Autobiographical memory biases in social anxiety

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Abstract

Individuals with social anxiety preferentially attend to threatening social information during and following social events. As such, cognitive models predict that social anxiety should be associated with biases in the recall of social events. However, initial experimental studies examining this assumption either failed to find such biases or found only weak evidence for an autobiographical memory bias. The current review examines an emerging line of evidence offering support for the role of an autobiographical memory bias in the development and maintenance of social anxiety. The review begins by examining current theoretical approaches to autobiographical memory before looking at empirical studies that have examined differences between socially anxious and non-anxious individuals in the recall of autobiographical memories. Specific memory biases include properties of social-threat memories, the imagery associated with these memories, and the cognitive processing styles that have been found to either facilitate or inhibit the recall of emotional memories. Limitations in methodologies used to study retrieval of memories and the implications of findings for future research are discussed.

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Contents

1. Introduction .............................................................. 288
2. Theories of autobiographical memory .................................................. 289
   2.1. Autobiographical memories as reconstructions .................................................. 289
   2.2. The self-memory system ..................................................... 291
      2.2.1. Memory and current self-perceptions .......................................... 291
      2.2.2. Memory and self-regulation ............................................... 291
3. Autobiographical memory and anxiety .................................................. 291
   3.1. Autobiographical memory and social anxiety ........................................... 291
   3.2. Recall of social-threat memories in social anxiety ......................................... 291
   3.3. Properties of anxiety-related memories .............................................. 292
   3.4. Memory perspective biases and social anxiety .......................................... 293
4. Early autobiographical memories and social anxiety ........................................... 293
   4.1. Recall of early adverse social experiences ............................................. 293
   4.2. Imagery and early autobiographical memories .......................................... 294
5. Cognitive processing styles and autobiographical memories in social anxiety ............................... 294
   5.1. Effects of imagery on autobiographical memory recall ....................................... 294
   5.2. Effects of rumination on autobiographical memory recall .............................. 294
      5.2.1. Anticipatory processing and memory recall ........................................ 294
      5.2.2. Post-event processing and memory recall ........................................ 295
6. Directions for future research ...................................................... 295
References ................................................................. 296

1. Introduction

Social anxiety disorder is characterized by a marked and persistent fear of social or performance situations that provoke an immediate anxiety response (DSM-IV, American Psychiatric Association, 1994).
Anxiety typically focuses on concerns about negative evaluation from other people. Individuals with social anxiety disorder anticipate that they will embarrass or humiliate themselves before entering a social event, shift their attention towards detailed monitoring and observation of the self during the event, and engage in rumination following the event (Clark & McManus, 2002). Social anxiety is characterized therefore by a number of biases in cognitive processing (see Heinrichs & Hofmann, 2001) that are a direct result of the social context in which anxiety is apprehended and experienced. Given that social anxiety is associated with enhanced attention to perceived threat in social situations, a basic assumption of cognitive models of social anxiety (Clark & Wells, 1995; Rapee & Heimberg, 1997) postulates that individuals will display a tendency to recall negative experiences of social events. As such, it is expected that social anxiety will be associated with biases in the recall of certain types of autobiographical experiences.

In comparison with the wealth of research that has focused on the role of implicit and explicit memory biases in social anxiety (see Coles & Heimberg, 2002; Mitte, 2008), the role of autobiographical memory biases in social anxiety has been relatively under researched. However, there is good reason to believe that such biases play an integral role in the maintenance of this disorder. Clinical observation suggests that individuals with social anxiety disorder tend to be preoccupied with emotionally upsetting social events from the past, particularly in relation to perceived social failures (Clark & Wells, 1995; Coles & Heimberg, 2002). In addition, cognitive models of social anxiety have highlighted the importance that memory processes may play in exacerbating anxiety. For example, Rapee and Heimberg's (1997) cognitive-behavioral model proposes that socially anxious individuals' perception of their social performance is likely to be mediated by prior social experiences that are represented either accurately or inaccurately in long term memory. Furthermore, Clark and Wells' cognitive model argues that recently perceived social failures may be added to an extensive list of past social failures that are stored in memory, together serving to strengthen negative beliefs about social inadequacy and the threat of social situations.

Whereas autobiographical memory biases have been consistently demonstrated in depression and post-traumatic stress disorder (Moore & Zoellner, 2007; Williams et al., 2007), research examining whether such biases are apparent in other anxiety disorders has been more equivocal (Burke & Mathews, 1992; Levy & Mineka, 1998; Richards & Whittaker, 1990). Indeed, preliminary research examining memory biases in social anxiety initially failed to find differences between individuals with social anxiety disorder and non-anxious controls in the retrieval of threat-related autobiographical memories (Rapee, McCallum, Melville, Ravenscroft, & Rodney, 1994), despite clinical observation and theoretical models that would argue to the contrary. However, an emerging line of research in this area has begun to highlight new ways of examining autobiographical memory biases. For example, the link between early autobiographical memories and current images of the self (Hackmann, Clark, & McManus, 2000; Wild, Hackmann, & Clark, 2008), and the effect of certain cognitive processing styles on the retrieval of autobiographical memories (Morgan & Banerjee, 2008; Stopa & Jenkins, 2007) have together highlighted the role of autobiographical memory in the development and maintenance of social anxiety.

The current review will begin by introducing the concept of autobiographical memory, presenting the view that memories are reconstructed from self-knowledge, with particular reference to Conway and Pleydell-Pearce’s (2000) self-memory system. Current ways of examining autobiographical memory in social anxiety will then be reviewed (see Table 1), emphasizing the role that specific cognitive processing styles may play in enhancing the accessibility of emotionally adverse memories.

### 2. Theories of autobiographical memory

Tulving (1972) made an important distinction between two systems in long term memory: the semantic and episodic memory systems. The former consists of meaningful facts about the world and contextual knowledge, while the latter consists of a record of specific experiences. Autobiographical memory may be viewed as a particular type of episodic memory concerned with “specific experiences and memory for the personal facts of one’s life” (Conway, 1990, p.4). Autobiographical memories consist of complex events and contain a high degree of self-reference and personal significance. In addition, these memories typically feature sensory, perceptual, and reflective information, including details about the particular time and place in which an event was experienced (Rubin, 1996). Theoretical accounts of autobiographical memory have focused on the way in which memories are structured and represented in long term memory.

#### 2.1. Autobiographical memories as reconstructions

Current approaches to autobiographical memory are based on earlier theories that proposed autobiographical memories are represented within hierarchical knowledge structures. Neisser (1986) suggested that when individuals recall an experienced event, they do not revive a single record of the event but revive a whole network of memories associated with this event. This view emphasizes that autobiographical memory is organized into multiple levels of descriptions of events (e.g., actors, meanings, and perceptual and temporal features). Because these levels are nested within one another, recalling an event involves moving between these levels. Neisser proposed that at the base of this hierarchical structure are specific autobiographical memories. A key assumption of this approach is that memories are reconstructed based on what was perceived from an event rather than from what actually happened. For this reason, it has been argued that autobiographical memories are typically inaccurate and are often vague, incomplete, or distorted (Conway, 1990; Neisser, 1982). Both the encoding and retrieval of autobiographical memories may be influenced by a combination of bottom-up processes, in which incomplete or ambiguous sensory information is received via the senses, and top-down processes, in which information already stored in memory as prior knowledge influences expectations and interpretations of sensory input. What is remembered therefore appears to be influenced by what is already known.

The reconstructivist account has been further emphasized in more recent approaches to autobiographical memory (Anderson & Conway, 1993; Conway, 1996; Conway & Pleydell-Pearce, 2000). Autobiographical memories are not viewed as discrete, holistic units in long term memory, but rather they are temporary mental representations that are reconstructed through levels of autobiographical knowledge stored in an autobiographical knowledge base. According to Anderson and Conway (1993), these temporary or transitory mental representations are reconstructed in the context of a specific processing episode. They suggest that the autobiographical knowledge base facilitates the retrieval of these memories. This base contains at least three levels of knowledge. At the highest level of the hierarchy, lifetime periods represent the goals, plans, and themes of the self during specific periods. For example, knowledge of significant relationships with others and records of goal attainment that are characteristic of a particular period are represented at this level. The next level is represented by general events, which encompasses both repeated, extended events and single, specific events. At the lowest level, event-specific knowledge contains knowledge of the sensory-perceptual detail of specific events and highly specific facts.

The process through which autobiographical memories, or the three layers of the knowledge base, are retrieved has been described in terms of cyclic retrieval patterns (Anderson & Conway, 1993; Conway, 1996). In this way, when an internal or external cue is first elaborated, activation travels in channels through the knowledge base such that if a search accesses a lifetime period, activation is subsequently channelled by cues available at this level to associated general events and event-specific knowledge. At this stage of the cyclic retrieval process, knowledge accessed by the cue is evaluated
and is assessed by whether the knowledge is appropriate and required or whether the retrieval process should be terminated. Consequently, an autobiographical memory is retrieved once a stable pattern of activation is established across the appropriate set of knowledge layers in the autobiographical knowledge base. Anderson and Conway (1993) maintain that central control processes modulate the retrieval cycle (e.g., the working self, Conway, Singer, & Tagini, 2004). This allows current themes and discrepancies of the self to influence memory construction because current preoccupations of the self are believed to be part of these central control processes.

Table 1
Summary of studies examining autobiographical memory biases in social anxiety.

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Memory recall task</th>
<th>Social induction</th>
<th>Memory measure</th>
<th>Main finding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recall of social-threat memories</strong></td>
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</tr>
<tr>
<td>1. Rapee et al. (1994), Study 4</td>
<td>33 SAD</td>
<td>Social and neutral cue words</td>
<td>No</td>
<td>Anxiety ratings</td>
<td>No effect of SA on anxiety ratings of social memories</td>
</tr>
<tr>
<td>2. Wenzel et al. (2002)</td>
<td>16 SAD</td>
<td>Social-threat and neutral cue words</td>
<td>No</td>
<td>IC affect ratings</td>
<td>Weak effect of SA on negative affect ratings of social-threat memories</td>
</tr>
<tr>
<td>3. Wenzel, Werner et al. (2004)</td>
<td>15 SAD</td>
<td>Positive, neutral, and social-threat cue words</td>
<td>No</td>
<td>IC affect ratings</td>
<td>No effect of SA on ratings of social-threat memories when controlling for depression</td>
</tr>
<tr>
<td><strong>Properties of anxious memories</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Wenzel, Pinna et al. (2004)</td>
<td>99 students</td>
<td>Affective categories</td>
<td>No</td>
<td>IC affect ratings</td>
<td>Panic/trauma memories recalled with more vivid and detailed properties than worry/social anxiety memories</td>
</tr>
<tr>
<td>2. Erwin et al. (2006)</td>
<td>45 SAD</td>
<td>Clinical interview</td>
<td>No</td>
<td>PDS-revised</td>
<td>SAD group responded to stressful social memories with PTSD-type symptoms</td>
</tr>
<tr>
<td>3. D’Argembeau et al. (2006)</td>
<td>17 SAD</td>
<td>Social and non-social events</td>
<td>No</td>
<td>MCQ</td>
<td>SAD group recalled social events with greater self-referential information</td>
</tr>
<tr>
<td>4. McNally et al. (2001)</td>
<td>12 SAD</td>
<td>Fearful and neutral memory</td>
<td>No</td>
<td>IC affect ratings</td>
<td>No effect of diagnostic group on affective content of recalled memories</td>
</tr>
<tr>
<td>5. Anderson et al. (2008)</td>
<td>42 SAD</td>
<td>Adverse social memories</td>
<td>No</td>
<td>IC linguistic content</td>
<td>Greater use of self-referential and anxiety words in memories recalled by SAD group</td>
</tr>
<tr>
<td><strong>Memory perspective biases</strong></td>
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<td></td>
</tr>
<tr>
<td>1. Wells et al. (1998)</td>
<td>12 SAD</td>
<td>Social and non-social event</td>
<td>No</td>
<td>Image perspective</td>
<td>SAD group more likely to recall social events from an observer perspective</td>
</tr>
<tr>
<td>2. Wells and Papageorgiou (1999)</td>
<td>12 SAD</td>
<td>Social and non-social event</td>
<td>No</td>
<td>Image perspective</td>
<td>SAD and AP groups tend to recall social events from an observer perspective</td>
</tr>
<tr>
<td>3. Coles et al. (2001)</td>
<td>30 SAD</td>
<td>Low, medium, high anxiety social event</td>
<td>No</td>
<td>MAQ, Image perspective</td>
<td>SAD group more likely to recall high anxiety social events from an observer perspective</td>
</tr>
<tr>
<td><strong>Recall of early adverse memories</strong></td>
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</tr>
<tr>
<td>1. Harvey et al. (2005)</td>
<td>55 SAD</td>
<td>Childhood events</td>
<td>No</td>
<td>LHQ</td>
<td>Greater recall of peer group difficulties from childhood in SAD group</td>
</tr>
<tr>
<td>2. Stemberger et al. (1995)</td>
<td>68 SAD</td>
<td>Clinical interview</td>
<td>No</td>
<td>SAHIQ-R</td>
<td>SAD group more likely to recall a traumatic social conditioning event</td>
</tr>
<tr>
<td>3. Roth et al. (2002)</td>
<td>514 students</td>
<td>Childhood events</td>
<td>No</td>
<td>TQ</td>
<td>Social anxiety and anxiety sensitivity associated with recall of teasing events</td>
</tr>
<tr>
<td>4. Hackmann et al. (2000)</td>
<td>22 SAD</td>
<td>Memory based on self-imagery</td>
<td>No</td>
<td>Interview</td>
<td>Event depicted in memory tended to coincide with onset of disorder</td>
</tr>
<tr>
<td><strong>Cognitive styles and memory</strong></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>1. Magee and Zinbarg (2007)</td>
<td>35 hi-SA, 35 lo-SA</td>
<td>Negative social event</td>
<td>Social anticipation</td>
<td>N/A</td>
<td>Focusing on negative memory led to larger increase in shyness than suppressing memory in high SA group</td>
</tr>
<tr>
<td>2. Stopa and Jenkins (2007)</td>
<td>20 hi-SA, 20 lo-SA</td>
<td>Positive, negative, and neutral cue words</td>
<td>Self-imagery</td>
<td>Retrieval latencies</td>
<td>Participants took longer to retrieve positive memories when holding negative image in mind during speech</td>
</tr>
<tr>
<td>3. Vassilopoulos (2008)</td>
<td>24 hi-SA, 24 lo-SA</td>
<td>Social event</td>
<td>Social vignettes</td>
<td>IC affect ratings</td>
<td>High SA group recalled fewer positive social events than low SA group</td>
</tr>
<tr>
<td>4. Hinrichsen and Clark (2003), Study 1</td>
<td>20 SAD, 20 lo-SA</td>
<td>Social event</td>
<td>No</td>
<td>Interview, ASBQ</td>
<td>High SA group reported more past perceived social failures during social anticipation</td>
</tr>
<tr>
<td>5. Mellings and Alden (2000)</td>
<td>58 hi-SA, 58 lo-SA</td>
<td>Memory of social interaction</td>
<td>Social interaction</td>
<td>IC memory description</td>
<td>PEP associated with recall of negative self-related information following interaction</td>
</tr>
<tr>
<td>6. Field and Morgan (2004)</td>
<td>33 hi-SA, 33 lo-SA</td>
<td>Free recall of events</td>
<td>PEP</td>
<td>Affective ratings</td>
<td>High SA group recalled anxious and shameful memories following PEP</td>
</tr>
<tr>
<td>7. Morgan and Banerjee (2008), Study 2</td>
<td>29 hi-SA, 30 lo-SA</td>
<td>AMQ</td>
<td>Response style</td>
<td>Affective rating</td>
<td>High SA group recalled memories with highest anxiety ratings after ruminating about a hypothetical social event</td>
</tr>
</tbody>
</table>

Note. SAD = social anxiety disorder; NAC = non-anxious controls; IC = independent coder; PDS-revised = post-traumatic diagnostic scale-revised; MCQ = memory characteristics questionnaire; PD = panic disorder; MDD = major depressive disorder; AP = agoraphobia; B/IP = blood or injury phobia; MAQ = memory attributional questionnaire; LHQ = learning history questionnaire; SAHIQ-R = social anxiety history and interview questionnaire-revised; TQ = teasing questionnaire; ASBQ = anticipatory social behaviors questionnaire; PEP = post-event processing; AMQ = autobiographical memory questionnaire.
2.2. The self-memory system

The relationship between autobiographical memory and current self-perceptions has been emphasized in more detail in Conway and Pleydell-Pearce’s (2000) self-memory system account of autobiographical memory. This model suggests that autobiographical memories are the result of two competing demands: adaptive correspondence and self-coherence. Conway et al. (2004) describe the former as the need to encode a record of ongoing goal activity and experiences (i.e., reality) while the latter reflects the need to maintain a coherent and stable record of the self’s interaction with the world (i.e., an integrated life story). This account still maintains that memories are transitory mental constructions, but argues that a critical function of memory is to track progress in the attainment of goals and therefore memories should reflect reality to some extent.

2.2.1. Memory and current self-perceptions

The self-memory system predicts that the competing demand of coherence enhances the availability of memories that support and confirm current self-perceptions. This idea may help to explain why individuals with social anxiety disorder are preoccupied with perceived social failures from the past. These memories should be highly salient to socially anxious individuals because they reconfirm current self-views about the ability to interact effectively within interpersonal and social performance situations. In fact, recent research has shown that individuals with social anxiety disorder recall and rate autobiographical experiences of social situations with greater self-conscious emotion (Anderson, Goldin, Kurita, & Gross, 2006) and greater self-referential information (D’Argembeau, Van der Linden, d’Acremont, & Meyers, 2006) than non-anxious controls. A similar pattern of findings has been shown in studies of other types of anxiety disorders. For example, individuals with post-traumatic stress disorder (PTSD) report more trauma-related memories than individuals without PTSD (Kangas, Henry, & Bryant, 2005; McNally, Lasko, Macklin, & Pitman, 1995). In addition, Sutherland and Bryant (2008) found that perceiving a discrepancy between one’s current self and ideal self is related to the recall of traumatic memories. Current views of the self therefore appear to influence the type of memories recalled. The effect of current self-view on the recall of past events has been further emphasized in studies examining self-appraisal theory (Ross & Wilson, 2002; Wilson & Ross, 2001). These studies demonstrate a distancing bias in which individuals with high self-esteem report feeling subjectively further away from unfavorable past experiences than from favorable ones, whereas individuals with low self-esteem do not show any such bias. Ross and Wilson argue that such individuals are motivated to maintain high levels of self regard through subjectively distancing themselves from unflattering experiences, suggesting that autobiographical memory plays an important role in regulating self-views.

2.2.2. Memory and self-regulation

In further describing the types of memories which may be retrieved through the balance of adaptive correspondence and self-coherence, Conway et al. (2004) define a special class of autobiographical memories called self-defining memories which can be distinguished on the basis of their distinct attributes. These memories are often highly vivid and have intense affective qualities. They are subject to high levels of rehearsal and are connected often to enduring concerns or ongoing conflicts (Singer & Blagov, 2004; Sutin & Robins, 2005). For example, Sutherland and Bryant (2005) found that individuals with PTSD are more likely to report their trauma as a self-defining memory. It has been found that the affective quality of self-defining memories is a function of the relevance of these memories to the attainment of an individual’s most desired goals (Moffitt & Singer, 1994). This finding is consistent with goal-based models of self-regulation that suggest assessment of progress in goal attainment often results in intense affective experiences (Carver & Scheier, 1998). Research suggests that self-defining memories play an important role in regulating mood states. For example, non-depressed individuals tend to employ positive self-defining memories to repair their negative mood, whereas mildly depressed individuals are less likely to employ positive memories when in a negative mood state (Josephson, Singer, & Salovey, 1996). Certain types of autobiographical memories may therefore play an important role in self-regulation. In terms of anxiety, it is likely that emotional memories (e.g., anxious memories) are more accessible to anxious individuals, and may inhibit the effective regulation of anxious mood.

3. Autobiographical memory and anxiety

Autobiographical memory in anxiety disorders has typically been investigated in two ways: 1) studies of overgeneral memory have found that the tendency to recall overgeneral memories coupled with reduced ability to access specific memories is associated with PTSD (McNally, Litz, Prassas, Shin, & Weathers, 1994; McNally et al., 1995), and 2) studies have examined whether anxiety is associated with a retrieval bias for anxiety-related personal memories. In support of this, Richards and Whitaker (1990) found that following a mood induction task to increase anxiety, individuals with high trait anxiety were faster to recall specific personal memories in response to anxiety-related cue words than happiness-related words. Memories recalled by individuals with low trait anxiety were unaffected by the type of cue word. Similarly, Burke and Mathews (1992) found that in comparison to non-anxious controls, individuals with generalized anxiety recalled more autobiographical memories associated with nervousness and were quicker to recall memories associated with anxiety in response to neutral cue words. Certain types of memories therefore appear to be particularly salient to anxious individuals and may be more frequently rehearsed. Indeed, research has shown that stressful memories are associated with more emotional intensity and more frequent retrieval (Rubin, Boals, & Berntsen, 2008). Accessibility of anxious memories in individuals with high trait levels of anxiety may therefore be particularly enhanced, making them more readily available for retrieval from autobiographical memory.

3.1. Autobiographical memory and social anxiety

It has been well established that individuals with social anxiety preferentially attend to threatening social information (Gilboa-Schechtman, Foa, & Amir, 1999; Musa, Lépine, Clark, Mansell & Ehlers, 2003; Veljaca & Rapee, 1998). Rapee and Heimberg (1997) argue that socially anxious individuals examine their internal and external environment for signs of negative evaluation, detect such signs rapidly, and have difficulty disengaging attention from these signs. Given that socially anxious individuals tend to closely monitor threat and focus their attentional resources on perceived threat during social experiences, several researchers have reasoned that social anxiety should be associated with biases in the recall of social events. Several lines of research have examined this view in terms of: 1) whether social anxiety is associated with greater recall of social-threat memories, 2) whether the properties of anxiety-related memories differ from more neutrally valenced memories, and 3) whether the perspective from which social memories are recalled differs between socially anxious and non-anxious individuals.

3.2. Recall of social-threat memories in social anxiety

Several studies have used an autobiographical memory cueing procedure to examine the recall of social-threat memories in social anxiety. These studies are based on the assumption that the emotion or situation specified by a cue word should activate an associated memory.
In one of the first studies to examine autobiographical recall biases for threatening social events, Rapee et al. (1994) instructed individuals with social anxiety disorder and non-anxious controls to describe the first memory which came to mind following the presentation of words relating to social situations (e.g., interview, party) and neutral words (e.g., river, dog). They assigned participants to either a “self” condition, in which memories from their own lives were described, or an “other” condition, in which memories involving another person (e.g., a sibling or close friend) were described. The groups then rated their memories on a measure of how much anxiety was associated with each memory. Although memories recalled from the social words were rated with greater anxiety than memories recalled from neutral words, the results indicated no differences between the socially anxious and non-anxious groups in the retrieval of these memories.

Further studies examining whether individuals with social anxiety recall a greater proportion of social-threat memories found mixed results. Wenzel, Jackson, and Holt (2002) asked individuals with social anxiety disorder and non-anxious controls to record specific personal memories in response to social-threat and neutral cue words. Independent coders rated the memories for positive or negative affective tone. There were no differences between the groups in the percentage of specific memories retrieved overall. However, the socially anxious group did recall a greater percentage of memories subsequently rated as reflecting negative affect than the non-anxious group when cued by social-threat words. It should be noted that the memories reflecting negative affect cued by social-threat words were made by only 8% of the socially anxious group. Thus, the findings from the study provide only weak evidence for an autobiographical memory bias in social anxiety. A similar procedure using positive, social-threat, and neutral cue words was used to measure retrieval latencies and affective tone in autobiographical memories recalled by individuals with and without social anxiety disorder (Wenzel, Werner, Cochran & Holt, 2004). The study found that social anxiety did not influence either the time it took to recall threat-related memories or the affective content of these memories when accounting for levels of depression.

Evidence from studies using memory cueing procedures suggests that at best there is only weak evidence to support the view that social anxiety is characterized by biases in autobiographical memory. These findings contradict cognitive models of social anxiety (e.g., Clark & Wells, 1995; Rapee & Heimberg, 1997) that would predict greater recall of social-threat memories in socially anxious individuals. However, there are several limitations in using cue words to elicit social-threat memories in socially anxious individuals. For example, Holmes, Mathews, Mackintosh, and Dalgleish (2008) have shown that mental imagery is more effective in eliciting emotion than verbal processing of the same material. Furthermore, Holmes et al. found that imagery descriptions are more likely to resemble personal memories than sentence descriptions. Imagery (e.g., use of pictures) may therefore provide a more effective route to accessing emotional autobiographical memories than cue words. In addition, Clark and Wells’ model suggests that individuals with social anxiety will tend to dwell on memories of social-threat when either anticipating a social event (i.e., worrying about how they will come across to others) or when ruminating about a recent social interaction (i.e., worrying about how they did come across). As such, it could be argued that experiments exploring retrieval biases for negative information should include a social-threat manipulation to activate the dysfunctional assumptions or self-schemas that characterize social anxiety disorder (Hirsch & Clark, 2004).

Activating a state level of social anxiety (e.g., by requiring participants to engage in an anxiety-provoking social task) before presenting cue words would ensure that memory biases are examined under conditions that resemble the way information is processed in threatening social situations.

3.3. Properties of anxiety-related memories

Autobiographical memories incorporate detailed descriptions of memorable events and experiences. Recent research in social anxiety has therefore begun to examine properties of these memories, particularly those concerned with anxiety-related experiences. This research has questioned whether anxious memories differ qualitatively from other, more emotionally neutral events and experiences.

Wenzel, Pinna and Rubin (2004) have argued that autobiographical memories of anxiety-related experiences and the verbal descriptions, mental imagery, and emotional content associated with these memories may help to explain why they could be more accessible to anxious individuals. In a study that looked at the properties of different types of anxiety-related autobiographical memories, Wenzel et al. asked undergraduate students to retrieve three specific memories to each of five categories reflecting panic, trauma, worry, social anxiety, and contentment. They were then asked questions about the properties of these memories (e.g., vividness, accuracy, and sensory and emotional experiences). Wenzel et al. found that the panic- and trauma-related memories retrieved by students tended to be more vivid, were accompanied by intense negative emotions, and were more likely to be perceived as reflecting an accurate portrayal of the event than the other memory categories. This suggests that panic or trauma autobiographical memories may have more vivid and detailed properties than memories associated with worry or social anxiety. However, there may be important differences between anxious memories recalled by normal populations and those recalled by clinical groups. Indeed, recent research shows that memories of stressful social events recalled by individuals with social anxiety disorder are in fact re-experienced with the type of trauma symptoms that characterize PTSD. Erwin, Heimberg, Marx, and Franklin (2006) found that unlike non-anxious controls, individuals with social anxiety disorder reacted to their memories of past socially stressful events with PTSD-type symptoms such as hyperarousal and avoidance.

Properties of memories for social events recalled by socially anxious individuals have been further examined by D’Argembeau et al. (2006). They asked individuals with social anxiety disorder and non-anxious controls to recall recent social and non-social events associated with positive and negative emotion. Ratings of phenomenal characteristics associated with these memories revealed a bias towards recalling social events with greater self-referential information (i.e., memory for one’s own behavior and what one thought and said) but less sensory information (i.e., memory for visual and auditory details) in the socially anxious group. There were no differences between the groups in phenomenal characteristics for non-social events.

Using ratings made by independent coders, McNally, Otto, and Hornig (2001) found no evidence to distinguish the properties of fear-related memories recalled by anxious individuals from those recalled by non-anxious controls. They asked individuals with panic disorder, social anxiety disorder, major depressive disorder, and non-anxious controls to describe their most frightening experience (i.e., a fearful memory) and what they had for breakfast that morning (i.e., a neutral memory). Responses were audiotaped and the speech was content-filtered to eliminate high frequencies while leaving paralinguistic features such as pitch and loudness intact. This technique removes semantic content in the speech but the resulting sound can be analysed for emotional content. Independent coders rated the content-filtered speech on several emotional dimensions to assess whether the fear memories reported by the anxiety and depression groups were emotionally distinguishable from neutral memories and the memories reported by the control group. However, they did not find evidence to support this hypothesis. Regardless of the diagnostic status of the individuals, the content-filtered fear memories were rated as more anxious, arousing, and dominating than the neutral memories.

In a further study in which independent coders analysed the linguistic content of autobiographical narratives, Anderson et al. (2008) did find differences in the properties of social memories recalled by individuals with social anxiety disorder and non-anxious controls. Participants were asked to recall autobiographical situations characterized by vivid social humiliation, embarrassment, or shame. In line
with D’Argembeau et al.’s (2006) findings, the narratives written by the socially anxious group contained greater self-referential information and greater use of words reflecting anxiety symptoms than the narratives written by non-anxious controls. Importantly, Anderson et al. further found that the socially anxious group reported greater current self-conscious emotions when recalling social situations. Taken together, the findings from Anderson et al. and Erwin et al. (2006) suggest that the recall of past social encounters in social anxiety can impact on emotions currently being experienced and may disrupt the processing of past social events.

Overall, studies examining properties of anxiety-provoking memories that found support for an autobiographical memory bias in social anxiety tended to examine characteristics of memory other than, or in addition to, affective valence. Although models of anxiety (e.g., Beck, Emery, & Greenberg, 1985) would predict that anxiety-provoking memories should be associated with specific types of emotion, it is important to note that the emotions associated with autobiographical memories are likely to be multilayered across specific events and lifetime periods and may not always fall into discrete emotional categories. As shown in Table 1, studies examining autobiographical memory biases in social anxiety commonly measure the affective content of memories. Although this provides a useful measure of the emotion associated with the memory, it limits the conclusions that can be drawn regarding further characteristics of the memory (e.g., vividness, sensory detail, visual perspective, age of memory). As studies such as Anderson et al.’s (2008) show, using a qualitative approach such as content analysis to systematically categorise and classify properties of social memories is a potentially important and interesting methodological procedure for future work in this area.

3.4. Memory perspective biases and social anxiety

There is evidence to suggest that social anxiety may be associated with a memory perspective bias. It has been proposed that individuals with social anxiety disorder should demonstrate a marked tendency to recall social situations from an observer perspective due to detailed observation and monitoring of the self during anxiety-provoking social situations (Wells, Clark, & Ahmad, 1998). In an observer perspective memory, individuals concentrate on viewing themselves as if they were observing the situation. Hence, a socially anxious individual may concentrate on how he/she appears to others in the memory of an anxious social event. This type of perspective is typically contrasted with a field perspective image in which the individual looks out at the situation from their own eyes. Several studies have shown that socially anxious individuals have a greater tendency to report social situations from an observer perspective (Wells et al., 1998). For example, Wells and Papageorgiou (1999) asked participants to recall an anxiety-provoking social event and a non-anxiety-provoking, non-social event. Using a bipolar rating, participants indicated the extent to which the image in each memory was viewed from an observer or field perspective. They found that individuals with a diagnosis of social phobia or agoraphobia were more likely to report viewing the image in the social event from an observer perspective than individuals with blood/injury phobia or non-patients. This suggests that recalling anxious social memories from an observer perspective may be specific to individuals with greater social-evaluative concerns. Further research has shown that the use of observer perspective imagery is associated with more frequent negative thoughts, more safety behaviors, and worse self-evaluation of social performance (Spurr & Stopa, 2003). In addition, D’Argembeau et al. (2006) found an observer perspective bias for social events recalled by individuals with social anxiety disorder, but not for non-anxious controls.

These findings are supported by research which has shown that the level of anxiety associated with a social encounter influences whether the event is recalled from an observer or field perspective. Coles, Turk, Heimberg, and Fresco (2001) found that individuals with social anxiety disorder tended to recall social events, which they had rated as highly anxiety-provoking, from an observer perspective. In comparison, events rated as low in anxiety were more likely to be recalled from a field perspective. This suggests that socially anxious individuals do not simply recall all social situations from an observer perspective but that a memory perspective bias may play a role in social events that are perceived as greatly threatening.

Research into memory perspective biases suggests that the way a social event is recalled is important for understanding how memory biases maintain social anxiety. The research findings are consistent with the view that during social situations, individuals with social anxiety have heightened self-focused attention (see Spurr & Stopa, 2002). It seems reasonable to assume that excessive self-monitoring during a social event leads to the encoding and retrieval of an observer perspective memory. However, it should be noted that a discrepancy exists in the social anxiety literature: Clark and Wells’ (1995) model argues that socially anxious individuals monitor internal (i.e., negative cognitions) threat cues during social events, while Rapee and Heimberg’s (1997) model also emphasizes the role of external threat cues such as the social-evaluative behaviors of interaction partners (see Schultz & Heimberg, 2008). As such, further research is needed to examine more directly how and whether focus of attention during a social event affects the way that event is later recalled by socially anxious individuals.

4. Early autobiographical memories and social anxiety

Development of social anxiety disorder has been associated with a broad range of environmental influences (Bögels, van Oosten, Muris, & Smulders, 2001), individual response factors (Harvey, Ehlers, & Clark, 2005), and genetic factors (Kendler, Karkowski, & Prescott, 1999). In particular, problems with peer group relations have been shown to coincide with the onset of social fears (La Greca & Lopez, 1998). Harvey et al. (2005) found that when recalling social situations prior to the onset of the disorder, not fitting in with a peer group was indicated as one of the most common events to concur with the development of social anxiety. In addition, retrospective studies have shown that socially anxious adults recall more childhood inhibition, particularly in childhood social and school situations, than adults with generalized anxiety (Mick & Telch, 1998; Neal, Edelmann, & Glachan, 2002). Memory for these adverse social experiences suggests that such experiences may play an important role in the initial development of the disorder. Indeed, Clark and Wells’ (1995) model predicts that the cognitive processing biases that characterize social anxiety develop as a consequence of early adverse social experiences. In addition, the recall of such experiences may be implicated in the maintenance of the disorder. Approaches to studying the impact of these early memories in social anxiety have focused on whether these memories indicate a role for traumatic conditioning experiences and whether there is a link between early memories and current self-imagery in social anxiety.

4.1. Recall of early adverse social experiences

The recall of adverse social memories from earlier in the individual’s life may indicate that social fears in social anxiety disorder develop in response to a specific conditioning episode of a traumatic social experience. Although negative life-events generally precipitate phobia onset (Magee, 1999; Ost & Hugdahl, 1981), Rachman (2002) states that social fears develop gradually and cannot be linked to specific conditioning experiences. Contrary to this, Steinberger, Turner, Beidel, and Calhoun (1995) found that 56% of a sample with specific social phobia and 40% of a sample with generalized social phobia were able to recall a traumatic conditioning
episode involving an uncomfortable social situation that marked the start of their social fears.

Distinguishing between specific types of life experiences that are more likely to be drawn upon by socially anxious individuals may be an important direction for future research. Initial research in this area suggests that the recall of memories related to teasing during childhood is associated with social anxiety and anxiety sensitivity in adulthood (Roth, Coles, & Heimberg, 2002). The retrospective nature of these studies limits the conclusions that can be drawn. In particular, it is difficult to ascertain whether Roth et al.'s study indicates that teasing actually led to the development of high trait levels of social anxiety, or whether the individual's current self-view intensifies or distorts the adversity of the event recalled. However, the studies suggest that socially anxious individuals may be more likely to draw upon these adverse childhood experiences in adulthood. This may have important implications for the maintenance of the disorder; particularly given that such memories may prevent an individual from updating their current self-view.

4.2. Imagery and early autobiographical memories

During social situations individuals with social anxiety direct their attention inwardly towards monitoring internal bodily sensations, negative images of the self, and negative thoughts concerning the social situation (see Spurr & Stopa, 2002). This internal self-monitoring is often referred to as self-focused attention and has been theorized to play an important role in heightening the anxious response during social events. Cognitive models of social anxiety predict that this increase in self-focused attention should lead individuals to make erroneous inferences regarding how they believe they appear to others during a social situation (Clark & Wells, 1995). In line with this, recent studies in social anxiety have shown that such erroneous inferences are a result of negative self-imagery during social interactions (Hirsch, Clark, Mathews, & Williams, 2003; Hirsch, Meynen, & Clark, 2004).

Distorted images of the self appear to support negative beliefs about the way the individual sees themselves in social situations. However, an emerging line of research further suggests that these negative self-images may actually be based upon adverse social experiences from earlier in the individual's life. Using an interview procedure, Hackmann et al. (2000) asked 22 patients with social anxiety disorder to bring to mind the recurrent images they experienced from earlier in the individual's life. For 81% of the patients, the recalled event had happened no more than a year following onset of the disorder. It therefore appears that the self-images drawn upon by socially anxious individuals contain essences of adverse social events from the past. This proposal is further supported by recent studies that highlight the benefits of adapting treatment techniques such as imagery rescripting (see Holmes, Arntz, & Smucker, 2007) to directly modify early memories that are linked to these images. Through identifying memories associated with recurrent images and then using cognitive restructuring to update the meaning of these memories, Wild, Hackmann, and Clark (2007, 2008) have shown that imagery techniques can be used by patients with social anxiety disorder to link new meanings to distressing social memories. Wild et al. (2008) found that updating memories in this way significantly reduced the distress and vividness associated with the memories and led to improvements in more general maladaptive thoughts and beliefs associated with social anxiety.

5. Cognitive processing styles and autobiographical memories in social anxiety

The research reviewed thus far suggests that certain types of emotional autobiographical memories may be more accessible to socially anxious individuals. However, it is likely that there are certain circumstances under which these memories are more likely to be recalled and under which such memories exert stronger emotional responses. For example, Magee and Zinbarg (2007) examined how the type of cognitive processing style used in response to emotional social memories could affect levels of state anxiety in socially anxious individuals. They found that when high socially anxious individuals recalled and focused on a negative memory of a social interaction, they experienced larger increases in self-reported shyness than when instructed to suppress the memory. The same pattern was not evident in low socially anxious individuals. Examining the relationship between information processing styles and autobiographical memories may therefore provide further insight into how such cognitive processes interact and how certain cognitive styles may influence the types of memories recalled in social anxiety.

5.1. Effects of imagery on autobiographical memory recall

Self-imagery may exert an important influence on memory accessibility in social anxiety. As described above, current distorted images of the self appear to be based on memories of negative social experiences (Hackmann et al., 2000). A recent study has shown additionally that self-imagery may actually affect the type of autobiographical memories recalled by socially anxious individuals. Stopa and Jenkins (2007) investigated whether the valence of an image held in mind by high socially anxious individuals during a speech would affect the types of autobiographical memories retrieved in response to positive, negative, and neutral cue words. When holding a negative image in mind, participants spent longer retrieving positive than negative memories. However, there was no difference in retrieval latencies between negative and neutral memories, suggesting that negative imagery suppresses the retrieval of more positively valenced memories. Although the study did not employ a comparison group of low socially anxious individuals, these initial findings suggest that negative self-imagery may have inhibitory effects on the retrieval of autobiographical memories in social anxiety.

Further research has shown that imagery for social events may affect the recall of social memories. Vassilopoulos (2008) asked high and low socially anxious individuals to imagine future anxiety-provoking events using vignettes of social scenarios. Participants then recorded their thoughts about the scenarios and were asked to describe a memory of a similar social event that came to mind after reading each vignette. Although there was no difference between the high and low social anxiety groups in the number of negative and neutral memories recalled, the high social anxiety group did recall less positive events from the past. Interestingly, Vassilopoulos suggests this is due to a self-enhancing process in low socially anxious individuals, which is not engaged in by the high socially anxious individuals.

5.2. Effects of rumination on autobiographical memory recall

Clark and Wells’ (1995) cognitive model suggests two stages in the anxiety response when socially anxious individuals may be particularly vulnerable to dwelling on adverse memories: before entering a social interaction and after leaving a social event. Clark and Wells refer to these stages as anticipatory processing and post-event processing, respectively.

5.2.1. Anticipatory processing and memory recall

During anticipatory processing, individuals engage in a pre-mortem of the social event in which they may review the possible
outcomes of the social event in detail. Clark and Wells (1995) propose that this pre-mortem may be dominated by recollections of past failures, negative images of the self, and predictions of poor performance and rejection in future social events. In line with this, Hinrichsen and Clark (2003) have shown that in anticipation of an anxiety-provoking social event, high socially anxious individuals report experiencing more negative bodily sensations, are more likely to catastrophize on what might happen during the event, dwell on ways of avoiding or leaving the social event, and are more likely to recall past perceived social failures than low socially anxious individuals. However, this research was based on self-report and the recall of specific events was not further assessed (e.g., for specific properties of the memories). Further research is therefore needed to specify the processes involved in the recall of past events during anticipation. Interestingly, Melliings and Alden (2000) found no support for the notion that social anticipation enhances access to negative information about previous social events. However, they did find that ruminative thinking following a social interaction predicted recall of negative self-related information. This tentatively suggests that recalling negative social cues and past perceived social failures may be associated with cognitive processes which follow a social event rather than those which characterize the anticipation of the event.

5.2.2. Post-event processing and memory recall

After leaving an anxiety-provoking social event, socially anxious individuals engage in ruminative thought about the preceding social event (Melling & Alden, 2000; Rachman, Gruter-Andrew, & Shafран, 2000) and show a bias for the recall of anxiety-related behavior (Edwards, Rapee, & Franklin, 2003). It has been further suggested that such tendency to engage in rumination may occur in interaction with memories of past social performance (Abbott & Rapee, 2004; Clark & Wells, 1995). Although the influence of rumination on memory recall has been more readily associated with mood-congruency studies (McFarland & Buehler, 1998) and research in depression (Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998), recent research suggests that ruminative responses, particularly following an ambiguous social event, may lead to a bias in memory recall in social anxiety. Field and Morgan (2004) asked high and low socially anxious individuals to describe a recent personal social interaction which they felt had been ambiguous (i.e., uncertain about whether the social interaction had gone well). Participants then either focused on negative aspects of the interaction (i.e., negative post-event processing), positive aspects of the interaction (i.e., positive post-event processing), or engaged in a distraction task. Following this, participants engaged in free recall of memories of personal events and experiences. These memories were subsequently rated along three dimensions of negativity, anxiety, and shame. Field and Morgan found that regardless of the type of post-event processing engaged in, high socially anxious individuals recalled memories rated as more negative and shameful than low socially anxious individuals. This study suggests that post-event processing may therefore lead to a bias in the retrieval of past events and experiences in social anxiety.

Morgan and Banerjee (2008) have further demonstrated that the style of post-event processing engaged in by socially anxious individuals can affect subsequent recall of memories. Based on previous theoretical work (Treynor, Gonzalez, & Nolen-Hoeksema, 2003), Morgan and Banerjee distinguished between two types of response style: a ruminative response style characterized by a tendency to dwell passively and repetitively on the causes and consequences of negative feelings, and a reflective response style characterized by an openness to acknowledging and accepting negative thoughts and feelings. They found that compared to low socially anxious individuals, high socially anxious individuals who engaged in a ruminative response style following an imagined social event were more likely to recall anxious memories than after engaging in a reflective response style. Engaging in a ruminative response style therefore appears to enhance the accessibility of certain types of emotional memories for high but not low socially anxious individuals. It could be argued that this type of elaborative thinking reconfirms and strengthens existing dysfunctional assumptions people with social anxiety hold about themselves (e.g., assumptions about the ability to make a positive impression on others), therefore increasing the likelihood of retrieving memories associated with anxious emotion.

6. Directions for future research

Research findings reviewed above suggest that high socially anxious individuals do experience enhanced memory for threatening and highly emotional autobiographical material. Furthermore, it appears that memories which are highly representative of current self-perceptions tend to be more accessible to individuals with social anxiety. Several lines of enquiry are important for future research studies in this area. First, researchers should consider the value of further examining whether the negative impact of certain types of memories maintains and exacerbates social anxiety. Second, given that certain cognitive processing styles may be particularly influential in maintaining social anxiety, future research examining the role of these response styles in memory processes should be considered.

Current research emphasizes the importance of examining memory for life-events in individuals with high social anxiety. While it is unclear whether certain life-events have a greater negative impact for high socially anxious individuals, research suggests that memory for events occurring around the onset of social anxiety may be particularly influential in the formation of current images of the self (Hackmann et al., 2000; Wild et al., 2008). Accumulation of socially stressful life-events may therefore contribute to the emergence and maintenance of social anxiety. Future research should focus on examining whether high socially anxious individuals display a bias for recalling memories which reflect enduring concerns and ongoing conflicts (e.g., self-defining memories, Conway et al., 2004) and the role such memories play in maintaining dysfunctional beliefs about the self. Following research in self-appraisal theory (Ross & Wilson, 2002), it is possible that individuals with social anxiety will perceive certain social memories as subjectively closer in time because they repeatedly draw upon these memories when forming negative images of the self.

Research reviewed suggests that biases in autobiographical memory are a central feature of social anxiety, however, it has not always been clear how to study the way in which adverse memories are actively involved in maintaining social anxiety. Initial research exploring the recall of social-threat memories in individuals with social anxiety – memories which are theoretically assumed to be associated with intense emotion for these individuals – generally either failed to find differences between high and low social anxiety groups or found only weak evidence for the presence of memory biases (Rapee et al., 1994; Wenzel et al., 2002; Wenzel, Pinna et al., 2004; Wenzel, Werner et al., 2004). It is likely that the way a socially-threatening event is encoded into memory will affect the strength of recollection for that event. For example, Rubin (2005) states that while in clinical disorders such as PTSD and panic disorder a highly negative event has actually occurred and the event itself is therefore strongly encoded in memory, in social anxiety disorder a highly negative event tends to be anticipated but the event itself may not always be socially stressful and therefore a threatening memory is not encoded. The research reviewed shows that there are a range of factors affecting the recall of anxiety-provoking memories in social anxiety, and it is likely that certain stages in the anxiety response may differentially affect the encoding of these memories. Future research should focus on comparing memory for the anticipation of a social event, memory for the event itself, and memory for post-event processes to examine how vivid, detailed, and emotional these memories
are. This would further test the view that there are certain stages in the social anxiety response when autobiographical memory processes are more influential in maintaining dysfunctional beliefs about the self.

Cognitive models (Clark & Wells, 1995; Rapee & Heimberg, 1997) state that the experience of social anxiety is dependent on the activation of specific information processing biases and a negative self-schema. Following from this, individuals with social anxiety should be more likely to demonstrate memory biases when such schemas are activated and when engaged in specific types of cognitive processing. On this basis, it seems important that studies should employ a social-evaluative task either before or during the retrieval of autobiographical memories. Research that has examined the effect of cognitive processing styles on autobiographical memory (e.g., imagery and rumination) has shown that these processing styles can either facilitate the retrieval of memories with certain affective qualities (Morgan & Banerjee, 2008) or inhibit the retrieval of these memories (Stora & Jenkins, 2007). Further research into the facilitation and inhibition of autobiographical memories in social anxiety will be important for understanding the role of these memory processes in the maintenance of this disorder.

Research that has examined the effect of cognitive processing styles on memory recall has to date been carried out on analogue samples of high and low socially anxious individuals as determined by scores on various social anxiety measures. It is generally argued that anxiety disorders can be conceptualized on a continuum between low and high levels of anxiety rather than as discrete “all or none” categories (Vriends, Becker, Meyer, Michael, & Margraf, 2007). Therefore, research carried out with high socially anxious samples of non-clinical groups provides a good exploratory framework for determining whether certain information processing biases are more likely to be evident in individuals with clinical disorders. However, until research is carried out to confirm the presence of these memory biases in clinical groups, the generalization of the results from these studies to clinically referred individuals with social anxiety disorder remains open to question.

In conclusion, several lines of evidence suggest that social anxiety may be characterized by biases in autobiographical memory recall. Such biases include: 1) recall of social memories with properties relating to self-referential information, 2) an imagery bias such that socially anxious individuals recall memories of anxiety-provoking social events from an observer perspective and base current images of the self on memories of early adverse social experiences, and 3) a bias in the types of memories recalled when engaged in specific styles of cognitive processing. The research findings reviewed have important implications for the treatment of social anxiety disorder. As discussed above, rescoring distressing social memories can improve the symptoms of social anxiety and can lead to significant changes in social cognitions (Wild et al., 2008). Further research in social anxiety should clarify which particular properties of social memories are important to restructure in memory rescoring to lessen the distress associated with these memories. In addition, recent research has highlighted the benefits of Mindfulness Based Cognitive Therapy for individuals with social anxiety disorder (Kocovski, Fleming, & Rector, 2009) and for reducing ruminative tendencies (Teasdale et al., 2000). It is possible that this treatment approach could lessen the impact of certain cognitive processing styles such as rumination on the recall of adverse autobiographical memories. Further research should therefore consider whether such interventions can be used to regulate the retrieval of adverse social memories in social anxiety.

References


