education and IQ, suggesting that neither current nor past depression accounts for the difference.

Alternatively, it is possible that the expected association between depression and reduced specificity is not observed in this population as Borderline Personality Disorder is associated with particular behavioural sequelae which have differential associations with overgeneral recall. Research indicates that clinically depressed individuals with BPD differ qualitatively from other clinically depressed populations, displaying increased severity and earlier onset of depression, worse social impairment, greater levels of self-harm, and a stronger familial association with mood disorder (Bellino et al., 2005). In addition, evidence suggests that BPD is associated with a number of fairly unique avoidance strategies for managing emotions, including dissociation and self-harm (Chapman et al., 2006; Linehan, 1993a). These behaviours, which can be seen as functional analogues to overgeneral memory by serving as experiential avoidance strategies, are less prevalent in clinically depressed populations than in Borderline Personality Disorder (Parker et al., 2005; F. W. Putnam et al., 1996). It is possible that the Borderline’s predisposition towards recurrent self-harm, dissociation, and other impulsive behaviours may result in a reliance on such behaviours for managing aversive affect instead of developing an overgeneral autobiographical memory style as seen in clinically depressed individuals.

The failure to find a relationship between Borderline Personality Disorder and autobiographical memory specificity may also be explained in terms of the association between reduced specificity and self-schemas. Recent theorists have suggested that
reduced autobiographical specificity in clinical samples occurs in response to stimuli which trigger pathological generic sets of concerns or beliefs (schemas) (Dalgleish et al., 2003; Dalgleish et al., 2007). Stimuli which map closely onto dysfunctional schemas are thought to result in schema activation which promotes processing of themes related to generic self-knowledge (Spinhoven, Bockting, Kremers, Schene, & Williams, 2007). Because much of this schema related processing is task-irrelevant, fewer processing resources are available to the memory search at hand, increasing the chance that the memory search will be aborted prematurely resulting in an intermediate categoric memory (Spinhoven et al., 2007). In clinical populations, which typically display chronically primed negative schemas reinforced by ruminative processes, cues which stimulate the individual’s core schema will therefore result in an overproduction of generic responses which need to be inhibited in order for effective responding on the AMT (Dalgleish et al., 2007). An excess of to-be-inhibited material in combination with impoverished executive control then leads to reduced autobiographical specificity (Dalgleish et al., 2007). Research supports the theory that reduced specificity is related to schema activation as, in both clinically depressed patients and individuals with Borderline Personality Disorder, reduced specificity was found to be related to the extent to which cue words activated basic dysfunctional attitudes (Spinhoven et al., 2007)

Building on this theory, it may be that overgeneral memory is one component of the coping repertoire of individuals with Borderline Personality Disorder but that this mechanism is only triggered by cues which activate underlying schemas. Research indicates that the schemata of individuals with Borderline Personality Disorder generally fall into four main
domains: abandonment, defectiveness, social isolation and dependence (Jovev & Jackson, 2004; Kellogg & Young, 2006). These schema are thought to be the result of early childhood trauma in this population, such that Borderline Personality Disorder is thought to represent a complex form of Post Traumatic Stress Disorder (Gunderson & Sabo, 1993; Herman et al., 1989). It is possible that individuals with BPD would display reduced specificity in response to cue words indexing trauma or related schemas, but that this effect would not be observed for schema independent stimuli. Inline with this theory, Arntz and colleagues (2002) propose that Borderline individuals may be reluctant to be specific about painful childhood experiences, which would be particularly likely to map onto schema of abandonment and defectiveness, but that this overgenerality does not extend to a generalised inability to report specific autobiographical memories (Arntz et al., 2002). If this were the case, then the standard AMT used in this study may not have included cue words with content sufficient to trigger the self-schemas most salient to Borderline Personality Disorder such that reduced autobiographical specificity was not observed. This hypothesis would need further testing in future research using cue words which index the schema most fundamental to the Borderlines psychopathology. However, if this hypothesis was proved to be correct, important clinical implications would follow as evidence suggests that non-specificity impairs the integration of traumatic memories which is crucial to the recovery of individuals with PTSD (Herman et al., 1989).

It is also possible that the results of the current study are affected by the presence of comorbid PTSD within the clinical sample. Individuals with Borderline Personality Disorder frequently report a history of trauma, with estimates suggesting that over half of individuals with BPD have comorbid PTSD (Zanarini et al., 1998). If the BPD subjects in
the current study are representative of Borderline individuals in general, than it seems likely that a large number of them would have also met diagnosis for PTSD. As the current study did not assess for the presence of PTSD, it is impossible to determine whether effects were better accounted for by this comorbidity. Post Traumatic Stress Disorder was not assessed in this research as the organisation of the clinical service from which participants were recruited necessitated a reliance on routine assessment procedures which did not include an assessment of PTSD. This is a limitation of the current study and further research is needed to clarify this issue. However, given that the findings of this study indicate that the difference in autobiographical memory specificity between BPD subjects and controls was fully mediated by years of education and IQ, suggesting that neither Borderline or PTSD diagnosis accounts for the difference.

The results of the present study also indicated that reduced autobiographical memory specificity was associated with higher levels of thought suppression within the Borderline sample. This association was found not only for the total WBSI score, but also for the 6-item subset of WBSI, which has been identified as a primary indicator of a suppressive coping style (Palm & Strong, 2007). Thought suppression is a cognitive phenomenon which is posited to function as an affect regulation strategy by providing periodic relief from aversive arousal through cognitive avoidance (Beavers & Scott, 2001; Lynch, Schneider, Rosenthal, & Cheavens, 2007). However, the protective function of thought suppression has been questioned due to recent research which suggests that thought suppression has the paradoxical effect of increasing the target thought (Abramowitz, Tolin, & Street, 2001; Lynch et al., 2007; Purdon, 1999; Wenzlaff & Wegner, 2000). Indeed, the White Bear Suppression Inventory is thought to provide a more accurate measure of failed
suppression attempts or thought intrusions rather than successful suppression (Rassin, 2003). The association between reduced autobiographical memory specificity and thought suppression observed in this study provides indirect support for the notion that overgeneral memory serves as a cognitive avoidance strategy for managing intrusive distressing memories (J. M. G. Williams, 1996). This finding is in line with past research which indicates that traumatised individuals are more likely to produce overgeneral memories when under instructions to engage in thought suppression (Schönfeld et al., 2007). Interestingly, the association between thought suppression and memory specificity only emerged in the current study when the effects of education were controlled for. This indicates that the real relationship between memory specificity and thought suppression/intrusions may have been hidden by individual differences in education due to the relationship between education and memory specificity. Identifying education as a suppressor of the relationship between memory specificity and thought suppression may go someway towards explaining the mixed results from past research regarding the association between thought suppression and overgeneral memory (Brewin et al., 1998; de Decker et al., 2003; Gibbs & Rude, 2004; Henderson et al., 2002; Hermans et al., 2005; Kuyken & Brewin, 1995; Sampson, Kinderman, Watts, & Sembi, 2003; Stokes, Dritschel, & Bekerian, 2004). Failure to control for education may also explain the negative findings regarding thought suppression and memory specificity which emerged from recent research in Borderline Personality Disorder (Kremers et al., 2004).

Results also indicated that within the Borderline sample, autobiographical memory was unrelated to self-reported severity of depression as assessed by the Beck Depression Inventory II. This finding is supported by a large body of evidence from past research
which suggests that memory specificity is not related to self-reported depression (Dalgleish et al., 2001; Hermans et al., 2004; Iqbal et al., 2004; Jones et al., 1999; Kuyken & Brewin, 1995; Mackinger, Loschin et al., 2000; Merckelbach et al., 1996; Watkins et al., 2000; Wessel et al., 2001). This finding has been puzzling to researchers given that a diagnosis of depression is consistently related to memory specificity (van Vreeswijk & de Wilde, 2004), but is generally thought to indicate that overgeneral recall is not related to current mood state (Watkins et al., 2000). This interpretation has been challenged by recent research which found a relationship between memory specificity and self-reported depression using an alternate measure (Hamilton Rating Scale for Depression) (Dalgleish et al., 2001). It is suggested that these discrepant findings may be due to the BDI’s focus on cognitive symptoms of depression rather than somatic-vegetable symptoms (Dalgleish et al., 2001). The present study indicates that overgeneral memory is not accounted for by current mood state, as assessed by the BDI, in individuals with Borderline Personality Disorder.

Interestingly, the results of the present study failed to confirm the relationship between childhood trauma and overgeneral memory which has been observed in a number of past studies (Burnside et al., 2004; Dalgleish et al., 2003; de Decker et al., 2003; Henderson et al., 2002; Hermans et al., 2004; Kuyken & Brewin, 1995; Raes et al., 2005). However, although past research has generally supported the association between childhood trauma and memory specificity, some studies have found discrepant results (Wessel et al., 2001), and more importantly, recent research with Borderline Personality Disorder also failed to find a relationship between trauma and reduced specificity in this population (Kremers et al., 2004). This raises some important theoretical questions, as childhood trauma is posited to be one of the key factors in the development of overgeneral memory (J. M. G. Williams,
1996), and yet it appears, that in individuals with Borderline Personality Disorder at least, childhood adversity is not a precondition for overgeneral autobiographical memory.

Recently, theorists have argued that the relationship between overgeneral memory and trauma can be understood as a function of difficulties in assimilating the traumatic experience/s (J. M. G. Williams et al., 1999). Assimilation is thought to be an adaptive process, whereby problematic or painful experiences are resolved and gradually incorporated into an individual’s schema or frame of reference through a predictable series of stages (J. M. G. Williams et al., 1999) (for more detail on the assimilation model and how it pertains to overgeneral memory and Borderline Personality Disorder please refer to the general discussion of this thesis). For assimilation to occur, however, the individual must allow the trauma related experiences to enter into their awareness to be worked on and resolved, which can often be quite painful and distressing. Overgeneral memory is thought to be a cognitive strategy which individuals use for avoiding such emotions by effectively keeping the distressing thoughts and memories from awareness (J. M. G. Williams et al., 1999). In this regards, overgeneral memory can be conceptualised as a measure of the failure to assimilate as it is a strategy which is associated with the pre-assimilation state where memories are warded off (J. M. G. Williams et al., 1999).

Overgeneral memory would therefore be expected to occur in response to trauma only for individuals who have not yet assimilated their problematic experiences.

Individuals with Borderline Personality Disorder frequently report unresolved life events (Beblo et al., 2006), and indeed, many of the symptoms of BPD are thought to represent phenomena which result from the experience of trauma (Gunderson & Sabo, 1993). This
suggests that Borderline Personality Disorder is characterised by a lack of successful assimilation. However, individuals with BPD have also clearly progressed past the pre-assimilation state of successful avoidance where overgeneral memory is effectively employed. Instead, it appears that individuals with BPD may be “stuck” between successful warding off of problematic experiences (overgeneral memory) and successful assimilation. It may be that the expected relationship between childhood trauma and overgeneral memory has not been observed in this population as these individuals are at a later stage of assimilation where traumatic memories are intruding into consciousness rather than being effectively avoided through the use of overgeneral memory. However, this hypothesis is countered by evidence indicating that overgeneral memory and thought intrusions co-occur in both clinical and nonclinical samples (Brewin et al., 1998; Stokes et al., 2004; Hauer et al, 2006). This suggests that overgeneral memory is not only associated with the pre-assimilation state of successful warding off, but is also a feature of later stages of assimilation where thought intrusions and increasing psychological distress become apparent. Yet, past research indicates that intrusions and overgeneral memory are not associated in individuals with Borderline Personality Disorder, suggesting that the association may not hold in this population (Kremers et al., 2004). Further research is needed to determine whether affect regulation strategies, such as overgeneral memory, dissociation, thought suppression, and self-harm, are associated with distinct phases on the assimilation process, or are due to other individual differences.

Lastly, the results of the current study also indicated that memory specificity was unrelated to dissociation in individuals with Borderline Personality Disorder. This finding poses some important theoretical questions as overgeneral memory and dissociation are both
generally accepted forms of cognitive avoidance (Chapman et al., 2006) and would therefore be expected to be related. However, past research has yielded mixed results regarding the association between overgeneral memory and dissociation (Gibbs & Rude, 2004; Jones et al., 1999). Moreover, recent research in a sample of individuals with BPD, found no relationship between memory specificity and dissociation, consistent with the findings of this study (Kremers et al., 2004).

It is possible that overgeneral memory and dissociation are not related in individuals with BPD as they represent coping strategies which are associated with different stages of assimilation. Overgeneral memory is a form of cognitive avoidance which is thought to characterise the pre-assimilation state where problematic memories are warded off (J. M. G. Williams et al., 1999). In contrast, coping strategies such as dissociation or self-harm may be a response to a building awareness of the problematic memory and the subsequent psychological pain which accompanies early stages of the assimilation process. If this were the case, then one would expect individuals to progress from using overgeneral memory to strategies aimed at dealing with intrusive memories and intense affect, e.g. dissociation or self-harm, as assimilation progresses rather than displaying these strategies simultaneously. This may explain why overgeneral memory was not associated with dissociation in individuals with Borderline Personality Disorder. However, again, the suggestion that overgeneral memory is selectively associated with the pre-assimilation state of successful avoidance is countered by evidence indicating a relationship between overgeneral memory and thought intrusions (Brewin et al., 1998; Stokes et al., 2004; Hauer et al, 2006). This suggests that overgeneral memory is also observed during later stages of the assimilation process where there is an awareness of the problematic memory. Yet, past research
indicates that intrusions and overgeneral memory are not associated in individuals with Borderline Personality Disorder, suggesting that the association may not hold in this population (Kremers et al., 2004). Further research is needed to determine whether particular affect regulation strategies are associated with different stages within the assimilation process, and to assess the relationship between overgeneral memory and other forms of affect regulation, including dissociation and self harm.

**Summary**

In summary, the results of this study indicate that individuals with Borderline Personality Disorder display reduced autobiographical specificity relative to controls, though their level of specificity is more in line with data from normative samples than those previously observed in other clinical populations. Significantly, a factor common to both IQ and education, was found to fully mediate the association between overgeneral memory and BPD, suggesting a cognitive ability explanation of overgeneral memory. However, memory specificity was found to be negatively associated with thought suppression amongst individuals with Borderline Personality Disorder, which indicates that individuals who utilise thought suppression as an affect regulation strategy also display reduced autobiographical specificity. The expected associations between overgeneral memory, dissociation and childhood trauma were not observed in this population. Taken together, these results suggest that individual with Borderline Personality Disorder do not display overgeneral autobiographical memory in response to negative emotions.
Chapter 3: Memory Specificity and Affect Regulation in Borderline Personality Disorder

Introduction

“The best way I have heard Borderline Personality Disorder described is having been born without a skin – with no barrier to ward off real or perceived emotional assaults. What might have been a trivial slight to others was for me an emotional catastrophe, and what would be a headache in emotional terms for someone else was a brain tumor for me.”

(L. Williams, 1998, p 173)

Some of the earliest clinical observations of individuals with what is now known as Borderline Personality Disorder noted that this particular group of individuals appeared to have difficulties with affect regulation, as evidenced by the intensity, volatility and range of emotions which they displayed (Grinker et al., 1968; Zetzel, 1971). These observations led to the suggestion that the basic psychopathology of Borderline Personality Disorder involved the same underlying problems observed in individuals with mood disorders,
namely, deficits in affect regulation (M. H. Stone, 1979, 1980). This emphasis on affect dysregulation has been validated by research which indicates that affective symptoms, such as chronic depression, hopelessness, guilt, anxiety, anger, and emptiness, are the most common and persistent symptoms of Borderline Personality Disorder (Zanarini, Frankenburg et al., 2003). Moreover, evidence suggests that difficulties in regulating affect may account for many of the behavioural and interpersonal difficulties displayed by these individuals, including: frequent displays of temper, recurrent physical fights, volatile relationships, substance use, bulimic episodes and self-harming or suicidal behaviours (Conklin, Bradley, & Westen, 2006; Yen et al., 2004). In fact, deficits in affect regulation are posited to account for 6 of the 9 diagnostic criteria for Borderline Personality Disorder outlined in the DSM-IV TR, emphasising the key role which affect dysregulation plays in this disorder (American Psychiatric Association [APA], 2000; K. M. Putnam & Silk, 2005).

Affect Regulation Defined

To understand the nature of the regulatory deficits displayed by individuals with Borderline Personality Disorder, we must first begin with a working definition of the term: affect regulation. Over the last two decades, a burgeoning interest in the field of affect regulation (known synonymously as emotion regulation) has generated a surge of theoretical discussion and research into the nature and development of emotion regulation capacities. Despite this growing attention, there remains no clear consensus in the literature regarding how this phenomenon is defined and what processes it encapsulates (Thompson, 1994). Theoretical accounts vary from all-inclusive definitions incorporating intrinsic and extrinsic, automatic and controlled, conscious and unconscious processes (e.g. Cole,
Michel, & Teti, 1994; Gross, 1998), to accounts which limit affect regulation to the study of voluntary, self controlled, goal orientated behaviour (Eisenberg & Spinrad, 2004). The view of affect regulation taken within this thesis falls into this second category, being broadly based on Eisenberg and Spinrad’s (2004) definition of affect regulation as follows:

“We define emotion-related self regulation as the process of initiating, avoiding, inhibiting, maintaining or modulating the occurrence, form, intensity, or duration of internal feeling states, emotion-related physiological, attentional processes, motivational states, and or/the behavioral concomitants of emotions in the service of accomplishing affect-related biological, or social adaptation or achieving individual goals” (p 338).

Three key characteristics of the concept of affect regulation are evident in this definition. Firstly, affect regulation is viewed as an intrinsic process. Eisenberg and Spinrad specify that their account of affect regulation refers to “emotion-related self regulation”[emphasis added], clearly differentiating between emotion regulation strategies which are internally generated versus those which are externally imposed. While extrinsic processes, such as a caregiver soothing a distressed child, have been included in many theoretical accounts of affect regulation (e.g. Thompson, 1994), there is a fundamental difference between these two forms of regulation in terms of understanding the difficulties which some individuals have in regulating their own emotions (Eisenberg & Spinrad, 2004). In seeking to understand the regulatory difficulties displayed by individuals with Borderline Personality
Disorder, we will be focusing our exploration of affect regulation on self regulation by way of intrinsically generated processes.

Secondly, Eisenberg and Spinrad’s definition highlights the breadth of processes which are encapsulated by the term affect regulation. Affect regulation is not viewed as a unitary phenomenon but a broad construct which encompasses a wide range of heterogeneous processes (Yen et al., 2002). Regulatory process may involve the activation of any of a number of multidimensional systems, including neurophysiological processes as well as cognitive, behavioural and/or social strategies for modulating emotion (Yen et al., 2002). In addition, regulatory processes may influence any of the various points in the emotion generation process, from modifying features of the situation or context creating the emotion, to directly altering qualitative or quantitative features of the emotion state and physiological arousal, to altering the overt behavioural expression of emotion (Eisenberg & Spinrad, 2004; Gross, 1998; Thompson, 1994).

Thirdly, Eisenberg’s definition emphasises the functional nature of emotion regulation strategies. Affect regulation is viewed as a process which modulates emotion in order to aid in biological, social or situational goal achievement (Eisenberg & Spinrad, 2004). Effective regulation requires the ability to control emotion and its expression in order to organize the self for external, goal-orientated action (Gottman & Katz, 1990). As stated by Thompson “Emotional regulation processes enlist emotion to support adaptive, organised behavioural strategies” (1994, p 25). Viewed from this perspective, regulatory processes are not seen as inherently adaptive or maladaptive, but must be judged in relation to their success in meeting the goals of a particular situation (Gross, 1999). Affect regulation must equip the
According to this functionalist definition of affect regulation, affect dysregulation is said to occur when an individual has difficulty modulating emotion in response to contextual demands, or when the method of modulation interferes with adaptive and appropriate functioning (Cole et al., 1994). Affect dysregulation involves a “deficiency in the capacity to modulate affect such that emotions spiral out of control, change rapidly, get expressed in intense and unmodified forms, and/or overwhelm reasoning” (Conklin et al., 2006, p 69). Poor control over affective experience and expression means that arousal may interfere with the organization and quality of thoughts, actions and interactions (Cole et al., 1994). In fact, evidence suggests that emotion dysregulation negatively impacts on many aspects of daily life, including the capacity to work, relate to others and enjoy oneself (Gross & Munoz., 1995). Moreover, emotion dysregulation is clearly related to psychological well being, with affect regulation deficits being implicated in the majority of psychological disorders, particularly personality disorders (Gross, 1998).

**Borderline Personality Disorder and Affect Regulation**

Linehan’s Biosocial theory of Borderline Personality Disorder (1993a; 1993) suggests that at its core, Borderline Personality Disorder is best conceptualised as “a systemic dysfunction of the emotion regulation system” (Linehan & Koerner, 1993, p 103). According to this theory, Borderline Personality Disorder stems from the interaction between biological irregularities in emotion regulation and an early dysfunctional
environment. In particular, Linehan suggests that individuals with Borderline Personality Disorder have a biological predisposition towards difficulties with emotion regulation, and that these difficulties are the result of a combination of high emotional vulnerability and deficiencies in emotion regulation skills. Emotional vulnerability refers to an affective temperament which is highly sensitive to negative emotional stimuli, which reacts with intense emotional responses, and which is slow to return to baseline following arousal. When combined with a lack of effective skills for managing emotions, this emotional vulnerability leads to a characteristic pattern of affective responses that is highly reactive, easily triggered, extreme and long-lasting.

Linehan goes on to suggest that Borderline Personality Disorder develops when these biological tendencies are confluenced by an early invalidating environment. In an invalidating environment, the communication of private experiences is met by erratic, inappropriate and extreme responses. Displays of negative emotion are generally punished and/or trivialised, although escalation of emotions may be sporadically reinforced. This type of environment contributes to emotion dysregulation by actively teaching the child to invalidate their own emotive experiences, and by failing to teach the child to label, tolerate and modulate arousal. Moreover, an environment that combines a critical response style with intermittent reinforcement of escalation, teaches the individual to oscillate between inhibition and displays of extreme emotion. Thus, the individual’s early environmental experiences exacerbate biological difficulties with emotion regulation, to produce a pattern of behaviour identified as Borderline Personality Disorder. The relationship between affect dysregulation and Borderline symptoms is depicted in Figure 3.1, drawn directly from Linehan, (1993a, p 60).
Building on the notion that emotion dysregulation is the primary underlying mechanism for Borderline Personality Disorder, Linehan’s biosocial theory proposes that all of the symptoms of Borderline Personality Disorder can be viewed as sequelae of affect dysregulation (see Figure 3.1). Behavioural, interpersonal, cognitive, and self-related difficulties are viewed as arising either as a direct result of unmodulated emotion or through attempts on the part of the individual to regulate intense emotion. For example, diagnostic criteria such as: markedly reactive mood, chronic feelings of emptiness, frequent displays of temper, recurrent physical fights, and volatile relationships, are all affect related characteristics which are the direct result of deficits in emotion regulation. In addition, many of the problem behaviours observed in this population, such as substance use,
bulimic episodes, impulsive risk taking behaviour, and self-harming or suicidal behaviours, can be seen as maladaptive attempts at regulating emotion (M. Brown, Comotois, & Linehan, 2002; Conklin et al., 2006; Yen et al., 2004). Thus, affect dysregulation can be seen as a core feature in the pathogenesis and symptomatic profile of individuals with Borderline Personality Disorder.

Linehan’s theoretical viewpoint regarding the importance of affect dysregulation in Borderline Personality Disorder is supported by empirical evidence detailing the affective difficulties experienced by these individuals. In a study examining mood self-ratings over a two-week period, individuals with Borderline Personality Disorder reported experiencing greater levels of negative affect, greater variability in day-to-day affect, and a more random pattern of mood variation than nonclinical healthy controls (Cowdry, Gardner, O'Leary, Leibenluft, & Rubinow, 1991). Similarly, mood data collected in a random experience sampling study indicated that, in comparison with asymptomatic controls, individuals with Borderline Personality Disorder reported higher levels and greater fluctuations of a range of unpleasant affects, including: sadness, anxiety, fear, boredom and tiredness (Stein, 1996). In a student sample, Borderline traits have also been found to be related to increased intensity and variability of daily mood ratings (Tolpin, Gunthert, Cohen, & O'Neill, 2004). Further studies have confirmed the instability of affect in this population, with Borderline patients reporting more intense responses to negative events (Levine, Marziali, & Hood, 1997), and greater affect lability than controls and other personality disordered patients, particularly in terms of anger and anxiety (Henry et al., 2001; Koenigsberg et al., 2002).
According to clinician ratings, emotion dysregulation is the key feature which differentiates individuals with Borderline Personality Disorder from mood disordered individuals (Conklin et al., 2006). Research indicates that borderline individuals engage in a range of maladaptive regulation processes, including: internalizing strategies, externalizing strategies, emotional avoidance, and disorganised strategies (Conklin et al., 2006). Borderline individuals also rate their own ability to regulate emotion as poor, with research demonstrating a direct link between level of Borderline symptomatology and perceived lack of ability to regulate emotion once it is experienced (Yen et al., 2002). Thus, empirical evidence clearly supports Linehan’s theory that affect dysregulation is a key feature of Borderline Personality Disorder.

**Overgeneral Memory and Affect Regulation**

One of the primary theories regarding the function of overgeneral autobiographical memory is the ‘affect regulation hypothesis’ (J. M. G. Williams, 1996). According to this theory, overgeneral memory serves as a mechanism by which individuals can regulate affect. Specifically, it is proposed that overgeneral memory acts as a cognitive avoidance strategy which individuals use to protect themselves against the emotions associated with distressing memories (J. M. G. Williams, 1996). This theory is based on the premise that autobiographical memory recollection involves the reactivation of emotions which were experienced during the original event (Conway & Pleydell-Pearce, 2000). Research supports this notion, with evidence suggesting that specific emotions are well retained in autobiographical memories (Brewer, 1988; Johnson, Foley, Suengas, & Raye, 1988). Moreover, the intensity of emotions experienced during recall appears to be directly related
to the specificity of the memory being recalled, with research suggesting that specific
details increase affect, intimacy, and immediacy when compared to abstract
decontextualised statements (Conway & Pleydell-Pearce, 2000; Pillemer, 1992). Based on
this evidence, it appears that specific autobiographical recall will increase the reactivation
of acute emotions associated with personal memories, while maintaining a more general or
abstract level of processing will decrease reactivation (Raes, Hermans, de Decker, Eelen, &
Williams, 2003). Viewed from this perspective, overgeneral autobiographical memory can
be best conceptualised as an avoidant defence mechanism which is reinforced by the
minimization of unpleasant emotions (Westen, Muderrisoglu, Fowler, Shedler, & Koren,
1997).

The notion that overgeneral memory may be a cognitive avoidance strategy which protects
against negative affect has received a considerable amount of support within the research
literature. Firstly, overgeneral memory has been found to be significantly correlated with
measures of avoidant coping and thought suppression (Hermans et al., 2005). In a study
conducted on secondary school students, significant correlations were found between
number of specific responses on the Autobiographical Memory Test and avoidant coping as
assessed by the Cognitive-Behavioural Avoidance Scale, Acceptance and Action
Questionnaire, and the White Bear Suppression Inventory (Hermans et al., 2005). The
results of this study suggested that the less specific the participant, the higher the scores on
the avoidance questionnaire, indicating that this style of recall may be used as a form of
cognitive avoidance.
Secondly, research has demonstrated that in some populations, overgeneral memory appears to be protective against negative outcomes. A study conducted on a group of women who had been sexually abused as children demonstrated that those women who had an overgeneral style of recall in response to negative cues were significantly less likely to have experienced subsequent depression (Burnside et al., 2004). The authors concluded that in this population at least, overgeneral memory is capable of protecting against distress.

A protective account of overgeneral memory is also indicated by a study on self-harm within a sample of individuals with Borderline Personality Disorder (Startup et al., 2001). Interestingly, this study found that overgeneral memory was associated with a reduced rate of self-harm, independent of severity of depression and anxiety. This finding is striking given that past research has highlighted the fact that self-harming groups as a whole demonstrate higher levels of overgeneral recall than controls (Evans et al., 1992; Pollock & Williams, 2001), whereas this study suggests that within a self-harming population, higher levels of overgeneral recall are related to less self-harm. This seems to imply that in this situation at least, overgeneral memory may protect the individuals from distressing memories, which otherwise may have culminated in self-harming or suicidal behaviours (Startup et al., 2001).

Lastly, there is some indication from laboratory studies that there is a relationship between overgeneral recall and reduced distress. In an experimental study, Raes et al. (2003) exposed high specific and low specific students to a frustrating puzzle task. He found that the low-specific group later reported less stress and less thought intrusions than the individuals who displayed a high-specific style of recall. This suggests that overgeneral
memory serves to protect the individual from the emotional impact of experiencing negative events. This study has since been replicated with consistent results (Raes et al., 2006).

However, in contrast with these findings, a number of more recent studies have found that experimentally inducing a specific style of recall actually reduces emotional distress (Philippot, Schaefer, & Herbette, 2003; Raes et al., 2006; Philippot, Baeyens, & Douilliez, 2006; Neumann & Philippot, 2007; Moberly & Watkins, 2006). The authors of these studies propose that the more specific the recall, the more highly inhibited the link between the memory and the emotions and thus the less intense the emotions which are activated.

By this account, overgeneral memory can be thought to be a maladaptive mechanism which results in greater emotional distress, while specific recall is protective. The evidence presented in these studies is persuasive, primarily because the bulk consists of experimentally designed studies which provide a more rigorous test of the affect regulation account of overgeneral memory by directly manipulating autobiographical memory, rather than relying on correlations between naturally occurring patterns of autobiographical recall which may be open to influence from other independent variables.

Overgeneral Memory and Affect Regulation in BPD

Given that Borderline Personality Disorder is considered to be primarily a disorder of affect dysregulation (Westen, 1991), research within this population provides a unique opportunity for exploring the function of overgeneral memory as an affect regulation strategy. It has been suggested that individuals with Borderline Personality Disorder may
be particularly prone to developing an overgeneral style of memory due to their temperamental difficulties in controlling affect (J. M. G. Williams, 1996). Specifically, it is thought that Borderline individuals will learn to retrieve memories in a more general way in order to avoid the emotions associated with the recollection of painful experiences. The suggestion that Borderline individuals may utilize overgeneral memory as a cognitive avoidance strategy for managing aversive emotions is consistent with past research which suggests that individuals with Borderline Personality Disorder have a tendency to utilize avoidant coping strategies (Bijttebier & Vertommen, 1999; Chapman, Specht, & Cellucci, 2005; Kruedelbach, McCormick, Schulz, & Grueneich, 1993; Vollrath, Alnaes, & Torgerson, 1994). Further, it has been posited that the avoidant behaviours displayed by Borderline individuals will likely include experiential avoidance of all internal and external conditions which elicit aversive emotions, including thoughts and memories (Chapman et al., 2006). The Borderline individual’s reliance on a repertoire of avoidant strategies appears to suggest that these individuals will also display overgeneral autobiographical memory, although it may be that other forms of affect regulation in this population, including dissociation, and self harm, may be functional analogues of overgeneral memory which replace or minimise the functional support of overgeneral memory. To date, no research has been conducted exploring overgeneral memory as an affect regulation strategy with the Borderline population.

This study aims to explore the affect regulatory function of overgeneral memory within a sample of individuals with Borderline Personality Disorder. In accordance with Williams’ affect regulation hypothesis, we hypothesise that overgeneral memory will serve a protective function within a sample of individuals with Borderline Personality Disorder. In
Chapter 3: Memory Specificity and Affect Regulation

particularly, we hypothesise that elevated levels of overgeneral memory will be associated with less intense affect, particularly negative affect. However, given that overgeneral memory is posited to act as a cognitive avoidance strategy, we also expect that individuals who utilize this strategy for dealing with emotions will be more afraid of experiencing strong emotions and of losing control over their emotions.

In accordance with the theory that overgeneral memory serves an affect regulation function in individuals with Borderline Personality Disorder, we also expect that the negative association between overgeneral memory and self-harm which was been previously observed in individuals with BPD will be confirmed in this study (Startup et al., 2001). We intend to investigate this result further by examining whether the association between self-harm and overgeneral memory differs according to the nature of the self-harming behaviours: contrasting non-suicidal self-harm (referred to hence as deliberate self-harm) and suicidal self-harm (referred to suicide attempts). Differentiating between deliberate self-harm and suicide attempts is important as evidence suggests that these behaviours have different functions and correlates (M. Brown et al., 2002). In particular, research suggests that suicide attempts are often motivated by a desire to decrease the burden one creates for others, while deliberate self-harm functions primarily as a way to express anger, regain normal feelings, and distract oneself (M. Brown et al., 2002). Due to these differences in emotion regulation function, suicide attempts and deliberate self-harm can be expected to differ in their relationship to overgeneral autobiographical memory which also serves as a form of affect regulation (J. M. G. Williams, 1996). For example, deliberate self-harm, used solely as an affect regulation strategy without suicidal intent, is likely to be reduced by the tendency for overgeneral recall as overgeneral memory also serves to regulate negative
affect through cognitive avoidance. On the other hand, the use of overgeneral recall, which, in the long term, leads to problem solving deficits and hopelessness is likely to lead to an increase, or maintenance in the rate of suicide attempts. Thus it is hypothesised that overgeneral recall will be associated with lower levels of deliberate self-harm, but a similar or higher level of suicide attempts.

**Method**

**Subjects**

This study was conducted using the same participants described in Chapter 2, and testing took place during the same session.

**Measures**

**Autobiographical Memory**

The Autobiographical Memory Test (AMT: J. M. G. Williams & Broadbent, 1986) is a scale designed to assess autobiographical memory specificity. The test consists of a number of orally presented cue words to which participants are instructed to recall specific events from their past, where a specific event is defined as an event which occurred at a particular place and time and did not last longer than 24 hours (J. M. G. Williams, 1996). Instructions specified that the memories produced had to be related to events which took place more than one week ago. The present study utilised a version of the AMT consisting of a total twelve cue words, 6 positive and 6 negative, which were matched for emotionality and frequency. Participants were given three words on which to practice prior to commencing the test, and were prompted with the phrase “can you think of a particular time, one specific
event?” if they respond in an ambiguous non-specific manner. Participants were allowed 60 seconds in which to respond to each cue word and the memory recalled was recorded verbatim to be later coded for specificity. Responses were coded as either specific: involving an event which occurred at a particular place and time and lasted less than one day; categoric: a summary of repeated events; extended: involving an event that lasted longer than one day; non memories: the information recalled is not a memory but a semantic associate etc; or omissions: no response is given or time-limit exceeded. Memory repetitions were not counted. Responses were coded by the PhD candidate and re-coded by a trained independent rater in order to assess interrater reliability. The level of agreement between raters was good: Cohen’s overall Kappa = .89 (p < .001), with Kappa’s for individual questions on the AMT ranging between .77 and 1.00 (p’s all < .001).

This study formed the baseline component of a longitudinal study (reported in Chapter 5) and, due to the counterbalancing requirements of this longitudinal study, autobiographical memory within the current study was assessed using 5 parallel forms of the AMT (word lists shown in Appendix 1). Four of these word lists were drawn from Brittlebank et al. (1993), while the additional word list was compiled by the student researcher from the Affective Norms for English Words (ANEW) list (Bradley & Lang, 1999). The additional word list was matched to the original four in terms of valence, arousal and frequency. Within the current study, the five AMT versions were counterbalanced between the three subject groups as much as possible, however, given the unequal size of the groups, the effectiveness of this counterbalancing is limited. Preliminary analysis indicated that there were no significant differences between the groups in terms of the versions administered (χ² = 3.90, p = .87), however, form will be included in the main body of analysis to ensure that
differences in AMT form does not influence results. The AMT has shown good inter-rater reliability (.92 and .85 for clinical and control groups respectively) (Swales et al., 2001).

The AMT has also demonstrated adequate test-retest reliability (.53 to .68). Although these test-retest coefficients are only moderate, the study from which they are taken varied the procedures between testing occasions (oral versus written), therefore the test can be seen as a parallel forms reliability check which is a more stringent test of reliability (Raes et al., Unpublished).

Affect Regulation

Affect regulation was measured in this study through the use of the Affect Intensity Measure and the Affect Control Scale.

The Affect Intensity Measure (AIM: R. J. Larsen & Diener, 1987) is a 40 item questionnaire designed to assess the characteristic strength with which individuals experience emotions. Affect intensity is assessed through self-report of subjective experiences and bodily reactions to common life events. Examples of items include: “When I see someone hurt I feel sick to the stomach”, and “When I succeed at a difficult task I am elated”. Subjects are required to respond to items on a 6 point Likert scale ranging from 1 (never) to 6 (always). From this scale, a global affect intensity score can be calculated, however, research indicates that affect intensity is a multidimensional construct and scores can be better accounted for by a three factor model comprising: negative reactivity (responsiveness to negative events), negative intensity (strength of negative emotions), and positive affectivity (responsiveness to positive events + strength of positive emotions)
(Bryant, Yarnold, & Grimm, 1996). These subscale scores will be used to assess emotional intensity within this sample. The AIM has been shown to have good internal consistency (ranging from .90 to .94) and good test-retest reliability in intervals up to 3 months (.80 to .81) (Larsen & Diener, 1987). The AIM has also demonstrated adequate construct validity with scores being strongly associated with daily reports of mood arousal (R. J. Larsen & Diener, 1987), individual reports of emotional intensity (Flett, Boase, McAndrews, Pliner, & al., 1986), and observer ratings, including parents, family members, peers and objective judges (Bryant et al., 1996). The AIM is not associated with measures of social desirability (Goldsmith & Walters, 1989).

The Affective Control Scale (ACS: K. E. Williams, Chambless, & Ahrens, 1997) is a 42 item self report measure that measures perceived ability to regulate emotion once it is experienced (Yen et al., 2002). Specifically, the scale assesses the individual’s fear of losing control over their experience of emotions or over the behavioural response to those emotions (K. E. Williams et al., 1997). Items can be summed to give an overall score, or can be divided into four subscales, fear of anger, fear of depression, fear of anxiety and fear of positive emotions. Adequate internal consistency has been observed for both the overall scale (.94) and all four subscales (.72 - .91) (K. E. Williams et al., 1997). Adequate test-retest reliability has also been demonstrated over a two week interval (.78). Concurrent validity is evidenced in a high correlation with the Emotional Control Questionnaire (K. E. Williams et al., 1997). The ACS correlates only minimally with the Marlowe-Crowne Social Desirability Scale ($r = -0.17$) (K. E. Williams et al., 1997).
Self-harm

Self-harming behaviour was assessed using the Lifetime Parasuicide Count (LPC: Linehan & Comtois, 1996). The Lifetime Parasuicide Count is a semi-structured interview devised by Marsha Linehan as a clinical tool for the assessment of self-harming behaviour in individuals with Borderline Personality Disorder. The interview assesses history of parasuicidal behaviour, including frequency, method, intent and lethality. While the LPC is generally used to analyse all self-harming behaviour the individual has engaged in over their lifetime, it can also be used to assess self-harming behaviour within a specified period of time. In this study, the LPS was used to assess self-harm within the previous 4 months. This time period was chosen so that only recent self-harming behaviour is taken into account, and is based upon the time frame utilised in previous research (Startup et al., 2001).

Procedure

Both the control and Borderline participants were administered the Affect Intensity Measure, the Affect Control Scale, and the Lifetime Parasuicide Count during the testing sessions described in Chapter 2.
Results

Participant Demographics and Affect Regulation

Details of the three participant groups on which this study is based (Borderline depressed, Borderline non-depressed, and controls), have been recorded in Chapter two. Analysis indicated that the groups were comparable in terms of age and gender but differed significantly in IQ and education \[F(2,59) = 6.38, p < .01,\] and \[F(2,59) = 9.58, p < .01\] respectively. Given this group variability, the influence of IQ and education on affect regulation was explored. Separate hierarchical multiple regression analyses (see Aiken & West, 1991) were conducted with each of the various affect regulation scores as the dependent variables, and IQ and education as predictor variables. Group membership was dummy coded so that each of the groups (controls, BPD – MDD and BPD +MDD) could be tested against the other groups, and the interaction between group and IQ/education accounted for.

Results indicated that IQ was significantly related to several affect regulation indices, including: negative affect intensity \[(R^2_{change} = 0.10, F (1,58) = 6.17, p = .02),\] affect control depression subscale \[(R^2_{change} = 0.09, F (1,58) = 5.63, p = .02),\] affect control anxiety subscale \[(R^2_{change} = 0.10, F (1,58) = 6.14, p = .02),\] and affect control total score \[(R^2_{change} = 0.08, F (1,58) = 4.78, p = .03).\] None of the interactions between group and IQ were significant for any of the affect regulation indices.

Education was also found to be significantly related to several affect regulation indices, including: negative affect intensity \[(R^2_{change} = 0.22, F (1,58) = 16.11, p < .01),\] affect control
anger subscale ($R^2_{\text{change}} = 0.07, F (1,58) = 4.42, p = .04$), affect control positive affect subscale ($R^2_{\text{change}} = 0.09, F (1,58) = 5.87, p = .04$), affect control depression subscale ($R^2_{\text{change}} = 0.12, F (1,58) = 7.98, p = .01$), affect control anxiety subscale ($R^2_{\text{change}} = 0.13, F (1,58) = 8.40, p = .01$), and affect control total score ($R^2_{\text{change}} = 0.13, F (1,58) = 8.96, p < .01$). Again none of the interactions between group and education were significant for any of the affect regulation indices.

Further analysis was conducted to determine if IQ and education were independently related to affect regulation to ensure that these variables did not represent redundant variables. For each of the affect regulation variables which were found to be related to IQ and education, individual multiple regressions were conducted with IQ and education entered as predictors in a step wise fashion. Results indicated that education was a significant predictor of affect regulation over and above IQ for: negative affect intensity ($R^2_{\text{change}} = 0.14, F (1,57) = 10.03, p < .01$), total affect control score ($R^2_{\text{change}} = 0.07, F (1,57) = 4.99, p = .03$), affect control anxiety subscale ($R^2_{\text{change}} = 0.06, F (1,57) = 4.06, p = .05$), the affect control positive affect subscale ($R^2_{\text{change}} = 0.14, F (1,57) = 10.03, p < .01$), as well as bordering on significance for the affect control depression subscale ($R^2_{\text{change}} = 0.06, F (1,57) = 3.93, p = .05$). Multicollinearity diagnostics indicated that the relationship between education and IQ was not sufficient to bias a regression analysis (VIF = 1.24, and Tolerance statistic of .81). Given these findings, IQ and years of education will both be entered as covariates into all further analysis pertaining to affect regulation.
Group Differences in Affect Intensity

Table 3.1 Means and Standard Deviations for the Affect Intensity Measure

<table>
<thead>
<tr>
<th>AIM Indices</th>
<th>BPD + MDD N=22</th>
<th>BPD – MDD N=9</th>
<th>Controls N=29</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Negative Reactivity</td>
<td>4.51 (.88)</td>
<td>4.22 (.50)</td>
<td>4.51 (.65)</td>
</tr>
<tr>
<td>Negative Intensity</td>
<td>4.90 (.65)</td>
<td>4.30 (.35)</td>
<td>3.22 (.81)</td>
</tr>
<tr>
<td>Positive Affectivity</td>
<td>2.98 (1.01)</td>
<td>3.74 (.78)</td>
<td>3.87 (.72)</td>
</tr>
</tbody>
</table>

Means and standard deviations for each of the groups on the various affect intensity measure indices are presented in Table 3.1. To assess whether the groups differed significantly in terms of the various affect intensity indices, a multivariate analysis of covariance (MANCOVA) was conducted with the three affect intensity scores (negative reactivity, negative intensity, and positive affectivity) included as dependent variables. IQ and education were entered as covariates in this analysis because these variables differed significantly between groups and were found to be related to self-reported affect regulation abilities. Results indicated a significant main effect of group on the Affect Intensity Measure \( F(6,108) = 9.714, p < .01 \).

Follow-up analysis of this result consisted of three univariate analyses of covariance (ANCOVA’s) with the various affect intensity indices as the dependent variables. Results indicated significant differences amongst the groups on the negative intensity \( F(2,55)=21.88, p < .01 \) and positive affectivity \( F(2,55)=5.99, p < .01 \) subscales of the affect intensity measure, but no significant group difference in negative reactivity \( F(2,55) = 1.52, p = .23 \).
Post hoc (Hochberg’s GT2 test) analysis of the main effects observed indicated that both the Borderline depressed ($p < .01$) and Borderline non-depressed ($p < .01$) groups reported significantly higher levels of negative affect intensity than controls, but did not differ from one another ($p = .11$). The Borderline depressed group also reported significantly lower levels of positive affectivity than controls ($p < .01$), but did not differ from the Borderline non-depressed group ($p = .08$). Nor did controls differ from the Borderline non-depressed group in terms of positive affectivity ($p = .97$). These results are pictured below in Figures 3.1 to 3.3.

**Figure 3.2** Negative Affect Intensity Estimated Marginal Means and Standard Errors
Figure 3.3 Positive Affectivity Estimated Marginal Means and Standard Errors

Figure 3.4 Negative Reactivity Estimated Marginal Means and Standard Errors
Group Differences in Affect Control

<table>
<thead>
<tr>
<th>ACS Indices</th>
<th>BPD + MDD (N=22)</th>
<th>BPD – MDD (N=9)</th>
<th>Controls (N=29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Positive Affect</td>
<td>5.08 (1.00)</td>
<td>4.54 (.68)</td>
<td>3.30 (.80)</td>
</tr>
<tr>
<td>Depression</td>
<td>4.16 (.89)</td>
<td>4.23 (.90)</td>
<td>2.81 (.69)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>5.82 (.79)</td>
<td>5.40 (.50)</td>
<td>2.97 (.96)</td>
</tr>
<tr>
<td>Total ACS</td>
<td>5.22 (.81)</td>
<td>4.68 (.87)</td>
<td>3.05 (.82)</td>
</tr>
<tr>
<td></td>
<td>4.98 (.57)</td>
<td>4.65 (.31)</td>
<td>3.01 (.68)</td>
</tr>
</tbody>
</table>

Means and standard deviations for each of the groups on the various affect control indices are presented in Table 3.2. A multivariate analysis of covariance (MANCOVA) was conducted with the affect control scores (anger, positive affect, depression, anxiety and total affect control) as the dependent variables, and IQ and education as covariates. Results indicated a significant main effect of group on the Affect Control Scale \( F(8,106) = 9.28, p < .01 \).

Follow-up analysis using separate univariate analyses of covariance (ANCOVA) indicated highly significant differences between groups on all affect control scale scores, including: anger \( F(2,55) = 23.62, p < .01 \), positive affect \( F(2,55) = 17.96, p < .01 \), depression \( F(2,55) = 63.50, p < .01 \), anxiety \( F(2,55) = 34.19, p < .01 \), and total affect control \( F=(2,55) = 57.90, p < .01 \).
Post hoc analyses (Hochberg’s GT2 test) of these results indicated that the Borderline depressed and Borderline non-depressed groups differed significantly from controls on all of these measures, exhibiting greater fear of experiencing and expressing emotions ($p$’s all < .01). The two Borderline groups did not differ from each other on any of the measures, including: anger ($p = .31$), positive affect ($p = .99$), depression ($p = .52$), anxiety ($p = .29$), or total affect control ($p = .44$). These results are depicted in Figure 3.4 through 3.8.

Figure 3.5 ACS Anger Subscale Estimated Marginal Means and Standard Errors
Figure 3.6 ACS Anxiety Subscale Estimated Marginal Means and Standard Errors

Figure 3.7 ACS Depression Subscale Estimated Marginal Means and Standard Errors
Figure 3.8 ACS Positive Affect Subscale Estimated Marginal Means and Standard Errors

Figure 3.9 ACS total score Estimated Marginal Means and Standard Errors
Affect Intensity, Affect Control and Autobiographical Memory

To assess whether affect regulation was related to autobiographical memory specificity, correlations were conducted between memory specificity score and each of the affect regulation variables, for each of the groups of participants individually. One control participant was removed from this section of the analyses as a significant outlier, with a memory specificity score over 3 standard deviations from the group mean. The resulting Pearson-product moment coefficients are shown in Tables 3.3 and 3.4.

Results indicate that autobiographical memory specificity did not correlate significantly with any of the affect intensity indices in either the Borderline depressed, Borderline non-depressed, or control groups. Given that the Borderline depressed and Borderline non-depressed groups did not differ significantly from one another in terms of negative affect intensity, the correlation between memory specificity and negative affect intensity was repeated with the two Borderline groups combined to allow for greater power in detecting differences. The relationship between memory specificity and negative affect intensity remained non-significant for the combined Borderline group ($r = -.03$) and control group ($r = -.07$).

<table>
<thead>
<tr>
<th>Table 3.3 Correlations between Affect Intensity and Memory Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td>No. Specific</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$  ** $p < .01$  *** $p < .001$
As shown in Table 3.4, there were also no significant correlations observed between memory specificity and any of the Affect Control indices for either the Borderline depressed, Borderline non-depressed or control groups. Given that the Borderline depressed and Borderline non-depressed groups did not differ significantly from one another on any of the ACS variables, these two groups were combined to allow for greater power in detecting differences, and the analysis was repeated. None of the correlations between memory specificity and affect intensity reached significance for the combined Borderline (p’s >.54) or control groups (p’s >.31).

Table 3.4 Correlations between Affect Control and Memory Specificity

<table>
<thead>
<tr>
<th>Group</th>
<th>Anger</th>
<th>Positive Affect</th>
<th>Depression</th>
<th>Anxiety</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BPD +MDD</td>
<td>-.03</td>
<td>-.06</td>
<td>.08</td>
<td>.15</td>
<td>.05</td>
</tr>
<tr>
<td>BPD – MDD</td>
<td>.01</td>
<td>.15</td>
<td>.04</td>
<td>-.54</td>
<td>-.31</td>
</tr>
<tr>
<td>Controls</td>
<td>-.21</td>
<td>-.06</td>
<td>-.15</td>
<td>-.28</td>
<td>-.21</td>
</tr>
</tbody>
</table>

* p <.05  ** p <.01  *** p <.001

To assess whether affect regulation was related to any of the other autobiographical memory variables (i.e. categoric, extended and omissions), nonparametric correlations were conducted between memory specificity score and each of the affect regulation variables, for each of the groups of participants individually. The resulting Kendall’s Tau coefficients are shown in Tables 3.5 and 3.6. None of the correlations reached significance (p’s all > .06).
### Table 3.5 Correlations between Affect Intensity and Memory Specificity

<table>
<thead>
<tr>
<th>Group</th>
<th>Group</th>
<th>Negative Reactivity</th>
<th>Negative Intensity</th>
<th>Positive Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls</td>
<td>Categoric</td>
<td>-0.04</td>
<td>-0.23</td>
<td>-0.05</td>
</tr>
<tr>
<td></td>
<td>Extended</td>
<td>0.25</td>
<td>0.29</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>Omissions</td>
<td>&gt;0.01</td>
<td>-0.05</td>
<td>-0.12</td>
</tr>
<tr>
<td>BPD - MDD</td>
<td>Categoric</td>
<td>-0.06</td>
<td>0.30</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>Extended</td>
<td>0.11</td>
<td>-0.14</td>
<td>0.17</td>
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<tr>
<td></td>
<td>Omissions</td>
<td>0.10</td>
<td>0.53</td>
<td>0.20</td>
</tr>
<tr>
<td>BPD + MDD</td>
<td>Categoric</td>
<td>0.18</td>
<td>-0.07</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>Extended</td>
<td>0.07</td>
<td>0.04</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Omissions</td>
<td>0.14</td>
<td>0.09</td>
<td>0.14</td>
</tr>
</tbody>
</table>

* p < .05  ** p < .01  *** p < .001

### Table 3.6 Correlations between Affect Control and Memory Specificity

<table>
<thead>
<tr>
<th>Group</th>
<th>Anger</th>
<th>Positive Affect</th>
<th>Depression</th>
<th>Anxiety</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls</td>
<td>Categoric</td>
<td>0.13</td>
<td>0.23</td>
<td>-0.08</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>Extended</td>
<td>0.20</td>
<td>-0.01</td>
<td>0.12</td>
<td>0.23</td>
</tr>
<tr>
<td></td>
<td>Omissions</td>
<td>0.03</td>
<td>-0.08</td>
<td>0.10</td>
<td>0.06</td>
</tr>
<tr>
<td>BPD – MDD</td>
<td>Categoric</td>
<td>-0.06</td>
<td>-0.09</td>
<td>-0.03</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td>Extended</td>
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<td>-0.14</td>
<td>-0.31</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>Omissions</td>
<td>0.07</td>
<td>-0.13</td>
<td>0.13</td>
<td>0.39</td>
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<tr>
<td>BPD + MDD</td>
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<td>0.19</td>
<td>-0.03</td>
<td>0.23</td>
</tr>
<tr>
<td></td>
<td>Extended</td>
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<td>-0.10</td>
<td>0.15</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>Omissions</td>
<td>-0.06</td>
<td>-0.06</td>
<td>-0.25</td>
<td>0.02</td>
</tr>
</tbody>
</table>

* p < .05  ** p < .01  *** p < .001
Correlates of Affect Regulation Ability in BPD

Exploratory analyses, in the form of bivariate correlations, were carried out to determine whether affect regulation within the Borderline sample was related to any of a selection of variables identified on the basis of theory and past research. These included: depressive symptomatology, hopelessness, thought suppression, childhood abuse, dissociation, deliberate self-harm (without suicidal intent), IQ and level of education. Preliminary analysis of these variables indicated that DES, childhood sexual abuse, and self-harm scores were positively skewed so natural logarithm transformations were performed on these variables. After the transformations were applied, DES and sexual abuse scores no longer departed from normality so the transformed scores for these variables were utilised in subsequent analysis. However, self-harm data were still significantly non-normal, therefore Kendall’s Tau nonparametric correlations are reported for the self-harm data. Please note that the data relating to childhood trauma is based on a smaller number of borderline participants (n= 18) as in the interests of rapport building, the CTQ was administered at a later stage during the longitudinal component of the study and was therefore affected by natural attrition of participants from the treatment program.

As shown in Table 3.7, negative affect intensity was significantly related to dissociation within the Borderline sample, such that those individuals who self-reported experiencing greater intensity of negative emotions also reported higher levels of dissociation. In addition, positive affectivity was significantly related to scores on the BDI and BHS, such that those individuals who reported experiencing high levels of positive affectivity reported lower levels of depressive symptoms and hopelessness. Childhood trauma, self harm, and thought suppression were unrelated to all of the affect intensity variables. Repeating the
analysis of the association between affect intensity and thought suppression using the 6-item subset scale of thought suppression did not alter the results ($p$’s all <.56). When an adjusted alpha level ($p$=.002) was applied to this analysis to account for the increase in family wise error rate, the association between positive affectivity and scores on the BDI and BHS remained significant, but the relationship between negative affect intensity and dissociation no longer reached significance ($p$=.005).

Results also revealed a number of significant correlations with the Affect Control Scale, as shown in Table 3.8. Total ACS score was significantly related to scores on the BDI, transformed DES data, and frequency of self-harm, such that higher scores on the ACS were associated with higher levels of depressive symptomatology, higher levels of dissociation, and more frequent episodes of deliberate self-harm. The depression subscale of the ACS was significantly related to a number of indices, including scores on the: BDI, BHS, DES and total WBSI. The pattern of results indicated a positive association between these variables, with higher scores on the ACS depression subscale being related to higher levels of depressive symptoms, hopelessness, dissociation and thought suppression. Repeating the analysis of thought suppression with the 6-item subset score yielded similar results (ACD subscale: $p$<.01). Lastly, scores on the anxiety subscale of the ACS were significantly related to scores on the BDI, BHS, DES, and frequency of self-harm. Again the relationship was positive, such that higher scores on the ACS anxiety subscale were associated with higher levels of depressive symptomatology, more hopelessness, more dissociation, and more frequent episodes of self-harm. However, when an adjusted alpha level ($p$=.001), was applied to this analysis to account for the increase in family wise error rate, all associations with the ACS became non-significant.
### Table 3.7 Correlations Between AIM indices and Psychological Measures

<table>
<thead>
<tr>
<th></th>
<th>BDI</th>
<th>BHS</th>
<th>DES</th>
<th>WBSI</th>
<th>Self-harm</th>
<th>CTQ</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Emotional Abuse</td>
<td>Physical Abuse</td>
<td>Sexual Abuse</td>
<td>Emotional Neglect</td>
<td>Physical Neglect</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.20</td>
<td>-0.11</td>
<td>-0.28</td>
<td>-0.04</td>
<td>-0.10</td>
</tr>
<tr>
<td>Negative Intensity</td>
<td>0.25</td>
<td>-0.01</td>
<td>0.49</td>
<td>0.22</td>
<td>0.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative Reactivity</td>
<td>-0.01</td>
<td>-0.26</td>
<td>0.01</td>
<td>0.22</td>
<td>0.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Affectivity</td>
<td>-0.61***</td>
<td>-0.63***</td>
<td>-0.13</td>
<td>0.21</td>
<td>-0.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < 0.05$  ** $p < 0.01$  *** $p < 0.001$

### Table 3.8 Correlations Between ACS indices and Psychological Measures

<table>
<thead>
<tr>
<th></th>
<th>BDI</th>
<th>BHS</th>
<th>DES</th>
<th>WBSI</th>
<th>Self-harm</th>
<th>CTQ</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Emotional Abuse</td>
<td>Physical Abuse</td>
<td>Sexual Abuse</td>
<td>Emotional Neglect</td>
<td>Physical Neglect</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.02</td>
<td>-0.07</td>
<td>0.16</td>
<td>-0.09</td>
<td>0.14</td>
</tr>
<tr>
<td>ACS total</td>
<td>0.37*</td>
<td>0.34</td>
<td>0.37*</td>
<td>0.13</td>
<td>0.27*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACS anger</td>
<td>0.18</td>
<td>0.12</td>
<td>0.12</td>
<td>0.10</td>
<td>0.16</td>
<td></td>
<td>-0.08</td>
<td>-0.07</td>
<td>-0.13</td>
<td>-0.25</td>
</tr>
<tr>
<td>ACS positive affect</td>
<td>0.02</td>
<td>-0.06</td>
<td>-0.01</td>
<td>-0.16</td>
<td>0.03</td>
<td></td>
<td>0.14</td>
<td>0.02</td>
<td>0.18</td>
<td>0.16</td>
</tr>
<tr>
<td>ACS depression</td>
<td>0.44*</td>
<td>0.36*</td>
<td>0.42*</td>
<td>0.50**</td>
<td>0.23</td>
<td></td>
<td>-0.10</td>
<td>0.01</td>
<td>0.20</td>
<td>-0.31</td>
</tr>
<tr>
<td>ACS anxiety</td>
<td>0.36*</td>
<td>0.47**</td>
<td>0.44*</td>
<td>0.10</td>
<td>0.31*</td>
<td></td>
<td>-0.02</td>
<td>-0.11</td>
<td>0.11</td>
<td>-0.01</td>
</tr>
</tbody>
</table>

* $p < 0.05$  ** $p < 0.01$  *** $p < 0.000$
Self-harm and autobiographical memory in BPD

Table 3.9 Descriptive Statistics for Self-harm Data

<table>
<thead>
<tr>
<th></th>
<th>Median</th>
<th>Range</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total episodes</td>
<td>8</td>
<td>0-133</td>
<td>18.71</td>
</tr>
<tr>
<td>Self-harming episodes</td>
<td>5</td>
<td>0-131</td>
<td>13.55</td>
</tr>
<tr>
<td>Suicidal episodes</td>
<td>0</td>
<td>0-17</td>
<td>1.52</td>
</tr>
<tr>
<td>Ambivalent episodes</td>
<td>0</td>
<td>0-55</td>
<td>3.65</td>
</tr>
</tbody>
</table>

Descriptive statistics for the various lifetime parasuicide scores are presented in Table 3.9.

Preliminary exploration of the data indicated that results on the Lifetime Parasuicide Count were positively skewed. Attempts were made to transform the data, however, given the high proportion of zero scores, particularly in the suicidal and ambivalent episode categories, the data continued to depart from normal even after various transformations were applied (including natural logarithm, square root and inverse). Non-parametric analysis was therefore considered to be most appropriate. Kendalls tau correlations were carried out to determine if parasuicidal behaviour within the Borderline sample was related to memory specificity, IQ, years of education and various psychometric measures, including the: BDI, BHS, WBSI, DES and BSL. As self-harm is one of the symptoms of Borderline Personality Disorder directly assessed in the BSL, use of the total BSL score in this analysis would result in an inflated correlation score between self-harm and borderline symptomatology. To avoid this confound, an adjusted BSL score was calculated excluding all items which contributed to the BSL self-destruction subscale. This adjusted BSL total
score was then used to determine if there was a relationship between self-harm and borderline symptomatology independent of self-harm.

As shown in Table 3.10, IQ was found to be significantly related to number of suicide attempts, such that greater levels of IQ were associated with less suicide attempts. A near significant positive relationship was also observed between years of education (edu) and deliberate self-harm ($p = .05$). In addition, dissociation was related to parasuicide, with significant associations observed between DES score and both deliberate self-harm ($p < .01$), and total number of parasuicidal episodes ($p = .01$). Both of these relationships were positive, such that higher levels of dissociation were associated with more deliberate self-harm, as well as a greater number of total episodes of parasuicidal behaviour. A significant correlation was also observed between the adjusted BSL score and total number of parasuicidal episodes ($p = .04$), such that the higher the levels of borderline symptomatology, the greater the number of parasuicidal episodes. Thought suppression was unrelated to all of the self-harm variables. Repeating this analysis with the 6-item subset of thought suppression items did not alter results ($p$’s all >.49). When an adjusted alpha ($p=.002$) was applied to this analysis to account for the increase in family-wise error rate, only the association between deliberate self harm and dissociation remained significant.
Table 3.10 Kendalls Tau Correlations between Self-harm and Psychological Variables

<table>
<thead>
<tr>
<th></th>
<th>IQ</th>
<th>Edu.</th>
<th>BDI</th>
<th>BHS</th>
<th>DES</th>
<th>WBSI</th>
<th>BSL (adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deliberate Self-harm</td>
<td>.06</td>
<td>.27</td>
<td>.04</td>
<td>.19</td>
<td>.41**</td>
<td>.16</td>
<td>.18</td>
</tr>
<tr>
<td>Suicide</td>
<td>-.33*</td>
<td>.04</td>
<td>-.10</td>
<td>.18</td>
<td>-.06</td>
<td>.02</td>
<td>-.05</td>
</tr>
<tr>
<td>Ambivalent</td>
<td>.16</td>
<td>.05</td>
<td>.16</td>
<td>-.04</td>
<td>.09</td>
<td>.02</td>
<td>.10</td>
</tr>
<tr>
<td>Total</td>
<td>-.03</td>
<td>.09</td>
<td>.10</td>
<td>.10</td>
<td>.33*</td>
<td>.06</td>
<td>.27*</td>
</tr>
</tbody>
</table>

* p < .05  ** p < .01  *** p < .001

Correlations between the parasuicide scores and memory variables are shown in Table 3.11. A significant relationship was observed between categoric recall and deliberate self-harm (p < .05), and the relationship between deliberate self harm and specific recall approached significance (p = .07). All other correlations were non-significant (p’s all < .08).

Table 3.11 Kendalls Tau Correlations between Self-harm and Memory Specificity

<table>
<thead>
<tr>
<th>Parsuicide</th>
<th>AMT memory variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specific</td>
</tr>
<tr>
<td>Deliberate Self-harm</td>
<td>.25</td>
</tr>
<tr>
<td>Suicide</td>
<td>.02</td>
</tr>
<tr>
<td>Ambivalent</td>
<td>.13</td>
</tr>
<tr>
<td>Total</td>
<td>.15</td>
</tr>
</tbody>
</table>

* p < .05  ** p < .01  *** p < .001

Given the association between categoric memory and deliberate self-harm (p < .05), further analysis was conducted to ascertain the relationship between these variables when accounting for additional variables which also displayed associations with deliberate self-harm, including dissociation (τ = .41, p < .01), and education (τ = .27, p = .05). Note that previous analysis also revealed a significant correlation between education and memory specificity (F (1,57) = 10.10, p < .01). Self-reported depression was also included in this
analysis as past research indicates it is a suppressor variable for the relationship between self-harm and memory specificity (Startup et al., 2001). Analysis was conducted using a generalised linear model based on the Poisson probability distribution with a log link function. Self-harm was entered as the dependent variable while education, categoric memory, depression and dissociation were the predictor variables. Results indicated that education \( \chi^2 (1) = 91.75, p < .01 \), dissociation \( \chi^2 (1) = 119.39, p < .01 \), and categoric memory \( \chi^2 (1) = 60.23, p < .01 \) were significant unique predictors of self-harm without suicidal intent, while depression was not \( \chi^2 (1) = 1.44, p = .23 \). However, investigation of the spread of the data set using a scatter plot indicated that there were two significant outliers which may have been biasing the results of this analysis. Indeed when the outliers were removed, categoric memory was no longer related to self-harm without suicidal intent \( \chi^2 (1) = .53, p = .47 \), although both education \( \chi^2 (1) = 38.60, p < .01 \) and dissociation \( \chi^2 (1) = 95.08, p < .01 \) remained significant predictors. BDI remained a non-significant predictor of deliberate self-harm even when the outliers were removed \( \chi^2 (1) = .07, p = .47 \).

A similar pattern of results was observed for analysis pertaining to specific memory score, with memory specificity being significantly related to deliberate self harm over and above IQ, education and self reported depression \( \chi^2 (1) = 90.97, p < .01 \). However, again, when outliers were removed, this result was no longer significant \( \chi^2 (1) = .09, p = .76 \).

This result indicates that categoric memory is not associated with deliberate self-harm over-and above education. However, in this situation, removing outliers was considered to be a less than optimal approach to the analysis as the outliers reported rates of self-harm which
were consistent with rates observed in past research (Startup et al., 2001) and were considered to be a useful source of information about the higher range of the population. Therefore, the relationship between categoric memory and self-harm without suicidal intent was also investigated using a nonparametric partial correlation controlling for education. Results indicate that the association between categoric memory and self-harm was nonsignificant once the effects of education were removed ($\tau = -.24, p > .05$). Similarly, the association between memory specificity and self-harm was weaker and non-significant once the effects of education were removed ($\tau = .19, p > .05$).

**Discussion**

The prevailing viewpoint within the autobiographical memory literature to date is that overgeneral recall is a memory phenomenon closely associated with affect regulation. In particular, researchers suggest that overgeneral memory may function to regulate emotions by serving as a cognitive avoidance strategy which protects the individual from the negative emotions associated with the specific recall of distressing memories (J. M. G. Williams, 1996). A large number of studies, both correlational and experimental, have accumulated in support of this hypothesis (e.g. Burnside et al., 2004; Hermans et al., 2005; Raes et al., 2003), although there is also some evidence to the contrary (Philippot et al., 2003; Raes et al., 2006). The purpose of this study was to extend the research in this area by exploring the relationship between autobiographical memory and affect regulation in Borderline Personality Disorder, which is a clinical disorder characterised by affect dysregulation.
Affective Characteristics of Individuals with BPD

In general, the results of this study provide further empirical support for the notion that Borderline Personality Disorder is a clinical condition characterised by dysregulated emotional experiences (Linehan, 1993a). Borderline participants in this study reported experiencing a range of negative emotions, including anger, guilt, and anxiety at greater levels than their control counterparts. This finding is consistent with past research which indicates that Borderline individuals typically report greater intensity of negative emotions when compared to other psychiatric and normative samples (Levine et al., 1997; Stein, 1996; Tolpin et al., 2004). However, it should be noted that, in the absence of a psychiatric control group, it is impossible to determine whether the affective features observed within the Borderline sample are specifically related to a diagnosis of BPD or a feature common to psychiatric conditions in general. Research including a psychiatric control group is necessary to elucidate this finding further.

Further, within this study, the elevated levels of negative affect intensity reported by the Borderline individuals did not appear to be dependent on depressed mood as borderline participants both with and without clinical depression reported elevated levels of negative affect intensity, after controlling for IQ and level of education. This suggests that negative affect is a trait feature of Borderline Personality Disorder which is independent of mood state.
Of the Borderline individuals in this study, those with comorbid clinical depression also reported experiencing less intense positive emotions and rated themselves as less responsive to positive events when compared to controls. However Borderline participants without depression did not differ from controls in their responsiveness to positive events or in the intensity of positive emotions experienced. Further, within the borderline sample, positive affectivity was found to be associated with depressive symptoms, and hopelessness. The association between depression and positive affectivity is fairly intuitive in that being depressed is likely to reduce one’s ability to respond to positive events and experience positive emotions, or alternatively, individuals who have a tendency to be unresponsive to positive events or experience low levels of positive emotions are likely to experience feelings of depression and hopelessness. However, taken together, these findings suggest that Borderline Personality Disorder is better characterised by an excess of negative emotion rather than a paucity of positive emotion, and that reduced levels of positive affectivity in this population are accounted for by depressive symptoms rather than representing a trait feature of Borderline Personality Disorder.

This finding is contrary to theoretical accounts of Borderline Personality Disorder which suggest that the emotional dysregulation observed in BPD extends across both positive and negative emotions (Linehan, Bohus, & Lynch, 2007). Linehan suggests that while the emotional difficulties of the borderline individual are most pronounced in the negative affect domain, they also exhibit difficulties regulating positive emotions, and controlling impulsive behaviours related to both intense positive and negative affects (Linehan, 1993a; Linehan et al., 2007). Contrary to this suggestion, the results of this study indicate that except when clinical depression is present as a comorbid diagnosis, Borderline individuals...
report being equally responsive to positive events and experiencing positive emotions of a similar intensity as controls. However, as clinical depression has been found to occur in the majority (>70%) of individuals with Borderline Personality Disorder (Bateman & Fonagy, 1999; Linehan, 1993a; Linehan & Koerner, 1993), it is likely that the typical clinical presentation of Borderline Personality Disorder will include both a paucity of positive affect and increased intensity of negative affect.

Interestingly, the Borderline individuals within this study did not rate themselves as more reactive than controls in their emotional responses to negative events. This finding is in direct opposition to Linehan’s Biosocial theory of Borderline Personality Disorder which identifies high sensitivity to negative stimuli as a key aspect of the emotional profile of individuals with this disorder (Linehan, 1993a). According to Linehan, Borderline individuals have a low threshold for emotional responses, reacting quickly to low level stimuli that would be unlikely to provoke a response in less emotionally vulnerable individuals (Linehan, 1993a). It is suggested that this emotional sensitivity is due to the Borderline individuals’ limited ability to buffer the impact of stressors, such that marked shifts in affect result each time a stressor is encountered (Tolpin et al., 2004). The empirical evidence in support of this theory to date has been scant, consisting of just two studies indicating heightened sensitivity to facial expressions of emotions in individuals with BPD (Levine et al., 1997; Lynch, Rosenthal et al., 2006). The results of the present study contradict this theory, suggesting that in fact, Borderline individuals are no more reactive to negative events than normal community individuals.
The finding that Borderline Personality Disorder is not associated with increased reactivity to negative events is supported by the results of several past studies. Firstly, in a study which utilised experience sampling to explore mood variability in Borderline Personality Disorder, researchers found that the affective instability of Borderline individuals was characterised by increased intensity of negative mood states but not increased emotional reactivity (Links et al., 2007). Indeed, only 30% of reported mood states in this study were reported to be triggered by a current external event, countering the proposition that the mood shifts in individuals with BPD are usually reactions to external triggering events (Links et al., 2007). Secondly, research using a daily process design to explore the relationship between borderline features and affect regulation in a student sample found no relationship between borderline traits and affective reactivity to daily interpersonal stressors (Tolpin et al., 2004). Thirdly, a study exploring the psychophysiological responses of Borderline individuals in response to emotive pictures coupled with startle noises also failed to find any indication of hyper-responsivity within this population (Herpertz et al., 2000). Contrary to expectations, Borderline individuals did not show elevated skin conductivity or startle responses, nor did they self-report greater emotional responses to the stimuli. Instead, this study found reduced electrodermal responsivity in the BPD subjects, indicative of hypoarousal.

The findings of the present study extend past research in this area by demonstrating through the use of self-report data, that individuals with Borderline Personality Disorder do not perceive themselves to be any more reactive to negative stimuli than controls. Together with the findings from past research, these results suggest that Borderline Personality Disorder may not be related to increased emotional reactivity as previously thought. A
possible explanation for this finding may lie in the coping strategies associated with BPD. It has been suggested that individuals who experience intense negative affect may learn to avoid, suppress or curtail negative reactions resulting in a reduction in their reactivity to aversive stimuli (Bryant et al., 1996). Indeed, researchers suggest that the psychophysiological hypoarousal previously observed in individuals with Borderline Personality Disorder may result from the use of avoidance and self-protective behaviours in response to emotional stimuli which are interpreted as a danger (Arnett, 1997; Raine, 1996). It is plausible that individuals with Borderline Personality Disorder may not be as sensitive to negative events as previously expected because they have learnt to control their initial reactions in order to avoid strong negative emotions.

Alternatively, it may be that Borderline individuals are indeed more reactive than controls but that this reactivity is limited to particular emotional stimuli which are identified by individuals with Borderline Personality Disorder as specific stressors (Herpertz et al., 2000). There are two main categories of stimuli considered to be particularly salient for individuals with Borderline Personality Disorder (Schmahl et al., 2004). Firstly, Borderline individuals exhibit an intense fear of abandonment, such that frantic efforts to avoid real or imagined abandonment is considered to be one of the hallmark symptoms of this disorder (DSM IV-TR: APA, 2000). Secondly, childhood abuse has been identified as a key factor in the etiology of BPD, and many authors now conceptualise Borderline Personality Disorder as a form of complex post traumatic stress disorder (Gunderson & Sabo, 1993; Herman et al., 1989). It may be that individuals with BPD are highly reactive but only to stimuli referencing trauma / abuse or abandonment. If this is the case, the negative reactivity scale of the Affect Intensity Measure, which assesses emotional responses to
everyday stimuli such as public speaking, emotional movies, seeing graphic images of motor vehicle accidents or telling lies, may not tap into the core elements of the Borderlines’ reactivity. However past research does not support the theory of selective reactivity as Borderline individuals do not display elevated levels of psychophysiological reactivity in response to personalised abandonment and trauma scripts (Schmahl et al., 2004). This suggests that, even with highly salient stimuli, individuals with Borderline Personality Disorder are no more reactive to negative events than controls.

Conversely, the null findings regarding increased emotional reactivity in Borderline individuals may be due to the use of self-report measures of affect regulation within the present study. Both the Affect Intensity Measure and the Affect Control Scale are self-report measures of affect regulation and as such have several limitations which are inherent to self-report scales – that is, reporting on these scales may be biased by mood and current mental state, and influenced by beliefs, confirmation bias, and demand effects. More importantly, these self-report measures also depend on memory and observation and therefore cannot assess cognitive or emotional processes which occur at a pre-conscious level or at a speed which is not amenable to introspection. Thus it may be that the negative reactivity exhibited by Borderline individuals in previous experimental studies (Levine et al., 1997; Lynch, Rosenthal et al., 2006) may not be observed in the current study as it occurs at a level not open to conscious inspection, or is masked by some form of reporting bias.

Lastly, the results of the present study also indicate that Borderline individuals report greater fear of being overwhelmed or losing control of their emotions when compared to
controls. Borderline participants reported feeling afraid of losing control over a range of emotions, including: anger, depression, anxiety and positive affect. This suggests that Borderline individuals tend to view emotional experiences in general as being overwhelming and beyond their ability to control or contain. This finding is consistent with past research which indicates that Borderline symptomatology is associated with a perceived lack of ability to regulate emotion once it is experienced (Yen et al., 2002).

Further to this, fear of experiencing emotions, particularly depression and anxiety, was also found to be related to greater levels of depression and hopelessness with the Borderline sample. This finding is fairly intuitive in that it follows logically that individuals who have experienced higher levels of depressive symptoms and hopelessness are more likely to be more fearful of experiencing these emotions again or of being overwhelmed by these emotions as is often the experience in a depressive episode.

In sum, the results of this study suggest that individuals with Borderline Personality Disorder experience elevated levels of negative affect, report an overwhelming fear of experiencing and expressing emotions, and are less responsive to positive events when they are suffering from clinical depression in addition to a diagnosis of BPD. However, contrary to expectations, Borderline individuals were no more reactive to aversive stimuli than controls.
Affect Regulation and Maladaptive Behaviours in BPD

The results of this study also suggest that affect dysregulation is closely associated with behavioural dysregulation in individuals with Borderline Personality Disorder. Firstly, results indicate that amongst the Borderline participants, high affect intensity was found to be associated with a tendency to dissociate. Dissociative behaviour has been consistently observed at high levels in individuals with Borderline Personality Disorder (Linehan, 1993a; Wagner & Linehan, 1998; S. Watson, Chilton, Fairchild, & Whewell, 2006).

Dissociation is defined as “a disruption in the usually integrated functions of consciousness, memory, identity or perception” (APA, 2000, p. 519). Theoretical accounts suggest that the function of dissociation in clinical populations is to serve as a primitive psychological defence mechanism to block out aversive cognitions and emotions (Cardena, 1994; Van den Bosch, Verheul, Langeland, & Van den Brink, 2003). The tendency for dissociative behaviours to increase with the strength of negative affect within this study suggests that dissociation is indeed a form of avoidance that individuals with Borderline Personality Disorder use as a strategy for managing strong negative emotions. The association between elevated levels of negative affect and dissociation is supported by past research which suggests that negative affect intensity is associated with avoidant behaviours in general, of which dissociation is but one form (Lynch, Robins, Morse, & MorKrause, 2001).

In addition, within the Borderline sample, the tendency to perceive emotions as overwhelming was found to be related to increased levels of a number of maladaptive behaviours. Firstly, fear of experiencing depression (as assessed by the ACS depression
Chapter 3: Memory Specificity and Affect Regulation

Subscale) was related to higher levels of dissociation and thought suppression. Secondly, fear of experiencing anxiety (as assessed by the ACS anxiety subscale) was associated with higher levels of dissociation as well as higher levels of self-harming behaviours. Thirdly, overall fear of emotions (Total ACS which includes depression, anxiety, anger and positive affect) was related to increased levels of dissociation and self-harming behaviour.

Deliberate self-harm occurs in the majority of individuals with Borderline Personality Disorder and is considered to be the behavioural pattern most frequently associated with a diagnosis of BPD (Linehan, 1993a; Zanarini, Frankenburg et al., 2003). The prevailing viewpoint in the research literature to date is that deliberate self-harm serves to regulate emotions, particularly in individuals with high levels of affective instability (Chapman et al., 2006; Zlotnick, Donaldson, Spirito, & Pearlstein, 1997). Indeed, suicidal and self-harming behaviours in individuals with Borderline Personality Disorder have been referred to as “maladaptive solution behaviours to the problem of overwhelming, uncontrollable, intensely painful negative affect” (Linehan, 1993a, p 60). The exact mechanisms by which self-harm regulates emotion are as yet unclear, however it has been suggested that self-harm may be a way for the individual to express or concretize their emotions whilst also serving to elicit help from the environment which may further reduce negative affect (Chapman et al., 2006). Self-harm is also thought to be beneficial as a strategy for managing dissociative states (Eckhardt-Henn, 2005; Paris, 2005), a hypothesis which is supported by the results of the present study which indicate an association between deliberate self-harm and increased dissociation. Research indicates that Borderline individuals report substantial relief from anxiety and other aversive emotions after engaging in self-harming behaviours (Leinbenluft, Gardner, & Cowdry, 1987). Further,
amongst a sample of self-harming women, the number one reason given for engaging in deliberate self-harm was to obtain emotional relief or to regulate emotion (M. Brown et al., 2002). The association between fear of experiencing emotions and self-harm observed in this study is consistent with these findings, indicating that the more afraid the individual is of experiencing or being overwhelmed by emotions, particularly anxiety, the more likely they are to engage in self-harm. This finding supports the theory that self-harm is a form of avoidance which functions to allow the individual to avoid emotions which are perceived as overwhelming.

In addition, past research indicates that Borderline Personality Disorder is associated with a tendency to engage in thought suppression (Chapman et al., 2005). Thought suppression is posited to function as an affect regulation strategy by providing periodic relief from aversive arousal through cognitive avoidance (Beevers & Scott, 2001; Lynch et al., 2007). However, the protective function of thought suppression has been questioned due to recent research which suggests that thought suppression has the paradoxical effect of increasing the target thought (Abramowitz et al., 2001; Lynch et al., 2007; Purdon, 1999; Rassin, Merckelbach, & Muris, 2000; Wenzlaff & Wegner, 2000). Regardless of the effectiveness of this strategy, past research indicates that highly emotional individuals are more likely to regularly engage in thought suppression as a means of regulating aversive emotions compared to less emotional individuals (Cheavens et al., 2005; Lynch et al., 2001; Rosenthal, Cheavens, Lejuez, & Lynch, 2005). The association between fear of experiencing emotions and thought suppression observed in this study further supports this notion, indicating that the more afraid the individual is of experiencing or being
overwhelmed by emotions, particularly depression, the more likely they are to engage in avoidant behaviours such as thought suppression.

The association between affect dysregulation and dissociation, thought suppression and self-harm observed in this study indicates that for individuals with Borderline Personality Disorder, these behaviours may serve as a form of experiential avoidance. Experiential avoidance is a term used to refer to any behaviour which functions to allow the individual to avoid or escape from unwanted internal experiences or the external conditions which produce them (Chapman et al., 2006; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). As such, experiential avoidance is posited to be an emotion regulation strategy (Eifert & Forsyth, 2005). However, evidence suggests that, paradoxically, experiential avoidance is a putative pathological process related to the development and maintenance of psychopathology (Chawla & Ostafin, 2007; Hayes, Strosahl, & Wilson, 1999).

Affect dysregulation is posited to lead to experiential avoidance in the following way: high intensity affect leads to increased arousal which disrupts normal emotion regulation processes, thereby increasing the likelihood that the individual will experience their emotions as overwhelming and resort to avoidance as a strategy for managing these emotions (Chapman et al., 2006; Lynch et al., 2001). According to this theory, experiential avoidance is the result of heightened affect intensity, as well as a lack of effective strategies for modulating emotional arousal which together increase the likelihood that the individual will seek to avoid aversive emotions entirely (Chapman et al., 2006). Indeed, individuals who experience intense affect typically report negative expectancies about their ability to regulate emotional states (Flett, Blankstein, & Obertynski, 1996) suggesting that avoidance
may result when the individual perceives their intense emotions to be in excess of their regulatory capabilities.

A similar idea is presented by Linehan in her Biosocial theory of Borderline Personality Disorder (Linehan, 1993a). According to this theory, the affect dysregulation displayed by individuals with Borderline Personality Disorder is the result of a combination of a biological disposition for heightened intensity of affect and deficient emotion regulation skills (Linehan, 1993a). She posits that as a result of dysregulated emotional experiences, individuals with Borderline Personality become “emotion-phobic”, and seek to avoid or inhibit emotions entirely. Many of the maladaptive behaviors exhibited by individuals with Borderline Personality Disorder are thought to be the direct result of experiential avoidance, being efforts to inhibit or avoid negative emotional cues (Linehan, 1993a).

Empirical evidence supports the notion that Borderline Personality Disorder is associated with elevated levels of avoidant coping strategies (Bijttebier & Vertommen, 1999; Vollrath et al., 1994). Indeed, individuals with Borderline Personality Disorder have been found to engage in a variety of experiential avoidant behaviours, including: thought suppression; mental disengagement, behavioural disengagement, denial, and substance abuse (Chapman et al., 2005).

The findings of this study provide further evidence that dysregulated emotional experience is associated with experiential avoidant behaviors in Borderline Personality Disorder. Consistent with Linehan’s Biosocial theory, individuals with Borderline Personality Disorder demonstrated elevated levels of negative affect and tended to view emotions as overwhelming. Further, this affect dysregulation was related to increased levels of
dissociation, thought suppression and self-harm, providing further support for Linehan’s suggestion that the combination of high affect intensity and poor emotion regulation skills are key factors in the behavioral sequelae of BPD. Further, the results highlight the importance of experiential avoidance in this disorder, suggesting that many of the behaviors exhibited by individuals with this disorder, including dissociation, thought suppression and self-harm may function as avoidant coping strategies for managing intense negative emotions which are perceived as aversive and overwhelming.

The association between affect dysregulation and maladaptive avoidant behaviours in Borderline Personality Disorder highlights the importance of therapeutic interventions targeting emotional inhibition and avoidance in this population (Lynch et al., 2001). Indeed, current treatment protocols designed to address the issues of Borderline Personality Disorder, such as the evidence-based Dialectical Behaviour Therapy, have focused on strategies such as acceptance, exposure and mindfulness, which directly address the avoidant behaviours observed in this population (Hayes et al., 1996). The findings of the present study provide further support for interventions taking this approach, suggesting that strategies designed to alter experiential avoidance will likely bring about a reduction in maladaptive behaviours such as dissociation, thought suppression and deliberate self-harm within this population.

Affect Regulation and Autobiographical Memory

Contrary to expectations, the results of the present study indicate that autobiographical memory specificity is not related to affective instability in individuals with Borderline
Personality Disorder. Autobiographical memory specificity was not related to negative affect intensity, negative reactivity or positive affectivity in either the Borderline depressed, Borderline non-depressed, or control groups. Nor did it appear to be related to fear of experiencing or expressing emotions within any of these groups.

This finding is surprising given that theoretical accounts suggest that overgeneral autobiographical memory functions as a form of experiential avoidance in response to aversive emotional stimuli in the form of painful memories (Hayes et al., 1996; J. M. G. Williams, 1996). As a form of experiential avoidance, overgeneral memory would be expected to be directly associated with affect dysregulation as avoidant strategies are generally elicited in response to negative emotions. However, the present study failed to confirm such an association. Moreover, the results of the present study indicated that affect dysregulation in Borderline individuals was related to a number of alternative forms of experiential avoidance, including: thought suppression, dissociation and deliberate self-harm. The fact that affect dysregulation was associated with a number of experiential avoidant strategies but not with overgeneral memory brings into question the largely accepted affect regulation theory of overgeneral memory.

However, again it is important to note that the assessment of affect regulation within the current study was based on the use of self-report scales, and as such provides a measure of perceived emotion regulation rather than actual emotion regulation. Moreover, these scales largely depend on conscious observation and are therefore unable to assess cognitive or emotional processes which occur at a pre-conscious level or at a speed which is not amenable to introspection. Lastly, self report scales naturally rely on memory and accurate
Chapter 3: Memory Specificity and Affect Regulation

reporting. The use of self report scales to assess affect regulation may have confounded findings regarding the association between affect regulation and autobiographical memory as both rely on memory and accurate reporting, and may be postulated to include processes which occur at a preconscious level or speed. Further research, using on-line measures of affect regulation is warranted to provide definitive evidence regarding the association between affect regulation and autobiographical memory in this population.

Interestingly, however, overgeneral autobiographical memory had a tendency to be related to reduced levels of deliberate self-harm within the Borderline sample in this study. This relationship held for both categoric and specific memories. A similar association has been observed in past research (Startup et al., 2001), although the present study extends these findings, suggesting that the association between parasuicide and overgeneral memory in BPD is limited to deliberate self-harm (self-harm without suicidal intent). This result seems to imply that overgeneral memory may be protective in BPD, reducing the negative affect normally associated with distressing memories which otherwise would have culminated in deliberate self-harm (Startup et al., 2001). However, this result was not particularly robust, and appeared to be accounted for by the effect of education as when education was partialled out, overgeneral memory was no longer related to deliberate self-harm. The most plausible explanation for the relationship between education and self-harm is that self-harm is a coping strategy which is predominantly employed by individuals who lack effective coping strategies and is therefore associated with skills such as problem solving, which are developed through learning. Indeed, Williams theory of “psychological entrapment” suggests that overgeneral memory reduces cognitive access to solutions, thereby increasing hopelessness resulting in increases in self-harming and suicidal
behaviour (J. M. G. Williams, 1997). However, the direction of the results counter this theory as education was associated with greater levels of self-harm, rather than less as would be expected under an ineffective coping theory. Moreover, self-harm was unrelated to IQ, again suggesting that the association between self-harm and education is not a reflection of poor cognitive ability.

Notably, the results of Startup and colleagues (2001) also suggest that the association between self-harm and memory specificity is only observed when controlling for self-reported depression and/or anxiety. The present study did not confirm the suppressor effect of BDI score, although without including a measure of anxiety, it is impossible to determine whether these results indicate a failure to replicate Startup’s findings. It should also be noted that the parasuicidal results observed in this study were exceptional in that frequency of self-harm was not associated with self-reported severity of depression or hopelessness, as has been consistently observed in past research in other clinical populations (e.g. Beck, Steer, Kovacs, & Garrison, 1985; Ellis & Ratliff, 1986; Hill, Gallagher, Thompson, & Ishida, 1988; Kessler, Berglund, Borges, Nock, & Wang, 2005; Laget et al., 2006; Lohner & Konrad, 2006; Pollock, 1999; Ranieri, Steer, Lavrence, Rissmiller, & et al., 1987; Simms, McCormack, Anderson, & Mulholland, 2007; Westefeld & Liddell, 1994). It is possible that the failure to replicate the association between depression, hopelessness and self-harming behaviour in this study is due to qualitative differences between individuals with Borderline Personality Disorder and other populations that engage in suicidal or self-harming behaviour.
In support of this notion, preliminary evidence suggests that suicidal ideation may become increasingly independent of depression and hopelessness among individuals who have multiple attempt histories, such as Borderline individuals (Witte, Fitzpatrick, Warren, Schatschneider, & Schmidt, 2006). It is suggested that in such individuals, previous suicidal behaviour simultaneously increases the accessibility and activation of suicide related structures and the strength of opponent processes (i.e. calming and pain relieving effects of self-harm) which together increase the chances of future self-harm (Joiner, 2002). Thus it may be that Borderline individuals develop a trajectory of self-harm which becomes increasingly independent of depression and hopelessness. However, past research in individuals with Borderline Personality Disorder has found the expected association between depression and self-harm (Startup et al., 2001).

The finding that Borderline individuals do not appear to utilize overgeneral memory as a form of experiential avoidance in the way posited to occur in other emotionally disordered populations may indicate a reliance on other affect regulation strategies within this population. Research indicates that repeatedly abused individuals, such as the majority of individuals with Borderline Personality Disorder, may develop finely honed dissociative cognitive avoidance skills (Terr, 1991), and indeed, research indicates that trauma is significantly related to dissociation in individuals with BPD (Ross-Gower, Waller, Tyson, & Elliott, 1998; S. Watson et al., 2006). Similarly, research indicates that trauma is related to deliberate self-harm in individuals with Borderline Personality Disorder (Dubo, Zanarini, Lewis, & Williams, 1997; Zweig-Frank & Paris, 1997), suggesting that self-harm may be a strategy which these individuals develop in response to the negative emotions associated with the experience of trauma. Thus it may be that individuals with Borderline Personality
Disorder use dissociation and self-harm to regulate affect and manage the negative emotions associated with distressing memories rather than relying on overgeneral autobiographical memory.

Summary

In sum, the affective experience of individuals with Borderline Personality Disorder can be characterised by an overwhelming fear of experiencing and expressing emotions, increased intensity of negative emotions (although not increased reactivity to negative events) and a tendency to be less responsive to positive events and experience less intense positive emotions when clinical depression is also present. Moreover, within the borderline sample, the tendency to experience elevated levels of negative affect and to view emotions as something to be feared was associated with increased levels of experiential avoidance including: dissociation, thought suppression and deliberate self-harm. However the affect dysregulation observed in individuals with Borderline Personality Disorder was unrelated to overgeneral autobiographical memory which to date has been largely accepted as an avoidant affect regulation strategy.

Deliberate self-harm was found to be related to reduced categorical recall in this population, although this relationship was not particularly robust and appeared to be accounted for primarily by the effects of education. Further research is needed to provide conclusive evidence of the relationship between self-harm and autobiographical memory specificity. Research in this regard would benefit from employing a prospective design in the measurement of self-harm. The use of retrospective measures, as employed in both the
present study and Startup and colleagues research, may confound results as both autobiographical retrieval and reporting of parasuicidal acts depend on memory (Startup et al., 2001). However, past research has suggested that there is good agreement between reports on the parasuicide history interview and therapist recordings of frequency of suicidal acts (Linehan, Armstrong, Suarez, Allmon, & Heard, 1991; Startup et al., 2001).
Chapter 4: Memory Specificity and Problem Solving

4 Memory Specificity and Social Problem Solving in Borderline Personality Disorder

Introduction

Within the field of psychology, the exploration of individual differences in problem solving ability has been seen as a key area of research, largely due to the recognition that the ability to handle difficulties in life is crucial to the maintenance of mental health and well-being (Bijttebier & Vertommen, 1999). Problem solving can be conceptualised as an important coping strategy which enables a person to better manage daily problematic situations and their emotional effects, thereby reducing, minimizing or preventing psychological distress (Thomas. J. D'Zurilla & Sheedy, 1991). Indeed, problem-solving ability has been found to mediate the relationship between stressful daily problems and affective experiences (Nezu & D'Zurilla, 1989). Conversely, problem-solving deficits have been consistently found to be associated with psychopathology (Bijttebier & Vertommen, 1999), and various indices of psychological distress, including: depression, hopelessness, stress, and suicidal ideation and behaviour (Thomas. J. D'Zurilla & Chang, 1995; Thomas. J. D'Zurilla & Sheedy, 1991; Pollock & Williams, 2001; J. M. G. Williams, Barnhofer, Crane, & Beck, 2005). The growing appreciation of the clinical importance of problem-solving in psychopathology is evidenced by the recent surge in problem-solving based therapies which are currently
viewed as effective forms of intervention for various mental disorders (Bijttebier & Vertommen, 1999; Malouff, Thorsteinsson, & Schutte, 2007).

**Problem Solving Defined**

Of primary clinical relevance, much of the research into problem solving ability has focused on an exploration of problem solving as it applies to adaptive functioning in the real-life world (Thomas, J. D'Zurilla, Nezu, & Maydeu-Olivares, 2004). D’Zurilla and colleagues coined the phrase ‘social problem solving’ to refer specifically to problem solving which occurs in the natural environment (Thomas, J. D'Zurilla & Nezu, 1982). The label ‘social’ is not to be misunderstood as referring to a particular limited category of problems, but is instead intended to denote the application of problem solving strategies within the real-life social setting (Thomas, J. D'Zurilla et al., 2004). Social problem solving may be concerned with any of a variety of problems that might affect a person’s functioning, including: impersonal, intrapersonal, and interpersonal problems, as well as broader community or societal issues (Thomas, J. D'Zurilla et al., 2004).

Social problem solving has been defined as:

“the self-directed cognitive-behavioral process by which a person attempts to identify or discover effective or adaptive ways of coping with problematic situations encountered in everyday living” (Thomas, J. D'Zurilla & Maydeu-Olivares, 1995, p 410).
According to this definition, social problem solving is conceptualised as being a conscious, rational and effortful activity that enhances an individual’s ability to find effective solutions to problematic situations as they arise (Thomas. J. D'Zurilla & Maydeu-Olivares, 1995; Thomas. J. D'Zurilla & Nezu, 1982). In this context, a *problem* can be defined as any life situation which requires a response for adaptive functioning but in which an effective response is not immediately apparent or available (Thomas. J. D'Zurilla et al., 2004). A *solution* is identified as the coping response which is the result of the problem solving process when it is applied to a specific problem (Thomas. J. D'Zurilla et al., 2004).

Solutions may be either problem focused (aimed at changing the problematic situation) or emotion focused (aimed at reducing the emotional distress produced by the situation), or both, depending on the nature of the problem (Baker, 2006; Thomas. J. D'Zurilla et al., 2004; Nezu & D'Zurilla, 1989). A solution is considered to be effective if it alters the situation or emotional response so that it is no longer a problem to the individual, while at the same time maximizing other positive consequences and minimizing negative consequences, both personal and social, short and long term (Thomas. J. D'Zurilla et al., 2004).

**The Social Problem-Solving Process**

The general consensus emerging from the problem-solving literature is that effective problem solving is the result of a complex, cognitive-affective-behavioural process involving several stages of operations (Thomas. J. D'Zurilla & Nezu, 1990). The general stages agreed upon in the literature include: 1) problem-solving orientation, 2) problem definition and formulation, 3) generation of alternatives, 4) decision making, and 5)

The first stage, known as problem-solving orientation, refers to the operation of a relatively stable set of cognitive and emotional schemas which are activated when the individual is first confronted with a problematic situation (Thomas. J. D'Zurilla & Nezu, 1990, 1999). Problem orientation is primarily determined by past experiences and encompasses the individual’s feelings and beliefs about problems, problem-solving in general, and their own problem-solving ability (Thomas. J. D'Zurilla et al., 2004). Problem-orientation serves a motivational function within the problem solving process and can have generalised facilitative or inhibitive effects on problem-solving performance by influencing tendencies towards initiation, efficiency, and effort expended on problem-solving activities (Thomas. J. D'Zurilla & Godfried, 1971; Thomas. J. D'Zurilla & Nezu, 1990). Effective problem solving is generally the result of a positive problem orientation where problems are accepted as a normal and inevitable part of life, problematic situations are recognised rather than ignored, effective coping is seen as possible with time and effort, and avoidant or impulsive responding is inhibited (Thomas. J. D'Zurilla & Godfried, 1971).

The remaining four stages in the social problem solving process refer to a specific set of component cognitive skills which are necessary for effective problem solving (Nezu & D'Zurilla, 1989). The first of these stages is problem definition and formulation. Problem definition is essential for effective problem solving as it provides an accurate foundation on which to build during the rest of the problem solving process (Thomas. J. D'Zurilla &
Godfried, 1971). This stage requires the individual to gather as much relevant information as possible, to clarify the nature of the problem, to formulate the problem in operational terms, and to delineate realistic problem solving goals (Thomas. J. D'Zurilla & Nezu, 1999). For effective problem solving, the individual must be concrete, comprehensive, specific, and realistic in both their definition and formulation of the problem which needs to be addressed, as well as in their identification of problem solving goals (Thomas. J. D'Zurilla & Godfried, 1971).

After clearly defining the problem, the next step in the problem solving process is the generation of alternatives. The goal of this phase is to make available a variety of potentially effective response alternatives, whilst also increasing the probability of selecting the most effective response from among the alternatives (Thomas. J. D'Zurilla & Godfried, 1971). Performance in this stage of the problem solving process is enhanced by “brainstorming” which maximizes the number of good-quality ideas produced by encouraging the generation of a large quantity and variety of alternatives whilst deferring judgment until a later stage (Thomas. J. D'Zurilla & Nezu, 1999).

Following this, the next stage of the problem solving process involves decision-making. The purpose of this phase is to compare and judge the ideas produced with the aim of choosing the best overall solution for implementation within the current problematic situation (Thomas. J. D'Zurilla & Nezu, 1990). The decision making process is posited to be based on a cost / benefits analysis procedure, whereby the individual considers the costs and benefits of each alternative in terms of outcomes, including problem resolution as well as impact on personal, social and emotional well-being, and time and effort requirements.
(Thomas. J. D'Zurilla & Nezu, 1999). This value judgment is then combined with an analysis as to the likelihood of the anticipated outcomes resulting from the alternative under consideration (Thomas. J. D'Zurilla & Nezu, 1999). A solution is chosen on the basis of a prediction as to which alternative has the best chance of maximizing utility in the given situation (Thomas. J. D'Zurilla & Nezu, 1999).

The final stage of the problem solving process, termed verification, is carried out after the chosen response has been implemented. This stage is designed to assess the actual outcome of the chosen strategy in the real-life situation (Thomas. J. D'Zurilla & Godfried, 1971). On the basis of information obtained through self-monitoring, an evaluation is made as to whether the chosen solution has met the needs of the current situation. If the result is satisfactory then the problem solving process is terminated, however if the result is unsatisfactory, the problem solving process will be repeated again until a satisfactory match is achieved (Thomas. J. D'Zurilla & Godfried, 1971). Verification is essential to effective problem solving as it allows for self-correction to maximize the effectiveness of the solution being utilised (Thomas. J. D'Zurilla & Godfried, 1971).

There are two main points to note about the social problem solving process as conceptualised through these stages. Firstly, as described above, social problem solving appears to be presented as a sequential process which occurs through the execution of a specific set of ordered stages. However, evidence suggests that in actual practice, problem solving rarely occurs in a linear fashion (Thomas. J. D'Zurilla & Godfried, 1971). D’Zurilla and colleagues suggest that the five stages listed above should instead be conceptualised as overlapping and interacting tasks, such that effective problem solving involves movement
back and forth from one task to another before a solution is finally achieved (Thomas. J. D'Zurilla & Nezu, 1999).

Secondly, it is evident from a perusal of the five stages identified that solution implementation is not considered a component of what is conceptualised as social problem solving. Instead, problem solving, as outlined above, refers to the technique of finding effective solutions for problematic situations, while solution implementation refers to the process of putting the identified solutions into practice (Thomas. J. D'Zurilla et al., 2004). This distinction is important as many theorists regard problem solving and solution implementation as conceptually distinct phenomena which require different sets of skills (Thomas. J. D'Zurilla & Nezu, 1999). On the one hand, problem solving involves a general set of skills which are consistent across problems, whereas solution implementation skills will vary from situation to situation depending on the nature of the solution which needs to be executed (Thomas. J. D'Zurilla & Nezu, 1999). Moreover, solution implementation may be influenced significantly by factors other than problem solving ability, including specific skills deficits, emotional distress, or motivational deficits (Thomas. J. D'Zurilla & Nezu, 1999). While both problem solving and solution implementation are necessary for effective functioning, these skills may often be independent of each other and should therefore be considered as distinct and separate factors when examining problem solving ability.

A Prescriptive Model of Social Problem Solving

On the basis of empirical evidence arising from research on the five-stage problem solving process, D’Zurilla and colleagues have formulated a comprehensive multi-factor model of
social problem solving (Thomas. J. D'Zurilla et al., 2004). This model consists of five main factors: positive problem orientation, negative problem orientation, rational problem solving, impulsive-carelessness style, and avoidance style.

The first two factors included in the model coincide with the motivational component of the problem solving process and focus specifically on problem orientation variables. Evidence arising from research in this area suggests that problem orientation consists of two independent variables: Positive Problem Orientation and Negative Problem Orientation (Thomas. J. D'Zurilla & Nezu, 1990). *Positive problem orientation* is a constructive set which involves a general disposition to view problems as a challenge, to see problems as solvable with time, effort, and commitment, and to believe in one’s personal ability to solve problems successfully (Thomas. J. D'Zurilla et al., 2004). Conversely, *negative problem orientation* is a dysfunctional set involving a general tendency to view problems as a threat, to doubt one’s personal ability to solve problems successfully, and to become easily frustrated and upset when problems arise (Thomas. J. D'Zurilla et al., 2004).

The remaining three factors in the model refer to distinct problem solving styles. The first, known as *rational problem solving style*, is a constructive approach to problem solving characterised by the deliberate, systematic, and effective application of problem-solving skills (Thomas. J. D'Zurilla et al., 2004). The core component skills identified in this model are consistent with the staged model of the problem solving process and include: the ability to clearly define and formulate the problem, generate alternative solutions, make decisions, and monitor the implementation of the chosen solution (Thomas. J. D'Zurilla et al., 2004). The *impulsive – carelessness style* is a dysfunctional problem solving pattern characterised
by attempts to apply problem solving strategies but in a way which is narrow, impulsive, careless, hurried and incomplete (Thomas. J. D'Zurilla et al., 2004). Individuals displaying this style of problem solving usually consider only a limited number of solution alternatives, frequently act on the first idea that comes to mind, and evaluate and monitor alternatives and consequences in a way which is quick and careless (Thomas. J. D'Zurilla, Nezu, & Maydeu-Olivares, 2002). The avoidance problem solving style is another dysfunctional problem solving pattern, and is characterised by procrastination, passivity, inaction or dependency (Thomas. J. D'Zurilla et al., 2004). Individuals with this style of problem solving avoid problems, put off confronting problems for as long as possible, wait for problems to resolve themselves, or shift the responsibility for problem solving to someone else (Thomas. J. D'Zurilla et al., 2002).

Problem solving, as described in this model, is hypothesised to be a function of the interaction between problem orientation and problem solving style (Thomas. J. D'Zurilla et al., 2004). The relationship between these factors is depicted in Figure 4.1, as drawn from D'Zurilla and colleagues (2004). As shown in the figure, effective problem solving occurs as the result of a positive problem orientation which facilitates the use of rational problem solving skills (Thomas. J. D'Zurilla et al., 2004). In contrast, ineffective problem solving is the result of a negative problem orientation which contributes to either an impulsive/careless style or an avoidant style, both of which are likely to produce negative outcomes (Thomas. J. D'Zurilla et al., 2004). Thus, according to this model, “good problem solvers” are likely to display high levels of positive problem orientation and rational problem solving skills, and low levels of negative problem orientation, impulsive/careless problem solving, and avoidant problem solving (Thomas. J. D'Zurilla et al., 2004). In
addition, “good problem solvers” are likely to persist or re-engage in the problem solving process when initial problem solving outcomes are unsatisfactory, while “poor problem solvers” tend to give up if the initial outcome is negative, or try and gets others to fix their problems (Thomas. J. D'Zurilla et al., 2004). D’Zurilla and colleagues have devised a measure, known as the Social Problem Solving Inventory – Revised, to assess these five dimensions of social problem solving (Thomas. J. D'Zurilla et al., 2002).

**Figure 4.1** Social Problem Solving Model
Problem Solving Deficits in Borderline Personality Disorder

From a clinical perspective, much of what we define as “abnormal behaviour” or “emotional disturbance” can be conceptualised as a reflection of ineffective behaviour and its consequences (Thomas, J. D'Zurilla & Godfried, 1971). Theoretical accounts of Borderline Personality Disorder have emphasised the central role which problem-solving deficits play in the development and presentation of this disorder (Linehan, 1993a).

According to Linehan’s Biosocial theory, individuals with Borderline Personality Disorder have a biological predisposition towards difficulties with emotion regulation due to the combination of high emotional vulnerability and poor coping skills (Linehan, 1993a). Borderline Personality Disorder is posited to develop when these biological tendencies are confluenced by an early invalidating environment in which the private experiences and overt behaviour of the individual are frequently invalidated, punished, ignored and/or trivialised (Linehan, 1993a). Invalidating environments also serve to oversimplify the ease of problem solving and reaching one’s goals (Robins, Ivanoff, & Linehan, 2001). In such an environment, the individual never learns how to deal with problems actively and effectively as difficulties and their consequences are either minimised or ignored (Linehan, 1993a). Instead, the individual learns to escalate and magnify their problems in order to elicit a response from their environment. This results in a behavioural pattern characterised by poorly regulated emotions and behaviour, helplessness and passivity in the face of difficulties, and a reliance on maladaptive coping strategies to manage distress. Indeed, many of the features which characterize Borderline Personality Disorder, including: frequent displays of temper, recurrent physical fights, impulsive behaviour, substance use, bulimic episodes, and self-harming or suicidal behaviours, can be viewed as the direct
result of ineffective attempts on the part of the individual to cope with problems and their emotional consequences (Linehan, 1993a).

A growing body of empirical evidence supports the theory that individuals with Borderline Personality Disorder will display poor problem-solving abilities. In terms of emotion-focused problem solving, research indicates that individuals with Borderline Personality Disorder rely on maladaptive ways of coping with emotion, including: internalising strategies, externalising strategies, emotional avoidance, and disorganised strategies (Conklin et al., 2006). Borderline individuals also rate their own ability to manage emotion as poor, with research demonstrating a direct link between level of Borderline symptomatology and perceived lack of ability to regulate emotion once it is experienced (Yen et al., 2002). Indeed, within the affective domain, the problem solving efforts of Borderline individuals have been described as “desperate, flailing, impulsive attempts to escape psychological pain” (Conklin et al., 2006, p 74).

Further, evidence suggests that individuals with Borderline Personality Disorder demonstrate a problem solving style that is characterised by impulsive and passive problem solving, and problem avoidance. The label “active passivity” has been used to refer to the Borderline tendency to approach problems passively and helplessly and to demand solutions to life’s problems from others (Linehan, 1993a). Indeed, research exploring coping strategies in personality disorders indicates that Borderline Personality Disorder is positively associated with high levels of avoidance, and negatively associated with social support seeking (Bijttebier & Vertommen, 1999). Further, in a study comparing the problem solving ability of individuals with and without Borderline Personality Disorder,
results indicated that the Borderline individuals reported fewer active, passive and introspection / reflection means according to the Means Ends Problem Solving procedure than controls (Kremers, 2004c). Similarly, research on individuals diagnosed with Borderline Personality Disorder and substance abuse, indicates that these individuals utilise escape/avoidance strategies more often, and used problem solving, positive reappraisal, and social support seeking less often than substance abusers without Borderline Personality Disorder (Kruegelbach et al., 1993). Research also indicates that there is an association between Borderline Personality Disorder and low self-efficacy, high dependency and emotional reliance on others (Percy & Cooper, 1985).

Further to this, in a study exploring problem solving in a group of women undergoing short term DBT, 81% of whom were diagnosed with BPD, results indicate that these patients saw themselves as less effective problem solvers than normal controls, expressed less confidence in their problem solving abilities, avoided problems rather than approaching them, and expressed little sense of personal control in problem solving tasks (Douglass, 2000). They also self reported more dysfunctional problem solving (on the SPSI-R) when compared to psychiatric and normal adult, with higher levels of negative problem orientation, avoidance, and impulsivity / carelessness and lower levels of positive problem orientation and rational problem solving. Moreover, in a study comparing problem solving skills in suicide attempters with and without Borderline Personality Disorder, results indicated that attempters with Borderline Personality Disorder displayed poorer social problem solving skills than those without Borderline Personality Disorder and, in particular, appeared to have significantly greater negative problem orientation, as well as greater levels of impulsivity and avoidance problem solving styles (Berk et al., 2007). In
this study, clinicians also rated the BPD patients as having greater problems with their partners or significant others, and greater problems relating to others in general, further emphasizing the problem solving deficits of individuals with Borderline Personality Disorder (Berk et al., 2007).

Overgeneral Memory and Problem Solving

“Autobiographical Memory is not only a record, it is a resource”

(Robinson, 1986, p 23)

Over the last couple of decades, research in the field of memory has broadened dramatically, shifting away from the traditional laboratory style analysis of the taxonomy and structure of the memory system, to a more naturalistic approach exploring memory in everyday contexts (Pillemer, 2003). This shift has led to a burgeoning interest in the functional aspects of memory in an attempt to understand the “real-world usefulness or adaptive significance of memory mechanisms “ (Bruce, 1989). Research into the functions of autobiographical memory has suggested that this form of memory can serve three broad functions: directive, self, and communicative (Pillemer, 2003). While the self and communicative functions of autobiographical memory have been well established and documented over the years, to date the directive functions of autobiographical memories have been largely overlooked (Pillemer, 2003).
The apparent disregard of the directive function of specific autobiographical memories stems from the belief that human behaviour is primarily guided by general abstract knowledge of the world, that is, semantic memory (Pillemer, 1998). This notion springs from a body of evidence suggesting that memory frequently informs behaviour through generalised event knowledge or ‘scripts’ which serve to guide actions and predict the future (Abelson, 1981; Nelsen, 1993). When faced with a decision involving a routine or recurrent situation, it appears that generalised knowledge of customary modes of behaviour may be the most economical way of arriving at a solution (J. M. G. Williams, 1996).

However, recent research on autobiographical memory has led to a re-evaluation of the unqualified primacy of semantic or generalised memory in directing behaviour. Evidence suggests that the autobiographical memory database does in fact serve as a resource where individuals can draw on specific episodes from the past to guide thought and behaviour. Individuals appear to access their store of autobiographical memories in the process of: problem solving, planning, and in the development of models that allow them to comprehend the past and predict future outcomes (Robinson, 1986). In particular, specific episodes appear to aid the problem solving process at the problem-definition stage, where reference to previous specific experiences may provide a clearer understanding of the problem, as well as in the generation of alternatives stage, where the multiple cues inherent in specific memory recollection facilitate the generation of a wide variety of potential solutions (Goddard et al., 1996). The role of specific episodes is particularly critical in open-ended social situations or novel situations for which there are no generalised event knowledge or scripts available (Pillemer, 2003). In these situations, specific memories
which reference analogous situations can be invaluable in providing information for how to act in the current situation (Cohen, 1989).

Conversely, there is some evidence that the habitual use of generalised knowledge can actually be detrimental to problem solving. Most problems, particularly interpersonal difficulties, can be solved in various ways, and in these cases generalisations pertaining to customary modes of behaviour tend to be detrimental by reducing the number of cues available for effective problem solving (Goddard, Dritschel, & Burton, 2001; J. M. G. Williams, 1996). For example, if one is unhappy and is seeking possible ways of rectifying the situation, memories rich in detail about previous times of happiness will provide multiple cues from which to develop alternatives and solutions that can be implemented in the current problem situation. In comparison, memories which involve generalizations or abstract forms of knowledge provide limited access to the memory database which serves as a resource for the development of problem solving strategies (Evans et al., 1992). Thus access to specific memories may foster effective problem solving, while an overgeneral memory style may lead to poor problem solving (Evans et al., 1992).

The association between overgeneral autobiographical memory and poor problem solving has been well supported within the research literature. Evans’ et al. (1992) conducted a study on problem solving in suicidal individuals and found that those individuals who responded in a less specific way on the Autobiographical Memory Test, produced less problem solving means and less effective problem solutions on the Means-Ends Problem-Solving Procedure (Evans et al., 1992). Similarly, Goddard and colleagues have found that the specificity of memories spontaneously retrieved during problem solving is significantly
related to the effectiveness of the solutions produced (Goddard et al., 1996; Goddard et al., 2001). The association between overgeneral memory and problem solving deficits has since been confirmed in suicidal individuals (Kaviani et al., 2005; Pollock & Williams, 2001; Sidley et al., 1997), and also found to occur in clinically depressed individuals (Goddard et al., 1996; Raes, Hermans, Williams, Demyttenaere et al., 2005), non-clinically depressed students (Goddard et al., 1997) and in individuals with Bipolar disorder (Scott et al., 2000).

In addition to reducing cues which aid in problem solving, it has been suggested that overgeneral memory may also impair problem solving by detracting from the individual’s ability to imagine the future. Williams, Ellis, Tyers, Healy, Rose & MacLeod (1996) conducted a series of experiments which demonstrated that degree of specificity when remembering past events was related to the degree to which individuals could imagine the future in detail. Furthermore, they found that manipulating specificity resulted in associated changes in specificity when imagining the future. Imagining the future in an overgeneral way is likely to negatively affect problem solving (J. M. G. Williams et al., 1996) because in order to determine what solution one wants to achieve, and the best method for going about it, the individual must be able to analyse alternatives for appropriateness by imagining possible future scenarios. Thus an inability to imagine the future in any amount of detail is likely to reduce the ability to determine which is the most advantageous solution, and in turn, what is the most effective way of achieving this result.

However, it has also been suggested that the impact of overgeneral memory on problem solving may not be a consequence of reduced access to details in the past or in the future, but may spring from the impact which overgeneral memory has on problem orientation. In
Goddard et al.’s (1996) study on depressed outpatients, a relationship between overgeneral memory and poor problem solving according to the MEPS was observed. However it also became evident that on some occasions, problems were solved without reference to any sort of memory at all. In fact, in many instances where depressed individuals did retrieve memories, these tended to be focused on past failures rather than an effort to solve the current problem. They concluded that problem-solving deficits in depressed individuals were thus a result of a negative problem orientation. Problem orientation, they suggest, can be negatively affected by overgeneral recall as this promotes a ruminative style of thinking which, if focused on negative experiences, will decrease expectancies of problem solving success, and if focused on positive experiences, will decrease motivation to extend one’s problem solving repertoire.

Burnside (2004) claims that overgeneral autobiographical memory becomes problematic primarily through the impact which it has on problem solving. She suggests that while overgeneral memory may initially function as an effective strategy for warding off distressing memories, continued use of an overgeneral style of recall will eventually have a detrimental impact on problem solving. Further, she states that problem solving deficits may then lead to increasing difficulties which in turn lead to depression. With the onset of depression, overgeneral memory as a regulation strategy will fail and the individual will experience an overwhelming rush of emotions which often leads to further avoidance. According to Burnside’s theory, overgeneral autobiographical memory leads to impaired problem solving ability, which in turn negatively impacts on psychological health.
Overgeneral Memory and Problem Solving in BPD

Although the relationship between problem-solving and overgeneral memory has been clearly demonstrated in various populations, there is a dearth of research examining the relationship between problem-solving and autobiographical recall in individuals with Borderline Personality Disorder. Only one study to date has examined the relationship between autobiographical memory and problem solving within Borderline Personality Disorder (Kremers, 2004c). According to the results of this study, individuals with Borderline Personality Disorder reported fewer active/passive and introspection/reflection means than controls on the Means Ends Problem Solving Procedure. However, problem solving deficits appeared unrelated to level of specificity in autobiographical recall (Kremers, 2004c). This result is clearly at odds with past results and appears to suggest that within this population, there is no relationship between overgeneral autobiographical memory and problem solving deficits. However, Kremers’ study is limited in that it did not assess individual components of the problem solving process, nor did it assess problem-solving orientation. This is problematic in that it has been proposed that overgeneral memory is related to problem solving mainly through the impact which this style of recall has on problem solving orientation (Goddard et al., 1996). Furthermore, problem solving orientation has been shown to be the main component of problem solving related to hopelessness and depression (Priester & Clum, 1993).

The aim of the present study is to extend past research in this population by exploring the relationship between memory specificity and problem solving ability as assessed by both performance and self-report measures of problem solving ability. In addition, the
relationship between memory specificity and individual constituents of the problem solving process, including problem solving orientation, problem solving style, and problem solving skills, will also be explored. It is hypothesised that there will be an association between autobiographical memory specificity and problem solving such that higher levels of overgeneral memory will be associated with more problem solving deficits (less rational problem solving and more avoidance / impulsivity) and a more negative problem solving orientation.

**Method**

**Subjects**

This study was based on the same groups of Borderline and control individuals described in Chapter 2, and testing took place during the same session.

**Measures**

**Autobiographical Memory**

The Autobiographical Memory Test (AMT: J. M. G. Williams & Broadbent, 1986) is a scale designed to assess autobiographical memory specificity. The test consists of a number of orally presented cue words to which participants are instructed to recall specific events from their past, where a specific event is defined as an event which occurred at a particular place and time and did not last longer than 24 hours (J. M. G. Williams, 1996). Instructions specified that the memories produced had to be related to events which took place more than one week ago. The present study utilised a version of the AMT consisting of a total
Chapter 4: Memory Specificity and Problem Solving

twelve cue words, 6 positive and 6 negative, which were matched for emotionality and frequency. Participants were given three words on which to practice prior to commencing the test, and were prompted with the phrase “can you think of a particular time, one specific event?” if they respond in an ambiguous non-specific manner. Participants were allowed 60 seconds in which to respond to each cue word and the memory recalled was recorded verbatim to be later coded for specificity. Responses were coded as either specific: involving an event which occurred at a particular place and time and lasts less than one day; categoric: a summary of repeated events; extended: involving an event that lasted longer than one day; non memories: the information recalled is not a memory but a semantic associate etc; or omissions: no response is given or time-limit exceeded. Memory repetitions were not counted. Responses were coded by the student researcher and re-coded by a trained independent rater in order to assess interrater reliability. The level of agreement between raters was good: Cohen’s overall Kappa = .89 ($p < .001$), with Kappa’s for individual questions on the AMT ranging between .77 and 1.00 ($p$’s all <.001).

This study formed the baseline component of a longitudinal study (reported in Chapter 5) and, due to the counterbalancing requirements of this longitudinal study, autobiographical memory within the current study was assessed using 5 parallel forms of the AMT (word lists shown in Appendix 1). Four of these word lists were drawn from Brittlebank et al (1993), while the additional word list was compiled by the student researcher from the Affective Norms for English Words (ANEW) list (Bradley & Lang, 1999). The additional word list was matched to the original four in terms of valence, arousal and frequency. Within the current study, the five AMT versions were counterbalanced between the three subject groups as much as possible, however, given the unequal size of the groups, the
effectiveness of this counterbalancing is limited. Preliminary analysis indicated that there were no significant differences between the groups in terms of the versions administered ($\chi^2 = 3.90, p = .87$), however, form will be included in the main body of analysis to ensure that differences in AMT form does not influence results. The AMT has shown good inter-rater reliability (.92 and .85 for clinical and control groups respectively) (Swales et al., 2001). The AMT has also demonstrated adequate test-retest reliability (.53 to .68). Although these test-retest coefficients are only moderate, the study from which they are taken varied the procedures between testing occasions (oral versus written), therefore the test can be seen as a parallel forms reliability check which is a more stringent test of reliability (Raes et al., Unpublished).

**Problem Solving**

Problem solving ability was measured within this study using two independent measures. The first of these was the Means-Ends Problem-Solving Procedure (Platt & Spivack, 1989; Platt, Spivack, & Bloom, 1975), which assesses interpersonal problem solving ability. The MEPS involves successful problem solving scenarios where the participant is given the beginning and the end of a story and is requested to fill in the middle component addressing how the protagonist may progress from the beginning to the end. The complete MEPS comprises 10 problem solving scenarios, however, Platt et al. (1975) have shown that the validity of the MEPS is not compromised when a shortened version is used (Goddard et al., 1996; Pollock & Williams, 2001), therefore in this study only four scenarios per testing occasion were employed in the interests of time. These scenarios were taken from Kehrer and Linehan (1996), who have adapted the MEPS scenarios to be particularly relevant to individuals with Borderline Personality Disorder (see Appendix B). Within each version of
the MEPS, two scenarios referred to interpersonal difficulties (desired outcome of scenario is the resolution of some form of relationship problem), and two referred to emotional difficulties (desired outcome of scenario is the management of some form of painful emotion). Responses on the MEPS can be coded to identify particular types of means, as well as effectiveness of solutions (Linehan, 2006). For the purpose of this study, we scored total number of means (separated according to type, including: active, passive, self regulation, introspective and irrelevant) and the solution effectiveness, rated on a scale from 1 (not at all effective) to 7 (very effective). MEPS responses were rated by the PhD candidate and re-coded independently by a trained rater in order to assess the interrater reliability. The overall level of agreement between the raters was good (89%). Binomial regression analysis indicated that there was no difference in inter-rater agreement between stories \( W(3) = 1.13, p = .77 \). A significant difference in agreement was observed for types of mean \( W(5) = 11.95, p = .04 \), with greater agreement observed for inappropriate means compared to the other types of means \( p = .004 \). This finding can be accounted for by the explicit nature of actions defined as inappropriate means. Deficits on the MEPS have been demonstrated to be closely associated with difficulties in finding ways to solve real-life problems (Marx, Williams, & Claridge, 1992; Rotheram-Borus, Trautman, Dopkins, & Shrou, 1990). The MEPS has been shown to have adequate validity, and internal consistency. It also has adequate test-retest reliability over periods ranging from 2.5 weeks to 8 months (.59-.43) (Platt & Spivack, 1989).

In addition to the MEPS, a second problem solving measure, known as the Social Problem Solving Inventory – Revised was included in this study. The decision to include a second measure of problem solving was based on the fact that the MEPS, as a measure of problem
solving, provides a global indicator of problem solving ability, but does not provide any specific information about the nature of process abilities or deficits, nor assess problem solving orientation (Thomas. J. D'Zurilla, Chang, Nottingham, & Faccini, 1998). In order to make conclusions about specific problem solving process deficits, a process measure of problem solving was needed. Process measures directly assess the attitudes, skills, and abilities that enable a person to find effective or adaptive solutions to specific everyday problematic situations and therefore provide information about the specific individual constituents of the problem solving process (Thomas. J. D'Zurilla et al., 1998). As research indicates that problem orientation and problem solving skills are somewhat independent (e.g. Haaga, Fine, Terrill, Stewart, & et al., 1995), measures which assess both of these components of problem solving needed to be incorporated.

The Social Problem Solving Inventory – Revised (Thomas. J. D'Zurilla et al., 2002) is a 52 item, Likert type, self report inventory aimed at assessing problem solving ability in social situations. It consists of five main scales which assess: Positive Problem Orientation; Negative Problem Orientation; Impulsivity / Carelessness style; Avoidance style; and Rational Problem Solving. The Rational Problem Solving scale includes four subscales which address the four main skills involved in problem solving: problem definition and formulation, generation of alternative solutions, decision making and solution implementation and verification. The SPSI-R has shown high internal consistency (subscales ranging from .69 to .95) and adequate test-retest reliability (.68-.91). Furthermore, the SPSI-R has shown good predictive validity, being significantly correlated with distress measures including the Beck Depression Inventory, Beck Hopelessness Scale and the Suicide Probability scale (Douglass, 2000). It takes 15-20 minutes to complete.
Hopelessness

The Beck Hopelessness scale (BHS: Beck & Steer, 1988) is a 20 item self-report scale that is used to assess negative attitudes towards the future (Beck & Steer, 1988). It has been shown to have good internal consistency (.82-.93), test-retest reliability (.66-.69), and correlates with clinical ratings of hopelessness (.62-.86) (Beck & Steer, 1988). It is valid for use with individuals aged over 17 and takes 5-10 minutes to complete.

Procedure

Both the control and Borderline participants were administered the AMT, SPSI-R and MEPS during the testing session described in Chapter 2.

Results

Demographics and Problem-Solving ability

Details of the three participant groups on which this study is based (Borderline depressed, Borderline non-depressed, and controls), have been recorded in chapter two. Analysis indicated that the groups were comparable in terms of age and gender but differed significantly in IQ and education [F(2,59) = 6.38, \( p < .01 \), and F(2,59) = 9.58, \( p < .01 \) respectively]. Given this group variability, the influence of IQ and education on problem solving ability was explored. Separate hierarchical multiple regression analysis (see Aiken & West, 1991) were conducted with each of the various SPSI-R problem solving scores as the dependent variables, and IQ and education as predictor variables. Group membership was dummy-coded so that each of the groups could be tested against the other groups, and the interaction between group and IQ/education accounted for.
Chapter 4: Memory Specificity and Problem Solving

Results indicated that IQ was significantly related to a number of problem solving indices, including: negative problem orientation, ($R^2_{\text{change}} = 0.11$, $F(1,58) = 7.34$, $p < .01$), impulsivity ($R^2_{\text{change}} = 0.12$, $F(1,58) = 7.98$, $p < .01$), avoidance ($R^2_{\text{change}} = 0.11$, $F(1,58) = 6.95$, $p = .01$) and total problem solving ($R^2_{\text{change}} = 0.07$, $F(1,58) = 4.58$, $p = .05$). None of the interactions between group and IQ were significant for any of the social problem solving measures.

Education was also significantly related to a number of problem solving measures, including: negative problem orientation ($R^2_{\text{change}} = 0.21$, $F(1,58) = 14.72$, $p < .01$), rational problem solving ($R^2_{\text{change}} = 0.06$, $F(1,58) = 3.87$, $p = .05$), problem definition and formulation ($R^2_{\text{change}} = 0.08$, $F(1,58) = 5.35$, $p = .02$), impulsivity ($R^2_{\text{change}} = 0.17$, $F(1,58) = 11.68$, $p < .01$), avoidance ($R^2_{\text{change}} = 0.13$, $F(1,58) = 8.32$, $p < .01$), and total problem solving ($R^2_{\text{change}} = 0.16$, $F(1,58) = 10.86$, $p < .01$). Again none of the interactions between group and IQ were significant for any of the social problem solving measures.

As preliminary exploration indicated that the MEPS data were not normally distributed, the relationship between problem solving according to the MEPS, and IQ and education was assessed using several generalised linear models (based on the Poisson probability distribution with log link function) with the various MEPS indices as dependent variables and IQ and education as predictors. Results indicated that IQ was not significantly related to any of the MEPS measures, apart from number of active means [$\chi^2 (1) = 4.13$, $p = .04$]. Education was found to be significantly related to a number of MEPS indices, including: passive means [$\chi^2 (1) = 9.72$, $p < .01$], self regulation means [$\chi^2 (1) = 5.36$, $p = .02$], introspective means [$\chi^2 (1) = 4.72$, $p = .03$], irrelevant means [$\chi^2 (1) = 5.28$, $p = .02$], and
total means $\chi^2 (1) = 8.94, p < .01$. MEPS effectiveness data was normally distributed and was therefore analysed using a linear regression procedure, where IQ and education were entered as predictor variables in separate multiple regression analysis and group membership was dummy coded. Results indicate that MEPS effectiveness was not significantly related to either IQ ($R^2$ change < .01, $F(1,55) = .28, p = .56$) or the interaction between IQ and group ($R^2$ change = .03, $F(2,53) = 1.02, p = .37$). Nor was MEPS effectiveness related to level of education ($R^2$ change < .01, $F(1,55) = .47, p = .50$) or the interaction between education and group ($R^2$ change < .01, $F(2,53) = .12, p = .89$).

Due to the relationships observed between IQ / education and problem solving, both IQ and education will be entered as covariates into all analysis involving SPSI-R measures. IQ will also be entered as a covariate into analysis for the MEPS active means, while education will be entered as a covariate into analysis on the passive, self regulation, introspective, irrelevant and total means indices of the MEPS.
Social Problem Solving in Borderline Personality Disorder

Table 4.1 Means and Standard Deviations for the Social Problem Solving Inventory – Revised

<table>
<thead>
<tr>
<th>SPSI-R Indices</th>
<th>BPD + MDD (N=22)</th>
<th>BPD – MDD (N=9)</th>
<th>Controls (N=29)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Global Problem Solving</td>
<td>7.44 (.63)</td>
<td>8.82 (1.15)</td>
<td>13.66 (.46)</td>
</tr>
<tr>
<td>Positive Problem Orientation</td>
<td>6.00 (.69)</td>
<td>8.78 (1.75)</td>
<td>11.24 (.70)</td>
</tr>
<tr>
<td>Negative Problem Orientation</td>
<td>30.23 (1.35)</td>
<td>25.00 (2.60)</td>
<td>10.86 (1.25)</td>
</tr>
<tr>
<td>Rational Problem Solving Score</td>
<td>30.55 (3.23)</td>
<td>30.11 (4.73)</td>
<td>46.35 (2.13)</td>
</tr>
<tr>
<td>Problem Definition &amp; Formulation</td>
<td>7.86 (.83)</td>
<td>8.44 (1.20)</td>
<td>12.86 (.60)</td>
</tr>
<tr>
<td>Generation of Alternative Solutions</td>
<td>7.64 (.95)</td>
<td>7.89 (1.33)</td>
<td>11.31 (.62)</td>
</tr>
<tr>
<td>Decision Making</td>
<td>9.14 (.95)</td>
<td>8.44 (1.62)</td>
<td>12.28 (.57)</td>
</tr>
<tr>
<td>Solution Implementation &amp; Verification</td>
<td>5.91 (.92)</td>
<td>5.33 (1.33)</td>
<td>9.86 (58)</td>
</tr>
<tr>
<td>Impulsivity / Carelessness</td>
<td>19 (1.83)</td>
<td>20.22 (2.21)</td>
<td>8.90 (.28)</td>
</tr>
<tr>
<td>Avoidance</td>
<td>16.54 (1.26)</td>
<td>13.44 (2.47)</td>
<td>6.90 (.83)</td>
</tr>
</tbody>
</table>

Means and standard deviations for each of the groups on the various Social Problem Solving Inventory – Revised subscales are presented in Table 4.1. To assess whether the groups differed significantly in terms of social problem solving, a multivariate analysis of covariance (MANCOVA) was conducted on the ten problem solving scores produced by this scale (including: positive problem orientation, negative problem orientation, problem definition and formulation, generation of alternatives, decision making, solution implementation and verification, rational problem solving, impulsivity /carelessness, avoidance, and global problem solving). IQ and education were entered as covariates in this
analysis because these variables differed significantly between groups and were found to be related to problem solving ability. Results indicated a significant main effect of group for SPSI-R scores \( F(20,94) = 3.48, p < .01 \).

Follow-up analysis of this result was conducted through several univariate analysis of covariance (ANCOVA’s) with the various social problem-solving indices as the dependent variables. Results indicated a significant main effect of group on global social problem solving \( F(2,55) = 21.92, p < .01 \). Post Hoc analysis (Hochberg’s GT2 test) of this effect indicated that both the borderline depressed \( (p < .01) \) and borderline non-depressed groups \( (p < .01) \) differed significantly from controls, reporting significantly lower overall levels of problem solving ability. The two Borderline groups did not differ significantly from one another on this variable \( (p = .52) \). These results are depicted in Figure 4.2 below.

Figure 4.2 Global Problem Solving Estimated Marginal Means and Standard Errors
Significant group differences were also observed for both positive problem orientation \([F (2,55) = 10.73, p < .01]\) and negative problem orientation \([F (2,55) = 35.22, p < .01]\). Post hoc analysis (Hochberg’s GT2 test) of these effects indicated that the BPD depressed group had significantly lower levels of positive problem orientation than controls \((p < .01)\). There was no difference between BPD depressed and BPD non-depressed \((p = .20)\) or between BPD non-depressed and controls in degree of positive problem orientation \((p = .26)\).

Results also indicated that the BPD depressed \((p < .01)\) and BPD non-depressed \((p < .01)\) groups exhibited significantly higher levels of negative problem orientation than controls, while the two Borderline groups did not differ from each other \((p = .16)\). These results are pictured in Figures 4.3 and 4.4.

![Figure 4.3 Positive Problem Orientation Estimated Marginal Means and Standard Errors](image-url)
ANCOVA results also indicated significant between group differences on the rational problem-solving component of the SPSI-R. This included both the rational problem solving summary score \([F (2,55) = 9.19, p < .01]\), as well each of the component skill scores: problem definition and formulation \([F (2,55) = 10.37, p < .01]\), generation of alternative solutions \([F (2,55) = 5.03, p = .01]\), decision making \([F (2,55) = 5.88, p < .01]\), and solution implementation \([F (2,55) = 8.74, p < .01]\).

Hochberg’s GT2 test (post hoc analysis) indicated that the BPD depressed group scored significantly lower than controls on all rational problem solving variables [rational problem solving total \((p < .01)\), problem definition and formulation \((p < .01)\), generation of alternatives \((p < .01)\), decision making \((p = .02)\) and solution implementation and verification \((p < .01)\)]. The BPD non-depressed group also scored lower than controls on
most of the rational problem solving indices [rational problem solving total ($p < .01$), problem definition and formulation ($p < .01$), decision making ($p = .04$) and solution implementation and verification ($p < .01$)]. The only exception to this was the generation of alternatives scale ($p = .07$), where the difference between controls and borderline non-depressed did not reach significance. There were no significant differences between BPD depressed and BPD non-depressed on any of the rational problem solving indices. These results are pictured in Figures 4.5 and 4.6.

![Figure 4.5 Rational Problem Solving Estimated Marginal Means and Standard Errors](image-url)
Figure 4.6 Rational Problem Solving Subscale Estimated Marginal Means and Standard Errors

ANCOVA results also indicated a significant difference between groups in impulsivity / carelessness \( [F(2,55) = 7.16, p < .01] \). Hochberg’s GT2 test indicated that the BPD depressed \( (p < .01) \) and BPD non-depressed \( (p < .01) \) groups both reported significantly higher levels of impulsivity than controls. There was no difference between the two BPD groups \( (p = .97) \). See Figure 4.7.
There was also a main effect of group on avoidant problem solving \([F (2,55) = 12.80, p <.01]\). Post hoc analysis indicated that the BPD depressed \((p <.01)\), and BPD non-depressed \((p <.01)\) groups were significantly more avoidant than controls, but the two BPD groups did not differ from one another \((p = .41)\). These results are depicted in Figure 4.8.
Analysis was also conducted to determine if self-reported problem solving was related to severity of depression. A number of regression analyses were conducted with BDI score as the predictor variable and each of the SPSI-R indices as the dependent variables. Results indicate that self-reported depression was related to both of the problem orientation variables, including: positive problem orientation \(F(1,29) = 8.09, p = .01\) and negative problem orientation \(F(1,29) = 5.84, p = .02\). Depression was unrelated to rational problem solving \(F(1,29) = .40, p = .53\), and all of the rational problem solving indices (problem definition and formulation \(F(1,29) = .02, p = .89\), generation of alternative solutions \(F(1,29) = .02, p = .88\), decision making \(F(1,29) = 1.32, p = .26\), and solution implementation and verification \(F(1,29) < .01, p = .99\)). Similarly, depression was unrelated to impulsivity and carelessness \(F(1,29) < .00, p = .95\), avoidance \(F(1,29) = 2.11, p = .16\), and total problem solving score \(F(1,29) = 2.78, p = .11\). The only problem
solving variable to which depression was related when group, IQ and education were included in the analyses was positive problem orientation \[F(1,26) = 5.07, p = .03\].

**Autobiographical Memory and Social Problem Solving (SPSI-R)**

To assess whether memory specificity accounted for problem solving ability over and above group differences, memory specificity was added as a covariate to each of the ANCOVA’s reported above. One control participant was removed from this section of the analyses as a significant outlier, with a memory specificity score over 3 standard deviations from the group mean. Results indicate that memory specificity was not significantly related to any of the SPSI-R variables, including: global problem solving ability \[F(1,53) = .25, p = .62\], positive problem orientation \[F(1,53) = .43, p = .51\], negative problem orientation \[F(1,53) = .10, p = .76\], rational problem solving \[F(1,53) = .48, p = .49\], problem definition and formulation \[F(1,53) = .02, p = .88\], generation of alternative solutions \[F(1,53) = .34, p = .37\], decision making \[F(1,53) < .01, p = .98\], solution implementation and verification \[F(1,53) = 1.74, p = .19\], impulsivity / carelessness \[F(1,53) = .05, p = .83\], or avoidance \[F(1,53) = .78, p = .38\].

Furthermore, when Pearson product-moment correlations were conducted between memory specificity score and each of the problem solving indices for each of the groups individually, none of the correlations reached significance (see Table 4.2). Due to the small number of participants in the BPD depressed group, the two borderline groups were combined to increase power and these correlations repeated. All correlations remained non-significant.
### Table 4.2 Pearson’s Correlation Coefficients for SPSI-R and Memory Specificity

<table>
<thead>
<tr>
<th></th>
<th>BPD + MDD (N=22)</th>
<th>BPD – MDD (N=9)</th>
<th>Controls (N=29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Problem Solving</td>
<td>.02</td>
<td>.28</td>
<td>.05</td>
</tr>
<tr>
<td>Positive Problem Orientation</td>
<td>-.20</td>
<td>-.02</td>
<td>.24</td>
</tr>
<tr>
<td>Negative Problem Orientation</td>
<td>.25</td>
<td>-.45</td>
<td>-.03</td>
</tr>
<tr>
<td>Rational Problem Solving Score</td>
<td>.16</td>
<td>-.14</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Problem Definition &amp; Formulation</td>
<td>.05</td>
<td>.06</td>
<td>-.07</td>
</tr>
<tr>
<td>Generation of Alternative Solutions</td>
<td>.28</td>
<td>.07</td>
<td>-.14</td>
</tr>
<tr>
<td>Decision Making</td>
<td>.08</td>
<td>.19</td>
<td>.06</td>
</tr>
<tr>
<td>Solution Implementation &amp; Verification</td>
<td>.16</td>
<td>.92</td>
<td>.13</td>
</tr>
<tr>
<td>Impulsivity / Carelessness</td>
<td>-.13</td>
<td>.21</td>
<td>.05</td>
</tr>
<tr>
<td>Avoidance</td>
<td>-.14</td>
<td>.29</td>
<td>-.03</td>
</tr>
</tbody>
</table>

* p < .05   ** p < .01   *** p < .001

The relationship between autobiographical and problem solving on the SPSI-R was also explored for the remaining AMT indices, namely: categoric memories, extended memories and omissions. Analyses for these variables were conducted using generalised linear models based on the Poisson distribution as categoric, extended and omission data were non-normally distributed. IQ and education were entered as covariates in all analyses. Results indicate that categoric memory was unrelated to all SPSI-R problem solving indices over and above group, IQ and education [total SPSI-R \( \chi^2(1) = .81, p = .37 \)], positive problem orientation \( \chi^2(1) = .16, p = .69 \), negative problem orientation \( \chi^2(1) = 2.09, p = .13 \).
Chapter 4: Memory Specificity and Problem Solving

.15], rational problem solving [$\chi^2(1) = .27, p = .61$], problem definition and formulation [$\chi^2(1) = .03, p = .87$], generation of alternative solutions [$\chi^2(1) = 1.45, p = .23$], decision making [$\chi^2(1) = .12, p = .73$], solution implementation and verification [$\chi^2(1) = .12, p = .73$], impulsivity / carelessness [$\chi^2(1) = 1.47, p = .23$], or avoidance [$\chi^2(1) = 2.09, p = .15$]. Furthermore, when Kendall’s Tau correlations were conducted between categoric memory score and each of the problem solving indices for each of the groups individually, none of the correlations reached significance ($p$’s all $>.16$).

Extended memory was also unrelated to SPSI-R problem solving indices over and above group, IQ and education [total SPSI-R [$\chi^2(1) = 1.01, p = .32$], positive problem orientation [$\chi^2(1) = 0.61, p = .43$], rational problem solving [$\chi^2(1) = .76, p = .38$], problem definition and formulation [$\chi^2(1) = .70, p = .40$], generation of alternative solutions [$\chi^2(1) = .02, p = .88$], decision making [$\chi^2(1) = .04, p = .84$], solution implementation and verification [$\chi^2(1) = .41, p = .52$], impulsivity / carelessness [$\chi^2(1) = .18, p = .67$], or avoidance [$\chi^2(1) = 2.26, p = .13$]. The only exception to this was negative problem orientation, which was found to be related to number of extended memories over and above group, IQ and education [$\chi^2(1) = 5.74, p = .02$]. When Kendall’s Tau correlations were conducted between extended memory score and each of the problem solving indices for each of the groups individually, none of the correlations reached significance ($p$’s all $>.07$).

However, results indicated that number of omissions on the AMT was significantly related to: total SPSI-R [$\chi^2(1) = 4.90, p = .03$], rational problem solving [$\chi^2(1) = 6.32, p = .02$], solution implementation and verification [$\chi^2(1) = 6.20, p = .01$], and avoidance [$\chi^2(1) = 5.50, p = .02$] over and above group, IQ and education. The direction of the results
indicated that high levels of omissions were associated with poorer total problem solving, less rational problem solving, and less solution implementation and verification, and greater levels of avoidance. When BDI score was added as a covariate, number of omissions remained a significant predictor of total SPSI-R $[\chi^2(1) = 10.84, < .01]$, rational problem solving $[\chi^2(1) = 8.16, p < .01]$, and solution implementation and verification $[\chi^2(1) = 13.94, p < .01]$ but was no longer related to avoidance $[\chi^2(1) = 3.09, p = .08]$. Omissions were unrelated to the remaining SPSI-R variables [positive problem orientation $[\chi^2(1) = 0.93, p = .34]$, negative problem orientation $[\chi^2(1) = 0.16, p = .69]$, problem definition and formulation $[\chi^2(1) = 0.37, p = .54]$, generation of alternative solutions $[\chi^2(1) = 1.30, p = .25]$, decision making $[\chi^2(1) = 0.81, p = .37]$, or impulsivity / carelessness $[\chi^2(1) = 0.68, p = .41]$. 

**Means-ends Problem Solving in Borderline Personality Disorder**

**Table 4.3 Means and Standard Deviations for MEPS Categories**

<table>
<thead>
<tr>
<th>BPD + MDD N=22</th>
<th>BPD – MDD N= 9</th>
<th>Controls N= 29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Active means</td>
<td>2.77 (2.29)</td>
<td>4.00 (1.67)</td>
</tr>
<tr>
<td>Passive means</td>
<td>1.95 (1.86)</td>
<td>2.44 (3.21)</td>
</tr>
<tr>
<td>Self Regulation means</td>
<td>1.77 (2.16)</td>
<td>1.44 (1.59)</td>
</tr>
<tr>
<td>Introspective means</td>
<td>1.32 (1.46)</td>
<td>.67 (1.00)</td>
</tr>
<tr>
<td>Inappropriate means</td>
<td>1.36 (1.43)</td>
<td>.44 (.73)</td>
</tr>
<tr>
<td>Irrelevant means</td>
<td>2.05 (2.03)</td>
<td>.89 (.93)</td>
</tr>
<tr>
<td>Total means</td>
<td>11.23 (5.92)</td>
<td>9.89 (3.76)</td>
</tr>
</tbody>
</table>
Means and standard deviations for each of the groups on the various MEPS indices are presented in Table 4.3. Preliminary exploration of the data indicated that scores on the MEPS were not normally distributed. Various transformations were applied (including natural logarithm, square root and inverse) but the data continued to depart significantly from normality due to the large proportion of zero scores in particular categories. Therefore data were analysed using several generalised linear models based on the Poisson probability distribution with log link function, with each of the MEPS categories as dependent variables. Education was entered as a covariate for passive means, self-regulation means, introspective means, irrelevant means and total means, while IQ was entered as a covariate for active means. Estimated marginal means for groups, after controlling for IQ and education where relevant, are presented in Table 4.4.

**Table 4.4 Estimated Marginal Means and Standard Errors for MEPS Categories**

<table>
<thead>
<tr>
<th></th>
<th>BPD + MDD (N=22)</th>
<th>BPD – MDD (N=9)</th>
<th>Controls (N=29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active means</td>
<td>2.82 (.36)</td>
<td>4.43 (.77)</td>
<td>5.26 (.45)</td>
</tr>
<tr>
<td>Passive means</td>
<td>2.22 (.35)</td>
<td>2.55 (.55)</td>
<td>2.14 (.29)</td>
</tr>
<tr>
<td>Self Regulation means</td>
<td>1.87 (.31)</td>
<td>1.47 (.41)</td>
<td>2.67 (.33)</td>
</tr>
<tr>
<td>Introspective means</td>
<td>1.38 (.27)</td>
<td>.68 (.28)</td>
<td>2.50 (.32)</td>
</tr>
<tr>
<td>Inappropriate means</td>
<td>1.36 (.25)</td>
<td>.44 (.22)</td>
<td>.21 (.08)</td>
</tr>
<tr>
<td>Irrelevant means</td>
<td>2.38 (.36)</td>
<td>.93 (.33)</td>
<td>1.00 (.19)</td>
</tr>
<tr>
<td>Total Means</td>
<td>12.19 (.80)</td>
<td>10.19 (1.08)</td>
<td>13.65 (.74)</td>
</tr>
</tbody>
</table>
Results indicated a significant main effect of group on number of active means according to the MEPS [$\chi^2 (2) = 15.37, p < .01$]. Simple effects analysis indicated that the borderline depressed group produced significantly less active means than controls [$\chi^2 (1) = 16.51, p < .001$], and less active means than borderline non-depressed participants, although this result did not reach significance [$\chi^2 (1) = 3.63, p = .06$]. There was no difference between borderline non-depressed and controls in number of active means produced [$\chi^2 (1) = .63, p = .43$]. These results are depicted in Figure 4.9.

![Figure 4.9 Estimated Marginal Means and Standard Errors for Active Means](image)

There were no significant differences between the participant groups in terms of the number of passive means [$\chi^2 (2) = .49, p = .78$] or self-regulation means [$\chi^2 (2) = .496, p = .08$] produced on the MEPS, although the latter approached significance.
Results also indicated a significant main effect of group on number of introspective means \[ \chi^2 (2) = 12.50, p < .01 \]. Simple effects analysis indicated that both the borderline depressed \[ \chi^2 (1) = 6.36, p = .01 \] and borderline non-depressed \[ \chi^2 (1) = 17.88, p < .01 \] groups produced significantly less introspective means than controls. The borderline groups did not differ significantly from one another on this variable \[ \chi^2 (1) = 3.37, p = .07 \], although there was a trend for borderline depressed participants to produce more introspective means that borderline non-depressed participants. These results are depicted in Figure 4.10.

![Figure 4.10 Estimated Marginal Means and Standard Errors for Introspective Means](image)

Significant group differences were also observed for number of inappropriate means \[ \chi^2 (2) = 20.12, p < .01 \]. Follow-up simple effects analysis indicated that borderline depressed participants produced significantly more inappropriate means than both controls \[ \chi^2 (1) = 19.36, p < .01 \], and borderline non-depressed participants \[ \chi^2 (1) = 7.59, p < .01 \]. There was
no difference between borderline non-depressed and controls in number of inappropriate means $[\chi^2 (1) = 1.00, p = .32]$. These results are depicted in Figure 4.11.

![Figure 4.11 Estimated Marginal Means and Standard Errors for Inappropriate Means](image)

In terms of number of irrelevant means, results indicated a significant main effect of group $[\chi^2 (2) = 14.59, p = .01]$. Follow-up simple effects analysis indicates that Borderline depressed participants produced significantly more irrelevant means than controls $[\chi^2 (1) = 10.83, p = .01]$ and Borderline non-depressed participants $[\chi^2 (1) = 8.81, p < .01]$. There was no difference between Borderline non-depressed and controls $[\chi^2 (1) = .03, p = .86]$. These results are depicted in Figure 4.12.
There was also a significant main effect of group on total number of means produced on the MEPS \[ \chi^2 (2) = 6.09, p < .05 \]. Simple effects analysis indicated that Borderline non-depressed participants produced significantly less means than controls \[ \chi^2 (1) = 6.78, p < .01 \]. There was no difference between the total number of means produced by borderline depressed and controls \[ \chi^2 (1) = 1.59, p = .21 \] or between the two borderline groups \[ \chi^2 (1) = 2.22, p = .14 \]. These results are depicted in Figure 4.13.

**Figure 4.12** Estimated Marginal Means and Standard Errors for Irrelevant Means
Data regarding the effectiveness of solutions produced on the MEPS was found to be normally distributed and was therefore analysed using an analysis of variance (ANOVA) with effectiveness score as the dependent variable and group membership as the independent variable. Results indicate that groups were significantly different in the effectiveness of the solutions they produced ($F(2,57) = 13.86$, $p < .01$). Post Hoc analysis of this result using Hochberg’s GT2 test indicated that the Borderline depressed group produced significantly less effective means than controls ($p < .01$). The Borderline non-depressed group also produced less effective means although this did no reach significance ($p = .06$). The two Borderline groups did not differ significantly from one another in terms of effectiveness ($p = .49$). These results are depicted in Figure 4.14.

**Figure 4.13** Estimated Marginal Means and Standard Errors for Total Means
Analysis was also conducted to determine whether the number and effectiveness of the means produced on the MEPS varied depending on the particular type of problem solving scenario being presented (interpersonal versus emotional). Analysis regarding number of means involved several generalized estimating equations (generalized linear models for repeated measures) based on the Poisson distribution, with group as the between subjects factor, and scenario type as the within subjects factor. Results indicated significant differences according to scenario type, with the emotional scenarios resulting in significantly more: self-regulation [$\chi^2 (1) = 30.95, p < .01$], introspective [$\chi^2 (1) = 9.92, p < .01$], and inappropriate means [$\chi^2 (1) = 5.24, p < .01$], and less active [$\chi^2 (1) = 37.89, p < .01$], passive [$\chi^2 (1) = 5.89, p = .02$], irrelevant [$\chi^2 (2) = 5.52, p = .02$], and total means [$\chi^2 (1) = 5.19, p = .02$], compared with the interpersonal scenarios. None of the interactions between group and cue type reached significance except for number of self-regulation means [$\chi^2 (2) = 10.13, p < .01$]. Follow up simple effects analysis of this effect was
conducted using generalized estimating equations assessing each scenario type individually. As shown in Figure 4.15, the three participant groups differed significantly in the number of self regulation means produced on the interpersonal scenarios \[ \chi^2 (2) = 13.99, p < .01 \], with controls producing more self regulation means than both the Borderline depressed \( p < .01 \) and Borderline non-depressed groups \( p < .01 \). There was no difference between the groups in the number of self regulation means produced on the emotion based scenarios \[ \chi^2 (2) = 1.48, p = .48 \].

![Figure 4.15 Self Regulation Means According to Scenario Type](image)

Figure 4.15 Self Regulation Means According to Scenario Type

Analysis regarding the effectiveness of the means produced according to scenario type was conducted using a mixed ANOVA, with group as the between subjects factor, and scenario type as the within subjects factor. Results indicated that the effectiveness of responses differed according to scenario \( F (1.57) = 9.93, p < .01 \), with the interpersonal scenarios producing significantly more effective responses than the emotion based scenarios. The
interaction between scenario type and group was non-significant (F (2,57) = .22, p=.80).

These results are shown in Figure 4.16.

![Figure 4.16](image)

**Figure 4.16** Means and Standard Errors for Effectiveness Ratings

**Autobiographical Memory and MEPS**

To assess whether problem-solving ability as assessed by the MEPS was related to autobiographical memory specificity, specificity score was added as a predictor variable to each of the generalised linear models reported above. Results indicated that memory specificity approached significance as a predictor of active means over and above diagnostic group and IQ [χ² (1) = 3.16, p = .08]. As IQ was not found to be a significant predictor within the current model [χ² (1) = 1.32, p = .25], it was removed from the model to improve parsimony and the analysis repeated. Results indicated that memory specificity was a significant predictor of active means over and above diagnostic group [χ² (1) = 5.44, p = .02]. The direction of the results indicated a positive relationship between memory
specificity and number of active means, such that high levels of specificity were associated with the production of more active means. These results are illustrated in the line-graph below (Figure 4.17), which depicts the relationship between memory specificity and number of active means as predicted by the regression equation if IQ is held at a constant. An IQ of 100 was chosen as the constant value, being the average level of IQ.

![Figure 4.17 Change in Number of Active Means According to Specificity](image)

Given that most of the problem solving deficits observed in this study were exhibited by the Borderline depressed sample, BDI score was also added as a covariate to the above analysis to determine whether depression accounted for the observed relationship between specificity and number of active means. Results indicated that BDI score was not related to number of active means over and above diagnostic group and IQ \( \chi^2 (1) = .12, p = .73 \), and specificity remained a significant predictor of active means after controlling for diagnostic group, IQ and BDI severity \( \chi^2 (1) = 4.60, p = .03 \).
Results also indicated that memory specificity was a unique predictor of irrelevant means over and above diagnostic group and education level \( \chi^2 (1) = 4.08, p = .04 \). The relationship between these variables was negative, such that greater specificity was associated with the production of less irrelevant means. Figure 4.19 depicts the relationship between memory specificity and number of irrelevant means as predicted by the regression equation if years of education were held at a constant. Thirteen years of education was chosen as the constant value being the number of years of education required to complete secondary school. However, again it should be noted that when BDI score was added to this analysis, number of specific memories was no longer a significant predictor of number of irrelevant means \( \chi^2 (1) = .86, p = .35 \), indicating that the association between autobiographical recall and irrelevant means is accounted for by depressive symptoms.

![Figure 4.18 Change in Number of Irrelevant Means According to Specificity](image)
Memory specificity was unrelated to the remaining MEPS indices, including: number of total means over and above education [$\chi^2 (1) = 1.44, p = .23$], number of inappropriate means [$\chi^2 (1) = .01, p = .92$], number of passive means over and above education [$\chi^2 (1) = .134, p = .23$], number of self-regulation means over and above education [$\chi^2 (1) = .13, p = .72$], and number of introspective means over and above education [$\chi^2 (1) = .80, p = .37$].

Removing education from the models in which it did not reach significance (self-regulations means and introspective means) did not alter the results notably ($p = .49$ and $p = .29$ respectively).

Given that generalized linear modeling is a distribution free form of analysis, the analysis detailed above was conducted on raw data with all data points included. However, due to the fact that previous analysis had identified a significant outlier in the data (one control participant displaying a memory specificity score greater than 3 S.D.’s from the mean) which exerted a strong influence on results, analysis for number of specific memories was repeated with the outlier removed to determine if this particular participant was exerting undue influence in the current results. In regards to number of irrelevant means, results indicated that removing the outlier caused a slight increase in the absolute value of the regression coefficient ($\beta$ change = .03), and memory specificity remained a significant predictor of irrelevant means over and above diagnostic group and education level [$\chi^2 (1) = 6.27, p = .01$]. In regards to active means, removing the outlier also caused an increase in the absolute value of the regression coefficient ($\beta$ change = .02), and memory specificity became highly predictive of active means over and above diagnostic group [$\chi^2 (1) = 7.38, p < .01$]. The relationship between memory specificity and: passive means [$\chi^2 (1) = .39, p = .84$], self-regulation means [$\chi^2 (1) < .01, p = .94$], introspective means [$\chi^2 (1) = 2.30, p = .19$].
Chapter 4: Memory Specificity and Problem Solving

.13, inappropriate means $\chi^2 (1) = .04, p = .84$ and total means $\chi^2 (1) = 1.15, p = .28$, remained non-significant. These results indicate that the general trend for memory specificity to be related to active means and irrelevant means over and above diagnostic group was largely unaffected by the influence of the outlier.

The relationship between MEPS effectiveness and autobiographical memory specificity was assessed using a regression analysis with effectiveness score as the outcome variable and predictors entered in three steps - dummy coded diagnostic group variables in first step, specificity in the second step, and the interaction between group and specificity in the third step. Results indicate that memory specificity made a significant contribution to the prediction of effectiveness over and above group membership ($R^2_{change} = 0.8, F (1,55) = 7.03, p = .01$), though the interaction between group and specificity was not significantly associated with effectiveness scores ($R^2_{change} = 0.2, F (2,53) = .80, p = .46$). The direction of the result indicated that as specificity increased, effectiveness also increased. This result is pictured in Figure 4.19.
Analysis was also conducted to determine whether any of the remaining AMT indices, namely categoric, extended memories and omissions, were related to problem solving on the MEPS. Analyses were conducted using several generalised linear models based on the Poisson distribution with log link function, as these memory variables were non-normally distributed.

Results indicated that neither categoric memories $[\chi^2 (1) = 1.08, p = .30]$, nor omissions $[\chi^2 (1) = .52, p = .47]$ were significant predictors of active means over and above IQ. However, number of extended memories was a significant predictor of active means over and above IQ $[\chi^2 (1) = 5.99, p = .01]$. The direction of the results indicated a negative relationship between extended memory and number of active means, such that high levels of extended memories were associated with the production of less active means. These results are
illustrated in the line-graph below (Figure 4.18), which depicts the relationship between extended memory and number of active means as predicted by the regression equation if IQ is held at a constant of 100. However, when BDI score was added as a covariate to the above analysis, extended memory was no longer a significant predictor of active means $\chi^2 (1) = .98, p = .32$, suggesting that the association between extended memories and number of active means can be accounted for by depressive symptoms.

Figure 4.20 Change in Number of Active Means According to Extended recall

Neither extended memories $\chi^2 (1) = .40, p = .53$, nor number of omissions $\chi^2 (1) = .45, p = .51$ were significant predictors of irrelevant means over and above IQ. However, number of categoric memories was found to be a significant predictor of irrelevant means over and above years of education $\chi^2 (1) = 9.48, p < .01$. The direction of the results indicated a positive relationship between categoric memory and number of irrelevant means, such that high levels of categoric memories were associated with the production of
more irrelevant means. These results are illustrated in the line-graph below (Figure 4.20), which depicts the relationship between categoric memory and number of irrelevant means as predicted by the regression equation if years of education is held at a constant of 13. Again, however, when BDI score was added as a covariate, categoric recall was no longer a significant predictor of number of irrelevant means \( \chi^2 (1) = .07, p = .80 \).

![Figure 4.20](image)

**Figure 4.20** Change in Number of Irrelevant Means According to Categoric Memory

Autobiographical memory was unrelated to number of total means over and above education according to analysis pertaining to categoric memories \( \chi^2 (1) < .01, p = .99 \), and omissions \( \chi^2 (1) < .01, p = .97 \). However, extended memories were significantly related to total means over and above education \( \chi^2 (1) = 6.42, p = .01 \). The direction of the result was negative, such that higher levels of extended memories was associated with a lower number of total means on the MEPS. These results are illustrated in the line-graph below (Figure 4.21), which depicts the relationship between extended memory and number of...
total means as predicted by the regression equation if years of education is held at a constant of 13. Again depressive symptoms appeared to account for the relationship between extended recall and total means as when BDI score as added as a covariate, extended memory was no longer a significant predictor \( \chi^2 (1) = .69, p = .41 \).

![Figure 4.22 Change in Number of Total Means According to Extended Memories](image)

Autobiographical memory was unrelated to number of inappropriate means (categoric memories \( \chi^2 (1) = 1.58, p = .21 \), and extended memories \( \chi^2 (1) = 1.10, p = .30 \)) but was significant in relation to number of omissions on the AMT \( \chi^2 (1) = 4.30, p = .04 \).

Autobiographical memory was also unrelated to number of passive means over and above education (categoric memories \( \chi^2 (1) = 0.58, p = .45 \), extended memories \( \chi^2 (1) = 1.76, p = .18 \), and omissions \( \chi^2 (1) < .01, p = .98 \)); number of self-regulation means over and above education (categoric memories \( \chi^2 (1) = .02, p = .88 \), extended memories \( \chi^2 (1) = .03, p = .85 \).
The relationship between MEPS effectiveness and autobiographical memory was also explored for categoric, extended and omission data on the AMT, using generalised linear model analyses. Diagnostic group, AMT indices, and the interaction term were entered for each model. Results indicate that neither categoric memory \( \chi^2 (1) = 3.57, p = .06 \), nor the interaction between categoric memory and group \( \chi^2 (2) = 0.94, p = .63 \) were significantly related to effectiveness score on the MEPS. Similarly, extended memory \( \chi^2 (1) = 1.57, p = .21 \), and the interaction between extended memory and group \( \chi^2 (2) = 0.01, p = .99 \), were unrelated to problem solving effectiveness. Lastly, number of omissions \( \chi^2 (1) = 1.98, p = .16 \), and the interaction between omissions and group \( \chi^2 (2) = 5.61, p = .06 \), were unrelated to MEPS effectiveness.

**Problem Solving as a Mediator Between Autobiographical Specificity and Self-Harm**

The results above have established that autobiographical memory specificity is associated with problem solving ability as assessed by the MEPS active means, irrelevant means and effectiveness scores. Past theorists has speculated that this association between reduced autobiographical specificity and poor problem solving ability may account for the relationship between autobiographical memory and deliberate self-harm observed in past research (J. M. G. Williams et al., 2005). More specifically, they suggest that reduced autobiographical memory specificity results in poor problem solving, which increases hopelessness and therefore increases the likelihood that the individual will results to
strategies such as self-harm in the face of difficulties (J. M. G. Williams et al., 2005). This model is depicted in Figure 4.20. Given that the present study has confirmed the relationship between autobiographical specificity and problem solving in this population (path $a$ in model), further analysis was conducted to test this model in individuals with Borderline Personality Disorder.

![Figure 4.23 Model of Relationship Between Autobiographical Memory, Problem Solving, Hopelessness, and Deliberate Self-harm.](image)

The first step in this analysis was to determine whether the expected relationship between hopelessness and deliberate self-harm was observed in this sample (path $b$ in model). Because hopelessness and self-harm data were significantly skewed (hopelessness scores negatively skewed while self-harm data positively skewed) analysis was conducted using generalized linear models based on the Poisson distribution with log link function. Results indicated that hopelessness was significantly related to number of episodes of self-harm [$\chi^2 (1) = 47.64, p < .01$], including both deliberate self-harm without suicidal intent [$\chi^2 (1) = 119.53, p < .01$], and ambivalent self-harm [$\chi^2 (1) = 47.70, p < .01$], but not number of suicide attempts [$\chi^2 (1) = .94, p = .33$]. However, investigation of the fit of the Poisson model to this data, indicated a significant degree of overdispersion as demonstrated by
results from a likelihood ratio test comparing the Poisson and Negative Binomial distributions. The Negative Binomial distribution was found to be a better fit for the data and the above generalized linear models were therefore repeated with analysis based on the Negative Binomial distribution. Results indicated that hopelessness score was significantly related to number of episodes deliberate self-harm without suicidal intent \( \chi^2 (1) = 4.21, p = .04 \), but unrelated to total self-harm \( \chi^2 (1) = 1.30, p = .25 \), suicide attempts \( \chi^2 (1) = .13, p = .72 \), and ambivalent self-harm \( \chi^2 (1) = 2.16, p = .14 \).

Next, analysis was conducted to determine whether autobiographical memory specificity was related to hopelessness within this population (path \( c \) in model). Analysis was conducted using a generalized linear model based on the Poisson distribution with log link function. Results indicated that autobiographical memory specificity was significantly related to hopelessness as assessed by the Beck Hopelessness Scale \( \chi^2 (1) = 11.32, p < .01 \). This result was confirmed by a significant Kendall’s correlation between hopelessness and specificity (\( \tau = .30, p = .03 \)).

Thirdly, analysis was conducted to determine whether any of the problem solving variables which had been previously found to be related to autobiographical memory specificity (that is MEPS active means, irrelevant means, and effectiveness scores) were related to degree of hopelessness (path \( d \) in model). Results indicated that neither number of active means \( \chi^2 (1) = .03, p = .87 \), nor effectiveness scores \( \chi^2 (1) = .89, p = .35 \) were related to hopelessness within the Borderline sample. Number of irrelevant means approached significance in its relationship to hopelessness \( \chi^2 (1) = 3.20, p = .07 \).
Of interest, investigation of the remaining MEPS subscales indicated that both passive $[\chi^2 (1) = 11.50, p < .01]$ and inappropriate means $[\chi^2 (1) = 3.81, p = .05]$ were significantly related to hopelessness, though introspective $[\chi^2 (1) < .01, p = .99]$, self regulation means $[\chi^2 (1) = 1.60, p = .21]$, and total number of means $[\chi^2 (1) = 1.09, p = .30]$ were not. In addition, SPSI-R total score $[r = -.42, p = .02]$, positive problem orientation $[r = .58, p = .001]$, and negative problem orientation $[r = .45, p = .01]$, were also related to hopelessness, although none of the rational problem solving skills, or impulsivity / carelessness, or avoidance were related to hopelessness ($p’s > .25$). However, none of these problem solving measures were related to memory specificity and are therefore spurious to the model currently being tested.

Lastly, analysis was conducted to determine if number of irrelevant means mediated the relationship between memory specificity and hopelessness. Number of irrelevant means and specificity score were both entered as predictor variables in a generalized linear model with hopelessness as the outcome. Results indicated that memory specificity was a significant predictor of hopelessness over and above its impact on number of irrelevant means $[\chi^2 (1) = 11.46, p < .01]$. The relationship between irrelevant means and hopelessness did not change notably with the inclusion of specificity score $[\chi^2 (1) = 3.34, p = .07]$. This suggests that the relationship between memory specificity and hopelessness is not accounted for by problem solving as assessed by number of irrelevant means on the MEPS.
Discussion

Overgeneral autobiographical memory has been consistently found to be associated with problem solving deficits in a number of clinical populations, including: clinically depressed individuals, suicide attempters, bipolar patients, and non-clinically depressed students (Goddard et al., 1996, 1997; Pollock & Williams, 2001; Scott et al., 2000; Sidley et al., 1997). However, the only study which has explored the relationship between problem solving ability and autobiographical memory in individuals with Borderline Personality Disorder found that the problem solving deficits of Borderline individuals were unrelated to specificity of autobiographical recall (Kremers, Spinhoven, Van der Does, & Van Dyck, 2006). The aim of the present study is to clarify and extend research regarding the relationship between memory specificity and problem solving ability in individuals with Borderline Personality Disorder.

Problem Solving in Borderline Personality Disorder

In general, the results of this study indicate that individuals with Borderline Personality Disorder display impoverished problem solving ability relative to controls, on both performance based and self-report measures of problem solving. Moreover, the problem solving deficits of these individuals appear to extend to all components of the problem solving process, from poor problem orientation, to maladaptive problem solving styles and ineffective problem solving skills. It should be pointed out, however, that without a clinical control group it is impossible to determine whether these deficits are specific to a diagnosis of Borderline Personality Disorder per se or are common to individuals with psychiatric disorders in general.
Firstly, the Borderline individuals in this study self reported higher levels of negative problem orientation compared with controls. This indicates that Borderline individuals have a tendency to view problems as a threat, to doubt their ability to solve problems successfully, and to become easily frustrated and upset when problems arise (Thomas. J. D'Zurilla et al., 2004). Borderline individuals with comorbid depression also reported lower levels of positive problem orientation compared to controls. This suggests that clinical depression compounds the problem solving deficits of Borderline individuals and decreases the likelihood that individuals with BPD will see problems as solvable with time, effort, and commitment, or believe in their own personal ability to solve problems successfully (Thomas. J. D'Zurilla et al., 2004). These findings are consistent with past research which indicates that Borderline individuals have significantly greater negative problem orientation and lower positive problem orientation on the SPSI-R compared with controls (Berk et al., 2007; Bray et al., 2007; Douglass, 2000). Indeed, research has shown that Borderline individuals tend to perceive themselves as ineffective problem solvers, express less confidence in their problem solving abilities, and have little sense of personal control in problem solving tasks (Douglass, 2000; Percy & Cooper, 1985; Yen et al., 2002). Results also indicate that both positive and negative problem orientation were associated with self-reported depression, however, only positive problem orientation was related to depression over and above diagnostic group. The results of the present study provide further evidence that poor problem orientation is a major component of the problem solving difficulties displayed by individuals with Borderline Personality Disorder. This finding has important clinical implications as research indicates that perception of one’s ability to solve problems is more important in relation to depression and stress than actual problem solving ability (Schur, 1999).
Secondly, Borderline individuals rated themselves as less likely to approach problems using a rational problem solving style compared with controls. Rational problem solving is characterised by the deliberate, systematic, and effective application of problem-solving skills, including the ability to clearly define and formulate the problem, generate alternative solutions, make decisions, and monitor the implementation of the chosen solution (Thomas, J. D'Zurilla et al., 2004). According to the results of the present study, Borderline individuals, both with and without comorbid depression, rated themselves as significantly poorer than controls on all of these component skills. The only exception to this was the ability to generate alternatives, where the Borderline non-depressed group did not differ significantly from controls, although the relationship approached significance. This finding suggests that the deficits of Borderline individuals extend to all aspects of the problem solving process, from the ability to define problem situations, through to brainstorming solutions and decision making. This finding is supported by past research utilising the SPSI-R in Borderline individuals (Bray et al., 2007; Douglass, 2000).

Thirdly, the Borderline individuals in this study reported higher levels of avoidance, impulsivity, and carelessness in their problem solving. This suggests that when a problem arises, the borderline’s response is likely to involve inaction, procrastination, passivity or dependency (Thomas, J. D'Zurilla et al., 2004). Further, when they do make an attempt at problem solving, this is likely to involve the application of problem solving strategies in a way which is narrow, impulsive, careless, hurried and incomplete (Thomas, J. D'Zurilla et al., 2004). They are likely to consider only a limited number of solution alternatives, to act on the first idea that comes to mind, and to evaluate and monitor alternatives and consequences in a haphazard way (T. J. D'Zurilla, Nezu, & Maydeu, 2002). Past research
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has clearly documented the avoidance tendencies of Borderline individuals (e.g. Berk et al., 2007; Bijttebier & Vertommen, 1999; Bray et al., 2007; Douglass, 2000; Kruegelbach et al., 1993), as well as increased impulsivity and carelessness in problem solving within this population (Berk et al., 2007; Bray et al., 2007; Douglass, 2000).

In addition to self-reported differences in problem solving ability as assessed by the SPSI-R, the results of the present study also indicated significant differences between Borderline and control participants on the Means-Ends Problem Solving measure, which is a performance based measure of problem solving ability. Individuals with Borderline Personality Disorder produced problem solving responses which were significantly less effective than those produced by controls. That is, they had difficulties identifying problem solving means which would maximize positive short and long term consequences, whilst taking into account both the personal and social ramifications of their actions. In addition, when solving problems, the Borderline individuals produced less active means, less introspective means, and more inappropriate and irrelevant means compared with controls. The Borderline individuals were less likely to report thinking about how to solve the problem prior to action (introspection), used less self-directed means to try to resolve the problem (active means), and were more likely to report using problem solving actions that were either not relevant to solving the problem at hand (irrelevant means), or were maladaptive or destructive to self or others, such as self-harm, suicide, substance or alcohol use, binge eating, self punishment, lying, and aggression or violence against others (inappropriate means).
However, these problem solving tendencies appeared to be partly accounted for by comorbid clinical depression within this population, as results indicated that the Borderline depressed participants differed significantly from controls and Borderline non-depressed participants in number of active, inappropriate and irrelevant means, while the Borderline non-depressed participants and controls did not differ from one another on these measures. The only exception to this pattern of increased problem solving deficits in Borderline depressed individuals relative to the other groups was number of introspective means, with the Borderline depressed and Borderline non-depressed participants demonstrating equally low levels of introspection. The Borderline depressed participants also produced the least effective problem solving means, although there was a non-significant trend for the Borderline non-depressed group to also produce less effective means relative to controls.

The finding that Borderline Personality Disorder is associated with impoverished problem solving according to the MEPS is consistent with past research which indicates that Borderline individuals produce fewer active and introspective means on this measure compared with controls (Kremers, 2004c). However, as this previous study did not control for comorbid depression, it is unclear whether the problem solving deficits observed in this population can be accounted for by Borderline Personality Disorder per se or by symptoms of depression. The results of the present study suggest that the impoverished problem solving seen in Borderline Personality Disorder may not be a trait feature of BPD independent of mood state. Rather, poor problem solving may be the result of a depressive mood state which occurs in a majority of individuals meeting the diagnosis for BPD (Bateman & Fonagy, 1999; Linehan et al., 1993; Linehan & Koerner, 1993). Consistent with this suggestion, past research has clearly demonstrated an association between clinical
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depression and impoverished problem solving as measured by the MEPS (Goddard et al., 1996, 1997; Marx et al., 1992; Nezu, Wilkins, & Nezu, 2004). It is generally thought that depressed individuals display social problem solving deficits because the ruminative processes which occur in depression impair the problem solving process (Raes, Hermans, Williams, Demyttenaere et al., 2005). It may be that a similar process is at play in the Borderline population, with comorbid depression resulting in rumination, which in turn impairs problem solving ability. However, because a clinically depressed comparison group was not included in this study, it is impossible to tell if the problem solving deficits displayed by the Borderline depressed group are comparable to those demonstrated by depressed individuals, or whether the combination of Borderline symptomatology and depression results in a different problem solving profile than that observed in clinical depression alone. Further research is needed to determine whether individuals with BPD display problem solving deficits of similar magnitude to those observed in clinically depressed individuals, and to determine if rumination plays a central role in the relationship between depression and problem solving deficits in BPD.

Interestingly, the results of this study also indicate that there was no difference between Borderline participants and controls in terms of the number of passive means produced on the MEPS. This indicates that Borderline individuals are no more likely than controls to rely on others to solve their problems. This finding contrasts directly with Linehan’s theoretical account of Borderline Personality Disorder which identifies passive problem solving as a key feature of the Borderline individual’s presentation (Linehan, 1993a). According to Linehan, Borderline individuals have a tendency to approach problems passively and helplessly, and to demand solutions to life’s problems from the environment
and others around them (Linehan, 1993a). The label “active passivity” has been used to refer to the Borderline’s tendency to be active in trying to get others to solve problems for them, while being passive in solving problems on their own (Linehan, 1993a). The Borderline’s tendency towards passivity is thought to be the product of learned helplessness which results from the individual’s temperamental disposition and history of failed attempts at controlling negative affect and associated maladaptive behaviours (Linehan, 1993a). Despite this theoretical account of passivity in the Borderline population, empirical evidence to date has been mixed, with some studies indicating higher levels of passivity in Borderline individuals (Hochhausen, Lorenz, & Newman, 2002; Percy & Cooper, 1985), and other studies finding less passivity in this population (Kremers, 2004c). The results of the present study indicate that, contrary to expectations, Borderline individuals are not necessarily more passive in their approach to problem solving.

The problem solving responses of the Borderline individuals in this study were found to vary according to the type of problem solving scenario with which they were faced. In particular, the Borderline individuals in this study tended to respond with more self-regulation, introspective and inappropriate means in response to the emotional scenarios on the MEPS, while producing more active, passive, and irrelevant means in response to the interpersonal scenarios. Borderline individuals also produced less effective problem solving means in response to the emotion-based scenarios compared with the interpersonal scenarios. This suggests that Borderline individuals have greater difficulty addressing problems with emotion regulation than interpersonal difficulties. Past research is consistent with these findings, indicating that Borderline individuals rely on a number of maladaptive ways of coping with emotion, including: internalising, externalising and disorganised
strategies, in addition to emotional avoidance (Conklin et al., 2006). More specifically, research has found that individuals with BPD engage in more inappropriate and self-soothing responses when confronted with emotion regulation problems and greater passivity in response to interpersonal situations (Kehrer & Linehan, 1996).

The Borderline’s tendency to produce greater self-regulation means and less active means in response to emotional problem solving scenarios is as expected given that effective problem solving for emotion based problems requires the use of strategies which are predominantly identified as self regulation means. However, the emotion based problem scenarios also resulted in more introspective and inappropriate means and less passive means in the Borderline participants. This suggests that when attempting to manage aversive emotions, Borderline individuals are more likely to report thinking about or deciding to take a particular course of action, and are also more likely to engage in maladaptive or destructive means, including: self-harm, substance use, self punishment, lying, and aggression or violence against others. Moreover, when dealing with interpersonal conflict, these individuals are more likely to depend on actions taken by external parties rather than instigating problem solving strategies themselves.

The elevated levels of introspective means observed in response to the emotion based scenarios in this study appears to suggest that BPD individuals are more likely to spend time considering how to manage their emotions than they would in addressing interpersonal conflict. However, it is also possible that this difference is a function of differences in the content included in the two categories of scenarios. As this particular version of the MEPS was designed to tap into the behavioural and emotional difficulties of BPD individuals,
many of the emotion based scenarios included in this study detailed self-harm and suicide as the emotion regulation strategy being currently considered by the protagonist in the story. As a result of this, many of the problem solving responses to these scenarios involved statements such as “he/she decided that cutting was not the best option” in direct response to the content of the scenario. In contrast, the interpersonal scenarios did not identify a particular course of action that the participant needed to consider and decide upon. Thus it is likely that the increased introspection in response to the emotion based scenarios is simply an artefact of the content of the scenarios involved.

The increased levels of maladaptive means in response to the emotion-based problem scenarios, however, suggest that such behaviours are a response to negative emotions in individuals with BPD. When confronted with a problem involving the management of emotions such as rejection, stress, frustration and anger, many of the Borderline individuals recommended that the protagonist engage in self-harm, vent their aggression on others, use substances, or engage in some form of escape or avoidance. Moreover, a number of the Borderline respondents in this study spontaneously clarified their responses by stating that they themselves had found such strategies to be beneficial in their own attempts to manage their emotions. This suggests that individuals with Borderline Personality Disorder engage in maladaptive behaviours such as self-harm as a response to negative emotions. As such, these behaviours can be thought of as affect regulation strategies for individuals with this disorder. This relationship between maladaptive means and emotion regulation scenarios has also been observed in past research (Kehrer & Linehan, 1996).
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It should be noted, however, that although the control participants in this study differed from the Borderlines in the number of means they produced on the MEPS, they demonstrated the same differential pattern of problem solving responses for emotional versus interpersonal scenarios. That is, controls displayed the same tendency to respond with more self-regulation, introspective and inappropriate means in response to the emotional scenarios, while producing more active, passive, and irrelevant means in response to the interpersonal scenarios. They also produced less effective problem solving means in response to the emotional scenarios relative to the interpersonal scenarios.

This suggests that although the problem solving attempts of Borderline individuals are less effective than those of healthy controls, they rely on similar forms of problem solving in response to emotional and interpersonal problems. The only exception to this was number of self-regulation means, where a significant interaction between group and scenario type was observed. Results indicated the three groups produced a comparable number of self regulation means on the emotion regulation scenarios, but that both of the Borderline groups produced significantly less self regulation means on the interpersonal scenarios relative to controls. This finding suggests that individuals with Borderline Personality Disorder will actively seek to use strategies to regulate their internal feelings of frustration, stress and anger, but place less emphasis on managing their emotions in the context of dealing effectively with interpersonal difficulties. It may be that failing to manage the emotions which arise during interpersonal difficulties may contribute to the Borderline’s ongoing difficulties with relationships.

In summary, the results of the present study indicate that in comparison with nonclinical controls individuals with Borderline Personality Disorder perceive themselves to be less
effective problem solvers, report greater levels of impulsivity, carelessness and avoidance, and view themselves as having greater deficits across the range of problem solving skills, from difficulties defining the problem, to brainstorming solutions, decision making and monitoring solution implementation. On a performance measure of problem solving ability Borderline individuals also displayed impoverished problem solving, producing less effective means, less active and introspective means and more inappropriate and irrelevant means compared with controls. However, the difference between Borderline and control participants on the MEPS appeared to be mainly accounted for by comorbid depression, indicating that problem solving deficits in this population may not be a trait feature of Borderline Personality Disorder independent of mood state. Regardless, given the frequency with which clinical depression is observed in BPD, the results of the present study emphasise the importance of addressing problem solving deficits in the treatment of Borderline Personality Disorder.

**Autobiographical Memory and Problem Solving**

Contrary to expectations, overgeneral autobiographical memory did not appear to be related to any of the indices of problem solving ability as assessed by the SPSI-R. Results indicated that neither specific nor categoric recall were associated with self-reported problem solving orientation, problem solving skills, or problem solving style. This suggests that overgeneral memory does not influence the individual’s attitude towards problem solving, alter their perception of their own ability to effectively apply problem solving skills, or influence the extent to which they avoid problems or respond with impulsivity and carelessness in their problem solving attempts. However, number of omissions on the AMT
was associated with an avoidant style of problem solving, and with difficulties in the
application of rational problem solving skills, particularly the ability to implement and
verify solutions. This suggests that difficulty recalling memories, as compared to an
overgeneral style of recall, is associated with self-reported problem solving in Borderline
Personality Disorder.

Autobiographical memory was found to be unrelated to problem orientation as assessed by
the self-report measure of problem solving (SPSI-R). Results indicated that neither positive
nor negative problem orientation was related to autobiographical memory, as assessed by
specific, categoric, extended memories and omissions. It has been previously suggested that
overgeneral memory may be related to problem solving ability primarily though the impact
which it has on problem orientation (Goddard et al., 1996). This suggestion was based on
past research, which found that in depressed individuals, references to one’s
autobiographical memory database tended to be focused on past failures rather than
functioning as efforts to solve the current problem (Goddard et al., 1996). It was concluded
that overgeneral promotes a ruminative style of thinking which, if focused on negative
experiences, will decrease expectancies of problem solving success, and if focused on
positive experiences, will decrease motivation to extend one’s problem solving repertoire.
Thus, overgeneral memory is thought to promote poor problem orientation which in turn
impairs problem solving performance. However, the results of the present study do not
support this theory, suggesting that although Borderline individuals do report poorer
problem orientation, this is unrelated to autobiographical memory specificity.
It is possible that the expected association between problem orientation and autobiographical memory was not observed in the present study because problem orientation was assessed through self-report which is open to influence by factors such as mood, current mental state, and/or beliefs. However, given that problem orientation refers to the components of problem solving which directly involves the individual’s perceptions and beliefs regarding their own problem solving ability, it is unclear how these factors could have negatively affected results. Alternatively, it may be that autobiographical memory is related to problem solving through the effect which it has on actual problem solving skills rather than its effect on problem orientation. That is, reduced specificity may impair the ability to carry out the problem solving process effectively, without necessarily leading to a change in the individual’s perceptions and beliefs about their problem solving abilities. This proposition appears to be consistent with current findings, however, it carries little weight from a logical perspective as consistently poor problem solving performance would undoubtedly, at some point at least, lead to a negative view of one’s problem solving abilities. More research is needed to clarify the nature of the relationship between autobiographical memory, problem solving skills, and problem solving orientation.

Specific and categoric recall were also found to be unrelated to self-reported use of rational problem solving skills, including the ability to define and formulate the problem, generate alternative solutions, make decisions, and monitor the implementation of the chosen solution. However results indicated that number of omissions on the AMT was related to self-reported use of rational problem solving skills, over and above clinical diagnosis, self-reported depression, IQ, and years of education. The relationship between omissions and rational problem solving skills appeared to be specific to one skill in particular, namely the
ability to implement and monitor solutions to problematic situations. Solution implementation and verification is the final stage of the problem solving process and is designed to assess the actual outcome of the chosen strategy in the real-life situation (Thomas. J. D'Zurilla & Godfried, 1971). Verification is essential to effective problem solving as it allows for self-correction in order to maximize the effectiveness of the solution being utilised (Thomas. J. D'Zurilla & Godfried, 1971). The results of the present study indicate that an inability to produce autobiographical memories is in someway related to the capacity to monitor and adjust solution implementation where necessary. It is unclear exactly why such an association may exist. It is possible that past instances of successful problem solving are used as a template against which outcomes are compared during the implementation and verification process, and that problems accessing the memory database thereby decrease one’s ability to determine whether the current solution is effective or requires adjustment.

However, it is important to note that the relationship between autobiographical memory and solution implementation and verification was only observed for number of omissions on the AMT, and did not extend to any of the other AMT indices, including specific, categoric, or extended memories. This suggests that the association is not due to reduced specificity as has been observed in past research (Evans et al., 1992), but rather appears to be the result of an impaired ability to recall memories of any description. It has been previously suggested that nonspecific recall which is characterised by omissions or vague responses is functionally different to the categoric form of nonspecificity which is normally observed in clinical populations (Raes, 2005). Essentially it is proposed that categoric nonspecificity is a dysfunctional strategy which is detrimental to emotional well-being as it
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fosters rumination which in turn leads to the intensification of negative emotions (Raes, 2005). In contrast, nonspecificity which is characterised by omissions is thought to reflect a type of defensive avoidance and as such may be a protective mechanism (Raes, 2005). While no comment can be made in regards to the effectiveness of an omission form of nonspecificity in terms of affect regulation, the results of the current study suggest that this form of nonspecificity is associated with problem solving deficits in individuals with Borderline Personality Disorder.

Autobiographical memory was unrelated to the remaining rational problem solving skills, including the ability to define and formulate the problem, generate alternative solutions, and make decisions. There were no significant associations observed between any of these component skills and AMT indices, including: specific, categoric, and extended memories and omissions. These findings are contrary to expectations given that autobiographical memory is thought to impair problem solving ability through the impact which it has on problem solving skills such as the ability to generate alternative solutions and make decisions (Goddard et al., 1996). Firstly, it has been suggested that overgeneral memory may impair problem solving skills by reducing the number of cues available for effective problem solving (Goddard et al., 2001; J. M. G. Williams, 1996). That is, recollection of memories which are rich in detail will provide multiple cues from which to develop alternative solutions that can be implemented in the current problem situation, while memories which involve generalizations or abstract forms of knowledge provide limited access to the memory database which serves as a resource for the development of problem solving strategies (Evans et al., 1992). However, if this were the case then one would expect to observe a relationship between memory specificity and the ability to generate
alternative solutions. The failure to find such a relationship in the present study suggests that overgeneral memory may not be related to problem solving ability through its impact on cues which assist in the production of alternative solutions.

Secondly, it has been suggested that overgeneral memory may impair problem solving ability by detracting from the individual’s ability to imagine the future (J. M. G. Williams et al., 1996). Imagining the future in detail is posited to be an important component of problem solving because the ability to determine an appropriate solution, and the best method for going about it, requires the individual to analyse alternatives for suitability by imagining possible future scenarios (J. M. G. Williams et al., 1996). Thus, by detracting from the ability to imagine the future, overgeneral memory is likely to reduce the ability to determine what is the most advantageous solution, and in turn, the most effective way of achieving this result. If this hypothesis were correct, then one would expect to see a direct association between reduced autobiographical specificity and impoverished ability to generate appropriate solutions as well as ineffective decision making. The failure to find such an association again suggests that memory specificity is not related to either of these skills in Borderline individuals.

Finally, the results of the present study indicate that autobiographical memory specificity (as assessed by number of specific and categoric memories) was not associated with either of the problem solving styles assessed by the SPSI-R, namely: impulsivity/carelessness and avoidance. However, high levels of omissions on the AMT were found to be related to an avoidant style of problem solving. Avoidant problem solving on the SPSI-R refers to a dysfunctional problem solving pattern characterised by procrastination, passivity, inaction
or dependency (Thomas. J. D'Zurilla et al., 2004). Individuals with this style of problem solving tend to avoid problems, put off facing problems for as long as possible, wait for problems to resolve themselves, or shift the responsibility for problem solving to someone else (Thomas. J. D'Zurilla et al., 2002). Results suggest that individuals who approach problems in an avoidant way are also likely to have difficulty producing memories in response to cue words on the AMT. The relationship between avoidance and autobiographical recall in this population appears to support the hypothesis that nonspecific memory may be used as a cognitive avoidance strategy to protect against the emotions associated with distressing memories (J. M. G. Williams, 1996). That is, individuals who display an avoidant style of problem solving may avoid confronting the problem of distressing memories by simply reducing their autobiographical recall. However, the relationship between avoidant problem solving and omissions was no longer significant after controlling for depression, suggesting that depression may account for the observed relationship.

It is important to note that again the observed relationship between autobiographical memory and avoidance in this population was particular to number of omissions on the AMT and was no observed for any of the other AMT indices, including specific, categoric, or extended memories. This differential association suggests that individuals who display an avoidant style of problem solving tend to recall fewer memories in total, rather than simply less specific memories. This finding is intriguing given that past research clearly identifies categoric memory or reduced specificity as the key forms of overgenerality displayed by emotionally disturbed individuals (Raes, 2005; J. M. G. Williams, 1996), although evidence suggests that Borderline individuals display higher rates of both
overgeneral recall and omissions on the AMT (Jones, Startup, Swales, Williams, & Jones, 1999). Past research also indicates that problem solving deficits are normally associated with categoric recall or reduced specificity (Pollock & Williams, 2001; Sidley et al., 1997; Kaviani et al., 2005; Goddard et al., 1996; Goddard et al., 1997; Goddard et al., 2001; Scott et al., 2000; Raes, Hermans, Williams, Demyttenaere et al., 2005; Evans et al., 1992). This distinction is important as an omission form of nonspecificity is thought to be functionally different to a categoric form (Raes, 2005). In particular, categoric nonspecificity is thought to be detrimental to emotional well-being as it fosters rumination which in turn leads to the intensification of negative emotions, while an omission form of nonspecificity is thought to reflect a protective type of defensive avoidance (Raes, 2005). The results of the present study run contrary to the suggestion that an omission form of nonspecificity is a functional strategy as number of omissions were associated with an avoidant style of problem solving in individuals with Borderline Personality Disorder.

The results pertaining to the SPSI-R suggest that overgeneral memory (as assessed by specific and/or categoric recall) was unrelated to self-reported problem solving orientation, problem solving style, and problem solving skills. However number of omissions on the AMT was related to problem solving skills and avoidance in this population. This is the first study to investigate the relationship between memory specificity and individual components of the problem solving process, using a process measure of problem solving ability.

However, caution should be displayed in consideration of these findings as the SPSI-R is a self report measure of problem solving and as such, may be biased by mood and current
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mental state, and influenced by beliefs, confirmation bias, and demand effects. More importantly, the SPSI-R also depends on observation and memory and therefore cannot assess cognitive processes which occur at a pre-conscious level or at a speed which is not amenable to introspection. Thus, the null findings regarding the association between particular aspects of the problem solving process and overgeneral autobiographical memory should be treated with caution as both the SPSI-R and AMT rely on memory and accurate reporting, and may be postulated to include processes which occur at a preconscious level or speed.

Indeed, in line with this theory, a number of significant relationships between memory specificity and problem solving were observed for the performance based measure of problem solving ability (MEPS). In particular, memory specificity was found to be significantly related to number of active means and number of irrelevant means over and above diagnostic group, IQ and education. Categoric memory was also related to number of irrelevant means over and above diagnostic group, IQ and education, while extended memory was associated with number of active means and total means on the MEPS. The direction of the results suggests that the more specific individuals are in their autobiographical recall, the more active and the less irrelevant means they produce, while individuals who display high levels of categoric or extended memories are likely to produce less means in total, less active means, and more irrelevant means.

These result cannot be seen as simply an artefact of greater detail in the memory responses of the specific individuals as memory specificity was associated with more active and total means but less irrelevant means. Moreover, memory specificity was unrelated to the
number of passive means, self regulation means, introspective means and inappropriate means produced on the MEPS. This suggests that memory specificity enhances particular problem solving responses, rather than representing a response style which impacts on problem solving by indiscriminately increasing the number of means produced. Indeed, in addition to being associated with a greater number of active means, memory specificity was also associated with greater effectiveness of the means produced. This suggests that memory specificity is in some way related to greater efficacy in problem solving.

However, it appears that at least some of the relationship autobiographical recall and problem solving on the MEPS was accounted for by depression. Indeed, when self-reported depression was entered as a covariate, the relationship between autobiographical memory (both specific and categoric) and irrelevant means, and the relationship between extended memory and active and total means became non-significant. However, specificity score remained a significant predictor of active means over and above diagnostic group, self-reported depression, IQ and education. This indicates that there is a relationship between memory specificity and number of active means on the MEPS that cannot be accounted for by depression.

The association between memory specificity and problem solving ability as measured by the MEPS, is supported by past research (Evans et al., 1992; Goddard et al., 1996, 1997; Kaviani et al., 2005; Pollock & Williams, 2001; Raes, Hermans, Williams, Demyttenaere et al., 2005; Sidley et al., 1997). Several hypothesis regarding this association have been made, including that overgeneral memory: 1) reduces the cues available for effective problem solving (Evans et al., 1992), 2) impairs ability to imagine the future (J. M. G.
Williams et al., 1996), and 3) detracts from the individual’s problem orientation (Goddard et al., 1996). Unfortunately, due to the non-significant findings involving overgeneral memory and the SPSI-R, it is impossible to draw any further conclusions from this study as to which component of the problem solving process is associated with memory specificity. Findings regarding omission data on the AMT indicate that difficulty producing autobiographical memories is associated with ineffective use of rational problem solving skills and higher levels of avoidance, however given that overgeneral memory and nonspecificity characterised by omissions are thought to be functionally different (Raes, 2005), the conclusions which can be drawn for overgeneral memory in particular may be limited. Regardless, results indicate that the frequently observed association between memory specificity and performance based problem solving deficits is also present in individuals with Borderline Personality Disorder. In addition, the results of the present study also suggest that the association between the MEPS and autobiographical memory is observed for number of active means, irrelevant means, and effectiveness ratings, rather than indiscriminately increasing all problem solving means. This extends past research which has primarily focused on the association between autobiographical memory and number of relevant means and effectiveness ratings on the MEPS (Evans et al., 1992; Goddard et al., 1996; Raes, Hermans, Williams, Demyttenaere et al., 2005; Sidley et al., 1997).

The findings of this study contrast directly with the only study to date in this population, which found that specificity of both past memories and future events was unrelated to problem solving ability (Kremers, 2004c). Kremers’ study differed significantly from the present study, however, in that it was based on a MEPS version which included only
interpersonal scenarios rather than a combination of interpersonal and emotional scenarios. It is possible that the significant result observed in this study is a result of the relationship between autobiographical memory and emotion based problem solving in individuals with BPD. To test this theory, further post hoc investigation was conducted and results indicated that the association between memory specificity and active and passive means was significant for the emotion based scenarios ($p = .015$, and $p = .008$ respectively) but not for the interpersonal scenarios ($p = .09$, and $p = .21$). However, effectiveness of means was related to memory specificity for the interpersonal scenarios ($p = .024$) and approached significance for the emotional scenarios ($p = .06$). This suggests that the relationship between memory specificity and problem solving ability according to the MEPS is more pronounced for emotional problems than interpersonal problems in individuals with BPD. It is unclear exactly why such a pattern may occur. One possibility is that individuals with BPD may perceive emotion based problems as having a more internal locus of control such that they will seek problem solving strategies internally and therefore access the autobiographical memory database. In contrast, interpersonal difficulties may be perceived as being largely determined by external influences, resulting in a more customary reliance on passivity which would not require access to the memory database. Further research is needed to determine if the extent to which individuals access the memory database during problem solving attempts is in any way related to locus on control.

The present study also provided a preliminary investigation of the model proposed by Williams, Barnhofer, Crane and Beck (2005), which states that reduced autobiographical specificity leads to impaired problem solving ability, which increases hopelessness, and in turn increases the likelihood that the individual will engage in deliberate self-harm when
problems arise in life. In addition to the relationship between reduced specificity and problem solving deficits which has been described above, a relationship was also observed between hopelessness and deliberate self-harm (without suicidal intent) and between autobiographical specificity and hopelessness. However, contrary to the model, there was no significant association between problem solving ability and hopelessness, and problem solving ability did not mediate the relationship between memory specificity and hopelessness. This finding suggests that memory specificity may be associated with hopelessness and deliberate self-harm via an alternative pathway to its impact on problem solving ability. However, given both the small sample size, and the few episodes of attempted suicide and self harm exhibited by the participants in this study, this analysis has limited power and further research is required to confirm these findings.

It is worth emphasizing that the association between overgeneral memory and problem solving ability observed in this study was limited to problem solving as assessed by the performance based measure (the MEPS), and did not extend to problem solving as assessed by self report on the SPSI-R. While the MEPS and the SPSI-R are both problem solving measures, they represent two distinct approaches to the assessment of problem solving ability and are generally thought to assess different elements of the problem solving process (Thomas. J. D'Zurilla & Maydeu-Olivares, 1995). The SPSI-R is what is known as a process measure of problem solving ability, and as such is designed to assess the general cognitive and behavioural activities related to problem solving, and provide information about specific strengths and weaknesses in problem solving ability (Thomas. J. D'Zurilla et al., 2004). In contrast, the MEPS is an outcome measure which requires the individual to perform a problem solving task and assesses the quality of the specific solutions produced,
providing a global estimate of actual problem solving performance (Thomas. J. D'Zurilla et al., 2004). The SPSI-R will therefore provide information regarding the individual’s problem solving attitude and their perception of their own problem solving strategies and techniques, while the outcome based MEPS will assess the individuals actual skills and abilities (Thomas. J. D'Zurilla et al., 2004). Although these two measures are generally thought to be related, evidence suggests that they are not always highly correlated because problem solving performance may be influenced by factors other than problem solving ability, including specific skills deficits, emotional distress, or motivational deficits (Thomas. J. D'Zurilla & Nezu, 1999). Indeed, research comparing these measures in suicidal individuals found that the MEPS scores only correlated with the orientation variables of the SPSI-R (Pollock, 1999). Moreover, the degree of concurrence between these scales appeared to lessen with degree of psychological impairment (Pollock, 1999).

The selective association between outcome based problem solving and memory specificity suggests that autobiographical specificity is related to the individual’s actual ability to perform in problem solving tasks, but is not related to the individual’s attitude towards problem solving or their perception of their own problem solving skills. This may be seen as contradicting the theory that overgeneral memory is related to problem solving ability though the impact which it has on problem orientation (Goddard et al., 1996), as results on the self-report SPSI-R would seemingly provide an accurate measure of the individual’s problem solving beliefs and attitudes. However, the differential association between memory specificity and performance measures of problem solving may also be seen as a reflection that the relationship between overgeneral autobiographical memory and problem solving processes occurs at a level which is not open to conscious observation, or is masked.
by the memory and reporting requirements of self-report scales. Given that outcome measures are thought to be the closest approximation to real-life problem-solving behaviour (Thomas, J. D'Zurilla & Maydeu-Olivares, 1995), the association between reduced autobiographical specificity and problem solving on the MEPS supports the theory that overgeneral memory impairs problem-solving performance in individuals with Borderline Personality Disorder. The applied implications of these findings are that addressing reduced specificity in Borderline individuals may be an important part of treating the problem solving deficits observed in this population.

Summary

In general, the results of this study indicate that individuals with Borderline Personality Disorder display impoverished problem-solving ability relative to controls, on both performance-based and self-report measures of problem solving. Moreover, the problem solving deficits of these individuals appear to extend to all components of the problem-solving process, from poor problem orientation, to maladaptive problem-solving styles and ineffective problem-solving skills. Problem-solving deficits, as assessed by an outcome measure of problem-solving ability, were found to be associated with reduced specificity in this population. Self-report problem solving was not related to memory specificity, although difficulty recalling any autobiographical memories whatsoever (as assessed by omissions on the AMT) was associated with self-reported avoidance and ineffective application of rational problem-solving skills, particularly the ability to implement and verify solutions. This indicates that particular types of autobiographical memory difficulties, as revealed by responses on the AMT, display differential patterns of
association with problem solving deficits in individuals with Borderline Personality Disorder. Overgeneral autobiographical memory appears to be associated with impaired problem solving performance, but does not impact on the individual’s attitude towards problem solving or their perception of their own problem solving ability. In contrast, omission nonspecificity is associated with self reported problem solving skills and avoidance, but unrelated to problem solving performance.
5 Overgeneral Memory and Dialectical Behavior Therapy

Introduction

Dialectical Behavior Therapy

Dialectical behavior therapy (DBT) is a broad-based cognitive-behavioural treatment developed by Marsha Linehan specifically to address the needs of individuals with Borderline Personality Disorder (Linehan, 1993b). DBT consists of a broad range of cognitive behavioural strategies in combination with the principles and techniques of acceptance-based practices embodied by Zen and other contemplative traditions (Linehan, 1993a). DBT is being referred to as a “third wave” cognitive behavioural psychotherapy due to its integration of more traditional change-focused strategies with acceptance based techniques (Hayes, Masuda, Bissett, Luoma, & Guerrero, In Press; Linehan, 1993a). DBT is the first psychotherapy which has been demonstrated via clinical controlled trials to be effective in the treatment of Borderline Personality Disorder, which is generally viewed as a difficult and treatment-resistant population (Linehan, 1993b).

The fundamental basis of DBT originates in a philosophical worldview known as dialectics (Linehan, 1993a). According to dialectics, reality is considered to be whole and interrelated and at the same time paradoxical, consisting of opposing and simultaneously valid polarities (Blennerhassett & O'Raghallaigh, 2005; Robins et al., 2001). Reality is
considered to be in a state of constant flux, with change occurring though the ongoing process of reconciliation of opposing elements through synthesis (Linehan, 1993a). As applied in DBT, the concept of dialectics affects the manner in which difficulties are conceptualised within the system as a whole, as well as the specific set of skills used to bring about change (Linehan, 1993b). The core dialectic within DBT is that of acceptance and change (Linehan, 1993b). That is, the patient must be fully accepted and validated as they currently are and at the same time encouraged and taught how to change (Linehan, 1993a). Treatment strategies within DBT are based on the two poles of this dialectic, leading to DBT’s unique integration of cognitive behavioural strategies with acceptance based practices (Linehan, 1993a; McMain, Korman, & Dimeff, 2001). Thus a variety of change focused strategies, such as: problem solving, exposure techniques, skill training, contingency management, and cognitive modification; are applied in DBT in combination with validation techniques, mindfulness, and a focus on the therapeutic relationship (Koerner & Linehan, 2000; Linehan, 1993a).

Standard Dialectical Behavior Therapy is a highly structured form of therapy which is designed to be implemented in an outpatient setting (Linehan, 1993a). It consists of four concomitant modes of treatment: individual psychotherapy, groups psychosocial skills training, telephone consultation, and weekly case consultation for therapists (Linehan, 1993a). This multi-modal structure was designed to address the difficulties that were observed when applying standard therapy to the problems presented by this population. In particular, the combination of these modes of therapy enables an effective balance between teaching much needed skills, managing crises and motivational issues, and preventing therapist burn-out (Linehan, 1993a).
Individual psychotherapy is the central component of DBT around which all the other modes of treatment revolve (Linehan, 1993a). Each patient is allocated an individual psychotherapist who they see, typically on a weekly basis, for the duration of the program (Linehan, 1993a). Individual psychotherapy sessions focus on crisis management, enhancing motivation to act skilfully, decreasing the motivation for dysfunctional behaviours, and overall treatment coordination and planning (M. Z. Brown, 2006; McMain et al., 2001). Individual therapy is also a platform for the strengthening and generalization of skills learnt during the group skills training mode of therapy (Linehan, 1993a). Techniques utilised within individual sessions may include any of the broad array of strategies included in DBT, depending on the presenting problems and stage of therapy. However, a consistent component of individual sessions is the discussion of weekly diary cards, on which patients self monitor target problems, and chain analysis of any dysfunctional behaviour which arises (Robins et al., 2001).

Group psychosocial skills training sessions are also conducted weekly, and emphasize skill acquisition and skill strengthening with the goal of enhancing patient capabilities (Linehan, 1993a). This component of the treatment package is based on the view that many of the problems experienced by patients with Borderline Personality Disorder are the result of behavioural skills deficits (Linehan, 1993a). Skills training consists of four individual modules designed to directly address the core symptoms of Borderline Personality Disorder (Linehan, 1993b). These include: emotion regulation, interpersonal effectiveness, distress tolerance, and core mindfulness (Linehan, 1993a). Modules are taught sequentially within group skills training, with each module taking approximately 8 weeks, except for the mindfulness component which is taught in two-week blocks at the beginning of each of the
other modules (Linehan, 1993a). Skills training in a standard DBT package takes one year, meaning that patients complete each of the four skills modules twice (Linehan, 1993a). Skills training is modelled on a standard behavioural skills building format and consists of a combination of didactic instruction, modelled examples, coached rehearsal of new skills, feedback and homework assignments (Robins et al., 2001). Conducting training in a group format is advantageous in that it provides the opportunity for group members to practise and learn from each other, allows for in vivo interpersonal skills training, improves ability to function within a group, and provides interaction with like minded others which provides a support group that decreases isolation while allowing the individual to feel understood and validated (Robins et al., 2001).

DBT also includes telephone consultation which is available to patients between sessions as needed (Linehan, 1993a). Telephone consultation is aimed directly at managing short term crises, teaching Borderline individuals to ask for and receive help effectively, and providing in vivo skills coaching to promote the generalization of skills and effective implementation of problem-solving skills in daily living (Linehan, 1993a; Robins et al., 2001). In addition, telephone consultation can be used to discuss conflict or misunderstandings between the therapist and client in order to repair the therapeutic alliance which is critical component of treatment success (Linehan, 1993a, 1993b).

Lastly, DBT involves weekly case consultation for therapists. Due to the nature of the disorder and its behavioural symptoms, treating individuals with Borderline Personality Disorder can be extremely stressful and challenging (Linehan, 1993a). Moreover, adhering to a strict DBT framework in the face of ongoing distress and opposition from clients can
prove particularly difficult (Linehan, 1993a). Weekly case consultation for therapists is a mandatory component of DBT and is designed to provide support for therapists currently utilizing DBT and to enhance their motivation and capacity to effectively treat clients and to hold to the treatment framework (M. Z. Brown, 2006; Linehan, 1993a; McMain et al., 2001).

**Empirical Support**

In recent years, a substantial body of research has accumulated in support of the efficacy of Dialectical Behavior Therapy (Feigenbaum, 2007). The weight of evidence in support of DBT is such that the American Psychiatric Association promotes DBT as one of only two forms of psychotherapy which have been shown to be efficacious in the treatment of Borderline Personality Disorder (APA, 2001). In fact, it has recently been claimed that DBT is the only treatment for Borderline Personality Disorder which is currently considered to be “well-established” or “efficacious and specific” (Lynch, Chapman, Rosenthal, Kuo, & Linehan, 2006, p 476). Much of the evidence in support of DBT comes from a series of randomised controlled trials conducted by Linehan and colleagues and added to across the years by various other independent research teams.

Preliminary evidence in support of the efficacy of DBT emerged from the first randomised controlled trial comparing DBT to treatment as usual in a sample of Borderline individuals (Linehan et al., 1991). The results of this study indicated that those individuals who received DBT had significantly fewer and less severe parasuicidal episodes, a lower treatment dropout rate, and fewer psychiatric inpatient days than those who received
treatment as usual. Linehan and colleagues later extended this study in a second cohort of Borderline patients and found that DBT was also more effective than treatment as usual in improving general and interpersonal functioning (Linehan, Tutek, Heard, & Armstrong, 1994). In particular, the group who underwent DBT reported significantly less anger, greater social adjustment, better employment/role performance, and less anxious rumination, and were rated by the interviewer as more socially adjusted and less severely disturbed based on the Global Assessment Scale. Further to this, a one-year naturalistic follow-up of these subjects indicated that the superiority of Dialectical Behavior Therapy over treatment as usual was maintained in every area, except for work performance and anxious rumination, for at least 6 months following the cessation of treatment (Linehan et al., 1993).

Linehan and colleagues found similar support for the efficacy of DBT in research into the treatment of drug-dependent suicidal women with Borderline Personality Disorder (Linehan et al., 1999). In a randomised controlled study comparing Dialectical Behavior Therapy and treatment as usual, results indicated that those who received DBT had significantly lower drop-out rates (36% compared to 73%), significantly greater reductions in substance abuse, and significantly greater improvements in social and global adjustment at 16 months follow-up. The authors conclude that DBT is an effective treatment for severely dysfunctional drug-dependent patients (Linehan et al., 1999).

The third randomised controlled study, this time based on a sample of female veterans diagnosed with Borderline Personality Disorder, also provided support for the efficacy of DBT over treatment as usual (Koons et al., 2001). Results indicated that individuals who
undertook a 6-month abbreviated course of DBT showed significantly greater reductions in suicidal ideation, hopelessness, depression, and expression of anger, compared to those receiving treatment as usual (Koons et al., 2001). In addition, only those individuals involved in DBT demonstrated significant reductions in dissociation, anger experienced, and number of parasuicidal episodes.

Similar results have been observed in research exploring the use of DBT in a mixed group of Borderline individuals with and without substance abuse (Verheul et al., 2003). In comparison to treatment as usual, results indicated that DBT resulted in a significantly better retention rate and greater reductions in self-mutilating and self-damaging impulsive behaviours, especially among those with a history of frequent self-mutilation (Verheul et al., 2003). This result was unrelated to group differences in the use of psychotropic medications. Furthermore, evidence suggests that the superior benefits of DBT in terms of reduction in parasuicide, impulsive behaviour and alcohol use, were sustained six months after DBT was discontinued (van den Bosch, Koeter, Stijnen, Verheul, & van den Brink, 2005).

Further evidence for the effectiveness of DBT is provided by an independent randomised controlled trial comparing Dialectical Behavior Therapy with client centred therapy in the treatment of Borderline Personality Disorder (Turner, 2000). According to the results of this study, those individuals who received DBT showed greater improvements in a range of outcomes, including: suicidal and self-harming behaviour, suicidal ideation, depression, impulsiveness, anger, global psychological functioning and number of days as a psychiatric inpatient. Further, results indicated that the improvement in suicide and self-harm observed
for those in DBT reached a clinically significant level. On the basis of these results, it can be concluded that DBT offers some advantage over basic supportive psychotherapy in the treatment of Borderline Personality Disorder.

The most recent randomised controlled trial compared DBT to community treatment by experts from a non-behaviourist orientation (Linehan et al., 2006). Results again support the efficacy of DBT, suggesting that those individuals who completed DBT were less likely to make a suicide attempt, made less severe attempts, used less crisis services, had fewer psychiatric hospitalizations and were more likely to be retained during treatment. These differences were maintained over a 12 month follow-up period. This finding suggests that the efficacy of DBT cannot be attributed solely to general factors associated with receiving expert psychotherapy (Linehan et al., 2006)

In addition to evidence supporting the efficacy of Dialectical Behaviour Therapy for the treatment of Borderline Personality Disorder, research has also demonstrated that DBT is an effective form of treatment for a wide range of alternative presenting problems, including: comorbid substance use disorders (Linehan et al., 2002), ADHD (Hesslinger et al., 2002), suicidality in adolescents (Katz, Cox, & Gunasekara, 2004; Miller, Wyman, Huppert, Glassman, & Rathus, 2000), binge eating (Telch, Agras, & Linehan, 2001), criminal behaviour (Trupin, Stewart, Beach, & Boesky, 2002) and chronic depression in older patients (Lynch, Morse, Mendelson, & Robins, 2003). Modified versions of DBT have also been used effectively in inpatient (M. Bohus et al., 2004; M. Bohus et al., 2000) and outpatient settings (Harley, Baity, Blais, & Jacobo, 2007).
It is clear from this brief review of the literature that a substantial body of evidence supports the efficacy of DBT in the treatment of Borderline Personality Disorder. To date, research has demonstrated the effectiveness of DBT on a wide variety of outcome measures: from improving treatment retention, psychological well being, and interpersonal functioning, to reducing suicidal behaviours, substance abuse, and inpatient admission days (Feigenbaum, 2007). However, there still remain a number of variables pertinent to Borderline Personality Disorder that have not been assessed in research exploring the effects of DBT. One such variable is overgeneral autobiographical memory.

Past research suggests that overgeneral autobiographical memory may be present in the Borderline population, either as a result of a direct association between overgeneral memory and Borderline Personality Disorder (Jones et al., 1999), or through the association between overgeneral memory and clinical depression which is present as a comorbid diagnosis in approximately 70% of individuals with Borderline Personality Disorder (Bateman & Fonagy, 1999; Kremers et al., 2004; Linehan et al., 1993; Linehan & Koerner, 1993). The presence of this phenomenon in the Borderline population is important as research indicates that overgeneral autobiographical memory is related to poor problem solving, failure to recover from depression, and poor treatment outcome (J. M. G. Williams, 1996). Given its clinical relevance, research is needed to ascertain whether DBT has any effect on autobiographical memory style, and if so, whether the impact which it has on overgeneral memory is in any way related to the effectiveness of the intervention.
The Effect of DBT on Autobiographical Memory

There are several reasons to expect that DBT will have an effect on overgeneral autobiographical memory. Firstly, research indicates that it is possible to alter autobiographical memory style directly through therapeutic intervention. In a study comparing psychoanalytic transference focused psychotherapy and schema focused cognitive behaviour therapy in the treatment of Borderline Personality Disorder, results indicate that both forms of therapy resulted in a reduction in overgeneral memory for Borderline individuals with comorbid depression (Kremers et al., 2003). Reductions in overgeneral memory have also been observed in clinically depressed individuals exposed to mindfulness based cognitive therapy (J. M. G. Williams et al., 2000), and in experimental studies using distraction and decentring tasks (Watkins et al., 2000), experiential self focused tasks (Watkins & Teasdale, 2004) and tasks which reduced analytical self-focused thinking (Watkins & Teasdale, 2001). This research demonstrates that therapeutic intervention can directly alter autobiographical memory style.

It has been suggested that successful psychotherapy has an effect on overgeneral memory by fostering assimilation of problematic or painful experiences (Stiles et al., 1990). Assimilation is thought to be an adaptive process, whereby problematic or painful experiences are resolved and gradually incorporated into an individual’s schema or frame of reference through a predictable series of stages (J. M. G. Williams et al., 1999). For assimilation to occur, however, the individual must allow the problematic memories to enter into their awareness to be worked on and resolved, which can often be painful and distressing. Overgeneral memory is thought to be a cognitive strategy which individuals
use for avoiding such emotions by effectively keeping the distressing thoughts and memories from awareness (J. M. G. Williams et al., 1999). In this regards, overgeneral memory can be conceptualised as a measure of the failure to assimilate as it is a strategy which is associated with the pre-assimilation state where memories are warded off (J. M. G. Williams et al., 1999). Successful psychotherapy is thought to promote assimilation by providing exposure to memories of distressing experiences whilst also aiding in the development or alteration of schemata into which the experience can be integrated (Stiles et al., 1990). Indeed, assimilation of problematic experiences is hypothesised be a key change mechanism common to all effective psychotherapies (Stiles et al., 1990). By promoting assimilation, successful psychotherapy is therefore likely to directly alter autobiographical memory specificity.

In addition to the effects common to all successful psychotherapies, Dialectical Behavior Therapy may also alter overgeneral memory because it includes treatment strategies that aim to directly modify a number of factors that are believed to be related to the maintenance of overgeneral memory. These include: mindfulness, affect regulation, and problem solving. These strategies and their relationship to overgeneral memory are detailed below.

**Mindfulness**

Mindfulness in DBT was derived from Zen and Christian contemplative practices and can be thought of as “a particular way of paying attention: on purpose, moment-by-moment, and without judgment” (Kabat-Zinn, 1994). In essence, mindfulness refers to the art of
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being fully present in one’s experience in the current moment (Lynch, Chapman et al., 2006). The goal of mindful practice is to allow the individual to become aware of and fully engage in their own experience as it is happening, without any attempt to change, suppress or otherwise avoid the experience (Lynch, Chapman et al., 2006). Within DBT, a specific emphasis is placed on the use of mindfulness to achieve what is known as “wise mind”, a state of mind that combines logical analysis, emotional experiencing and intuition (Linehan, 1993a). The practice of mindfulness is posited to increase conscious control over attentional processes, non-judgmental awareness, and sense of true self, whilst also decreasing identity confusion, emptiness and cognitive dysregulation (Robins et al., 2001).

Mindfulness skills are considered to be central in DBT (Linehan, 1993b). They are the first skills taught within skills training, and are highlighted and reviewed throughout the entire year of therapy (Linehan, 1993b). Mindfulness skills are actively taught within DBT through the use of formal and informal exercises. Within DBT, the practice of mindfulness has been distilled down to six discrete behavioural skills (Lynch, Chapman et al., 2006). These include three “what” skills: observing, describing, participating; and three “how” skills: taking a non-judgmental stance, focusing on one thing in the moment, being effective (Linehan, 1993a).

The “what” skills outlined in DBT refer to the specific behavioural components involved in mindful practice which, when used in combination, foster a lifestyle of participating with awareness (Linehan, 1993b). The first “what” skill is observation. Observation requires learning to attend to events, emotions and behavioural responses without trying to alter or terminate the experience, even when it is distressing (Linehan, 1993a). This skill involves
learning to allow oneself to experience whatever is happening and requires the ability to step back from the event in order to observe it (Linehan, 1993a). The second “what” skill is describing. The ability to describe involves learning to differentiate between thoughts/emotions and reality so that accurate verbal labels may be applied to behavioural and environmental events (Linehan, 1993a). The third “what” skill is participation. Learning to participate, as it is conceptualised in mindfulness, involves entering completely into activities of the current moment without self-consciousness and without any attempt to separate self from the experience (Linehan, 1993a). It is participating with attention and awareness (Linehan, 1993a).

There are also three “how” skills. The how skills in mindfulness are designed to provide instruction as to how to implement the behavioural skills identified as constituting mindful practice. Firstly, DBT suggests that mindfulness must be implemented with a non-judgmental stance. Taking a non-judgemental stance means that in most instances judging should be dropped altogether – events, people and objects are judged as neither good nor bad and instead are viewed simply as being (Linehan, 1993a). From a non-judgemental perspective, the individual learns to make decisions based entirely on the consequences of his/her actions, rather than on an evaluative labels or judgments regarding the behaviour or event (Linehan, 1993a). Secondly, mindfulness requires the individual to act in a way which is one-minded. That is, the individual must learn to focus on one thing in the moment, without splitting attention with other activities or thoughts (Linehan, 1993a). Thirdly, mindful behaviour must also be conducted in a manner that is effective. This skill is directly aimed at reducing patients’ tendency to be more concerned about what is “right” than in doing what is actually needed (Linehan, 1993a). The effectiveness skill encourages
the individual to focus on doing what works in the situation, regardless of the evaluative judgment they attach to it (Linehan, 1993a).

There is considerable variation in the degree to which individuals are willing to be aware of and sustain attention to what is occurring in the present (K. W. Brown & Ryan, 2003). The degree to which an individual engages in mindful practice may be influenced by a number of factors, including inherent capability, discipline, or inclination (K. W. Brown & Ryan, 2003). Mindfulness can be inhibited by rumination, absorption in the past, anxieties or fantasies about the future, divided attention, and by compulsive or automatic behaviour (K. W. Brown & Ryan, 2003). Acting in an unmindful way may also be defensively motivated - allowing the individual to avoid thoughts, emotions, motives or objects which they would prefer not to be aware of (K. W. Brown & Ryan, 2003).

Individuals with Borderline Personality Disorder typically have difficulty being mindful (Wupperman, 2007). Instead, they exhibit a strong tendency to disengage their attention from emotional stimuli, and are frequently distracted by thoughts and images of the past, worries about the future, ruminative thoughts about troubles, and by their own current affective state (Linehan, 1993b). Indeed, in contrast to being mindful, Borderline individuals tend to rely on avoidance strategies to help deal with their own emotions (Conklin et al., 2006) and with general difficulties that arise in life (Bijttebier & Vertommen, 1999; Kruegelbach et al., 1993). Overgeneral autobiographical memory is posted to be one example of the avoidance strategies utilised by Borderline individuals. Overgeneral memory is hypothesised to serve as a cognitive defence mechanism which
reduces the affect associated with the recall of distressing memories by maintaining an abstract level of processing (J. M. G. Williams, 1996).

It is theorised that the practice of mindfulness may alter overgeneral memory by increasing the attention given to private experiences, resulting in non-reinforced exposure to these experiences (Lynch, Chapman et al., 2006). Mindfulness involves observation and acceptance of painful private thoughts, feelings, or sensations without any attempt to alter or control these experiences (Lynch, Chapman et al., 2006). By engaging in mindful practice, the individual is thus exposed to naturally arising thoughts, feelings, and sensations which might otherwise have been avoided (Linehan, 1993a). Because mindfulness is fundamentally an acceptance based strategy, the observation of negative emotions and experiences through mindful practice involves learning to observe these negative states without any of the judgment or evaluative labels typically attached to these experiences. Thus, mindful exposure to negative internal events will extinguish the association between these events and the negative evaluations and secondary emotions previously associated with them, and instead recondition these events, such that they are associated with acceptance and neutral observation (Linehan, 1993a). Bringing awareness to internal experiences is also likely to aid in the successful assimilation of problematic experiences by bringing previously avoided experiences into consciousness so that they can be identified, worked on, and integrated into the self (K. W. Brown & Ryan, 2003).

Empirical evidence supports the notion that mindfulness will bring about a reduction in overgeneral autobiographical memory. In a randomised control trial comparing mindfulness-based cognitive therapy and treatment as usual in the treatment of Major
Depressive Disorder, results indicated that those individuals who underwent the mindfulness based treatment protocol showed a significant reduction in overgeneral recall (J. M. G. Williams et al., 2000). Similar results have emerged from an experimental study exploring self-focus in depression (Watkins & Teasdale, 2004). The researchers in this study found that by manipulating level of self-focus they were able to produce a subsequent change in level of specificity of autobiographical recall. In particular, they found that experiential self focused tasks (analogous to mindfulness tasks) resulted in a reduction in overgeneral memory. Further to this, a second experimental study exploring the effects of self-focus and analytical thinking on autobiographical memory, found that tasks which increased analytical self-focused thinking also increased overgeneral memory, while tasks which aimed to reduce analytical self-focused thinking resulted in less overgeneral recall (Watkins & Teasdale, 2001). The results of these studies indicate that mindfulness based techniques, which emphasize awareness of experience without judgment, are effective in bringing about reductions in overgeneral recall. On the basis of these findings, it is posited that the mindfulness practices included in DBT may be effective in reducing level of overgeneral autobiographical recall.

Affect Regulation

According to the biosocial theory upon which Dialectical Behaviour Therapy is based, Borderline Personality Disorder is best conceptualised as a systemic dysfunction of the emotion regulation system (Linehan, 1993a). Within DBT, many of the problems experienced by individuals with Borderline Personality disorder are viewed as the result of
a failure to acquire the necessary skills to regulate negative affect (Robins et al., 2001). Thus, one of the central aims within DBT is to teach Borderline individuals to effectively manage their emotions. Affect regulation is enhanced within DBT via two sets of skills: Emotion regulation skills and distress tolerance skills.

Emotion regulation training is designed to equip the individual with the skills necessary to modulate the experience and expression of emotion in order to enable them to function effectively within their environment (Gottman & Katz, 1990). DBT involves a number of specific skills, including the ability to: accurately identify and label their emotions, identify the obstacles to changing emotions, reduce vulnerability to emotional responding by improving health and mastery, engaging in opposite action, increasing positive events, and increasing the degree of mindfulness given to emotions (Linehan, 1993a).

Another important component of effective emotion regulation is the ability to tolerate distress. Distress tolerance can be described as “the ability to perceives one’s environment without putting demands on it to be different; to experience one’s current emotional state without attempting to change it; and to observe one’s own thoughts and action patterns without attempting to stop or control them” (Linehan, 1993a). Distress tolerance involves learning to bear pain skilfully through techniques which promote tolerance and acceptance of distress (Linehan, 1993b). Within DBT, distress tolerance techniques are taught as a separate set of skills to emotion regulation techniques, and are addressed during a separate module in skills training. Distress tolerance skills include four main strategies designed to help the individual survive during crises: distraction, self-soothing, improving the moment and evaluating the pros and cons of tolerating distress as a strategy for motivating the
individual to utilize distress tolerance skills (Linehan, 1993a). In addition to these techniques, distress tolerance also involves a focus on accepting the current situation through the use of radical acceptance (complete acceptance from deep within), turning the mind towards acceptance (choosing to accept reality as it is), and willingness versus wilfulness (accepting what is rather than imposing one’s own will onto reality).

DBT’s approach to enhancing emotion regulation through the active teaching of emotion regulation and distress tolerance skills is likely to have a direct effect on autobiographical memory style given that overgeneral memory is hypothesised to serve an affect regulation function. It is posited that overgeneral memory regulates emotion by maintaining a general or abstract level of memory processing which is believed to decrease the reactivation of acute emotions associated with personal memories, resulting in a reduction in the distress experienced when recalling negative events (Raes et al., 2003). Thus, overgeneral memory can be conceptualised as a cognitive avoidant defence mechanism which is reinforced by the minimization of unpleasant emotions (Westen et al., 1997). Research supports the notion that overgeneral memory serves to regulate affect with evidence suggesting an association between overgeneral memory and measures of avoidant coping and thought suppression (Hermans et al., 2005). In addition, evidence suggests that overgeneral memory may protect against distress, in some populations at least, with overgeneral memory being associated with lower rates of self-harm in Borderline individuals (Startup et al., 2001), and with lower rates of subsequent depression in women who had been sexually abused as children (Burnside et al., 2004).
In accordance with the view that overgeneral memory is a cognitive avoidance strategy that serves an affect regulation function, it is proposed that treatment regimes, such as DBT, which focus on improving ability to regulate emotion and tolerate distress will decrease the need for overgeneral memory by providing the individual with the skills necessary to deal with the emotions elicited by specific memory recall. In addition, DBT’s focus on mindfulness of emotions will also provide non-reinforced exposure to distressing internal experiences, which will serve to extinguish secondary emotions as well as providing the opportunity for successful assimilation of the problematic memories, thoughts or images (Linehan, 1993a). Thus DBT can be expected to directly alter overgeneral memory through its effect on emotion regulation capabilities.

**Problem Solving**

Problem solving strategies are considered to be the core change strategies in DBT (Linehan, 1993a). All dysfunctional behaviours on the part of the client are viewed within the DBT framework as either problems to be solved or as ineffective attempts to solve problems which arise in daily living (Linehan, 1993a). The goal of the problem solving process as applied in DBT is to generate effective solutions for dysfunctional thoughts, emotions and behaviours and to enable the application of relevant change procedures (M. Z. Brown, 2006). Problem solving training is designed to promote an active approach that can counter the passive, helpless response commonly encountered among individuals with Borderline Personality Disorder (Linehan, 1993a).
Problem solving within DBT is presented as a process involving a number of interwoven steps (Robins et al., 2001). The first step involves developing a thorough understanding of the problem behaviour or situation. Strategies such as behavioural analysis, insight strategies and didactic strategies are used in combination to determine what the problem is, what is causing it, what resources are available to help solve the problem, and what obstacles are preventing problem resolution (Robins et al., 2001). Next, the therapist and patient focus on generating and evaluating various possible solutions to the problems faced. All difficulties are viewed as problems that can be solved, even if the only solution involves finding a new way of adapting to life as it is (Linehan, 1993a). Solutions within DBT usually comprise some combination of the following change procedures: learning new skills, changing maintaining reinforcement contingencies, reducing inhibitions that interfere with more skilful behaviour through the use of graduated exposure, and/or identifying and modifying maladaptive cognitive styles and content (Robins et al., 2001). Once a solution has been chosen, the patient and therapist will develop a plan for making change come about, troubleshoot what might go wrong with the solution and begin actively working towards the solution (Linehan, 1993a; Robins et al., 2001).

Past research indicates a clear association between poor problem solving and overgeneral autobiographical memory (Evans et al., 1992; Goddard et al., 1996, 1997; Pollock & Williams, 2001; Scott et al., 2000; Sidley et al., 1997). Because of this association, DBT can be expected to directly alter overgeneral memory through the impact which it has on problem solving abilities. The problem solving strategies utilised in DBT are likely to have an effect on overgeneral autobiographical memory in a number of ways. Firstly, increasing the Borderline individual’s problem solving repertoire is likely to increase their overall...
level of effective functioning. This in turn, is likely to decrease the need for overgeneral memory which is posited to be a form of avoidant coping. Research suggests that individuals with Borderline Personality Disorder tend to display a problem solving style that is characterised by emotional avoidance (Conklin et al., 2006), active passivity (Linehan, 1993a), high dependency and emotional reliance on others (Percy & Cooper, 1985), and high levels of escape / avoidance (Bijttebier & Vertommen, 1999; Kruedelbach et al., 1993). Increasing their ability to handle problems is likely to decrease the extent to which these individuals must resort to avoidance / escape strategies such as overgeneral autobiographical memory.

Secondly, on a practical level, problem solving training in DBT teaches the individual to describe problems in specific detail and to consider the chain of events that lead to problematic behaviours for particular patients in specific situations (M. Z. Brown, 2006; Linehan, 1993a). Discussing the chain of events that led to dysfunctional behaviour is posited to enhance episodic memory for sequences of information due to the rehearsal involved in this process (Tan & Ward, 2000). Increasing specificity through rehearsal may also have a flow-on effect such that future events will be encoded at a more specific level, thereby increasing overall level of autobiographical specificity.

**Overgeneral Memory as a mechanism of change in DBT**

Despite the mounting body of evidence which supports the efficacy of DBT in the treatment of Borderline Personality Disorder, the processes by which DBT produces change are as yet, unknown. There has been a recent drive towards delineating the
mechanisms of change in DBT in an effort to further the process of treatment development and refinement (Lynch, Chapman et al., 2006). The possible mechanisms currently under consideration are wide and varied (Lynch, Chapman et al., 2006), however, one possible mechanism for producing change which has not yet been studied is the effect which DBT has on overgeneral autobiographical memory.

Evidence arising from past research supports the supposition that change in autobiographical memory style may be one mechanism by which therapeutic change occurs in DBT. Firstly, research suggests that autobiographical memory style is related to treatment outcome. Brittlebank et al (1993) conducted a longitudinal study with individuals undergoing psychiatric treatment for Major Depressive Disorder. They found that overgeneral memory at baseline was highly correlated with failure to recover from depression and concluded that overgeneral memory is indicative of a vulnerability to persistent depression. Secondly, evidence suggests that overgeneral recall can be directly modified by therapeutic intervention (Kremers, 2004a; Watkins & Teasdale, 2001; Watkins & Teasdale, 2004; J. M. G. Williams et al., 2000). Thirdly, past research suggests the degree of change in overgeneral autobiographical memory is related to treatment outcome. In a study on women undergoing parent training, Wahler & Afton (1980) found that initially, all of the mothers in their research displayed an inability to give details about stressful events in their lives. However, over treatment, some women developed the ability to give more detailed descriptions of problematic interactions. It was these women who displayed a favourable treatment outcome. These results suggest that persisting is an overgeneral style of recall is predictive of poor outcome, while enhanced autobiographical specificity is predictive of good treatment outcome.
Thus, past research suggests that change in overgeneral memory may not be simply a bi-
product of therapy but may be one of the main mechanisms by which treatment regimes
produce their effects. In line with this theory, it is plausible that DBT reduces symptoms
and enhances functioning through its impact on autobiographical specificity. The most
likely pathway between memory specificity and improved functioning in BPD is problem
solving ability. Increased specificity is thought to directly improve problem solving ability
by increasing the number of cues available to aid in the generation of alternative solutions
and effective decision making (Goddard et al., 2001; J. M. G. Williams, 1996). In turn,
increased problem solving ability is likely to result in a greater ability to deal with
interpersonal and emotional problems and less maladaptive behaviours, many of which are
viewed as the direct result of ineffective attempts to cope with problems and their
emotional consequences (Linehan, 1993a). Thus increased specificity may play a
fundamental role in the treatment outcomes of DBT, through its impact on problem solving
ability.

The aim of the present study was to explore change in autobiographical memory specificity
in individuals with BPD over the course of a year long Dialectical Behaviour Therapy
program. It was hypothesised that autobiographical specificity would increase over
treatment and that increases in specificity would be associated with improved emotion
regulation and problem solving abilities. More specifically, it was hypothesised that as
specificity increases, Borderline individuals would report progressively less intense affect,
would be less afraid of experiencing strong emotions, and would report greater problem
solving orientation and skills. However, given that overgeneral memory functions as a
coping strategy, it was hypothesised that Borderline individuals with an overgeneral
memory style would experience greater distress when undergoing treatment compared with more specific individuals, particularly in the initial phases of the therapy while alternative coping strategies are still being developed.

Method

Subjects

Nineteen volunteers meeting criteria for Borderline Personality Disorder were recruited from the waitlist for Dialectical Behaviour Therapy at the Centre for Psychotherapy, Newcastle. The sample consisted of 16 females and 3 males, aged between 18 and 60 (M=25.21, SD=9.58). Participants were predominantly single (63%), unemployed (58%), and had completed an average of 14 years of education (SD=2.22). Diagnostic assessments on the Borderline participants were conducted by an experienced psychiatrist and career medical officer as part of the routine assessment procedure for determining eligibility for treatment at the Centre for Psychotherapy. Patients were considered eligible for admission to the treatment program if they had a current diagnosis of Borderline Personality Disorder according to the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID II: M. B. First et al., 1997), were eighteen years or over, and had engaged in at least two episodes of self-harming behaviour in the last 12 months. Patients were excluded from the treatment program if they presented with a disabling organic condition, severe substance abuse, schizophrenia, bipolar affective disorder, melancholic or psychotic depression, excessive anti-social behaviour or a developmental disability.
All 37 patients who were accepted into the Dialectical Behaviour Therapy treatment program at the Centre for Psychotherapy during the timeframe of this study were invited to participate in this research. However, only those participants who actually commenced DBT (attended at least one session of group skills training) were included in the analysis for this study. The final sample represented a total of 51% of eligible subjects. No data was available on individuals who declined to participate and it is therefore uncertain whether the groups differed in anyway. Participants were excluded from continuing in the study if they ceased attending DBT. Of the nineteen who commenced DBT within the time frame of this study, 17 completed at least two months of treatment, 16 completed four months, 11 completed 6 months, and 8 completed the entire 12 months program. Of the 11 subjects who dropped out of the DBT program prior to completion, 4 declined to continue after only one or two sessions as they were unable to commit to the time requirements or felt that the style of therapy did not suit their individual needs, 2 moved away, 1 felt they had improved sufficiently and did not need to continue, 1 was discharged due to continued absenteeism, and 3 discontinued for reasons unknown. There was no difference between completers and noncompleters in terms of: age ($p=.35$), education level ($p=.26$), IQ ($p=.08$), borderline symptomatology severity ($p=.37$), depression severity ($p=.26$), or baseline autobiographical recall score ($p=.22$).

**Measures**

A selection of the tests utilised in the correlational study outlined in chapters 2 through 4, were administered on regular occasions in a longitudinal design in order to assess change over treatment. These include: the Autobiographical Memory Test (AMT); the Borderline
Symptom List (BSL), the Beck Depression Inventory, second edition (BDI-II), the White Bear Suppression Inventory (WBSI); the Affect Intensity Measure (AIM); the Affect Control Scale (ACS), the Means – Ends Problem Solving Procedure (MEPS); and the Social Problem Solving Inventory – Revised (SPSI-R). These scales have already been described in detail in chapters 2 through 4 of this thesis but will be briefly reviewed below. An additional scale, the Session Evaluation Questionnaire, was also included in this study.

### Autobiographical Memory

The Autobiographical Memory Test (AMT: J. M. G. Williams & Broadbent, 1986) is a scale designed to assess autobiographical memory specificity. The test consists of a number of orally presented cue words to which participants are instructed to recall specific events from their past, where a specific event is defined as an event which occurred at a particular place and time and did not last longer than 24 hours (J. M. G. Williams, 1996). The AMT was administered and scored according to the procedure outlined in chapter 2 of this thesis. Past research has shown the AMT to be sensitive to changes in autobiographical specificity (Kremers et al., 2006). As autobiographical memory was assessed on 5 different occasions throughout the DBT program, 5 parallel forms of the AMT were used (words shown in Appendix 1). Of these 5, four include word lists taken from Brittlebank et al. (1993), which have been matched for emotionality and frequency. The additional word list was compiled by the student researcher from the Affective Norms for English Words (ANEW) list (Bradley & Lang, 1999). The additional word list was matched to the original four in terms of valence, arousal and frequency. The 5 parallel versions were counterbalanced between participants over the 5 testing occasions. Fifty percent of AMT responses were re-coded by a trained independent rater in order to assess interrater reliability. The level of agreement
between raters was good: Cohen’s overall Kappa = .90 (\(p < .001\)), with Kappa’s for individual questions on the AMT ranging between .86 and .96 (\(p^\prime\)’s all <.001).

**Borderline Symptomatology**

The Borderline Symptom List (BSL: Martin Bohus et al., 2001) is a 95 item, self-report, Likert style questionnaire based on the diagnostic criteria for BPD as outlined in the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV), and on the Diagnostic Interview for Borderlines. Participants are required to rate, on a scale from 0 (not at all) to 4 (very strong), the extent to which they had experienced a particular symptom of BPD in the course of the last week (Martin Bohus et al., 2001). The BSL can be scored to produce an overall symptomatology score, various subscale scores and a maladaptive behaviours score. The BSL also includes a visual analogue measure of overall well-being. Preliminary evidence indicates that the BSL is sensitive to therapeutic change in Borderline symptomatology (Martin Bohus et al., 2007). The BSL was administered pre and post treatment in order to assess the effectiveness of DBT in reducing borderline symptomatology.

**Thought Suppression**

The White Bear Suppression Inventory (WBSI: Wegner & Zanakos, 1994) was included as a measure of the individual’s tendency to suppress thoughts (Muris et al., 1996). This self-report scale consists of 15 items, such as: “There are things I prefer not to think about” and “I have thoughts I cannot stop”, to which subjects are required to respond on a 5 point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Research suggests that the WBSI may not be a unidimensional scale, but rather includes items which assess both
thought suppression and thought intrusions (Rassin, 2003). However, recently, a sub-set of 6 items (items 3, 6, 9, 12, 13 and 15) has been identified as providing a pure measure of “thought suppression” (Palm & Strong, 2007). As such, analysis pertaining to this measure will assess both the total WBSI score and the 6 item subset score (identified as WBSI – thought suppression). Research suggests that the WBSI has good internal consistency (.89) and adequate test-retest reliability (ranging between .69 and .92 over a three month period) (Muris et al., 1996; Wegner & Zanakos, 1994). The WBSI was administered pre and post treatment.

Affect Regulation

The Affect Intensity Measure (AIM: R. J. Larsen & Diener, 1987) is a 40 item questionnaire designed to assess the characteristic strength with which individuals experience emotions. The AIM produces three factor scores: negative reactivity (responsiveness to negative events), negative intensity (strength of negative emotions), and positive affectivity (responsiveness to positive events + strength of positive emotions) (Bryant et al., 1996). The AIM was administered on all five testing occasions across the course of the DBT program. Because of its repeat administration, the AIM was prefixed with the instruction to rate emotional responses for the last 8 weeks only.

The Affective Control Scale (ACS: K. E. Williams et al., 1997) is a 42 item self report measure that measures perceived ability to regulate emotion once it is experienced (Yen et al., 2002). Specifically, the scale assesses the individual’s fear of losing control over their experience of emotions or over the behavioural response to those emotions (K. E. Williams et al., 1997). Items can be summed to give an overall score, or can be divided into four
subscales, fear of anger, fear of depression, fear of anxiety and fear of positive emotions. The ACS was also administered on all five testing occasions across the course of the DBT program and was prefixed with the instruction to rate responses for the last 8 weeks only.

Problem Solving

Problem solving ability was measured within this study using two independent measures. The first of these was the Means-Ends Problem-Solving Procedure (MEPS: Platt & Spivack, 1989), which assesses interpersonal problem solving ability. The MEPS involves successful problem solving scenarios where the participant is given the beginning and the end of a story and is requested to fill in the middle component addressing how the protagonist may progress from the beginning to the end. This study used four scenarios per testing occasion, with the scenarios drawn from Kehrer and Linehan (1996), who have adapted the MEPS scenarios to be particularly relevant to individuals with Borderline Personality Disorder (see Appendix B). Within each version of the MEPS, two scenarios referred to interpersonal difficulties (desired outcome of scenario is the resolution of some form of relationship problem), and two referred to emotional difficulties (desired outcome of scenario is the management of some form of painful emotion). Responses were scored on the following dimensions: number of means (separated according to type, including: active, passive, self regulation, introspective, inappropriate, and irrelevant) and solution effectiveness, rated on a scale from 1 (not at all effective) to 7 (very effective) (Linehan, 2006). MEPS responses were rated by the PhD candidate and 50% were re-coded independently by a trained rater in order to assess the interrater reliability. The overall level of agreement between the raters was good (84%). Binomial regression analysis indicated that there was no difference in inter-rater agreement between stories [W (3) =
1.48, \( p = .69 \). A significant difference in agreement was observed for types of mean [\( W (5) = 22.46, p < .001 \)], with greater agreement observed for inappropriate means compared to the other types of means (\( p < .001 \)). This finding can be accounted for by the explicit nature of actions defined as inappropriate means.

The Social Problem Solving Inventory – Revised (SPSI-R: Thomas, J. D'Zurilla et al., 2002) is a 52 item, Likert type, self-report inventory aimed at assessing problem solving ability in social situations. It consists of five main scales which assess: Positive Problem Orientation; Negative Problem Orientation; Impulsivity / Carelessness style; Avoidance style; and Rational Problem Solving. The Rational Problem Solving scale includes four subscales which address the four main skills involved in problem solving: problem definition and formulation, generation of alternative solutions, decision making and solution implementation and verification. The SPSI-R was administered on all five testing occasions across the course of the DBT program and was therefore prefixed with the instruction to rate problem solving responses for the last 8 weeks only.

**Depressive symptomatology**

Depressive symptomatology was assessed using the Beck Depression Inventory second edition (BDI II: Beck et al., 1996). The BDI-II is a 21 item, self-report inventory that assesses the severity of depressive symptoms experienced during the past two weeks. It has shown excellent reliability (.92 to .93 for outpatient and student samples respectively) and test-retest reliability (.93 over 1 week). The BDI-II was administered on all five testing occasions as a check for current mood.
Emotional Response to Therapy

The Session Evaluation Questionnaire (SEQ: Stiles, Gordon, & Lani, 2002) is a 21 item, self-report scale which is used to judge an individual’s perception of, and emotional reactions to, a single therapy session. The SEQ has two main components: a session evaluation component, which examines the individual’s view of the depth and smoothness of the session; and a post session mood component, which examines the individual’s levels of positivity and arousal. Individual scores can be calculated for each of these dimensions individually (i.e. depth, smoothness, positivity and arousal). The depth score refers to the extent to which the individual perceived the session to be powerful or valuable versus weak or worthless, while smoothness refers to the degree to which the session was experienced as relaxed or comfortable versus tense or distressing. The SEQ has been applied to a variety of sessions, including both individual and group therapy formats. The SEQ has shown high internal consistency, with the alpha coefficients for all indexes ranging from 0.9 to .93 (Stiles et al., 2002). The SEQ was administered after the first group session of each module to assess how difficult the participant was finding skills training to be.

Procedure

The Dialectical Behavior Therapy treatment program on which this study was based was conducted at the Centre for Psychotherapy, Newcastle, which is an outpatient service specialising in the treatment of Borderline Personality Disorder. The treatment program was run in accordance with the standardised procedures set out by Linehan (Linehan, 1993b). Intervention was administered by a team of 13 therapists consisting of: 7 clinical psychologists, 1 psychiatrist, 1 Occupational Therapist, 2 Social Worker therapists, and 2
nurse therapists. All therapists have completed training in DBT, and have extensive experience working with Borderline Personality Disorder. Therapists received ongoing supervision through weekly case consultation to ensure adherence to the DBT model.

The current study was conducted in accordance with procedures approved by the University of Newcastle’s research ethics committee (reference number: H-952-0205), and the Hunter New England Research Ethics Unit (reference number: 04/12/08/3.21). Borderline individuals were followed up over the course of treatment within the Dialectical Behavior Therapy program. All assessments were conducted on an individual basis with the PhD candidate. Baseline assessment sessions were conducted prior to beginning DBT (as outlined in chapters 2-4), and follow-up assessments were conducted at the completion of each of the first three modules of the program and again after completion of the entire program. The schedule for these sessions is shown in Figure 5.1. The Session Evaluation Questionnaire was also administered to participants at the completion of the first skills training session of each module, resulting in a total of six administrations throughout the DBT program.
### Chapter 5: Memory Specificity and DBT

**Figure 5.1 DBT and Testing Schedule**

<table>
<thead>
<tr>
<th>Wait List</th>
<th>Pre-Treatment Induction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assessment 1 = baseline</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>Module 1</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>Module 2</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>Module 3</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>Repeat</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>Repeat</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>Repeat</td>
</tr>
</tbody>
</table>

- Assessment 2 = 2 months
- Assessment 3 = 4 months
- Assessment 4 = 6 months
- Assessment 5 = 12 months

- 2 weeks
- 6 weeks
- 8 weeks
Chapter 5: Memory Specificity and DBT

Results

Participant baseline characteristics

Table 5.1 Means and Standard Deviations for Baseline Scores on Psychological Variables

<table>
<thead>
<tr>
<th>Psychological Measures</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borderline Symptom List</td>
<td>188.79</td>
<td>46.34</td>
</tr>
<tr>
<td>Beck Depression Inventory</td>
<td>36.95</td>
<td>8.53</td>
</tr>
<tr>
<td>WBSI</td>
<td>64.79</td>
<td>4.95</td>
</tr>
<tr>
<td>Affect Intensity Measure</td>
<td>3.8</td>
<td>0.46</td>
</tr>
<tr>
<td>Affect Control Scale</td>
<td>4.91</td>
<td>0.65</td>
</tr>
<tr>
<td>Social Problem Solving – Inventory</td>
<td>8.11</td>
<td>3.94</td>
</tr>
<tr>
<td>Means Ends Problem Solving Measure (total number of means)</td>
<td>11.16</td>
<td>4.60</td>
</tr>
</tbody>
</table>

Means and standard deviations for the Borderline Participants at baseline are presented in Table 5.1. Prior to commencing treatment, the Borderline participants in this study reported typical levels of borderline symptomatology (Group mean equivalent to 46th percentile on the BSL: Martin, Bohus, Limberger, Frank, & Stieglitz, 2004), and depressive symptoms in the severe range (Beck et al., 1996). Compared with past research on non-clinical samples (shown in parentheses), Borderline participants reported higher levels of thought suppression (M=45.76, SD = 9.67: Wegner & Zanakos, 1994), affect intensity (M = 3.7, SD = 0.5: Bryant et al., 1996), and affect control (M = 3.37, SD = .78: K. E. Williams et al., 1997), and poorer problem solving according to the Social Problem Solving Inventory (M = 11.19, SD = 3.02: Thomas. J. D’Zurilla et al., 2002), and the Means Ends Problem Solving procedure (M = 14.13, SD = 5.8: Goddard et al., 1996). However, participants’
scores were comparable to those previously observed in Borderline samples for the Affect Intensity Measure (M = 3.9, SD = .74: Yen et al., 2002), Affect Control Scale (M =4.6, SD = .88: Yen et al., 2002), Beck Depression Inventory – second edition (M = 38.7, SD = 8.6: Yen et al., 2002), MEPS (M = 9.4, SD = 6.1: Kremers et al., 2006), and SPSI-R (M = 6.58, SD = 3.35 : Bray et al., 2007).

Change over Treatment

Analyses were first conducted to determine whether DBT was effective in producing change in any of the variables under consideration. Results for each measure will be detailed separately below. It should be noted that the BSL and WBSI were only administered pre and post treatment, while the remaining measures (BDI-II, AIM, ACS, SPSI-R, and MEPS) were administered on five occasions across the treatment program. Because the retention rate for the treatment program was low, the data available for the pre post comparisons are significantly less (n=8) than those available for the multiple administration measures.

Borderline symptomatology (BSL)

Results indicate that borderline individuals reported significantly less symptomatology after completing the DBT program (M = 104.50, SE = 25.88) compared to when they first entered the program (M = 200.38, SE = 18.52). A paired samples t-test indicated that the reduction in Borderline symptomatology was statistically significant \(t(7) = 6.86, p < .01\). Participants also reported engaging in less maladaptive behaviour after completing DBT (M = 4.25, SE = 1.40), than they had prior to treatment (M = 9.25, SE = 1.82). The decrease in problematic behaviour was also significant \(t(7) = 3.08, p = .02\). In addition,
borderline participants rated their overall well-being significantly higher on the visual analogue measure after completing DBT (M = 66.88%, SE = 7.44) than they had prior to commencing treatment (M = 35.00%, SE = 5.09). The increase in well-being was also statistically significant [\(t(7) = -3.46, p = .011\)]. Investigation of results regarding the BSL indicated that there was one significant outlier (Cooks distance >4/N) which may have been biasing the results observed. However, this outlier displayed scores in the conservative direction, showing less change in borderline symptomatology than expected and indeed, removing this outlier did not change results (\(p<.01\)).

**Thought Suppression (WBSI)**

Borderline participants reported engaging in significantly less thought suppression after completing the DBT program (M = 52.50, SE = 2.08) compared to when they first entered the program (M = 64.63, SE = 1.70). A paired samples t-test indicated that the reduction in thought suppression was statistically significant [\(t(7) = 4.53, p < .01\)]. This analysis was repeated using the 6-item subset of WBSI scores thought to indicate pure thought suppression. Results were comparable, with participants reporting less thought suppression after completing the DBT program (M = 21.13, SE = 1.22) compared to when they first entered the program (M = 26.88, SE = .72). This results was statistically significant [\(t(7) = 5.09, p < .01\)]. Investigation of the spread of results for the WBSI indicated that one participant may have been an outlier (Cooks distance >4/N), however, results remained significant after removing this participant (\(p<.01\)).

Analysis was also conducted to determine whether change in thought suppression over the course of DBT was dependent on change in symptoms of BPD and depression. Depression
and Borderline symptom change scores were calculated by regressing post on pre for both of these variables. The standardized residual scores were then entered as covariates in a repeated measures ANOVA for WBSI score. Results indicate that WBSI changed significantly over treatment after controlling for change in depressive symptoms and Borderline symptoms \( [F(1,5) = 26.47, p<.01] \).

The remaining measures utilised in this study were administered on five occasions across the course of the DBT program. Means and Standard Error terms for each time point are presented in Table 5.2.

**Table 5.2** Means and Standard Errors for all time points

<table>
<thead>
<tr>
<th>Psychological Measures</th>
<th>Mean (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>Beck Depression Inventory</td>
<td>36.95</td>
</tr>
<tr>
<td></td>
<td>(2.85)</td>
</tr>
<tr>
<td>Affect Intensity Measure</td>
<td>3.80</td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
</tr>
<tr>
<td>Affect Control Scale</td>
<td>4.91</td>
</tr>
<tr>
<td></td>
<td>(0.17)</td>
</tr>
<tr>
<td>Social Problem Solving – Inventory</td>
<td>8.11</td>
</tr>
<tr>
<td></td>
<td>(0.78)</td>
</tr>
<tr>
<td>Means Ends Problem Solving Measure (total number of means)</td>
<td>11.16</td>
</tr>
<tr>
<td></td>
<td>(1.03)</td>
</tr>
</tbody>
</table>
Change in these variables was assessed using Linear Mixed Models (LMM) as this form of analysis allows for repeat measure designs with missing data (Vonesh & Chinchilli, 1997). Because LMM’s include all available data points, this form of analysis has greater power as well as providing a more accurate analysis of treatment effectiveness than would be provided by analysis based only on those who completed the entire treatment program. An auto-regressive covariance structure (AR1) was applied to the models as covariance’s for each of the variables were related over treatment (Fahrmeir & Tutz, 1994). The AR(1) based models were compared with models utilizing alternative structures (compound symmetry and unstructured) and were found to be the most appropriate for the number of degrees of freedom, as evidenced by smaller information criteria.

In addition to exploring change over treatment (i.e. pre versus post), a number of planned comparisons between time points will be conducted for each of these measures in order to determine when change occurred during the DBT treatment program. Pairwise comparisons will be conducted for each of the modules separately (i.e. Time 1- Time 2; Time 2-Time 3; Time 3-Time 4), as well as between Time 1 - Time 4 and Time 4 - Time 5 in order to determine whether most of the change was evidenced in the first six months of the program or whether repeating the modules in the second six months produced additional improvement. These time periods will hereafter be referred to as module 1, module 2, module 3, months 1-6, and months 6-12 respectively. The significance level for these comparisons will be adjusted to 0.008 to account for the increase in family-wise error rate. Results for these comparisons will be reported to three decimal places where pertinent due to this alteration in p value.
Self-reported Depression (BDI-II)

Results indicate that self reported depressive symptomatology changed significantly over treatment \([F(4,51) = 6.08, p < .01]\). Pairwise comparisons indicated that BDI-II scores decreased significantly from pre to post treatment \((p < .001)\), with a significant change observed in months 1-6 \((p = .002)\), but not in months 6-12 \((p = .012)\). There were no significant changes in BDI scores in any of the first three modules \((p = .014, .30, \text{and } .29\) respectively). These results are pictured in Figure 5.2 below.

![Figure 5.2 Change in Self-reported Depression Over Treatment](image)

**Figure 5.2** Change in Self-reported Depression Over Treatment

Affect Regulation

Change in each of the Affect Intensity Measure (AIM) subscales was also assessed using Linear Mixed Model (LMM) analysis. Results indicate that negative affect intensity changed significantly with treatment \([F(4,49) = 4.17, p < .01]\). Pairwise comparisons
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revealed that negative affect intensity decreased significantly from pre to post treatment ($p < .001$). However none of the changes for the individual time periods reached significance (module 1: $p = .21$, module 2: $p = .08$, module 3: $p = .39$, months 1-6: $p = .01$, months 6-12: $p = .02$). These results are pictured in Figure 5.3 below.

![Figure 5.3 Change in Negative Affect Intensity Over Treatment](image)

Negative reactivity was also found to change significantly with time [$F(4,47) = 3.05$, $p = .03$]. Pairwise comparisons indicated that negative reactivity decreased significantly between pre and post treatment ($p = .003$), although reactivity did not change significantly for any of the individual time periods assessed (module 1: $p = .02$, module 2: $p = .73$, module 3: $p = .24$, months 1-6: $p = .01$, months 6-12: $p = .24$). These results are pictured in Figure 5.4 below.
There was no effect of treatment on level of positive affectivity \([F(4,47) = .21, p = .93]\) as shown in Figure 5.5.

**Figure 5.4** Change in Negative Reactivity Over Treatment

**Figure 5.5** Change in Positive Affectivity Over Treatment
To determine whether the change in negative intensity and negative reactivity was related solely to symptom improvement, the above linear models were repeated with BDI and BSL scores entered as covariates. The BDI and BSL were time-dependent covariates as they included individual scores for each participant for all time points. Results indicated that change in negative reactivity over treatment was independent of symptom improvement \( F(1,23) = 4.34, p < .05 \), though negative intensity was not \( F(1,23) < .01, p = .98 \).

Analysis also indicated that scores on the Affect Control Scale (ACS) changed significantly over treatment \( F(4,49) = 13.23, p < .01 \). Pairwise comparisons indicated that affect control decreased significantly from pre to post treatment \( p < .001 \), with significant reductions observed in months 1-6 \( p = .004 \), but not in months 6-12 \( p = .98 \). Comparisons of individual modules indicated that affect control reduced significantly after the first module \( p = .001 \) but did not alter appreciably with the second and third module \( p = .11, \) and \( .98 \) respectively). These results are pictured in Figure 5.6.
Investigation of the ACS subscales, indicated that Borderline participants displayed significant reductions in fear of experiencing and expressing all of the emotions assessed, including: anger \(F(4,48) = 9.07, p < .01\), anxiety \(F(4,50) = 4.53, p < .01\), depression \(F(4,50) = 17.02, p < .01\), and positive affect \(F(4,46) = 3.48, p = .02\). These results are shown in Figure 5.7.

Figure 5.6 Change in ACS Total Score Over Treatment
Pairwise comparisons for these subscales ($\alpha = .008$ to correct for multiple comparisons), indicated that all of the subscales changed significantly between pre and post ($p$'s all $<.004$). Fear of anxiety and depression decreased significantly within the first module ($p = .005$, and .007), while there appeared to be no significant change in any of the subscales for the second or third module ($p$’s all $>.16$), or overall for months 1-6 ($p$’s $>.009$). However, fear of experiencing and expressing both anger and depression decreased significantly in months 6-12 of the treatment program ($p$’s $<.001$).

To determine whether the change in the affect control variables was due to symptom improvement, the above linear models were repeated with BDI and BSL scores entered as time-dependent covariates. Results indicated that change in the fear of experiencing and expressing depression was independent of symptom improvement [$F(1,22) = 9.07, p < .01$]. However, the reduction in fear of experiencing and expressing the remaining emotions.
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appeared to be due to symptom reduction as time was no longer a significant predictor once BDI and BSL scores were entered as covariates (anger [F(1,23) = 3.37, \( p = .08 \)], anxiety [F(1,14) = .47, \( p = .51 \)], positive affect [F(1,23) = .92, \( p = .35 \)], and total ACS [F(1,20) = 3.49, \( p = .08 \)].

Problem Solving

Total score on the SPSI-R also changed significantly over treatment [F(4,49) = 5.29, \( p < .01 \)]. Pairwise comparisons indicated that problem solving ability increased significantly from pre to post treatment (\( p = .001 \)), with significant change on this variable occurring within the first module (\( p = .001 \)), but no further significant changes in modules 2 or 3 (\( p = .99 \) and .99). There was a non significant increase in overall problem solving in months 1-6 (\( p = .04 \)) and months 6-12 (\( p = .01 \)). These results are pictured in Figure 5.8 below.

![Figure 5.8 Change in Self-reported Problem Solving Over Treatment](image-url)
Investigation of the individual subscales of the SPSI-R indicated that negative problem orientation \[ F(4,50) = 10.41, p < .01 \] and impulsivity and carelessness changed significantly over treatment \[ F(4,50) = 3.74, p = .01 \], while the change in avoidance bordered on significance \[ F(4,50) = 2.56, p = .05 \]. Follow-up pairwise comparisons for the negative problem orientation and impulsivity subscales indicated that both decreased significantly between pre to post \( (p < .001, \text{ and } p = .008 \text{ respectively}) \), with a significant decrease observed within the first module \( (p < .001, \text{ and } p = .002 \text{ respectively}) \) but no further change in the second and third modules \( (p \text{'s all } > .50) \). Both subscales also decreased in months 1-6 of the program although this did not reach significance \( (p = .01, \text{ and } p = .08 \text{ respectively}) \). Negative problem orientation decreased further in months 6-12 \( (p < .001) \) while impulsivity and carelessness did not \( (p = .09) \). There were no significant results for the avoidance subscale on any of the pairwise comparisons. These results are pictured in Figure 5.9 below.
Figure 5.9 Change in Negative Problem Orientation, Impulsivity/Carelessness and Avoidance Over Treatment

The remaining subscales on the SPSI-R did not change significantly with treatment: positive problem orientation \(F(4,49) = 1.62, p = .19\), rational problem solving \(F(4,49) = 1.12, p = .36\), problem definition and formulation \(F(4,48) = .81, p = .53\), generation of alternative solutions \(F(4,48) = 2.20, p = .08\), decision making \(F(4,49) = .26, p = .91\), and solution implementation and verification \(F(4,50) = 1.17, p = .33\).

For each of the significant SPSI-R variables, further analysis was conducted to determine whether change in problem solving was due to symptom improvement. The above linear models were repeated with BDI and BSL scores entered as time-dependent covariates. Results indicated that change in all of the problem solving variables appeared to be due to symptom reduction as time was no longer a significant predictor of problem solving change.
once BDI and BSL scores were entered as covariates (total problem solving [F(1,18) < .01, 
p = .96], negative problem orientation [F(1,18) = .50, p = .49], impulsivity/carelessness 
[F(1,22) = 1.28, p = .27], and avoidance [F(1,16) = 1.10, p = .31]).

Analysis was also conducted to determine if problem solving ability, as assessed by the Means Ends Problem Solving Procedure (MEPS), changed significantly with treatment. Preliminary exploration of the data indicated that scores on the MEPS were not normally distributed. Various transformations were applied (including natural logarithm, square root and inverse) but the data continued to depart significantly from normality due to the large proportion of zero scores in particular categories. Therefore data were analysed using several generalized estimating equations based on the Poisson probability distribution with log link function, with each of the MEPS categories as dependent variables. Generalised estimating equations were deemed to be an appropriate form of analysis for the MEPS as they include loglinear models for count data and are able to cater for correlated longitudinal data (Hoffman, 2004).

Results indicate that number of active means [χ²(4) = 24.87, p < .01] and total number of means [χ²(4) = 9.59, p = .05], changed significantly with time. Pairwise comparisons indicated that number of active means increased significantly during module 1 (p < .01), remained stable over module 2 (p = .80), and decreased again during module 3 (p = .05), although this did not reach significance after applying the bonferroni correction for multiple comparisons (α = .008). There were no significant differences observed for months 1-6 (p = .42), 6-12 (p = .88), or between pre and post (p = .40). None of the pairwise
comparisons for total means reached significance ($p$’s all > .02). These results are displayed in Figure 5.10.

![Figure 5.10 Change in Active and Total Means Over Treatment](image)

There was no change over time in the number of: passive means [$\chi^2(4) = 1.73, p = .79$], self regulation means [$\chi^2(4) = 5.80, p = .22$], introspective means [$\chi^2(4) = 2.69, p = .61$], inappropriate means [$\chi^2(4) = 5.81, p = .21$], or irrelevant means [$\chi^2(4) = 5.87, p = .21$].

For each of the significant MEPS variables, further analysis was conducted to determine whether change in problem solving was due to symptom improvement. The above generalised estimating equations were repeated with BDI and BSL scores entered as time-dependent covariates. Results indicated that change in active means [$\chi^2(1) = 3.04, p = .08$],
and total means on the MEPS \( \chi^2(1) = .60, p = .44 \) were both non-significant after accounting for change in symptomatology.

Analysis was also conducted to determine if the effectiveness of solutions produced on the MEPS changed with treatment. As MEPS effectiveness data were normally distributed, this analysis was conducted using a Linear Mixed Model (LMM) based on a normal distribution. Results indicated that effectiveness according to the MEPS did not change with treatment \( F(4, 44) = .57, p = .67 \).

**Change in Autobiographical Memory Specificity**

Analysis was also conducted to determine if DBT produced any change in autobiographical memory. As change in autobiographical memory was assessed through the use of five parallel versions of the AMT, analysis was first conducted to check that memory specificity was not affected by differences in AMT version. At time 1, AMT versions were found to differ significantly in terms of the number of specific memories produced \( F(4,14) = 3.93, p=.02 \), but not in number of categoric memories \( F(4,14) = 2.87, p=.06 \), extended memories \( F(4,14) = 1.94, p=.16 \), or omissions \( F(4,14) = 2.08, p=.14 \). However, results also indicated that the spread of AMT versions did not differ significantly across testing occasions \( \chi^2(16) = 14.40, p=.57 \), suggesting that AMT version does not account for change in the memory specificity variables. In order to ensure that AMT version does not influence results pertaining to change in autobiographical memory, AMT version will also be entered as a covariate in further analyses.
Given that AMT data most closely approximates count data, analysis was conducted using a Linear Mixed Model based on the Poisson distribution (Hoffman, 2004). Results indicate that memory specificity increased significantly with treatment \([F(4,48) = 3.43, p = .02]\). Follow up planned comparisons indicated a significant initial increase during module 1 \((p = .004)\), but no significant changes in specificity during module 2 or 3 \((p = .10 \text{ and } .91 \text{ respectively})\), or indeed during months 1-6 \((p = .38)\) or months 6-12 of the program \((p = .11)\). Simple effects analysis comparing pre and post data only bordered on significant \((p = .05)\). These results are pictured in Figure 5.11.

![Figure 5.11](image)

**Figure 5.11** Change in Memory Specificity with Treatment

In order to check that findings regarding the change in memory specificity over treatment were not influenced by the use of multiple versions of the AMT, AMT version was added as a covariate to the above analysis. Results indicate that neither AMT version \([F(1,54) = \text{...}]\).
.29, \( p = .59 \) nor the interaction between time and AMT version [F(4,44) = 2.23, \( p = .07 \)] were related to change in memory specificity. Time remained a significant predictor of memory specificity over and above AMT version [F(4,46) = 3.37, \( p = .02 \)]. However, when BDI score and BSL score were entered as time-varying covariates, time was no longer a significant predictor of specificity [F(1,12) = 1.53, \( p = .24 \)], indicating that change in memory may be a function of symptom improvement.

Results also indicate that number of extended memories decreased significantly with treatment [F(4,51) = 3.40, \( p = .02 \)]. Follow up planned comparisons indicated that number of extended memories did not change significantly during modules 1, 2, or 3 (\( p = 1.00, 1.00 \) and 1.00 respectively), or indeed during months 1-6 (\( p = .98 \)) or months 6-12 of the program (\( p = .15 \)). However, a significant decrease was observed between pre and post (\( p = .005 \)). Again, neither AMT version [F(1,58) = .47, \( p = .50 \)], nor the interaction between Time and AMT version [F(4,51) = 2.41, \( p = .06 \)] were significant, indicating that differences in AMT versions do not account for these results. Time also remained a significant predictor of number of extended memories, even when BDI and BSL scores were entered as time-varying covariates, indicating that change in extended memories was largely independent of symptom improvement [F(1,12) = 15.78, \( p < .01 \)]. These results are pictured in Figure 5.12.
There was no change in number of categoric memories \( F(4,53) = 1.05, p = .40 \), or omissions \( F(4,48) = .95, p = .45 \) over the course of treatment. Change in both categoric memory and number of omissions was unrelated to AMT version \( (p = .70 \) and .65 respectively) and the interaction between AMT version and time \( (p = .92 \) and .20).

**Memory specificity and change over treatment**

Next, analysis was conducted to determine if the changes observed in symptomatology, affect regulation, and problem solving ability, were related to memory specificity. This investigation consisted of two main components: 1) an exploration of the relationship between change over treatment and baseline memory specificity and, 2) an exploration of the association between change over treatment and the degree of change in memory specificity.
In order to explore the relationship between change over treatment and baseline memory specificity, baseline specificity score was added as a covariate in each of the Linear Mixed Models described above. Linear Mixed Models analysis provides an appropriate framework for assessing change over time as related to individual covariates (Vonesh & Chinchilli, 1997). Results indicate that baseline specificity was not related to change in: borderline symptomatology \([F(1,18) < .01, p = .99]\), maladaptive behaviours \([F(1,19) = .05, p = .83]\), overall well being \([F(1,19) = .46, p = .51]\), self-reported depression(BDI-II) \([F(1,22) = .25, p = .62]\), thought suppression according to the full WBSI \([F(1,20) = .60, p = .45]\), or thought suppression as assessed by the 6-item subset of the WBSI \([F(1,22) = .97, p = .33]\). It should be noted, however, that due to the low retention rate in the treatment program on which this study was based, analysis for the pre post measures (BSL and WBSI) was based on a total of only 8 subjects, and therefore has low power.

Results also indicated that baseline specificity was not related to change over treatment in any of the Affect Intensity Measure (AIM) variables, including: negative affect intensity \([F(1,19) = 2.41, p = .14]\), negative reactivity \([F(1,17) = .38, p = .54]\), or positive affectivity \([F(1,18) = .07, p = .80]\). Nor was baseline specificity related to change in any of the Affect Control Scale (ACS) variables, including: total affect control \([F(1,18) < .01, p = .97]\), anger \([F(1,18) = .41, p = .53]\), anxiety, \([F(1,19) = .07, p = .79]\), depression \([F(1,19) = .53, p = .48]\) or positive affect \([F(1,16) = .16, p = .69]\).

Furthermore, baseline specificity was unrelated to change in problem solving according to the SPSI-R, including total score \([F(1,20) < .01, p = .93]\), as well as all of the SPSI-R subscales: positive problem orientation \([F(1,20) < .01, p = .99]\), negative problem
orientation \( F(1,20) < .01, p = .99 \), rational problem solving \( F(1,19) = .31, p = .59 \),
problem definition and formulation \( F(1,18) = 1.81, p = .20 \), generation of alternative
solutions \( F(1,18) = .27, p = .61 \), decision making \( F(1,19) = .63, p = .44 \), solution
implementation and verification \( F(1,21) = 1.13, p = .36 \), impulsivity / carelessness
\( F(1,19) < .01, p = .96 \), and avoidance \( F(1,19) = .02, p = .88 \).

Because MEPS data were non-normally distributed, the relationship between baseline
specificity and change in MEPS over treatment was assessed using several generalized
estimating equations with baseline specificity entered as a covariate. Results indicated that
baseline specificity was not related to change in any of the MEPS indices, including: active
means \( \chi^2(4) = .39, p = .53 \), passive means \( \chi^2(4) = .18, p = .67 \), self regulation means
\( \chi^2(4) = .36, p = .55 \), introspective means \( \chi^2(4) = 1.36, p = .24 \), inappropriate means
\( \chi^2(4) = 2.31, p = .13 \), irrelevant means \( \chi^2(4) = .24, p = .63 \) or total means \( \chi^2(4) = .28, p
= .60 \). Change in MEPS effectiveness (as assessed by LMM) was also unrelated to baseline
memory specificity \( F(1,17) = 3.64, p = .07 \).

The second component of the analysis was to explore the association between change over
treatment and the degree of change in memory specificity. Several Linear Mixed Models
were conducted with time as the repeat measures factor, and memory specificity entered as
a covariate. Memory specificity was a time-dependent covariate as it included specificity
scores for each participant for all time points. Results indicated that change in memory
specificity was not related to change in: borderline symptomatology \( F(1,24) = .35, p = .56 \),
maladaptive behaviours \( F(1,23) = .39, p = .54 \), overall well being \( F(1,22) = .20, p = .66 \),
depressive symptoms \( F(1,65) = .69, p = .41 \), thought suppression as assessed by the full
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WBSI \[F(1,22) = 1.33, p = .26\], or thought suppression as assessed by the 6-item subset of the WBSI \[F(1,22) = 1.28, p = .27\].

Change in memory specificity approached significance in its relationship to change in the negative reactivity scale of the AIM \[F(1,63) = 3.32, p = .07\]. The relationship between these variables was negative such that increases in specificity were associated with reductions in negative reactivity. There was no relationship between change in specificity and change in the negative intensity \[F(1,64) = 1.50, p = .23\] or positive affectivity \[F(1,61) = .02, p = .88\] subscales of the AIM. Change in memory specificity also approached significance in its relationship to change in the Affect Control Scale \[F(1,56) = 4.13, p = .05\]. Again, the relationship between these variables was negative, such that increases in specificity were associated with reductions in the fear of experiencing and expressing emotion. Further investigation indicated that change in specificity was negatively associated with change in the anger subscale \[F(1,65) = 3.75, p = .06\], but was unrelated to change on any of the other ACS variables, including: anxiety \[F(1,57) = 2.36, p = .13\], depression \[F(1,61) = .24, p = .63\], or positive affect \[F(1,60) = 1.16, p = .29\].

Change in memory specificity was found to be unrelated to change in problem solving according to the SPSI-R, including total score \[F(1,61) = .80, p = .38\], and all of the SPSI-R subscales: positive problem orientation \[F(1,64) = .10, p = .75\], negative problem orientation \[F(1,60) = .69, p = .41\], rational problem solving \[F(1,63) = .46, p = .50\], problem definition and formulation \[F(1,63) = .01, p = .91\], generation of alternative solutions \[F(1,61) = .28, p = .60\], decision making \[F(1,64) = .18, p = .67\], solution
implementation and verification \[ F(1,65) = .51, p = .48 \], impulsivity / carelessness \[ F(1,64) = 1.42, p = .24 \], avoidance \[ F(1,63) = 1.41, p = .24 \].

MEPS data were analysed using several generalized estimating equations with the aggregate specificity variable entered as a covariate. Results indicate that change in specificity was not related to change in any of the MEPS indices, including: active means \[ \chi^2(4) = .20, p = .61 \], passive means \[ \chi^2(4) = .04, p = .84 \], self regulation means \[ \chi^2(4) = 1.26, p = .26 \], introspective means \[ \chi^2(4) = 1.02, p = .31 \], inappropriate means \[ \chi^2(4) = .58, p = .45 \], irrelevant means \[ \chi^2(4) = 2.02, p = .16 \] or total means \[ \chi^2(4) = 1.93, p = .17 \]. Change in MEPS effectiveness (as assessed by LMM) was also unrelated to change in memory \[ F(1,64) = 1.53, p = .22 \].

As a reliability check for the form of analysis utilised to assess the relationship between change in specificity and the psychological variables, analyses were repeated using alternative methods for all of the variables which approached or reached significance (namely the negative reactivity scale of the AIM, the Affect Control Scale total score, and the anger subscale of the ACS). Change scores were obtained by regressing pre against post for all variables, and these were entered into a linear mixed model, in addition to a standard linear regression. Results indicate that the negative reactivity subscale of the AIM, which approached significance in its relationship to change in specificity \[ F(1,63) = 3.32, p = .07 \], was significantly related to change in memory specificity according to the LMM using change scores \[ F(1,42) = 6.52, p = .01 \], and the linear regression using change scores \[ F(1,50) = 7.46, p = .01 \]. Results for the ACS total score were comparable for all three methods of analysis [LMM aggregate: \[ F(1,56) = 4.13, p = .05 \]; LMM change: \[ F(1,45) = \]
3.89, \( p = .06 \), Regression change: \( F(1,59) = 4.21, p = .05 \). However, notably, the anger subscale of the ACS which approached significance in the LMM based on aggregate specificity \( [F(1,65) = 3.75, p = .06] \) was clearly non-significant according to the LMM based on change scores \( [F(1,46) = 2.21, p = .14] \) and the regression based on change scores \( [F(1,50) = 2.50, p = .12] \). This result may be a reflection of reduced degrees of freedom in the analyses using change scores, however, this seems to be questionable given that the significance for the negative reactivity scale increased in the analysis using change scores. It should also be noted that in all of the above analyses, adding memory specificity (both at baseline and aggregate) did not alter the relationship between any of the variables and time (largest change in \( \chi^2 = .51 \)).

Reaction during Treatment

Lastly, analysis was conducted to assess whether participant’s judgments and emotional responses to skills training sessions (as assessed by the SEQ) changed across treatment and to determine whether session ratings were in any way determined by baseline memory specificity score or change in specificity across treatment. The SEQ was administered after the first session of each module and data are therefore available for six time points. Analysis was conducted using Linear Mixed Models with each of the SEQ subscales as the dependent variables and time as the repeat measures variable. Results indicate that SEQ ratings did not change significantly over treatment: depth \( [F(5,45) = 1.20, p = .32] \), smoothness \( [F(5,44) = 1.52, p = .20] \), positivity \( [F(5,45) = 1.10, p = .38] \), and arousal \( [F(5,45) = .43, p = .83] \). These results are pictured in Figure 5.12 below.
Baseline specificity was not related to change in SEQ scores: depth \(F(1,21) < .01, p = .99\), smoothness \(F(1,21) = .48, p = .50\), positivity \(F(1,22) < .01, p = .99\), arousal \(F(1,24) = 2.03, p = .17\). Nor was change in specificity (as assessed by entering aggregate specificity score as a covariate) related to change in SEQ scores: depth \(F(1,48) = 1.28, p = .26\), smoothness \(F(1,44) = .05, p = .82\), positivity \(F(1,45) = .06, p = .82\), arousal \(F(1,51) = .66, p = .42\).
Discussion

Dialectical behavior therapy (DBT) is a broad-based cognitive-behavioural treatment developed by Marsha M. Linehan specifically to address the needs of individuals with Borderline Personality Disorder (Linehan, 1993b). Empirical evidence suggests that DBT is an efficacious form of treatment for many of the difficulties associated with BPD (Feigenbaum, 2007). The present study extended research in this area by exploring the effect of DBT on overgeneral autobiographical memory.

Effectiveness of treatment

In general, the results of this study support the proposition that Dialectical Behaviour Therapy is an effective form of treatment for individuals with Borderline Personality Disorder as improvement was observed in nearly all areas under examination. However, it should be noted that in the absence of a control group, it is unclear whether the improvement observed was the result of DBT, or a function of other variables, including: natural recovery, maturation effects, the course of the illness, seasonal changes, regression to the mean, or the effects of repeated testing. Moreover, given the small sample size, and high-drop out rate, the generalisability of these findings is unknown. Further research is needed to explicate these findings further.

First and foremost, results indicate a significant reduction in overall level of Borderline symptomatology over the course of treatment in a Dialectical Behaviour Therapy program. Prior to commencing DBT, the participants in this study reported a level of Borderline symptomatology on the BSL sufficient to place them at the 50th percentile for individuals
with BPD (Martin, Bohus et al., 2004). After completing treatment, their symptomatology score had decreased significantly, to approximately the 15th percentile. Dialectical Behaviour Therapy also appears to have an effect on the behavioural dysregulation of Borderline individuals, with participants reporting significantly less maladaptive behaviours after completing treatment. That is, the borderline participants reported engaging in less self-harm, substance use, acts of aggression, and other risk-taking behaviours after treatment relative to their pre treatment levels. In addition, the Borderline participants in this study rated their overall level of well-being as significantly improved after completing treatment, with ratings increasing from an average of 35% to 67%. Borderline participants also reported less depressive symptoms after completing DBT, with BDI-II scores decreasing from the “severe” range at pre-treatment to “minimal / mild” levels after treatment. Furthermore, Borderline participants reported significantly less thought suppression after completing the DBT program. This result remained significant after controlling for change in Borderline and depressive symptomatology over treatment, indicating that the effect on thought suppression is not a by-product of change in overall symptomatology. These results appear to suggest that Dialectical Behaviour Therapy is an effective form of treatment for addressing the symptoms and maladaptive behaviours associated with Borderline Personality Disorder.

These findings are consistent with past research suggesting that DBT is an efficacious form of treatment for Borderline Personality Disorder (for a review, see Feigenbaum, 2007). More specifically, past research has indicated that DBT significantly reduces Borderline symptomatology (Martin Bohus et al., 2007; Harley et al., 2007), and self reported depression (M. Bohus et al., 2004; Freda, 1999; Koons et al., 2001; McQuillan et al., 2005),
although some evidence suggests that DBT is no more effective than treatment as usual in addressing symptoms of depression in this population (Linehan et al., 1991; Linehan et al., 2006). This is the first study, to my knowledge, however, to explore the effects of DBT on thought suppression. Results suggest that thought suppression as measured by the White Bear Suppression Inventory reduced significantly over the course of treatment in a DBT program. Reductions in thought suppression were observed for both total score on the WBSI, and the six-item subset score which has been identified as providing a pure measure of “thought suppression” (Palm & Strong, 2007). This is an important finding as evidence suggests that thought suppression has the paradoxical effect of increasing intrusive thoughts (Abramowitz et al., 2001; Lynch et al., 2007; Purdon, 1999; Wenzlaff & Wegner, 2000), and this measure can therefore be thought of as a measure of failed suppression or severity of intrusive thoughts (Rassin, 2003).

Secondly, significant improvement was observed in the affect regulation difficulties of the Borderline individuals over the course of treatment in Dialectical Behaviour Therapy. An earlier study (see Chapter 3) indicated that borderline individuals tend to display an overwhelming fear of experiencing and expressing emotions, increased intensity of negative emotions, and a tendency to be less responsive to positive events and to experience less intense positive emotions when clinical depression is also present. The results of the present study indicate significant change in these affect-related variables over the course of treatment in a Dialectical Behavior Therapy program. In particular, substantial reductions were observed in negative affect intensity and reactivity, although there was no change in the extent to which Borderline individuals responded to positive events. Furthermore, negative intensity and reactivity were found to change significantly
over treatment even after controlling for change in self reported depression and borderline symptomatology, indicating that change in these variables is independent of general symptom improvement.

Over the course of treatment, Borderline individuals also reported being less afraid of experiencing and expressing emotions, including: anger, anxiety, depression, and positive affect. However, this effect appeared to be mainly due to symptom improvement as there was no significant change with time once change in self reported depression and borderline symptomatology was accounted for. Overall, these results suggest that after completing Dialectical Behavior Therapy, Borderline individuals are likely to be less sensitive to negative events, will experience less intense negative emotions, and will be less afraid of experiencing and expressing a wide range of emotions.

Although affect dysregulation is considered to be a core component of BPD, there has been minimal research to date directly assessing the impact that Dialectical Behavior Therapy has on emotion regulation capabilities. What research has been conducted, however, suggests that DBT is effective in reducing emotional instability in this population. Enhanced affect regulation as a result of DBT has been demonstrated on the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004; Kirby & Baucom, 2007), the Distress Tolerance Scale (Hong, 2004; Simons & Gaher, 2005), and the emotional instability subscale of the Life Problems Inventory (Miller et al., 2000; Rathus & Miller, 1995). The results of the present study provide further evidence that Dialectical Behavior Therapy is an effective form of treatment for affect dysregulation and, more specifically, provide direct
Chapter 5: Memory Specificity and DBT

evidence that DBT has an effect on affect intensity and reactivity, as well as decreasing the extent to which Borderline individuals perceive emotions as overwhelming.

Thirdly, significant improvement was observed in the problem solving deficits displayed by Borderline individuals over the course of treatment in a Dialectical Behaviour Therapy program. In regards to self reported problem solving ability, an earlier study (see Chapter 4) indicated that the problem solving deficits of borderline individuals appear to extend to all components of the problem solving process, from poor problem orientation, to maladaptive problem solving styles and ineffective problem solving skills. The results of the present study indicate that overall problem solving ability, as assessed by self-report on the SPSI-R, increases significantly with treatment. However, investigation of the individual components of problem solving ability indicated that improvements were observed mainly in terms of reductions in negative problem orientation, impulsivity / carelessness, and avoidance. There was no change in positive problem orientation or any of the rational problem solving variables. This suggests that Dialectical Behaviour Therapy affects problem solving ability by reducing the extent to which Borderline individuals view problems as a threat, doubt their ability to solve problems successfully, procrastinate and rely on others to solve their problems, or apply problem solving strategies in a way which is impulsive and careless (Thomas. J. D'Zurilla et al., 2004). Change in these problem solving variables appeared to be related to symptom improvement. However DBT does not affect the extent to which Borderline individuals are able to engage in the deliberate, systematic, and effective application of problem-solving skills, including the ability to clearly define and formulate the problem, generate alternative solutions, make decisions, and monitor solution implementation (Thomas. J. D'Zurilla et al., 2004).
Nor did DBT appear to have any sustained effects on performance based problem solving ability as assessed by the MEPS. There was an initial increase observed in the total number of means, and the number of active means produced on the MEPS. However these indices returned to baseline level by the third module and there was no difference observed between pre and post treatment. Moreover, the initial increase in active and total means appeared to be mainly due to symptom improvement as there was no significant change with time once change in self reported depression and borderline symptomatology was accounted for. In addition, there did not appear to be any change in either the effectiveness of the solutions produced or in the number of: passive means, self regulation means, introspective means, inappropriate means, or irrelevant means, over the course of treatment. This suggests that Dialectical Behaviour Therapy enhances perception of one’s problem solving ability, but may not actually improve social problem solving performance.

Despite the strong emphasis which Dialectical Behaviour Therapy places on problem solving training, there has been, as yet, minimal research exploring the effectiveness of DBT in enhancing problem solving abilities. Only one study to date has directly assessed the impact of DBT on problem solving ability (Friedrich, Gunia, & Huppertz, 2003). This study, which examined DBT as provided by a network of private practitioners, found that Borderline patients who received DBT reported significant improvement in their problem solving capabilities (Friedrich et al., 2003). The results of the present study also suggest that DBT has an impact on problem solving ability, however, this appears to be limited to its effect on problem orientation and problem solving style rather than on actual problem solving skills or performance. In particular, there appears to be a significant reduction in
the degree of negativity which Borderline individuals bring to the problem solving process, and a decrease in their impulsivity and avoidance over the course of treatment.

Improvement in these particular domains may be seen as a reflection of the systematic, collaborative, and hopeful problem solving stance modelled and advocated by DBT therapists and trainers (Linehan, 1993a). It is unclear why the problem solving training provided in DBT does not translate into a more positive perception of actual problem solving skills as rated on the SPSI-R, nor increase problem solving performance as assessed by the MEPS. It is possible that this result is influenced by the measures used in this study, perhaps due to artificial sampling of problem solving performance or insensitivity of the measures to change. However, the MEPS has been used in past research and found to be sensitive to therapeutic change in problem solving ability, over periods as short as 6 weeks (Coche & Flck, J. Intagliata & Doyle, 1984; J. C. I. Intagliata, 1978; Tellado, 1984).

Further research, using alternative measures of problem solving ability, is needed to clarify the effect which DBT has on problem solving ability. Regardless, improving problem orientation and problem solving style, even without subsequent improvement in skills, is likely to be of benefit to Borderline individuals as research indicates that perception of one’s ability to solve problems is more important in relation to depression and stress than actual problem solving ability (Schur, 1999).

The longitudinal design of this study also allowed some investigation of the critical time periods for change throughout the year-long DBT program. Results indicated that the first six months of the DBT program were sufficient to produce significant change in the extent to which individuals with Borderline Personality Disorder fear experiencing and expressing a range of emotions, including: anger, anxiety, depression and positive affect. Borderline
individuals also demonstrated improvement in their self-reported problem solving ability over the first six months of treatment, particularly in terms of negative problem orientation and impulsivity, although this did not reach statistical significance. Notably, a significant amount of the change observed for these variables occurred within the first module, indicating that improvement in evidenced very early in treatment within DBT. However, the second six months of the treatment program appeared to produce additional improvement in the extent to which individuals fear experiencing and expressing emotions, with substantial improvement in fear of anger and depression in particular occurring at this late stage of treatment. Months six-to-twelve of treatment also appear to lead to further improvement in problem solving orientation. Several of the variables, including negative affect intensity and reactivity, appear to gradually increase over the course of the entire treatment program, with significant differences observed between pre and post treatment but not limited to any of the individual time periods assessed. These results suggest that DBT is effective in producing change at a very early stage, but that additional improvements are gained by completing the entire twelve month program. This supports Linehan’s recommendation of a standard twelve month DBT regimen (Linehan, 1993b). However, it should be noted that of the 19 participants who commenced DBT, 8 withdrew within the first six months, and a further 3 withdrew prior to completion. This suggests that only half of the individuals who commence treatment will be retained in DBT for sufficient duration to capitalize on the benefits of the full program. It is evident that treatment retention continues to be a problem for individuals with Borderline Personality Disorder, and that addressing this difficulty would result in improved outcomes in this population.
In summary, the results of the present study indicate that Dialectical Behaviour Therapy is an effective form of intervention for Borderline Personality Disorder, with treatment being associated with reductions in overall level of symptomatology, maladaptive behaviour, depressive symptoms, thought suppression, affect dysregulation, impulsivity and avoidance, and improvements in problem solving orientation and overall level of self-reported well-being. Moreover, results suggest that improvement is evidenced over the full twelve months of the program, supporting the recommendation of a twelve month standard DBT regimen. Research has demonstrated the effectiveness of DBT on a wide variety of outcome measures: from improving treatment retention, psychological well being, and interpersonal functioning, to reducing suicidal behaviours, substance abuse, and inpatient admission days (Feigenbaum, 2007). The results of the present study extend these results, suggesting that DBT is also effective in reducing fear of experiencing and expressing emotions, decreasing negative intensity and reactivity, and decreasing negative problem solving orientation, impulsivity and avoidance. It should be noted, however, that as there was no control group included in this study, it is not certain that DBT produced the changes observed, or that outcomes were superior to treatment as usual.

**Change in memory specificity over treatment**

The results of the present study also indicate that memory specificity increases over the course of treatment in a Dialectical Behaviour Therapy program. The number of specific responses produced on the AMT increased from 65% at baseline to 80% post treatment. Conversely, number of extended memories was found to decrease significantly with treatment. Investigation of these results indicated that change in memory specificity was
predominantly due to general symptom improvement, including change in self-reported depression and borderline symptomatology, although change in number of extended memories appeared to be largely independent of symptom change.

A number of possible suggestions may be raised to explain the effect which DBT has on autobiographical memory. Firstly, it is possible that mindfulness skills, which are a core component of DBT, may alter memory specificity by increasing the individual’s ability to tolerate exposure to problematic experiences which would previously have been managed through avoidance strategies such as overgeneral memory (Lynch, Chapman et al., 2006). Secondly, by providing training in emotion regulation and distress tolerance, DBT may lead to improved affect regulation which will decrease the need for overgeneral memory as an affect regulation strategy (J. M. G. Williams, 1996). Thirdly, increasing problem solving ability directly through problem solving training is likely to decrease the extent to which borderline individuals need to resort to avoidance/escape strategies, such as overgeneral autobiographical memory, in order to deal with problems which arise in daily life. Finally, DBT may impact on memory specificity by promoting assimilation of problematic experiences which is thought to be a common change mechanism for many or all psychotherapies (Stiles et al., 1990).

Unfortunately, there is no direct evidence as to which particular component of DBT has produced the observed effect in autobiographical specificity. Investigation of individual constituents in DBT is made difficult by the overlapping and interwoven way in which the skills are taught in individual and group training sessions throughout the entirety of the DBT program. Moreover, at the particular centre where this research was conducted, skills
training modules are run on a rotating basis with individual clients commencing skills training with whatever module is being run at the time they are judged to be ready to begin skills training. This means that there is no consistency in the order with which participants’ complete skills training, making it even more difficult to assess the relative impact which individual modules have on autobiographical memory specificity. However, some tentative hypotheses may be formed on the basis of the timing of the observed effects. It appears that memory specificity improves very early during treatment, with most of the increase in specificity occurring within the first module. Of the affect regulation and problem solving variables under investigation, negative problem orientation and fear of experiencing and expressing emotions, particularly anxiety and depression, were also observed to change significantly during the first module. It appears plausible that the increase in memory specificity may thus be a result of an increase in willingness to be exposed to distressing emotions (lower ACS scores), and an increase in confidence regarding one’s ability to confront problematic experiences (less negative problem orientation). Increased mindfulness may be the mechanism driving both of these observed effects as mindfulness skills are the first skills taught during group training and are thought to foster non-judgmental awareness of, and contact with, internal experiences (Linehan, 1993a). Past research supports this suggestion, as mindfulness based interventions have been found to increase autobiographical specificity (Watkins & Teasdale, 2001; Watkins & Teasdale, 2004; J. M. G. Williams et al., 2000). It is also plausible that mindfulness has a beneficial effect by fostering successful assimilation of problematic experiences through exposure, thereby decreasing the need for overgeneral memory which is typically evident prior to, or in the early stages of, the assimilation process (J. M. G. Williams et al., 1999). If mindfulness is indeed the driving mechanism behind the observed changes, then one would
expect that similar results would be produced by interventions which focus solely on the use of mindfulness. Conversely, it may be that it is combination of mindfulness and skills training, particularly in the distress tolerance domain, that leads to the decreased need for emotional avoidance strategies such as overgeneral memory. More research, particularly of an experimental design, is needed to elucidate which particular elements of DBT are related to change in autobiographical memory specificity.

The Relationship between Memory Specificity and Treatment Effectiveness

Finally, the results of the present study provide minimal evidence that memory specificity is a mechanism for change in DBT. Results indicated that baseline specificity was unrelated to change in any of the variables under investigation. This suggests that level of autobiographical specificity does not determine the degree to which individuals will benefit from treatment in Dialectical Behavior Therapy. Furthermore, investigation of the relationship between change in memory specificity and change in the psychological variables yielded little conclusive evidence. There appeared to be some relationship between change in autobiographical memory and the degree of change in the negative reactivity subscale of the AIM, total ACS score, and the anger subscale of the ACS, suggesting that the more specific the individual became over treatment, the less reactive they were to negative events, and the less they feared experiencing and expressing emotions, particularly anger. However, these effects were not particularly robust (only bordering on significance) and the strength of the relationship appeared to vary according to the type of statistical analysis used. It is possible that this is a reflection of the small
sample size in this study and that with increased power a more consistent relationship would be observed.

However, change in memory specificity was also found to be unrelated to change in the remaining affect regulation variables, including negative affect intensity, positive affectivity, and fear of depression, anxiety and positive affect. Change in memory specificity was also unrelated to the degree of improvement in borderline symptomatology, maladaptive behaviours, depressive symptoms, thought suppression, and overall well-being. Adding autobiographical specificity to the analysis of these variables did not reduce the relationship between time and outcome, indicating that DBT has a treatment effect over and above its impact on memory specificity. The independence of memory specificity and treatment outcome indicates that autobiographical memory is not the underlying mechanism by which change is brought about in affect regulation or symptomatology within this treatment program.

The absence of a definitive relationship between memory specificity and affect regulation over treatment is contrary to expectations given that overgeneral memory is typically thought to serve an affect regulation function in clinically disordered populations (J. M. G. Williams, 1996). It is suggested that individuals with Borderline Personality Disorder will develop an overgeneral style of memory due to their temperamental difficulties in controlling affect (J. M. G. Williams, 1996). However, if overgeneral memory were a direct response to affect dysregulation in this population, then one would expect that overgeneral memory would decrease in response to treatment which improves affect regulation capabilities. That is, improving affect regulation should decrease the need for overgeneral
memory by providing the individual with the skills necessary to deal with the emotions elicited by specific memory recall. However, such a relationship was not observed in this study, with no clear association observed between change in affect regulation and memory specificity. Again, there was some indication that memory specificity may be related to negative reactivity and fear of emotions, particularly anger, and further research with larger samples may clarify these findings. However, on the basis of the evidence available, it is concluded that change in affect regulation in DBT is independent of the impact which this treatment program has on memory specificity.

Change in memory specificity also appeared to be unrelated to change in problem solving ability as assessed by both the MEPS and the SPSI-R. This finding is contrary to expectations given that reduced memory specificity is thought to directly impair problem solving ability by reducing the cues available for effective problem solving (Goddard et al., 2001; J. M. G. Williams, 1996). Correlational studies have appeared to support this hypothesis, with results indicating a clear association between problem solving ability and reduced specificity (Evans et al., 1992; Goddard et al., 1996, 1997; Kaviani et al., 2005; Pollock & Williams, 2001; Raes, Hermans, Williams, Demyttenaere et al., 2005; Scott et al., 2000; Sidley et al., 1997, and chapter 4 of this thesis). However, if a causal relationship indeed exists between memory specificity and problem solving ability, then increasing memory specificity should lead to a subsequent improvement in problem solving ability. This did not appear to be the case, at least in this population, with DBT producing a significant increase in specificity without leading to increased performance on the MEPS or self reported problem solving skills, including the ability to generate alternatives and make decisions. Conversely, if overgeneral memory is a form of escape / avoidance employed by
individuals with ineffective styles of coping, then one would also expect a direct association between improved problem solving orientation and memory specificity. Again, such a relationship was not observed in this study, with improvement in negative orientation, impulsivity and avoidance independent of change in memory specificity. Past experimental research has demonstrated similar results, with evidence suggesting that priming autobiographical memory specificity does not improve social problem solving ability (Beaman et al., 2007; Goddard et al., 2001). The results of the present study add further weight to these findings, indicating that a treatment protocol, which produced sustained improvement in autobiographical specificity, did not lead to subsequent improvement in problem solving ability. This finding raises important theoretical questions in regards to the notion that overgeneral memory and problem solving ability are causally related.

However, it is important to note that the exploration of the relationship between autobiographical memory specificity and problem solving in the current study may be somewhat limited due to the exclusive reliance on the AMT to assess the use of autobiographical memory. Previous research by Goddard et al. (2001) has suggested that the association between memory specificity and problem solving is best observed by investigating the number of helpful memories which are retrieved during the actual process of problem solving. This study does not address the issue of autobiographical memories arising during problem solving and as such provides a limited exploration of the association between problem solving and autobiographical memory in this population.
Summary

In summary, the results of the present study indicate that Dialectical Behaviour Therapy is an effective form of intervention for Borderline Personality Disorder, with treatment being associated with reductions in overall level of symptomatology, maladaptive behaviour, depressive symptoms, thought suppression, affect dysregulation, impulsivity and avoidance, and improvements in problem solving orientation and overall level of self reported well-being. Evidence suggests that improvement in these variables occurs over the whole 12 months of the program, supporting the recommendation of a standard year-long DBT regimen. Memory specificity was also found to increase over the course treatment. However, contrary to expectations, neither baseline specificity nor change in specificity was related to treatment outcomes. This suggests that improvement in DBT is independent of memory specificity and that autobiographical memory is not a mechanism for change in Dialectical Behavior Therapy.
Function of Overgeneral Memory: An Experimental Exploration

Introduction

The prevalence of overgeneral autobiographical memory within clinical populations, such as individuals with brain damage (Baddeley & Wilson, 1986; Cimino, Verfaellie, Bowers, & Heilman, 1991; J. M. G. Williams, 1996; Winthrope & Rabbitt, 1988), and individuals with mental disorders (van Vreeswijk & de Wilde, 2004), has led to the viewpoint within the research literature that this style of memory represents a cognitive deficit or error in normal memory processing. It has been suggested that overgeneral memory occurs in clinical populations because these conditions involve a level of brain impairment, either as a result of structural damage, trauma, or rumination and distraction processes (J. M. G. Williams, 1996). This brain impairment is posited to negatively affect working memory capacity such that the individual is no longer able to inhibit the production of categoric memories in aid of moving down the memory hierarchy to produce event specific information (J. M. G. Williams, 1996). From this viewpoint, overgeneral memory is seen as a deficit which occurs as the result of a disruption to the normal memory process.

The deficit model of overgeneral memory has received considerable empirical support within the research literature. Firstly, evidence from longitudinal studies indicates that overgeneral memory is related to poor prognosis in clinical depression (Dalgleish et al., 2001; Hipwell, Reynolds, & Pitts Crick, 2004; Mackinger, Kunz-Korfer, Schneider, &
Leibetseder, 2000; Peeters et al., 2002) and to higher rates of posttraumatic distress in accident survivors (A. G. Harvey et al., 1998). Secondly, overgeneral memory has been found to be associated with poor treatment outcome (Brittlebank et al., 1993; Wahler & Afton, 1980). Thirdly, research indicates that overgeneral memory is associated with impoverished problem solving abilities (Evans et al., 1992; Goddard et al., 1996, 1997; Pollock & Williams, 2001; Scott et al., 2000; Sidley et al., 1997), difficulty imagining the future (J. M. G. Williams, 1996), and poor problem-solving orientation (Goddard et al., 1996). These results suggest that overgeneral memory may be a cognitive deficit associated with negative clinical outcomes.

However, in direct contrast to the deficit model, it has also been suggested that in some situations, overgeneral memory may actually play a functional or adaptive role in well-being (Raes, 2005). The most prominent functional account of overgeneral memory is known as the ‘affect regulation hypothesis’ (J. M. G. Williams, 1996), which has been described at length in chapter three of this thesis. At its most fundamental, the affect regulation theory suggests that overgeneral autobiographical memory is best conceptualised as a cognitive avoidance strategy which individuals use to protect themselves against the emotions associated with distressing memories (J. M. G. Williams, 1996). Overgeneral memory is posited to protect against distress because it involves aborting the memory search at the general level prior to the activation of intense emotion which accompanies specific recall (J. M. G. Williams, 1996). It is hypothesised that individuals who have experienced negative childhood events, individuals who are particularly sensitive to negative events, and individuals who have temperamental difficulties in controlling affect, will learn to retrieve memories in a overgeneral way in order to minimise negative affect (J.
M. G. Williams, 1996). Thus overgeneral memory can be viewed as a protective or functional emotion regulation strategy which is reinforced by the avoidance of painful emotions (Williams, Stiles & Shapiro, 1999).

The notion that overgeneral memory may protect against negative affect has also received some support within the research literature. Firstly, overgeneral memory has been found to be significantly correlated with measures of repressive coping (Raes, 2005), avoidant coping and thought suppression (Hermans et al., 2005) indicating that an overgeneral style of memory may be a coping strategy. Secondly, research has demonstrated that in some populations, overgeneral memory appears to be protective against negative outcomes. For example, a study on women who had been sexually abused as children demonstrated that those who had not gone on to experience depression were the ones who tended to recall overgeneral memories to negative cues (Burnside et al., 2004). Similarly, in a sample of individuals with Borderline Personality Disorder, individuals with an overgeneral style of recall displayed lower rates of self-harming behaviour (Startup et al., 2001). These correlational studies seem to imply that, for these populations at least, overgeneral memory is capable of protecting against distress.

Further evidence in support of the affect regulation account of overgeneral memory has been provided by Raes et al. (2003), who conducted a semi-experimental study examining the relationship between memory specificity and distress in response to a negative event. From a sample of university students, two groups were selected according to level of naturally occurring memory specificity as assessed by prior responses on the AMT: high specific individuals (specific responses to all 10 cue words), and low specific individuals.
(specific responses to <6 cue words). Both groups were then exposed to a frustrating puzzle task, which was designed to induce significant levels of stress. Consistent with an affect regulation account, the results of this study indicated that the group of low-specific students reported less stress and less thought intrusions following the task than the individuals who displayed a high-specific style of recall. Moreover, this pattern of results was found to be independent of variables such as self-reported neuroticism and self-esteem. Raes and colleagues conclude that the results of this study are supportive of an affect regulation viewpoint whereby overgeneral memory might be termed as “functional, protective, or adaptive” (Raes, 2005, p 161).

These results, however, contrast strongly with the results of a second experimental study exploring the relationship between memory activation and emotional intensity (Philippot et al., 2003). In this study, Philippot and colleagues primed university students to recall autobiographical memories in either a general or specific way through the use of an induction procedure, which involved re-evoking personal memories which differed in specificity according to the priming condition. Participants were then asked to relive an emotional memory through a mental imagery task, and their responses to this task were recorded. The methodology employed in this study provides a rigorous test of the affect regulation account of overgeneral memory as it involves the direct manipulation of autobiographical memory through experimental means, rather than relying on correlations between naturally occurring patterns of autobiographical recall which may be open to influence from other independent variables. The results of Philippot’s study indicated that individuals who had been primed to recall in a general way reported experiencing more intense emotions when reliving the memory than those who had specific priming or no
priming at all. In addition, those who were primed to be general rated the emotions experienced during reliving as equally intense to those which arose when the event was actually experienced, while specific or control individuals experienced less intense emotions during the reliving.

The results of this study cannot be accounted for by the affect regulation hypothesis, and Philippot and colleagues suggest an alternative explanation, known as the “strategic inhibition hypothesis”. According to this hypothesis, when the memory system retrieves a specific memory it simultaneously goes through a process of inhibiting the affect associated with that memory in order to ensure that the memory search process is not hindered by emotion activation. Thus, according to this hypothesis, the more specific the recall, the more highly inhibited is the link between the memory and the emotions and thus the less intense the emotions which are activated. The strategic inhibition hypothesis is consistent with a deficit model account of overgeneral memory, suggesting that specific recall is protective while overgeneral memory is a maladaptive mechanism which results in greater emotional distress.

In light of these results, Raes et al. (2006) conducted a further experimental study exploring the affect regulatory function of overgeneral memory. In this study, a sample of low-specific students (specific responses to <6 cue words) were exposed to a retrieval style induction: half receiving a specific induction where they were instructed to recall specific responses to a number of cue words, and the other half receiving a general induction where they were instructed to recall types of events in response to cue words. All participants were then exposed to Tangram puzzle task and their emotional reaction to this task was
assessed. The results of this study replicated those found by Philippot et al (2003), namely that a categoric style of retrieval resulted in more intense affect following a negative event. This result is in direct contrast to Raes’s initial findings, and appears to support the deficit model of overgeneral memory.

It is clear from this brief perusal of the literature that findings in regards to the function of overgeneral memory have been quite contradictory, with some results indicating that overgeneral memory is a deficit associated with poor emotional well being, while other results indicate that overgeneral memory may be a protective or adaptive mechanism. A possible explanation for these divergent results can be found in Raes et al.’s (2006) hypothesis that there may be two different types of memory nonspecificity. In comparing the responses of participants in his 2003 study to those observed in previous studies on autobiographical memory, Raes noted that his low specific students were not responding with categoric responses, as would be expected based on past research, but were instead giving predominantly omissions, extended memories or vague responses. He suggests that this type of nonspecificity is qualitatively different to the categoric style of overgeneral memory typically observed in clinical populations and may be functionally different in terms of emotional health. He proposes that there may exist two independent types of nonspecificity: 1) categoric nonspecificity, characterised by a tendency to summarise series of events into categories without distinguishing between individual events, and 2) low specific nonspecificity, characterised by omissions, extended or vague responses.

The first form of nonspecificity identified, namely categoric nonspecificity, is the type of overgeneral recall which has been typically observed in past research on clinical
populations (Raes, 2005; J. M. G. Williams, 1996). Previous accounts of this memory phenomenon suggest that categoric recall is the result of an error in the memory retrieval process where the memory search is truncated at the intermediate stage prior to accessing event specific information resulting in the production of categoric or summarised event memories (J. M. G. Williams, 1996). It is hypothesised that this occurs because self-referent categoric descriptions tend to activate other self-descriptions, causing the retrieval search to move across the hierarchy rather than down to more specific levels (J. M. G. Williams, 1996). When this process is repeated over time, it can lead to an over-elaborate network of categoric descriptions where intermediate descriptions automatically activate other intermediate self-descriptions (J. M. G. Williams, 1996). Williams suggests that this over-elaboration of categories results in a chronically activated series of abstract self descriptions which promote, and are promoted by, a ruminative style of thinking (J. M. G. Williams, 1996). Rumination is defined as “behaviours and thoughts that focus one’s attention on one’s depressive symptoms and on the implications of those symptoms” (Nolen-Hoeksema, 1991, p 569). Past research indicates that rumination stimulates an overgeneral form of memory (Watkins et al., 2000; J. M. G. Williams, 1996). Moreover, as rumination is known to prolong negative affect (Nolen-Hoeksema, 1991), overgeneral autobiographical memory is held to increase negative affect through its association with rumination. Building on this theory, Raes suggests that categoric nonspecificity is detrimental to emotional well-being as it fosters rumination which in turn leads to the intensification of negative emotions (Raes, 2005). He offers this theory as a possible explanation for the association between overgeneral memory and intense negative affect observed in both his and Philippots et al’s experimental studies, stating that experimentally
inducing a categoric style of retrieval will also induce a ruminative mind-set, which would in turn, lead to the intensification of emotions in response to negative events.

The second form of specificity, namely low specific recall is clearly different to the categoric form of memory described above. Rather than processing at a categoric level, low specificity appears to be characterised by the avoidance of highly specific memories through omissions or vague responses (Raes, 2005). Raes suggests that this form of nonspecificity may reflect a type of defensive avoidance and as such may be a protective mechanism (Raes, 2005). He suggests that it was this type of nonspecificity which was observed in his initial study to result in less emotions in response to negative events.

Thus according to Raes’ theory, low specific nonspecificity is an affect regulation strategy which protects the individual against the emotions associated with negative events by serving as a form of cognitive avoidance. In contrast, categoric nonspecificity is a maladaptive mechanism which intensifies negative emotion by increasing rumination. Building on this theory, it can be expected that experimental tasks which foster rumination will result in a categoric form of nonspecificity which increases negative affect, while tasks which decrease rumination will result in greater specificity and less intense negative affect. The first aim of this study is to explore this hypothesis further by examining the effect which rumination and mindfulness tasks have on memory specificity and emotional response to a negative event. It is hypothesised that inducing a generic style of recall through a ruminative based procedure would result in an intensification of emotion in response to a negative event. Conversely, it is hypothesised that using mindfulness to
reduce rumination would result in increased specificity and less intense emotion in response to a negative event.

The second aim of this study is to explore the association between reduced specificity and borderline traits in a non-clinical sample. The question of whether reduced specificity serves as an affect regulation strategy is particularly relevant for individuals with Borderline Personality Disorder as it has been suggested that overgeneral memory develops in response to a history of trauma, or temperamental difficulties in controlling affect, both of which are characteristic of the Borderline population (Henderson et al., 2002; Herman, 1992; J. M. G. Williams, 1996; Zanarini, Williams, Lewis, Reich, & et al., 1997). In addition, the theory of overgeneral memory as an affect regulation strategy has particular relevance in this population as Borderline Personality Disorder is primarily conceptualised as a disorder of the emotion regulation system (Linehan, 1993a). To date, however, research has failed to conclusively determine whether overgeneral memory is even related to Borderline Personality Disorder (Arntz et al., 2002; Jones et al., 1999; Kremers et al., 2004; Renneberg et al., 2005). Nor has any research been conducted exploring the affect regulation theory within the Borderline population. This study seeks to test the hypothesis that Borderline Personality traits will be positively associated with overgeneral recall in a non-clinical sample.
Method

Subjects

A sample, consisting of 44 first-year undergraduate psychology students, was recruited from the first year research participant pool at the University of Newcastle. Participants were excluded if they were under 18 years of age or had a history of depression. All volunteers were screened for Depressive symptomatology using the screening items from the Major Depressive Episode module of the SCID-CV. Two participants were excluded on the basis of results from these screening items. The final sample consisted of 42 students, 32 females and 10 males, aged between 18 and 56 (M= 22.86, SD=8.80). Participants were given course credit for their participation in this research in accordance with the regulations for recruitment from the participant pool at the University of Newcastle.

Measures

Borderline Traits

Borderline Traits were measured within the student sample using the Personality Assessment Inventory – Borderline Features Scale (PAI-BOR: Morey, 1991). The PAI-BOR is a 24 item self-report measure which assesses a number of personality features which are considered core traits of Borderline Personality Disorder, including: affective instability, identity problems, negative relationships, and self-harm (Jackson & Trull, 2001). The scale was designed for assessing Borderline traits in nonclinical populations and has been widely validated in undergraduate populations (T. J. Trull, 1995). Research supports the validity of the PAI-BOR, results indicating a significant association between
diagnosis of BPD according to the Structured Interview for DSM–III–R Personality, and those individuals classified as exhibiting significant Borderline traits according to the PAI-BOR (Trull, 1995; Trull, 2001). The scale also demonstrates excellent internal consistency (.92) and test-retest reliability (.73 over 3 months).

**Depressive Symptoms**

Participants were screened for diagnosis of Major Depressive Disorder using components of the Structured Clinical Interview for DSM-IV Axis I Disorders Clinician Version (SCID CV: M. B. First et al., 1997). The SCID CV is a comprehensive, standardised diagnostic interview designed to assess Axis I mental disorders according to the criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM IV -TR: APA, 2000). The scale covers six main areas, namely: Mood Episodes, Psychotic Symptoms, Psychotic Disorders, Mood Disorders, Substance Use Disorders, and Anxiety and Other Disorders. The SCID-CV can be administered in its entirety as a screening tool, or individual modules can be used autonomously to confirm a particular DSM-IV diagnosis (M. B. First et al., 1997). In the current research project, participants were screened for clinical depression using the first two questions from the Major Depressive Episode module, which pertain to the two criteria necessary (though not sufficient) for diagnosis of Major Depressive Disorder. Research suggests that the SCID has adequate reliability, ranging from .70 (M. B. First et al., 1997), with diagnosis of Major Depression demonstrating excellent reliability (.93). The SCID-CV is appropriate for use in individuals aged 18 and over.
Chapter 6: Experimental study of Memory Specificity

Autobiographical Memory

The Autobiographical Memory Test (AMT: J. M. G. Williams & Broadbent, 1986) is a scale designed to assess autobiographical memory specificity. The test consists of a number of orally presented cue words to which participants are instructed to recall specific events from their past, where a specific event is defined as an event which occurred at a particular place and time and did not last longer than 24 hours (J. M. G. Williams, 1996). Instructions specified that the memories produced had to be related to events which took place more than one week ago. The version of the AMT utilised in this study consisted of a total of eighteen cue words, 9 positive and 9 negative, which had been matched for emotionality and frequency. Participants were given three words on which to practice prior to commencing the test, and were prompted with the phrase “can you think of a particular time, one specific event?” if they responded in a non-specific ambiguous manner. Participants were allowed 60 seconds in which to respond to each cue word and the memory recalled was recorded verbatim to be later coded for specificity. Responses were coded as either specific: involving an event which occurred at a particular place and time and lasted less than one day; categoric: a summary of repeated events; extended: involving an event that lasted longer than one day; non memories: the information recalled is not a memory but a semantic associate etc; or omissions: no response given or time-limit exceeded. Memory repetitions were not counted. As autobiographical memory was assessed twice in this study (pre and post), 2 parallel forms of the AMT were used. The two versions of the AMT were compiled by the PhD candidate from words lists available in Brittlebank et al (1993), and were been matched for emotionality and frequency (word lists presented in Appendix C). The order in which these versions were presented was counterbalanced amongst participants. Fifty percent of AMT’S (consisting of equal
numbers of pre and post) were re-coded by a trained independent rater in order to assess interrater reliability. The level of agreement between raters was adequate: Cohen’s overall Kappa = .67 ($p < .001$), with Kappa’s for individual questions on the AMT ranging between .52 and .87 ($p$’s all $< .001$). The AMT has shown good inter-rater reliability (.92 and .85 for clinical and control groups respectively) (Swales, Williams, and Woods, 2001). The AMT has also demonstrated adequate test-retest reliability (.53 to .68). Although these test-retest coefficients are only moderate, the study from which they are taken varied the procedures between testing occasions (oral versus written), therefore the test can be seen as a parallel forms reliability check which is a more stringent test of reliability (Raes et al., Unpublished).

**Emotion Regulation**

Emotion regulation was assessed in this study through the use of the Affect Intensity Measure and Affect Lability Scale.

The Affect Intensity Measure (AIM: R. J. Larsen & Diener, 1987) is a 40 item scale aimed at assessing the strength with which individuals experience positive and negative emotions. Affect intensity is assessed through self-report of subjective experiences and bodily reactions to ordinary life events. From this scale, a global affect intensity score can be calculated, however, research indicates that affect intensity is a multidimensional construct and scores can be better accounted for by a three factor model comprising: negative reactivity (responsiveness to negative events), negative intensity (strength of negative emotions), and positive affectivity (responsiveness to positive events + strength of positive emotions) (Bryant et al., 1996). Both the global score and the three subscale scores will be
assessed within this study. The AIM has been shown to have good internal consistency (ranging from .90 to .94) and good test-retest reliability in intervals up to 3 months (.80 to .81) (R. J. Larsen & Diener, 1987). Furthermore, the AIM has been shown to have adequate construct validity with scores being strongly associated with daily reports of mood arousal (R. J. Larsen & Diener, 1987), individual reports of emotional intensity (Flett et al., 1986), and observer ratings, including parents, family members, peers and objective judges (Bryant et al., 1996). The AIM is not associated with measures of social desirability (Goldsmith & Walters, 1989; R. J. Larsen & Diener, 1987). The AIM takes 5-10 minutes to complete.

The Affective Lability Scale (ALS: P. D. Harvey, Greenberg, & Serper, 1989) is a 54 item self-report instrument which is designed to assess the degree of changeability in an individual’s mood. The scale assesses fluctuations between euthymia and: anger, depression, elation, and anxiety, as well as oscillation between depression and elation and between depression and anxiety (P. D. Harvey et al., 1989). The ALS has been used in clinical populations such as Borderline Personality Disorder, as well as in university student samples (P. D. Harvey et al., 1989; Koenigsberg et al., 2002). Research demonstrates that the affective lability subscales have demonstrated good internal consistency (.76-.86), and adequate test-retest reliability (.48-.86) (Koenigsberg et al., 2002). In addition, scores on the ALS are not highly correlated with scores on the Affect Intensity Measure, indicating that affective lability, as measured by the ALS, is independent from affect intensity (P. D. Harvey et al., 1989). The ALS takes approximately 5-10 minutes to complete.
Autobiographical Recall Style Manipulation

Autobiographical memory was manipulated in this study through the use of two induction procedures (experiential versus analytical tasks), which were adapted by Watkins and Teasdale (2001) from the Nolen-Hoeksema analytical task (Nolen-Hoeksema, 1991). In these tasks, the participant is given a list of 28 self-focused symptom items (sample items: “the physical sensations you feel in your body” and “how similar/different you are relative to other people”) and told to concentrate on the items included in the task for a period of 8 minutes. Both the experiential and rumination tasks involve the same 28 items, but differ in the instructions that accompany them. Participants in the analytical condition are given the instructions to “use your imagination and concentration to think about the causes, meanings and consequences of each item”, while participants in the experiential task, are given the instructions to “use your imagination and concentration to focus your mind on the experience of each item”. These tasks have been used either individually or simultaneously in a number of past studies and results suggest that the analytical task effectively increases overgeneral recall in dysphoric individuals, while the experiential task decreases overgeneral recall (Park, Goodyer, & Teasdale, 2004; van Vreeswijk & de Wilde, 2004; Watkins & Teasdale, 2001; Watkins & Teasdale, 2004; Watkins et al., 2000). To increase the effectiveness of these manipulations in our euthymic sample, a negative film clip was included as a mood induction procedure to ensure that sufficient dysphoria was present for the rumination task to be effective. This film clip is detailed below.

Negative Event

The negative event component of this study involved exposure to a distressing film clip, comprised of excerpts from the film: “Clockwork Orange” (Kubrick, 1972). A film
medium was chosen as it allows for some control in terms of the intensity of emotions evoked and therefore provides a degree of consistency between subjects (Sloan, 2003). In addition, it was thought that the use of a film medium would allow the experiment to most closely approximate exposure to a real-life distressing event, allowing us to examine the ways in which individuals manage memories and emotions associated with distressing events which occur in their life. The film “Clockwork Orange” was selected as it has been used in previous research and has been shown to be effective in producing negative emotions in university students (Derakshan, Myers, Hansen, & O'Leary, 2004). A five minute clip, involving three individual scenes from the movie, was compiled according to pilot testing conducted in past research (Derakshan et al., 2004). The film clip was intended to serve a dual purpose in this study, acting as both a medium to induce the negative mood required for the rumination task, and as the negative event to which the individual’s emotional response was evaluated.

**Emotional response**

Emotional responses were assessed through the Positive and Negative Affect Scale (PANAS: D. Watson, Clark, & Tellegen, 1988). The PANAS is a 20 item self-report measure which includes two subscales designed to provide brief measures of positive and negative affect (J. R. Crawford & Henry, 2004). Each of the items in this scale refers to a particular emotion, and individuals are required to rate the extent to which they have experienced this emotion within a particular time frame. The PANAS has been used to assess mood over a number of different time frames, including: mood in general; in the last year; over the last few weeks; in the last week; in the past few days; today; and right at this moment. The varying time frames covered allow the PANAS to be used flexibly, either as a
measure of trait-like mood or as a measure of short term fluctuations in mood (D. Watson et al., 1988). As this experiment aimed to assess change in mood over a short period of time, the PANAS was used to assess mood “right at this moment”. The PANAS was administered both pre and post exposure to the emotional stimuli to assess baseline mood and film related distress. Research supports the external validity of the PANAS, with the negative affect subscale showing adequate correlations with the Beck Depression Inventory, the Spielberger State-Trait Anxiety Inventory and the Hopkins Symptom Checklist (ranging from .56 to .74) (D. Watson et al., 1988). The PANAS has been successfully used in previous research to assess self-reported emotional reactivity to film clips (Sloan, 2003). The PANAS has been normed in both student and community adult populations and takes 2-3 minutes to complete.

Reaction to Negative Event

Participant’s reactions to the film were assessed using a modified version of the Impact of Event Scale (IES: Horowitz, Wilner, & Alvarez, 1979). The Impact of Event Scale is a 15 item self-report scale designed to assess degree of current subjective distress for a specific life event (Horowitz et al., 1979). In particular, the scale assesses the degree of intrusions and avoidance an individual experiences as a result of exposure to a traumatic event. Sample items include: “I thought about it when I didn't mean to” and “I tried to remove it from memory”. The scale has demonstrated the ability to discriminate traumatised groups from non-traumatised groups, and has demonstrated acceptable reliability (.79 and .82 for the intrusion and avoidance subscales respectively) and split-half reliability (.86 for the whole scale) (Horowitz et al., 1979). It was necessary to modify the Impact of Event Scale for use in this study because the IES typically assesses symptoms which occur over a 7 day
period, and thus some items tap into symptoms which would not present in the short time frame involved in this study. A total of five items were found to be inappropriate for this study, including: “I had trouble falling asleep or staying asleep”, “I had dreams about it”, “I stayed away from reminders of it”, “I tried not to talk about it”, and “Other things kept making me think about it”. These items were removed from the IES, to leave a modified, 10-item version of the IES that will assess subjective distress symptoms which are likely to occur within the time frame of this study.

Procedure

The current study was conducted in accordance with procedures approved by the University of Newcastle’s research ethics committee (reference number: H-192-0306). Participants met with the PhD candidate individually to complete the battery of measures described above. The study was conducted in four phases. In the first phase, participants completed a number of baseline measures, including: the Autobiographical Memory Test, Personality Assessment Inventory – Borderline Features Scale, Affect Intensity Measure, Affective Lability Scale, and The Positive and Negative Affect Scales.

The second phase of the study involved manipulating the participant’s style of autobiographical recall through exposure to one of two attentional tasks by Watkins et al. (2001). Administration of these tasks was counterbalanced amongst the participants according to PAI-BOR score to ensure that the two tasks were administered to an equal number of participants at each level of Borderline traits. Counterbalancing was conducted within four equally sized groups defined by T-scores arising from normed data on the PAI-
BOR (T values of: 0-42, 43-50, 50-57, 58-100) (Morey, 1991). Tasks were administered according to the procedure set out by Watkins et al (2001), whereby participants were given the task and instructed that they were to read through and concentrate on the items in the task for a period of eight minutes. Participants were then left to read through the items at their own pace. At the end of the eight-minute time period, participants were notified that the time has elapsed.

In the third phase of the study, participants viewed the 5-minute excerpt from the film “Clockwork Orange”. After viewing the film, participants were given 5 minutes free time, during which they were instructed to just sit quietly. This time was included in the study to allow sufficient time for film-related emotions, thought intrusions and avoidance to occur.

The final phase of the study involved the administration of post-manipulation measures, including: The Positive and Negative Affect Scales, The Impact of Event Scale, and the Autobiographical Memory Test. These measures were designed to check that the manipulations were effective, and to assess film-related distress.
Chapter 6: Experimental study of Memory Specificity

Results

Baseline Measures

Table 6.1 Means, Standard Deviations, and Ranges for Baseline Measures

<table>
<thead>
<tr>
<th>Measures</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personality Assessment Inventory –Borderline features scale</td>
<td>21.64</td>
<td>8.71</td>
<td>4-43</td>
</tr>
<tr>
<td>Affect Lability Scale</td>
<td>0.95</td>
<td>.40</td>
<td>0-2</td>
</tr>
<tr>
<td>Affect Intensity Measure</td>
<td>Global</td>
<td>3.93</td>
<td>.56</td>
</tr>
<tr>
<td></td>
<td>Negative intensity subscale</td>
<td>3.33</td>
<td>.95</td>
</tr>
<tr>
<td></td>
<td>Negative reactivity subscale</td>
<td>4.42</td>
<td>.89</td>
</tr>
<tr>
<td></td>
<td>Positive affectivity subscale</td>
<td>4.20</td>
<td>.70</td>
</tr>
<tr>
<td>Autobiographical Memory</td>
<td>Specific</td>
<td>13.60</td>
<td>3.14</td>
</tr>
<tr>
<td></td>
<td>Categoric</td>
<td>1.64</td>
<td>1.82</td>
</tr>
<tr>
<td></td>
<td>Extended</td>
<td>1.69</td>
<td>1.44</td>
</tr>
<tr>
<td></td>
<td>Omissions</td>
<td>.29</td>
<td>.64</td>
</tr>
</tbody>
</table>

Descriptive statistics for the student sample on each of the baseline measures are presented in Table 6.1. Comparison of these scores with norms based on past research (shown in parenthesis) indicated that this sample was comparable to university samples on the PAI-BOR (M = 26.6, SD = 10.7: P. D. Harvey et al., 1989; Morey, 1991; T. J. Trull, 1995), the affect intensity measure (M = 3.7, SD = 0.5: Bryant et al., 1996; R. J. Larsen, 1984), and the AMT (Equivalent mean for number of words = 13.7, SD = 3.49: Hauer, Wessel, & Merckelbach, 2006). Scores on the Affect Lability Scale were slightly below those observed in past research indicating less affective lability in this sample (M = 1.91, SD = .06: P. D. Harvey et al., 1989).
Analysis of the relationships between the various measures indicated that scores on the PAI-BOR were significantly associated with scores on the Affect Lability Scale ($r(42) = - .52, p < .00$), but were unrelated to scores on the Affect Intensity Measure ($r(42) = .12, p = .45$).

**Relationship between Borderline Personality Disorder traits and Memory Specificity**

Preliminary analysis of baseline autobiographical recall indicated that specificity scores were negatively skewed within this sample ($D(42) = .15, p = .02$). A reversed square root transformation was applied and following this transformation, the distribution of specificity scores did not depart significantly from normal, nor were there any significant outliers ($D(42) = .10, p = .20$). The transformed data will therefore be used in all further analysis involving memory specificity. Preliminary analysis also indicated that baseline categoric, extended, and omission data were also non-normally distributed, all displaying a strong positive skew. Attempts were made to transform the data, however, these proved unsuccessful due to the high proportion of zero scores for each of these variables. Nonparametric forms of analysis will therefore be utilised for each of these variables.

In order to assess the relationship between autobiographical memory, borderline traits and affect regulation, a number of bivariate correlations were conducted. Results indicated that baseline memory specificity was not related to scores on the PAI-BOR ($r(42) = -.14, p = .38$), the Affect Lability Scale ($r(42) = .05, p = .77$), or the Affect Intensity Measure ($r(42) = .22, p = .17$). Nor was specificity associated with any of the subscales of the AIM, including: negative intensity ($r(42) = .24, p = .13$), negative reactivity ($r(42) = .16, p = .32$), or positive affectivity ($r(42) = .21, p = .18$).
Kendall’s Tau correlations also indicated that baseline categoric recall was not related to scores on the PAI-BOR ($\tau(42) = .10, p = .42$), the Affect Lability Scale ($\tau(42) = .08, p = .49$), or the Affect Intensity Measure ($\tau(42) = .12, p = .31$). Nor was categoric recall associated with any of the subscales of the AIM, including: negative intensity ($\tau(42) = .12, p = .30$), negative reactivity ($\tau(42) = .09, p = .44$), or positive affectivity ($r(42) = .05, p = .65$). Baseline scores on the PAI-BOR, Affect Lability Scale and Affect Intensity Measure were also unrelated to number of extended memories ($p$’s all > .44) and number of omissions ($p$’s all > .22).

Further analysis was conducted to determine if autobiographical memory differed in students with clinical levels of Borderline traits (highest 25%: T score $\geq 58$) when compared to those with very low scores on the PAI-BOR (lowest 25%: T score $\leq 42$). An independent samples t-test indicated that there was no difference between these two groups in terms of memory specificity ($t(17) = .77, p = .45$). Mann Whitney tests also indicated that there was no difference between groups in terms of categoric memories ($U(17) = 37.00, p = .50$), extended memories ($U(17) = 35.00, p = .40$), or omissions ($U(17) = 26.00, p = .11$).

**Manipulation Effects**

Preliminary analysis was carried out to determine if the participants allocated to the two manipulation groups differed in terms of demographic or trait characteristics. As shown in Table 6.2, groups were comparable in terms of age, gender, level of borderline traits, affect lability and affect intensity.
Table 6.2 Characteristics of Participants According to Manipulation Group

<table>
<thead>
<tr>
<th></th>
<th>Experiential N = 21</th>
<th>Analytical N = 21</th>
<th>Test Statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>22.48 (9.47)</td>
<td>22.86 (8.33)</td>
<td>t = 1.34</td>
<td>.89</td>
</tr>
<tr>
<td>Gender</td>
<td>Female: 17</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male: 4</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAI</td>
<td>21.86 (8.79)</td>
<td>21.57 (8.87)</td>
<td>t = -.09</td>
<td>.93</td>
</tr>
<tr>
<td>ALS</td>
<td>0.94 (.42)</td>
<td>0.93 (.40)</td>
<td>t = -.04</td>
<td>.97</td>
</tr>
<tr>
<td>AIM</td>
<td>4.00 (.40)</td>
<td>3.86 (.69)</td>
<td>t = -.78</td>
<td>.44</td>
</tr>
</tbody>
</table>

Next, analyses were conducted to determine if the induction tasks had the predicted effects on autobiographical recall specificity. Means and Standard Deviations for each of the autobiographical memory variables are presented for pre and post, for each manipulation group separately below (see Table 6.3).

Table 6.3 Means and Standard Deviations for AM variables at pre and post

<table>
<thead>
<tr>
<th>AMT Indices</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Analytical Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific</td>
<td>13.62 (2.85)</td>
<td>14.14 (3.00)</td>
</tr>
<tr>
<td>Categoric</td>
<td>1.52 (1.33)</td>
<td>1.10 (1.30)</td>
</tr>
<tr>
<td>Extended</td>
<td>1.57 (1.21)</td>
<td>1.43 (1.36)</td>
</tr>
<tr>
<td>Omissions</td>
<td>1.29 (1.55)</td>
<td>1.33 (1.43)</td>
</tr>
<tr>
<td>Experiential Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific</td>
<td>13.57 (3.47)</td>
<td>13.76 (4.04)</td>
</tr>
<tr>
<td>Categoric</td>
<td>1.76 (2.23)</td>
<td>1.43 (1.83)</td>
</tr>
<tr>
<td>Extended</td>
<td>1.81 (1.72)</td>
<td>1.33 (1.49)</td>
</tr>
<tr>
<td>Omissions</td>
<td>.86 (1.11)</td>
<td>1.48 (1.75)</td>
</tr>
</tbody>
</table>
Paired sample t-tests were conducted for each of the manipulation groups separately comparing pre and post specificity scores on the autobiographical memory test. As with the pre AMT specificity scores, post AMT specificity scores were also transformed using a reversed square root transformation to correct the strong negative skew ($D (42) = .20, p < .01$). The transformed data were used in subsequent analyses. Results indicate that neither the analytical task ($t(20) = -.87, p = .39$) nor the experiential task ($t(20) = -1.00, p = .33$), had any effect on autobiographical memory specificity in this sample. Furthermore, a repeat measures ANOVA with time (pre v. post) as the within subjects variable and manipulation group as the between subjects variable indicated that neither time [$F (1,40) = 1.74, p = .19$], nor manipulation group [$F (1,40) < .01, p = .97$], nor the interaction between time and manipulation group [$F (1,40) = .04, p = .84$], were significantly related to memory specificity score. The test-retest correlation for the AMT was significant ($r (42) = .70, p < .01$).

Similarly, Mann-Whitney tests indicated that neither the analytical ($U(21) = -1.76, p = .08$) nor the experiential tasks ($U(21) = -.94, p = .35$) affected categoric recall. A Generalised Estimating Equation (based on the Poisson distribution with log link function) was also conducted with time as the within subjects factor and manipulation group as the between subjects factor. Results indicate that neither manipulation group [$\chi^2(1) = .41, p = .52$], nor time [$\chi^2(1) = 3.74, p = .05$], nor the interaction between group and time [$\chi^2(1) = .19, p = .67$], were significantly related to number of categoric memories.
Film Effect

Paired samples t-tests indicated that the film had a significant effect on mood, with participants showing significant increases in negative affect ($t(41) = -5.57, p < .01$) and significant decreases in positive affect ($t(41) = 4.05, p < .01$) after viewing the clip.

Memory Specificity and response to film

Given that the manipulation tasks did not appear to have had any effect on memory specificity, the planned analysis which was intended to assess the impact of experimentally manipulated memory specificity on emotional response to the film clip was no longer appropriate. The most likely explanation for this result is that the current sample does not display the level of dysphoric mood which is required for the Nolen-Hoeskema tasks to have their differential effects (Rimes & Watkins, 2005). In line with this conclusion, an alternative form of analysis would be to compare the emotional reactions of high and low dysphoric participants in response to the manipulations. High ($n=21$) and low ($n=21$) dysphoric groups were formed by applying a median split based on pre induction scores on the Positive Affect scale of the PANAS. The positive affect scale was chosen over the negative affect scale as past research indicates that the depressed individuals are identified by an absence of positive affect on the PANAS rather than an increased level of negative affect (Waikar & Craske, 1997; Crawford & Henry, 2004).

Individual ANOVAs were conducted for each of the outcome variables (PANAS and IES) with dysphoric group and manipulation group entered as predictor variables in each. For the PANAS scales (positive and negative affect), pre scores were regressed on post scores to produce residualised change scores. These scores formed the basis of analyses exploring
change in mood and will be referred to as positive affect change and negative affect change respectively.

Results indicated that change in the positive affect scale of the PANAS was not related to dysphoric category \( F(1,38) = 2.15, p = .15 \), manipulation condition \( F(1,38) = .03, p = .87 \), or the interaction between dysphoric category and manipulation condition \( F(1,38) = 1.12, p = .30 \). Similarly, change in the negative affect scale for the PANAS was found to be unrelated to dysphoric category \( F(1,38) = .69, p = .41 \), manipulation condition \( F(1,38) = .03, p = .87 \), or the interaction between these variables \( F(1,38) = .23, p = .63 \).

A similar pattern of results was observed for the IES and its subscales. Namely, IES total score was not related to dysphoric category \( F(1,38) = .04, p = .85 \), manipulation condition \( F(1,38) = .55, p = .46 \), or the interaction between dysphoric category and manipulation condition \( F(1,38) = .05, p = .83 \). Both the IES intrusion and avoidance subscales were also unrelated to dysphoric category \( p's = .36 \) and \( .60 \) respectively), and manipulation condition \( p's = .85 \) and \( .35 \) respectively), and the interactions between dysphoric category and manipulation were non-significant \( p's = .45 \) and \( .78 \) respectively).

These results were confirmed by analysis exploring the effect of manipulation on the outcome variables within the high dysphoric group alone. Results indicate that manipulation condition was not significantly related to positive affect change \( F(1,19) = 1.24, p = .28 \), negative affect change \( F(1,19) = .29, p = .60 \), IES total score \( F(1,19) = .12, p = .73 \), IES intrusion score \( F(1,19) = .14, p = .71 \) or IES avoidance score \( F(1,19) = .74, p = .40 \).
Chapter 6: Experimental study of Memory Specificity

Analysis was also conducted to determine whether naturally occurring level of memory specificity was associated with response to the film, as assessed by the IES and the PANAS. Zero-order correlations were conducted between transformed pre AMT specificity scores and: total IES, IES intrusion subscale, IES avoidance subscale, positive change, and negative change, and the resulting Pearson’s product-moment coefficients are displayed in Table 6.3. Kendall’s tau correlations were also conducted between baseline categoric scores and the IES and PANAS change scores, and these results are also presented in Table 6.3. As can be seen, autobiographical memory (as assessed by both specific and categoric scores) was not found to be significantly associated with any of these variables, although the association between memory specificity and positive affect change approached significance ($p = .08$).

<table>
<thead>
<tr>
<th>Table 6.4 Pearson Product Moment Correlation Coefficients</th>
</tr>
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<tbody>
<tr>
<td>Total IES</td>
</tr>
<tr>
<td>Specific</td>
</tr>
<tr>
<td>Categoric</td>
</tr>
</tbody>
</table>

* p <.05    ** p <.01    *** p <.001

Further analyses were conducted to determine whether there was any difference in emotional response to the film clip between high specific individuals and low specific individuals. Two groups were selected from the sample based on pre AMT scores: high specific individuals (recalled a specific memory to ≥17 cues), and low specific individuals (recalled a specific memory to ≤10 cues). The cut-offs for the two groups were based on conventions used in past research (Raes et al., 2003). Investigation of the AMT response
profiles of the low specific students indicated that when not responding with a specific memory, these individuals most often recalled memories which were categoric (42%) or extended (36 %), followed by omissions (14%) and non-memories (8%).

Independent samples t-tests were conducted to compare IES scores for high and low specific students. As shown in table 6.3, there were no significant differences between groups in avoidance, intrusions, or total IES scores.

| Table 6.5 Means, Standard Deviations and T-test Results for High and Low specific students |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
|                                | Low Specific    | High Specific   | t value | p      |
|                                | (n=7)           | (n=8)           |         |        |
| Intrusions                     | Mean (SD)       | Mean (SD)       | .92     | .82   |
|                                | 11.14 (5.18)    | 11.75 (4.83)    |         |        |
| Avoidance                      | Mean (SD)       | Mean (SD)       | 1.47    | .17   |
|                                | 18.14 (5.21)    | 14.88 (3.31)    |         |        |
| IES total                      | Mean (SD)       | Mean (SD)       | .69     | .50   |
|                                | 29.29 (8.90)    | 26.63 (5.85)    |         |        |

Analysis was also conducted to determine whether high and low specific students differed in terms of their PANAS score before and after viewing the film. PANAS means and standard errors are presented for low and high specific students separately in Table 6.5.

| Table 6.5 Means, Standard Deviations and T-test Results for High and Low specific students |
|---------------------------------|-----------------|-----------------|-----------------|
|                                | Low Specific    | High Specific   |               |
|                                | (n=7)           | (n=8)           |               |
| Negative Affect                | Mean (SE)       | Mean (SE)       |               |
| Pre                             | 12.43 (1.53)    | 11.25 (0.45)    |               |
| Post                            | 18.71 (2.25)    | 14.75 (1.78)    |               |
| Positive Affect                 | Mean (SE)       | Mean (SE)       |               |
| Pre                             | 30.57 (2.11)    | 27.38 (1.46)    |               |
| Post                            | 22.29 (2.42)    | 25.25 (1.91)    |               |
Change in level of negative affect in response to the film was assessed through a 2 (group: high specific versus low specific) x 2 (PANAS negative affect score: pre and post) mixed analysis of variance with repeated measurements on the PANAS factor. Results indicate a significant main effect of time on negative affect \([F (1,13) = 22.85, p < .01]\), with both groups demonstrating significantly higher levels of negative affect after viewing the film. However, there was no difference between groups in level of negative affect \([F (1,13) = 1.61, p = .23]\), nor an interaction between group and change in negative affect \([F (1,13) = 1.85, p = .20]\). These results are depicted in Figure 6.1.

![Figure 6.1](image)

**Figure 6.1** Negative Affect Means and Standard Errors at Pre and Post

A second 2x2 repeated measures ANOVA was conducted exploring the effects of film on level of positive affect in high and low specific students. Results indicate that positive affect also differed significantly from pre to post viewing of the film \([F (1,13) = 26.00, p\).
<.01], but again, there was no difference between high and low specific individuals in terms of level of positive affect [F (1,13) < .01, p = .97]. However, a significant interaction was observed between time and group [F (1,13) = 9.11, p = .01]. Planned comparisons indicate that low specific individuals showed a significant reduction in level of positive affect in response to the film [t(6)= 5.62, p <.01] while high specific individuals did not change significantly [t(7)= 1.51 p =.18]. The difference in affect between high and low specific individuals was non-significant both before [t(13)= 1.27 p =.23] and after viewing the film [t(13)= -.98 p =.35]. These results are depicted in Figure 6.2.

![Figure 6.2 Positive Affect Means and Standard Errors at Pre and Post](image)

Figure 6.2 Positive Affect Means and Standard Errors at Pre and Post

Given that the above analysis was conducted on groups with very small sample sizes (n=7 and 8 respectively), analysis was conducted to ensure that the results observed were not a result of significant outliers. Standardized residuals (created by regressing positive affect at time 2 on positive affect at time 1, and negative affect at time 2 on negative affect at time
1) were all found to be between -3.5 and 3.5. Cooks distances were all less than 4/N. This indicates that the observed results were not unduly influence by outliers.

Response to Film and psychometrics

Exploratory analyses were also conducted to determine if response to the film clip was related to the presence of borderline traits or characteristic affective features, including affect intensity and affect lability. Bivariate correlations were conducted between IES and PANAS measures and the PAI, ALS and AIM. As shown in Table 6.4, none of the results were significant.

Table 6.6 Pearson Product Moment Correlation Coefficients

<table>
<thead>
<tr>
<th></th>
<th>PAI</th>
<th>AIM</th>
<th>ALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive affect change</td>
<td>-.02</td>
<td>.07</td>
<td>-.05</td>
</tr>
<tr>
<td>Negative affect change</td>
<td>.28</td>
<td>.11</td>
<td>.15</td>
</tr>
<tr>
<td>Intrusion</td>
<td>.27</td>
<td>.29</td>
<td>-.15</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.21</td>
<td>-.03</td>
<td>-.16</td>
</tr>
<tr>
<td>IES total</td>
<td>.29</td>
<td>.14</td>
<td>-.19</td>
</tr>
</tbody>
</table>

* p <.05   ** p <.01   *** p <.001
Chapter 6: Experimental study of Memory Specificity

Discussion

The “affect regulation” theory of overgeneral autobiographical memory suggests that this memory phenomenon develops as a form of cognitive avoidance which protects the individual from the negative emotions associated with the recall of specific memories (J. M. G. Williams, 1996). Although this theory is the most commonly cited hypothesis of overgeneral memory within the research literature to date, empirical evidence in support of this theory has been mixed, some studies indicating that reduced specificity is protective (Burnside et al., 2004; Hermans et al., 2005; Raes et al., 2003; Startup et al., 2001), while other studies indicate that overgeneral memory may actually be maladaptive (Brittlebank et al., 1993; Evans et al., 1992; A. G. Harvey et al., 1998; Peeters et al., 2002; Philippot et al., 2003; Wahler & Afton, 1980). The aim of the present study was bi-fold: 1) to explore the affect regulation hypothesis of overgeneral memory by examining the effects of experimentally induced generic recall on reaction to a negative event, and 2) to extend research in this area by exploring the relationship between memory specificity and traits of Borderline Personality Disorder in a non-clinical sample.

The results of this study indicate that autobiographical memory specificity is not related to borderline traits or severity of affect dysregulation within a non-clinical sample. Analysis indicated that there was no association between memory specificity and severity of borderline traits as measured by the personality assessment inventory, nor did there appear to be any difference in the degree of autobiographical specificity between students at the high and low ends of the spectrum of Borderline trait severity. In addition, no relationship was observed between degree of specificity and trait affect dysregulation, including affect
intensity and lability. These results suggest that reduced specificity of autobiographical memory may not be as closely associated with affect dysregulation as previously thought.

The finding that reduced autobiographical specificity is not related to affect dysregulation or borderline traits runs contrary to William’s theoretical proposition that overgeneral memory is a cognitive avoidance strategy which develops in response to dysregulated emotion (J. M. G. Williams, 1996). Williams suggests that individuals who are particularly sensitive to negative events or those who have temperamental difficulties with affect regulation, may be particularly prone to developing an overgeneral style of memory as a way of managing their emotions (1996). Individuals with Borderline Personality Disorder, which is primarily a disorder of affect dysregulation (Linehan, 1993a), were considered particularly likely to display an overgeneral style of memory. Preliminary research provided support for this theory, indicating that individuals with Borderline Personality Disorder were more overgeneral than controls (Jones et al., 1999). However, a growing body of evidence now suggests that Borderline Personality Disorder is not associated with reduced autobiographical specificity as previously thought (Arntz et al., 2002; Renneberg et al., 2005, and chapter 2 of this thesis). The results of this present study extend research in this area, suggesting that reduced autobiographical specificity is not related to trait measures of affect dysregulation, nor to characteristics of Borderline Personality Disorder in a non-clinical population. It should be noted, however, that the present study did not utilise cue words in the AMT which were particularly related to borderline concerns and it is possible that using such cues may have enhanced results. However, given the weakness of the associations observed, it is unlikely that this would have changed results significantly, although further research may be warranted in this regards.
In general, research in this area suggests that, unlike clinically depressed patients, Borderline individuals have sufficient cognitive flexibility to move through the hierarchies of the autobiographical memory system in order to produce specific memories (Renneberg et al., 2005). Indeed, it may be that increased accessibility of distressing memories may account for many of the symptoms of emotional and behavioural dysregulation which are indicative of Borderline Personality Disorder. It may also be that the symptomatic profile and/or developmental path of this disorder results in a reliance on alternative forms of experiential avoidance to overgeneral memory, including dissociation and self-harm (see chapter 3 of this thesis).

Although autobiographical memory was unrelated to measures of affect dysregulation and borderline traits in this non-clinical sample, the results of this study indicate that autobiographical memory style is related to how one responds emotionally to a negative event. In particular, the findings of this study indicate that individuals with naturally lower levels of autobiographical specificity report greater reductions in positive affect following a negative event than individuals with a specific style of autobiographical recall. This suggests that specific recall is somehow protective, enabling individuals to maintain their positive mood despite being exposed to distressing stimuli.

The association between high levels of specificity and the maintenance of positive affect supports a deficit model of overgeneral memory as it suggests that reduced specificity is associated with decreased well-being. This finding is contrary to William’s affect regulation hypothesis and past research suggesting that overgeneral memory may be protective (Burnside et al., 2004; Raes et al., 2003; Startup et al., 2001). However, these
findings are consistent with more recent experimental research indicating that increased specificity is associated with less emotional distress (Philippot et al., 2003; Raes et al., 2006).

Although consistent with a deficit model of overgeneral memory, the results of the current study differ slightly from those of Philippot and colleagues in that reduced specificity was found to be associated with greater reductions in positive affect rather than increases in negative affect (Philippot et al., 2003; Raes et al., 2006). This suggests that overgeneral memory influences well-being primarily through its impact on positive emotions. This trend has also been observed in experimental research demonstrating that decreases in autobiographical specificity are associated with greater reductions in positive affect (happiness) rather than increases in negative affect (sadness) (Yeung, Dalglish, Golden, & Schartau, 2004). Interestingly, within this study, there was no relationship between reduced specificity and change in negative affect or film-related intrusions and avoidance. Even when comparing students with extremely high and low levels of specificity, no significant differences in negative affect, thought intrusions or avoidance emerged. These findings suggest that autobiographical specificity may be tied to affect regulation through its association with positive emotions rather than negative emotions and thoughts as previously thought.

This finding challenges the “strategic inhibition hypothesis” of memory specificity which proposes that specific recall is protective because the memory system actively inhibits the affect associated with memory recollection in order to ensure that the memory search process is not hindered by emotion activation (Philippot et al., 2003). According to the
strategic inhibition hypothesis, the more specific the recall, the more highly inhibited is the link between the memory and the emotions and thus the less intense the emotions which are activated. In contrast, the results of this study indicate that the protective role of autobiographical specificity is in maintaining or enhancing positive emotions, rather than in inhibiting or avoiding negative emotions or thoughts.

The association between memory style and the maintenance of positive emotions in the face of negative stimuli may be indicative of the impact of specificity on mood-incongruent recall in this population. Mood incongruent recall refers to the process whereby an individual seeks to reduce an unpleasant mood state by retrieving pleasant thoughts and memories (Joorman & Siemer, 2004). Mood incongruent recall of positive memories has been shown to be an effective strategy for alleviating negative mood as it breaks the cycle between negative mood and negative memories (Erber & Erber, 1994; Sakaki, 2007). A specific style of autobiographical memory is likely to increase the effectiveness of mood incongruent recall as an affect regulation strategy as research indicates that the specificity of the memory being recalled is directly related to the intensity of the emotion which is activated by that memory (Conway & Pleydell-Pearce, 2000; Pillemer, 1992). Thus it may be that a specific style of recall is beneficial, at least in non clinical populations, as it allows individuals to access specific details about positive events from their past which, in turn, evoke greater levels of positive emotions to counter the emotions produced by negative events.

In contrast, the low-specific students in this study demonstrated substantial decreases in positive affect in response to the film-clip. Investigation of the memory responses of this
group of participants indicated that their non-specificity was mainly accounted for by categoric (42%) or extended responses (36 %), while omissions and non-memories only accounted for a small proportion of responses. This suggests that the low specific individuals in this study may be displaying a categoric or ruminative form of non-specificity rather than a low specific form of non-specificity which is typically characterised by omissions and vague responses (Raes, 2005). The memory search for these individuals is therefore posited to move across the memory hierarchy through a chronically activated series of abstract self descriptions rather than moving down through the memory levels to access event specific details, or avoiding the memory search altogether through the production of omissions or vague responses (J. M. G. Williams, 1996). Raes suggests that this categoric form of retrieval is maladaptive as it promotes, and is promoted by, a ruminative style of thinking, which results in increased negative affect (Raes, 2005). The results of the present study provide indirect support for this theory as low specific categoric individuals showed greater reductions in positive affect than their specific counterparts.

Unfortunately, the conclusions which can be drawn from this study are limited as results are based on a correlational exploration of naturally occurring memory patterns rather experimentally manipulated generic recall as intended. This limitation is due to the fact that the Nolen-Hoeksema’s attentional tasks did not appear to affect overgeneral within our student sample. In fact, results indicate that neither the analytical nor the experiential tasks had any effect whatsoever on specificity of recall, as assessed by scores on the follow up autobiographical memory test.
The most plausible reason for this result is the non-clinical nature of the population on which this study was based. Previous research indicates that the manipulations which were utilised in this study appear to only be effective in “vulnerable groups”, demonstrating little or no effect in non-depressed individuals (Rimes & Watkins, 2005). In light of this fact, the “Clockwork Orange” film clip was used in this study as a mood induction procedure with the expectation that it would evoke sufficient dysphoria in the non-clinical, euthymic sample to allow the manipulations to be effective. Within the experimental protocol, the film clip needed to be presented directly after the autobiographical memory manipulation task so that the effect of experimentally induced recall on emotional response to a negative event could be explored. However, it was hoped that the self-focus (either experiential or analytical) encouraged by the attentional tasks would be maintained during viewing of the film clip enabling an interaction between reactive mood in response to the film clip and the manipulation task. Results indicate that the film clip did have the expected effect on mood, with significant increases in negative effect observed when comparing mood following the film clip to baseline mood. However, given that autobiographical recall did not appear to have been affected in the manner expected, it appears that the negative emotions induced by the film clip were either insufficient in intensity or too delayed to enable the manipulations to be effective within this sample. This is a major limitation in the present study as the failure to include a mood manipulation procedure prior to the memory tasks effectively prevented the manipulations from working in this nonclinical sample. This problem could be remedied in future research by including a separate mood manipulation procedure prior to the memory manipulation tasks.
In light of this methodological limitation, an alternative form of analysis was conducted exploring the differential effects of the manipulations on emotional response for high and low dysphoric students. Results indicate that there was no interaction between dysphoric category and manipulation condition on either the PANAS or the IES. Moreover, within the high dysphoric group, manipulation was unrelated to response on the PANAS and IES. These results suggest that even for dysphoric individuals, the manipulation tasks did not have any effect on emotional response after exposure to a distressing stimulus. However, it should be noted that over 60% of the participants in this study exhibited a level of positive affect which would be classified as non-depressed or only mildly depressed according to past results observed in clinical populations (Petrocelli, Glaser, Calhoun, & Campbell, 2001). Indeed, only 5% exhibited scores which would be definitively classified as “severely depressed” (Petrocelli et al., 2001). Thus it is probable that even with this modified form of analyses, the students classified as having high levels of dysphoria would have had insufficient levels of depressed mood to respond effectively to the manipulation tasks presented.

An alternative explanation for the failure of the manipulation tasks within this sample is the non-personalised nature of the film-clip. Theorists have suggested that the Nolen-Hoeksema rumination task increases overgeneral memory by enhancing ruminative tendencies within dysphoric individuals. Rumination has been defined as the tendency to focus attention on one’s negative feelings and thoughts in response to negative mood, and is characterised by the tendency to focus on the self and on personal problems (Lyubomirsky, Tucker, Caldwell, & Berg, 1999; Nolen-Hoeksema, 1991). Indeed, rumination is posited to involve the activation of cognitive associations related to negative
self-beliefs which in turn fuel negative thoughts and emotions (Ingram & Smith, 1984). Thus, the activation of self-beliefs can be seen as a necessary component of rumination. It may be that the film clip utilised in this study was insufficient to activate negative self-beliefs in euthymic, non-clinical students as it depicts graphic scenes of physical and sexual violence, which would be removed from the majority of individuals’ personal experiences and sense of self. However, past research has suggested that it is the analytical component of rumination which is more important in overgeneral memory than the degree of self-focus (Watkins & Teasdale, 2001).

A third possibility is that the manipulations may have worked in the manner expected but that the effect was not maintained for sufficient duration to influence response to the negative event, or to be captured by the post AMT. Although past research has frequently used manipulation tasks such as those utilised in this study to alter autobiographical memory style, there is as yet no data indicating how long the induced modes of autobiographical recall are likely to persist (Watkins & Teasdale, 2004). Indications suggest, however, that the default processing mode will reinstate itself at some stage after completing the manipulations and autobiographical recall will return to its baseline level (Watkins & Teasdale, 2004). Given the lack of information regarding how long the alteration in autobiographical memory persists, it is unclear whether any change which may have been achieved in this study would have been maintained for the duration of the film clip or for long enough for the effect to be captured by the follow-up Autobiographical Memory Test.
Regardless of why the manipulations did not work in the present study, the reliance on naturally occurring levels of autobiographical specificity reduces the stringency of this exploration of the affect regulation hypothesis as naturally memory may be influenced by third independent variables unaccounted for in the present study. Further research is needed in this area to explore the role of rumination and reduced specificity as affect regulation strategies using tasks to experimentally manipulate specificity of autobiographical recall.

In summary, the findings of the present study suggest that reduced specificity is a deficit associated with poorer emotional well being. This contrasts with theoretical accounts of overgeneral memory as an affect regulation strategy as well as past research showing that overgeneral memory is protective in some clinical populations (Burnside et al., 2004; Startup et al., 2001). It may be that the deficit pattern observed in the present study, as well as previous experimental studies on non-clinical student populations (Philippot et al., 2003; Raes, Hermans, Williams, & Eelen, 2006), does not extend to clinical populations. This notion has been touched on by Philippot and colleagues (2003), who suggested that the association between specific recall and decreased distress (strategic inhibition pattern) observed in his study may be limited to normal individuals who have the executive capacity to automatically inhibit the associated emotions when recalling specific memories. He noted that for clinical groups, specific recall may be associated with increased distress (affect regulation pattern) because these individuals may lack the executive capacity to adequately inhibit emotional arousal during recall of specific memories in the same way that normal healthy individuals do (Philippot et al., 2003). However, although this explanation would go someway to explaining the discrepant results observed in past research, it does not account for studies indicating an association between measures of
repressive coping and reduced specificity in non clinical samples e.g. (Hermans et al., 2005; Raes, 2005). Moreover, as all of the studies in clinical samples to date have been correlational in nature, experimental research is needed to provide definitive evidence regarding the affect regulation function of overgeneral memory in clinical populations.
Chapter 7: General Discussion

7 General Discussion

The overall aim of this thesis was to explore the function of overgeneral memory and its implications for the clinical difficulties associated with Borderline Personality Disorder.

This thesis had five main aims:

1) To clarify the relationship between Borderline Personality Disorder and reduced autobiographical specificity by: a) determining whether individuals with BPD display reduced specificity comparative to controls, and b) examining the relationship between autobiographical specificity and borderline traits in a non-clinical sample (see chapters two and six).

2) To explore the relationship between autobiographical memory specificity and affect regulation in individuals with Borderline Personality Disorder (see chapter three).

3) To explore the relationship between autobiographical memory and problem solving deficits in individuals with Borderline Personality Disorder (see chapter four).

4) To examine change in autobiographical memory specificity, problem solving ability, and affect regulation, in Borderline individuals undergoing treatment within a Dialectical Behaviour Therapy program (see chapter five).

5) To examine the affect regulatory function of experimentally manipulated generic recall in a non-clinical sample (see chapter 6).

In order to achieve these aims, three studies were conducted which have been presented in chapters 2 through 6 of this thesis. This final chapter will present an overview of the
findings from this research and their implications, and will expand on the assimilation model as a framework for understanding the memory responses of individuals with Borderline Personality Disorder.

Summary of findings

Investigation of the memory responses of individuals with a diagnosis of Borderline Personality Disorder indicated that these individuals display reduced autobiographical specificity relative to controls, though their level of specificity appeared to be more in line with data from normative samples than rates previously observed in other clinical populations. Of importance, a factor common to both IQ and education, was found to fully mediate the association between overgeneral memory and BPD diagnosis, indicating a cognitive ability explanation of overgeneral memory. Executive functioning was considered as a possible element of cognitive ability that may be related to performance on the AMT, although further research would be needed to assess the association between executive functioning and reduced specificity in this population. In addition, results from the non-clinical study indicated that autobiographical memory specificity was unrelated to severity of borderline traits in a student sample. Collectively, these results are not consistent with Williams’ theoretical proposal that individuals with Borderline Personality Disorder are particularly prone to developing an overgeneral style of memory (J. M. G. Williams, 1996). However, findings add further weight to the increasing body of evidence suggesting that BPD is not associated with reduced autobiographical specificity (Arntz et al., 2002; Renneberg et al., 2005).
The expected associations between overgeneral memory and clinical depression, dissociation, and childhood trauma were not observed in this population. However, memory specificity was found to be associated with thought suppression, as measured by the White Bear Suppression Inventory (WBSI). Given that the WBSI is thought to provide a measure of failed suppression attempts, or thought intrusions (Rassin, 2003), this result provides indirect support for the notion that overgeneral memory serves as a cognitive avoidance strategy for managing distressing, intrusive memories (J. M. G. Williams, 1996). Interestingly, the association between thought suppression and memory specificity only emerged when the effects of education were controlled for, which may account for mixed findings in previous studies, many of which have not accounted for education or cognitive ability (Brewin et al., 1998; de Decker et al., 2003; Gibbs & Rude, 2004; Henderson et al., 2002; Hermans et al., 2005; Kuyken & Brewin, 1995; Sampson et al., 2003; Stokes et al., 2004).

Borderline individuals were also found to exhibit marked affect dysregulation relative to controls, reporting elevated levels of negative affect, and an overwhelming fear of experiencing and expressing emotions, as well as being less responsive to positive events when clinical depression was also present. Affect dysregulation was found to be closely associated to behavioural dysregulation in individuals with Borderline Personality Disorder, such that higher levels of negative affect and fear of emotions resulted in more dissociation, self-harm, and thought suppression / intrusions. However, contrary to expectations, results indicated that autobiographical memory specificity was not related to affective instability in individuals with Borderline Personality Disorder. This result is inconsistent with the theory that individuals with BPD are prone to developing an
overgeneral style of memory in response to temperamental difficulties in controlling affect (J. M. G. Williams, 1996). In addition, findings from the non-clinical study indicated that there was no relationship between memory specificity and trait affect dysregulation, including affect intensity and lability, suggesting that reduced specificity may not be as closely associated with affect dysregulation as previously thought.

However, findings give some indication that autobiographical memory specificity may be related to reduced rates of deliberate self-harm in individuals with BPD, replicating the findings of Startup and colleagues (Startup et al., 2001). This result seems to imply that overgeneral memory may be protective in BPD, reducing the negative affect normally associated with distressing memories which would otherwise have culminated in deliberate self-harm (Startup et al., 2001). This relationship was not particularly robust, however, and appeared to be accounted for primarily by the effects of education. Further research is needed to provide conclusive evidence of the relationship between self-harm and autobiographical memory specificity.

Borderline individuals also displayed impoverished problem solving ability relative to controls, on both performance based and self-report measures of problem solving ability. The problem solving deficits of the borderline individuals appeared to extend to all components of the problem solving process, from poor problem orientation, to maladaptive problem solving styles and ineffective problem solving skills. Poor problem solving ability, as assessed by an outcome measure of problem solving ability (Means – Ends Problem Solving Procedure: MEPS) was found to be associated with reduced specificity in individuals with Borderline Personality Disorder. This finding is consistent with a large
body of evidence emerging from research in other clinical populations (Evans et al., 1992; Goddard et al., 1996, 1997; Kaviani et al., 2005; Pollock & Williams, 2001; Raes, Hermans, Williams, Demyttenaere et al., 2005; Sidley et al., 1997), although it contrasts with recent research which failed to find an association between the MEPS and memory specificity in individuals with Borderline Personality Disorder (Kremers, 2004c).

Differences in the versions of the MEPs used in these studies may account for the discrepant findings. Self-report problem solving was not related to memory specificity, although difficulty recalling any autobiographical memories whatsoever (as assessed by omissions on the AMT) was associated with self-reported avoidance and ineffective application of rational problem solving skills, particularly the ability to implement and verify solutions. This indicates that particular types of autobiographical memory difficulties, as revealed by responses on the AMT, display differential patterns of associations with problem solving deficits in individuals with Borderline Personality Disorder. Overgeneral autobiographical memory appears to be associated with impaired problem solving performance, but does not impact on the individual’s attitude towards problem solving or their perception of their own problem solving ability. In contrast, omission nonspecificity is associated with self reported problem solving skills and avoidance, but unrelated to problem solving performance.

Findings also indicate that Dialectical Behaviour Therapy is an effective form of intervention for individuals with Borderline Personality Disorder with treatment being associated with reductions in overall level of symptomatology, maladaptive behaviour, depressive symptoms, thought suppression, affect dysregulation, impulsivity and avoidance, and improvements in problem solving orientation and overall level of self
reported well-being. Evidence suggests that improvement in these variables occurs over the whole 12 months of the program, supporting the recommendation of a standard year-long DBT regimen. However, as there was no control group included in this study, it is not certain that DBT produced the changes observed (as compared to maturation, or other time-related variables), or that outcomes were superior to treatment as usual. As expected, memory specificity also appeared to increase over the course treatment, with a substantial amount of the improvement occurring within the first module of skills training. The increase in specificity coincided with a decrease in affect control and negative problem orientation, leading to the hypothesis that the change in memory specificity is the result of an increase in willingness to confront painful thoughts and emotions, most likely due to training in mindfulness. However, more research, particularly of an experimental design, is needed to elucidate which particular elements of DBT are related to change in autobiographical memory specificity. Contrary to expectations, neither baseline specificity nor change in specificity was related to treatment outcomes. This suggests that improvement in DBT is independent of memory specificity and that autobiographical memory is not a mechanism for change in DBT. However, this study was limited by small sample size as the result of poor treatment retention, and further research with a larger sample, and a non-treatment control group is needed to clarify these results.

Lastly, an experimental investigation of the affect regulatory function of generic recall in a non-clinical sample indicated that autobiographical memory specificity is related to emotional response to a negative event. In particular, findings suggest that students with naturally lower levels of autobiographical specificity report greater reductions in positive affect following a negative event than individuals with a specific style of autobiographical
recall. This suggests that specific recall is somehow protective, enabling individuals to maintain their positive mood despite being exposed to distressing stimuli. An explanation for this, based on mood incongruent recall was considered. It is suggested that a specific style of recall may be beneficial, at least in non clinical populations, as it allows individuals to access specific details about positive events from their past which, in turn, evoke greater levels of positive emotions to counter the affect produced by negative events. This study was also intended as an exploration of the impact of experimentally manipulated overgeneral memory on response to a negative event, however the experimental manipulation did not have the effect intended, most likely due to methodological limitations.

In summary, the overall findings of this thesis suggest that reduced specificity may be a function of cognitive ability in individuals with Borderline Personality Disorder rather than a mechanism related to affect regulation. However, there was some indication that specificity was related to deliberate self-harm and problem solving ability, suggesting that autobiographical memory may have some clinical relevance in this population. Specificity was not associated with change over treatment, calling into question the idea that memory specificity is a direct cause or consequence of many of the difficulties associated with BPD.

Of note, Dialectical Behaviour Therapy appeared to be associated with an increase in specificity within this population. This finding has important clinical implications as autobiographical memory provides the database of all talking-cure psychotherapies and is therefore a necessary component of effective treatment (Brewin et al., 1998).
Models of Overgeneral Memory

As previously stated, there have been a number of models proposed in the literature to date to account for the occurrence of overgeneral memory. The findings of the studies presented in this thesis will be discussed in relation to each of these models.

Executive Control Hypothesis

It has been suggested that reduced memory specificity in emotionally disturbed individuals may be, at least in part, a function of diminished executive control (J. M. G. Williams et al., 2007). Successful autobiographical retrieval requires the use of executive resources and control processes, such as the ability to: hold a retrieval model in working memory, inhibit irrelevant autobiographical knowledge during the search, and sustain the final search results in working memory (J. M. G. Williams et al., 2007). In individuals with relatively diminished executive control, these processes may be impaired such that autobiographical retrieval stops short of its target, resulting in the production of categoric or overgeneral memories (J. M. G. Williams et al., 2007; Conway & Pleydell-Pearce, 2000). The results of the current thesis provide some support for the executive control model of overgeneral memory, as the relationship between Borderline Personality Disorder and reduced specificity was found to be fully mediated by a factor common to both IQ and education. Although not a direct test of the role of executive function specifically, these findings indicate that cognitive ability in general plays a fundamental role in the production of overgeneral memory.
Affect Regulation Hypothesis

The “affect regulation” theory suggests that overgeneral autobiographical memory develops as a form of cognitive avoidance which protects the individual from the negative emotions associated with the recall of specific memories (J. M. G. Williams, 1996). According to this theory, individuals who are particularly sensitive to negative events, and those who have temperamental difficulties with affect regulation, are particularly prone to developing an overgeneral style of memory as a way of managing their emotions (J. M. G. Williams, 1996). One population to which this theory could be justly applied is Borderline Personality Disorder, which is a disorder characterised by affect dysregulation (Linehan, 1993a). Within the current thesis, there was preliminary evidence in support of the theory that overgeneral memory serves an affect regulation function in this population. Specifically, overgeneral autobiographical memory was found to be related to reduced levels of deliberate self-harm within the Borderline sample. This result suggests that overgeneral memory may be protective in BPD, reducing the negative affect normally associated with distressing memories which otherwise would have culminated in deliberate self-harm (Startup et al., 2001). This result was not particularly robust, however, and disappeared when education was controlled for.

Moreover, the bulk of the evidence arising from this thesis did not support the hypothesis that individuals with BPD will use overgeneral memory as a form of affect regulation. Firstly, results suggest that overgeneral memory is unrelated to BPD diagnosis over and above IQ/education. Secondly, autobiographical memory specificity was found to be unrelated to severity of borderline traits in a student sample. Thirdly, autobiographical
memory specificity was found to be unrelated to self-report measures of affect dysregulation in individuals with Borderline Personality Disorder. Lastly, and perhaps most importantly, improvement in affect regulation over the course of a Dialectical Behavior Therapy program was found to be unrelated to both baseline specificity and change in specificity over treatment. If, as hypothesised, overgeneral memory were a direct response to affect dysregulation in this population, then one would expect that overgeneral memory would decrease in response to treatment which improves affect regulation capabilities. That is, improving affect regulation should decrease the need for overgeneral memory by providing the individual with the skills necessary to deal with the emotions elicited by specific memory recall. However, such a relationship was not observed. Taken together, these results suggest that contrary to the affect regulation hypothesis, overgeneral memory is not related to affect dysregulation in Borderline Personality Disorder.

Results did indicate that in a nonclinical sample, autobiographical memory style was related to how one responds emotionally to a negative event. However, this appeared to be in the opposite direction to what would be expected on the basis of the affect regulation model. That is, individuals with naturally lower levels of autobiographical specificity were found to report greater reductions in positive affect following a negative event than individuals with a specific style of autobiographical recall. This suggests that specific recall is somehow protective, enabling individuals to maintain their positive mood despite being exposed to distressing stimuli. The association between high levels of specificity and the maintenance of positive affect supports a deficit model of overgeneral memory, suggesting that reduced specificity is associated with decreased well-being. This finding is consistent
with more recent experimental research indicating that increased specificity is associated with less emotional distress (Philippot et al., 2003; Raes et al., 2006).

Rumination Hypothesis

The “rumination hypothesis” (Watkins & Teasdale, 2001; Watkins & Teasdale, 2004; Watkins et al., 2000, 2000; Williams, 1996), suggests that overgeneral memory is the product of a truncated memory search which is impaired by ruminative self-focus. In particular, it is suggested that during generative retrieval, rumination increases the likelihood that intermediate descriptions (which are conceptually based abstract self-representations) will activate other self-descriptions, causing the retrieval search to move across the hierarchy rather than down to more specific levels (Conway & Pleydell-Pearce, 2000; J. M. G. Williams, 1996; J. M. G. Williams et al., 2007). Individuals with emotional disorders are thought to be particularly prone to this difficulty as they frequently display highly activated emotion related self-representations, or schemas, which foster rumination (J. M. G. Williams et al., 2007). The current thesis did not include a measure of rumination and it is therefore impossible to draw any conclusions in regards to the role of rumination in the autobiographical retrieval of individuals with BPD. One might postulate that ruminative processes may account for at least part of the association between overgeneral memory and cognitive ability observed in this thesis, however, without a direct assessment of this, this suggestion remains highly speculative. Further research is warranted in this area.
The Assimilation Model

Theorists have also argued that overgeneral memory can be understood within the framework provided by the “assimilation model” (Stiles et al., 1990). According to this model, problematic or painful experiences are resolved through the process of assimilation, whereby the experience is gradually incorporated into the individual’s schema or frame of reference (Williams, Stiles & Shapiro, 1999). In order to assimilate a problematic experience, there must be some change in the individual’s schema in order to accommodate and incorporate the new material (Stiles et al., 1990). The more painful or traumatic the experience is, the more radical the accommodation which is required for the experience to be resolved (Williams, Stiles & Shapiro, 1999).

Assimilation is thought to occur through a series of predictable stages (J. M. G. Williams et al., 1999). Where initially problematic experiences are warded off, assimilation begins with the emergence of the experience into awareness as unwanted thoughts, and progresses through identification and understanding of the problem, to a point where the problem is worked on, resolved, mastered, and integrated into everyday life. These stages each include an affective component, which occur in sequence from the oblivion or apathy accompanying successful warding off, through increasing levels of anxiety and distress as the experience emerges and is identified as problematic, to feelings of reduced distress as the problem is understood, and finally to optimism and satisfaction as resolution is achieved and the experience is integrated (Williams et al, 1999). A summary of these stages
is provided below (see Table 7.1) as adapted from Williams, Stiles and Shapiro (1999) with additions from Stiles and colleagues (1990).

**Table 7.1 Stages Of Assimilation**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Content</th>
<th>Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Warded off. Client unaware of the problem. Content is unformed.</td>
<td>Minimal – successful warding off</td>
</tr>
<tr>
<td>1</td>
<td>Unwanted thoughts. Client prefers not to think about it and finds it painful when forced or stimulated to confront the experience. Content reflects emergence of painful thoughts but connection with content is unclear</td>
<td>Strong or overwhelming negative feelings – anxiety, fear, anger, sadness</td>
</tr>
<tr>
<td>2</td>
<td>Vague awareness / emergence. Client acknowledges the existence of a problematic experience and becomes increasingly in contact with the experience but cannot formulate the problem clearly yet</td>
<td>Acute psychological pain or panic clearly associated with problematic thoughts / experiences</td>
</tr>
<tr>
<td>3</td>
<td>Problem statement / clarification. Content includes a clear statement of a problem – something that can be worked on</td>
<td>Negative but manageable</td>
</tr>
<tr>
<td>4</td>
<td>Understanding / insight. Problematic experience is placed in a schema, formulated and understood with clear connective links.</td>
<td>Mixed – some unpleasant recognitions but with curiosity or pleasant surprise of the “aha” sort.</td>
</tr>
<tr>
<td>5</td>
<td>Application / working though. Understanding is used to work on the problem, there is reference to problem solving efforts, although complete success not yet reached. Client may describe considering alternatives or systematically selecting courses of action</td>
<td>Positive, optimistic, business – like.</td>
</tr>
<tr>
<td>6</td>
<td>Problem solution. Client achieves a successful solution for a specific problem</td>
<td>Positive, satisfied, proud</td>
</tr>
<tr>
<td>7</td>
<td>Mastery. Client successfully uses solutions in new situations. Generalizations largely automatic</td>
<td>Positive when topic is raised but otherwise neutral</td>
</tr>
</tbody>
</table>

As is evident from this model, the prevailing state prior to the process of assimilation is one of successful avoidance. That is, distressing thoughts and memories are effectively kept
from awareness with the result that minimal affect is experienced. In the first stage of assimilation, these thoughts and memories begin to emerge into awareness, although the individual is still unwilling to think about them and actively restricts contact with these painful experiences (J. M. G. Williams et al., 1999). It has been suggested that these two stages represent some sort of memory failure in that the individual has an experience that they are either unable or unwilling to recall (J. M. G. Williams et al., 1999). In accordance with this theory, overgeneral autobiographical memory has been posited to be a measure of the failure to assimilate (J. M. G. Williams et al., 1999). That is, being primarily utilised as a cognitive strategy for avoiding negative memories, overgeneral memory will be evident prior to or in the early stages of the assimilation process (J. M. G. Williams, 1996; J. M. G. Williams et al., 1999).

As a cognitive avoidance strategy, overgeneral memory is thought to be protective in the short term as it protects the individual from the negative emotions associated with the recall of distressing memories (J. M. G. Williams, 1996). However, continued use of an overgeneral style of memory is thought to be maladaptive as it serves as a barrier to successful assimilation by reducing the amount of exposure to the negative memory. Despite this, some individuals may persist in maintaining an overgeneral style of memory to avoid the increase in painful affect which is the result of progressing from the pre-assimilation state of avoidance to awareness of problematic experiences.

The assimilation model offers a useful framework for understanding the present findings regarding overgeneral memory in individuals with Borderline Personality Disorder. In general, the findings of this thesis add to a growing body of evidence indicating that
individuals with Borderline Personality Disorder to do not display an overgeneral style of recall (Arntz et al., 2002; Renneberg et al., 2005). This suggests that Borderline individuals have progressed further than the pre-assimilation stage characterised by successful warding off. The intense affect generally experienced by individuals with Borderline Personality Disorder supports this theory, being largely consistent with the distress that accompanies the early stages of the assimilation process, rather that the oblivion evidenced prior to beginning assimilation. Moreover, many of the behavioural symptoms of Borderline Personality Disorder, including dissociation, impulsive risk taking behaviours and self-harm, are generally thought to be reactions to or coping strategies for dealing with acute psychological pain, again suggesting that Borderline individuals may be best placed in the early stages of assimilation.

It appears likely that individuals with BPD are “stuck” somewhere between successful warding off of problematic experiences (overgeneral memory) and problem clarification. This idea has been previously touched on by Renneberg and colleagues who suggest that “BPD patients may not be at the stage of “warding off”, instead they may be able to verbalize their pain but have not reached the acceptance level” (Renneberg et al., 2005, p 352). Conceptualising BPD individuals as being stuck in an early stage of assimilation provides a plausible explanation for the emotional, cognitive, and behavioural symptoms of this disorder. It may also explain which individuals with Borderline Personality Disorder rely on strategies such as dissociation and self-harm to manage their acute psychological pain instead of overgeneral memory. However, the suggestion that overgeneral memory is selectively associated with the pre-assimilation state of successful avoidance is countered by evidence indicating a relationship between overgeneral memory and thought intrusions.
(Brewin et al., 1998; Stokes et al., 2004; Hauer et al, 2006). This suggests that overgeneral memory is also observed during later stages of the assimilation process where there is an awareness of the problematic memory. Yet, past research indicates that intrusions and overgeneral memory are not associated in individuals with Borderline Personality Disorder, suggesting that the association may not hold in this population (Kremers et al., 2004). Further research is needed to determine whether particular affect regulation strategies are associated with different stages within the assimilation process, and to assess the relationship between overgeneral memory and other forms of affect regulation, including dissociation and self harm.

There are several possible hypothesis to explain why Borderline individuals may be stuck in an early stage of assimilation. Firstly, as previously discussed, assimilation requires exposure to distressing memories in order that the differences between this information and existing schema can be reconciled and the new information integrated (Stiles et al., 1990). However, this process may be extremely difficult for individuals who believe that coming into contact with memories and the emotions associated with them would be catastrophic (J. M. G. Williams et al., 1999). This is particularly pertinent for Borderline individuals, who report experiencing a combination of intense negative emotions and a fear of losing control of, and being overwhelmed by, their emotions (chapter three). The intensity of negative affect which these individuals experience may prevent them from successfully warding off distressing thoughts and memories, while their elevated fear of emotions may lead them to persevere with experientially avoidant strategies for managing their emotions, even though these strategies are no longer effective. Thus, these individuals may be unable
to successfully ward off distressing internal experiences but also unwilling to engage in the exposure necessary for successful assimilation.

Secondly, it may be that individuals with Borderline Personality Disorder have difficulty moving further towards successful assimilation due to their unstable self-image or sense of self. Within the assimilation model, experiences are considered to be problematic to the extent that they are not adequately accounted for by currently existing schema (Stiles et al., 1990). For example, memories of abuse at the hands of a parent are considered to be particularly traumatic as they shatter generally held schema regarding our personal world, that is, self as worthwhile, and world as basically benign (Janoff-Bulman, 1992). The extent to which a memory is avoided is thought to be a reflection of the degree of discrepancy between the memory and currently existing schemata (Stiles et al., 1990). Where such a discrepancy exists, assimilation requires some change in the individual’s schema in order to accommodate and incorporate the new material (Stiles et al., 1990).

Accommodating problematic experiences into currently existing schemas may be particular difficult for individuals with Borderline Personality Disorder as this disorder is associated with disturbances in both identity (“self” schema) and relationships (“other” schema) (Bender & Skodol, 2007). In fact, it has been suggested that disturbed mental representations of self and other may underlie many of the difficulties associated with this disorder, such that: “Borderline psychopathology emanates from a profound disturbance in ability to create, maintain, and use benign and integrated images of self and other, which leads to the emotional instability, chaotic interpersonal relations and impulsive, self-
Destructive behaviors that capture so much clinical attention” (Bender & Skodol, 2007, p 501).

Difficulties with self-image have been recognised as a central component of BPD by many psychological traditions, including: psychodynamic (Kernberg, 1967), interpersonal (Benjamin, 1993), and cognitive behavioural perspectives (Bricker, Young, & Flanagan, 1993) (Bender & Skodol, 2007). Although these traditions differ slightly in their perspectives on the mechanisms involved, they all appear to concur that negative childhood experiences lead to maladaptive ways of being in the world (“splitting”, maladaptive schemas etc) which results in a fragmented sense of self (Bender & Skodol, 2007). Research supports this idea, indicating that individuals with BPD display high levels of all identified maladaptive schemas, denoting long-standing and pervasive negative views of self, others, and the world in general (Kellogg & Young, 2006; Young, Klosko, & Weishaar, 2003). In addition, these individuals appear to rapidly shift between multiple states of mind or schemas, resulting in a constantly fluctuating sense of self (Bender & Skodol, 2007).

Given that successful assimilation requires adjustment of currently existing schemas in order to incorporate discrepant material, assimilation is likely to be difficult for individuals with BPD due to their unstable sense of self. Indeed, previous theorists have suggested that instability in sense of self is one of the factors that makes treating individuals with BPD so difficult, and that successful treatment of this disorder requires strategies to integrate split mental images to result in a unified sense of self (Bender & Skodol, 2007). Building on this theory, it is likely that without effective treatment, the Borderline’s unstable sense of self
will interfere with the development or accommodation of schemas which is necessary for successful assimilation.

Thirdly, it may be that assimilation is to some degree dependent on cognitive ability, and that impaired cognitive ability in this population prevents successful assimilation. As shown in chapter 2 of this thesis, reduced specificity in individuals with BPD appears to be fully mediated by differences in IQ and education. It is possible that this relationship can be explained in terms of reduced cognitive capacity subsequent to intrusive symptoms which interfere with working memory and attention in this population. If assimilation requires a degree of cognitive ability to aid in the process of schema remodelling, insight building and problem solving application, then reduced cognitive capacity in this population would be an impediment to successful assimilation. It may also be that impaired cognitive ability in combination with traumatic early life experiences promotes an avoidant style of thinking which impairs the individual’s ability to assimilate their problematic experiences within their self-schema.

The assimilation of problematic experiences is posited to be a change mechanism which is a component of all effective psychotherapies (Stiles et al., 1990). According to the assimilation model, effective treatment of Borderline Personality Disorder should therefore result in movement through the remaining stages of assimilation such that problematic experiences are resolved, mastered, and integrated into everyday life (Stiles et al., 1990). This end is likely to be achieved by therapeutic interactions which provide exposure to the problematic experience, and develop schemata into which the problematic experience can be incorporated (Stiles et al., 1990). In line with this theory, an effective treatment for
Borderline Personality Disorder should be signposted by decreasing levels of overgeneral memory, particularly in the early stages of treatment, as evidence that assimilation is progressing. This pattern of results was observed for Dialectical Behaviour Therapy, with an increase in memory specificity within the first module of skills training. The finding that change in specificity was not related to change in affect regulation, problem solving or symptomatology over treatment, suggests that autobiographical specificity may be a hallmark for assimilation rather than a mechanism which drives the change in symptoms of BPD. Further research is needed to ascertain whether progress through the later stages of assimilation occurs over the course of DBT.

Conclusion

Individuals with Borderline Personality Disorder have been postulated to be particularly prone to developing an overgeneral style of memory due to their temperamental difficulties in controlling affect (J. M. G. Williams, 1996). However, research to date has yielded inconsistent findings in this regards (Arntz et al., 2002; Jones et al., 1999; Kremers et al., 2004; Renneberg et al., 2005). This thesis has provided further clarification of the nature of the relationship between autobiographical specificity and Borderline Personality Disorder, suggesting that reduced specificity may be a function of cognitive ability in individuals with Borderline Personality Disorder rather than a mechanism related to affect regulation. However, there was some indication that memory specificity is a clinically meaningful phenomenon in this population, with reduced specificity being related to poor problem solving ability and less self harm, and an increase in specificity occurring over the course of treatment. Moreover, experimental research in a non-clinical sample suggested that
overgeneral memory impairs the ability to maintain positive mood, most likely by reducing
the concreteness of positive memories evoked during mood incongruent recall. Therefore,
this thesis provides confirmation that overgeneral memory is a clinically meaningful
phenomenon warranting further research and consideration in treatment protocols.

Clinical Implications

The findings emerging from this thesis have a number of important clinical implications.
Firstly, results suggest that autobiographical memory may not be a protective mechanism
associated with affect regulation as has been previously thought. Instead, results appear to
be consistent with a dysfunctional view of overgeneral memory, with high levels of
specificity being associated with less deliberate self harm in individuals with Borderline
Personality Disorder, and with maintenance of positive emotions after a negative event in a
nonclinical population. Moreover, overgeneral memory was found to be associated with
problem solving deficits in individuals with BPD, again suggesting that overgeneral
memory is a dysfunctional strategy. Taken together these results emphasise the importance
of addressing autobiographical memory style in the treatment of clinical populations.

Secondly, results indicate that memory specificity increases over the course of treatment in
a Dialectical Behavior Therapy program. In the absence of a control group, it cannot be
concluded that this change is a direct result of the treatment program itself; however, given
that past research indicates that mindfulness based programs increase memory specificity, it
appears plausible that DBT played at least a minor role in the changes observed (Watkins
& Teasdale, 2001; Watkins et al., 2000; Williams et al., 2000). More research is needed in
this regards, however, findings provide preliminary evidence that the treatment strategies included in DBT may be useful in addressing the autobiographical deficits of individuals with Borderline Personality Disorder.

**Limitations**

The present thesis has a number of limitations that merit discussion. Firstly, although the research presented in this thesis has clearly established that Borderline individuals display significantly greater affect dysregulation and problem solving deficits than community controls, without the inclusion of a psychiatric control group, it is impossible to determine whether these deficits are specific to individuals with a BPD diagnosis. Similarly, without a control group of any description in the longitudinal study, it is impossible to determine if the effects observed were due to Dialectical Behavior Therapy, or were a reflection of other non-treatment related processes such as: natural recovery, maturation, the course of the illness or the effects of repeated testing, or indeed whether outcomes were superior to treatment as usual. However, while the inclusion of such control groups would have provided additional and interesting information, they were not necessary to the research questions of this thesis, which were to explore the association and covariance over time of memory specificity, affect regulation and problem solving in BPD.

Secondly, it is a limitation of this thesis that comorbid PTSD and past episodes of MDD were not screened in the Borderline sample. Past research has indicated that overgeneral memory is characteristic of individuals with PTSD (e.g. Schönfeld & Ehlers, 2003; Schönfeld & Ehlers, 2006), and recovered depressed patients (Brittlebank, Scott, Williams,
& Ferrier, 1993; Mackinger, Loschin, & Leibetseder, 2000; Mackinger, Pachinger, Leibetseder, & Fartacek, 2000). As past episodes of depression and diagnosis of PTSD were not assessed in our sample, it is impossible to determine whether findings were in some way influenced by the presence of comorbid diagnosis in the Borderline individuals. However, it is important to note that past research by Kremers et al. (2004) found an association between overgeneral memory and current depression in BPD, and neither comorbid PTSD nor past episodes of clinical depression were screened. Moreover, the findings of this study indicate that the difference in autobiographical memory specificity between BPD subjects and controls was fully mediated by years of education and IQ, suggesting that neither comorbid PTSD nor current or past depression accounts for the difference.

More importantly, the exploration of the relationship between memory specificity and comorbid depression in BPD which was presented in this thesis was limited by the small sample size, with the smallest group (Borderline non-depressed) having only nine participants. This is a major limitation as sample size issues may have affected the ability of this research to detect associations between these variables. However, as results indicated that it was the non-depressed BPD patients who differed from the controls in memory specificity rather than the larger sample of depressed BPD patients, it appears that lack of power cannot account for the pattern of results observed.

Sample size and retention rate were also an issue in the longitudinal study which has been presented in this thesis, with only 8 participants completing the entire 12 month DBT program. Although significant change was observed in numerous domains across the
course of treatment, the small sample size and poor retention rate limit the interpretability of the findings, especially in terms of the extent to which results can be generalised. This difficulty is likely to be one which plagues much of the research in this population as individuals with Borderline Personality Disorder are known to be notoriously difficult to keep engaged in therapy (Paris, 2005).

Lastly, there may also be some limitations inherent in the measures utilised throughout this thesis. All of the studies presented rely exclusively on the Autobiographical Memory Task to assess memory specificity. While the AMT is the most commonly used measure of autobiographical specificity, a number of other measures have been used in past research, including: the autobiographical fluency task (Dritschel, Williams, Baddeley, & Nimmo-Smith, 1992), autobiographical memory questionnaire (Wenzel, Pinna & Rubin, 2004), memory narrative approach (Singer & Moffit, 1992), and assessment of spontaneous autobiographical recall during other tasks (Goddard et al., 1996). Based on a cue-word design, the AMT is a more artificial method of assessment than naturalistic evaluation methods such as spontaneous recall and memory narrative approaches, and as such, its use may have limited investigation of the functional aspects of autobiographical recall in this population. Indeed, past research has identified an association between spontaneous autobiographical recall and problem solving which was not evident in responses on the AMT (Goddard et al., 1996). Due to the artificial nature of the AMT, this measure also places a heavy executive load on participants which may have again influenced the results observed. Furthermore, within the present study, AMT response categories were the only indices used to assess overgeneral memory. Latency to first response on the AMT has also been used in past research as an index to assess degrees of accessibility and, while past
research has yielded inconsistent findings in regards to latency effects in clinical groups (Williams & Scott, 1988; Williams & Boradbent, 1986; Scott et al., 2000; Kuyken & Dalgleish, 1995), assessing this index may have been a useful addition to the current research.

The investigation of the relationship between autobiographical memory and affect regulation in this population may also have been affected by measure limitations. Affect regulation was assessed solely through the use of self-report and as such, was open to bias by factors such as mood, current mental state, belief system, confirmation bias, and demand effects. More importantly, self-report measures of affect regulation also depend on memory and observation and therefore cannot assess cognitive or emotional processes which occur at a pre-conscious level or at a speed which is not amenable to inspection. The use of self report scales to assess affect regulation may have confounded findings regarding the association between affect regulation and autobiographical memory as both rely on memory and accurate reporting, and may be postulated to include processes which occur at a preconscious level or speed. The self report measure of problem solving (SPSI-R) is vulnerable to similar limitations, although the inclusion of an additional on-line measure of problem solving has strengthened the investigation of the association between problem solving and autobiographical memory.

**Future Research**

Unfortunately, the results of the present study do not provide definitive evidence in regards to the association between Borderline Personality Disorder and overgeneral memory.
Indeed, the failure to find an association between overgeneral memory and BPD, particularly for BPD individuals with comorbid depression, may have raised more questions than it has answered. Further research is needed to provide definitive evidence in regards to the occurrence of overgeneral memory in this population. More specifically, the association between cognitive ability and overgeneral memory in this population requires replication. Future studies in this area would also benefit from larger sample sizes and the inclusion of measures to assess comorbid Post Traumatic Stress Disorder, past episodes of clinical depression, and rumination processes, to provide a more complete assessment of autobiographical memory in BPD.

The association between affect regulation and overgeneral memory in BPD also warrants further exploration in the future. While the results of this thesis suggest that overgeneral memory was not related to affect regulation in Borderline Personality Disorder, this investigation was limited by the use of self-report measures. It may be that the association between these variables is due to unconscious processes which may be only identified through online measures of affect regulation, such as psychophysiological responses or experimental manipulation. The importance of autobiographical style as a means of affect regulation is emphasised by the observed association between self harm and memory specificity which suggests that overgeneral memory is a dysfunctional strategy in this population.

In addition, the protective role of specific recall in maintaining positive emotions following exposure to a negative event is a finding which warrants exploration in future research. It appears that specific recall may be protective primarily through its role in sustaining
positive emotions rather than decreasing negative emotions. Ideally, this result should be clarified in experimentally designed research, such as could be achieved by re-running the study presented in chapter six in a sample of dysphoric individuals, or by adding a mood induction task to the protocol for use in nonclinical samples. Alternative methods of specificity manipulation may also be considered (e.g. Philippot, Schaefer, & Herbette, 2003; Raes et al., 2006). It would also be interesting to determine whether this effect holds in clinical populations, particularly those with affect regulation difficulties.

Finally, further consideration should be given to the assimilation model as a framework for conceptualising the relationship between overgeneral memory and clinical states. It has been suggested that overgeneral memory is a measure of the failure to assimilate problematic experiences as it functions as a cognitive avoidance strategy which is employed in the early stages of assimilation where problematic material is warded off (J. M. G. Williams, 1996; J. M. G. Williams et al., 1999). Building on this theory, it could be suggested that overgeneral memory is a coping strategy used in the early phases of assimilation, while alternative coping strategies, such as dissociation or self harm, may be used to manage the intense emotional pain which arises as the assimilation process progresses. Indeed, this is a theory that has been considered in chapter 2 of this thesis. However, past research has indicated that overgeneral memory is associated with thought intrusions (Brewin et al., 1998; Stokes et al., 2004; Hauer et al, 2006), suggesting that overgeneral memory is not selectively associated with the pre-assimilation state of successful avoidance, but is also observed during later stages of the assimilation process where there is an awareness of the problematic memory. Further research is needed to
determine whether specific affect regulation strategies, particularly overgeneral memory, are exclusively associated with certain stages within the assimilation process.


References


References


References


References


References


Appendix A

Word Lists used in Chapters 2 through 5.

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<td>Tired</td>
<td>Fault</td>
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Appendix B

MEPS version A

1) Helen Chris very much, but they had many arguments. One day, after an argument over Chris flirting with another woman, Chris walked out on her. Helen felt extremely rejected and hopeless. The story ends with Helen feeling much more optimistic and good about herself. You begin the story where Helen is feeling rejected.

2) Mary noticed that her friends seemed to be avoiding her. Mary wanted to have friends and be liked. The story ends when Mary’s friends like her again. You begin the story where she first noticed her friends avoiding her.

3) Things were going particularly badly for Cindy that week. Work was too demanding, she had a bad fight with her mother, and she was feeling so
overwhelmed that suicide seemed like the only solution. The story ends with Cindy alive, deciding not to kill herself. You begin the story where Cindy begins feeling suicidal.

4) Susan had just been fired from a job she had held for the past two years. She needed a new job quickly because she didn’t have any money, but she didn’t feel like she had the confidence to go look for a new one. Susan tried talking to her friends at her old job, but they didn’t seem to want anything more to do with her. The story ends with Susan working in a new job. You begin the story just after Susan tries to talk to her friends at her old job.

MEPS version B

1) Karen and Jo loved each other very much and had plans to live together. One day while Karen was at Jo’s house, they had a bad argument. Karen blew up and left Jo’s house very angry and upset. The story ends with Karen and Jo happy again, planning their new home together. You begin the story when Karen leaves Jo’s home.

2) The nursing home was short on staff that day and Laura had more responsibilities than she was used to. Everyone was telling her to do different things, which made her very frustrated and angry. Laura thought of cutting herself to relieve some of the tension she was feeling. The story ends with Laura leaving the nursing home at the end of the day, feeling less frustrated. You begin the story where Laura first feels frustrated and angry.

3) Jane tried to pass a car on the freeway and almost hit its fender. The driver of the car yelled at Jane, saying she was an awful driver and didn’t belong on the road.
When Jane told some acquaintances about it, they looked at her in a strange way. Jane felt that not only was she an awful driver, but an awful person as well. The story ends with Jane feeling better about herself. You begin the story where Jane starts feeling bad about herself.

4) Zola just moved in that day and didn’t know anyone. She wanted to have friends in the new city. The story ends with Zola having many good friends and feeling at home in her new city. You begin the story with Zola in her room immediately after arriving in the new city.

M EPS version C

1) Lisa had been dating Leigh for six months and was very happy with their relationship. One day, out of the blue, Leigh started dating someone else and told Lisa they were through. Lisa felt extremely rejected and hopeless. The story ends with Lisa feeling much more optimistic and good about herself. You begin the story where Lisa is feeling rejected.

2) Kelly noticed that her friends seemed to be avoiding her. Kelly wanted to have friends and be liked. The story ends when Kelly’s friends like her again. You begin the story where she first noticed her friends avoiding her.

3) Things were going particularly badly for Judith that week. School was too demanding, she had a bad fight with her partner, and she was feeling so overwhelmed that suicide seemed like the only solution. The story ends with Judith alive, deciding not to kill herself. You begin the story where Judith begins feeling suicidal.
4) Joyce had just been fired from a job she had held for the past two years. She needed a new job quickly because she didn’t have any money, but she didn’t feel like she had the confidence to go look for a new one. Joyce tried talking to her friends at her old job, but they didn’t seem to want anything more to do with her. The story ends with Joyce working in a new job. You begin the story just after Joyce tries to talk to her friends at her old job.

MEPS version D

1) Melanie and Sheridan loved each other very much and had plans to live together. One day while Melanie was at Sheridan’s apartment, they had a bad argument. Melanie blew up and left Sheridan’s house very angry and upset. The story ends with Melanie and Sheridan happy again, planning their new home together. You begin the story when Melanie leaves Sheridan’s apartment.

2) The office where Althea worked was short of staff that day and Althea had more responsibilities than she was used to. Everyone was telling her to do different things which made her feel very frustrated, angry, and out of control. This had been happening a lot lately. Althea thought of hurting herself to relieve some of the tension she was feeling. The story ends with Althea leaving the office at the end of the day, feeling less frustrated. You begin the story where Althea first feels frustrated and angry.

3) Julia ran into a stranger at the mall and spilled some coffee on her sweater. The stranger yelled at Julia, saying she was a clutz and should watch where she was going. When Julia told some acquaintances about it, they looked at her in a strange way. Julia felt that not only was she a clutz, but an awful person as well. The story
ends with Julia feeling better about herself. You begin the story where Julia starts feeling bad about herself.

4) Erin just moved in that day and didn’t know anyone. She wanted to have friends in the new city. The story ends with Erin having many good friends and feeling at home in her new city. You begin the story with Erin in her room immediately after arriving in the new city.

MEPS version E

1) Jennifer loved Daniel very much, but they had many arguments. One day, after an argument over Daniel flirting with another woman, Daniel walked out on her. Jennifer felt extremely rejected and hopeless. The story ends with Jennifer feeling much more optimistic and good about herself. You begin the story where Jennifer is feeling rejected.

2) Tanya noticed that her friends seemed to be avoiding her. Tanya wanted to have friends and be liked. The story ends when Tanya’s friends like her again. You begin the story where she first noticed her friends avoiding her.

3) Things were going particularly badly for Angela that week. Work was too demanding, she had a bad fight with her mother, and she was feeling so overwhelmed that suicide seemed like the only solution. The story ends with Angela alive, deciding not to kill herself. You begin the story where Angela begins feeling suicidal.

4) Maria had just been fired from a job she had held for the past two years. She needed a new job quickly because she didn’t have any money, but she didn’t feel like she had the confidence to go look for a new one. Maria tried talking to her
friends at her old job, but they didn’t seem to want anything more to do with her.

The story ends with Maria working in a new job. You begin the story just after

Maria tries to talk to her friends at her old job.

Appendix C

Word Lists used in Chapter 6

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