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UNIVERSITY OF SOUTHAMPTON

FACULTY OF SOCIAL AND HUMAN SCIENCES

School of Psychology

**Understanding Cognitive Changes in Imagery Rescripting: The Role
of the Memory-Imagery-Self Relationship**

by

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Thesis for the degree of Doctor of Philosophy

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ABSTRACT

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**UNDERSTANDING COGNITIVE CHANGES IN IMAGERY RESCRIPTING:
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Imagery rescripting (IR) is a cognitive-behavioural technique that helps patients to modify the meaning they have attached to negative or traumatic experiences. Although it is effective in addressing memory-related intrusive images and in alleviating disorder-specific symptoms, there is little evidence as to how it works. The aim of this PhD project was to investigate the cognitive changes it promotes. Studies 1 and 2 found that memory recall influences individuals' sense of self. They report higher state self-esteem, fewer achievement goals, and more recreation/exploration goals after recalling positive memories than after recalling negative ones. They also report more emotional self-cognitions after recalling memories from which they have learnt lessons compared to recalling memories from which they have not abstracted any meaning. Studies 3 and 4 found that exposure and IR may influence individuals' perception of negative memories and the impact these memories have on them when recalled. After being exposed to such memories and after rescripting them, they perceive these memories as less negative and important for their sense of self. They also report higher state self-esteem and either a weaker or a more positive emotional response after recalling them. The findings suggest that memory recall triggers the activation of different self-representations and that IR may influence this process. By helping individuals modify the meaning they have attached to negative memories, IR may facilitate the integration of these memories within the sense of self. This may make the memories and associated self-representations less salient and less likely to be activated in the presence of distressing stimuli. The implications of these findings for imagery research and clinical practice are discussed.

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DECLARATION OF AUTHORSHIP

I, Soljana Çili, declare that the thesis entitled “Understanding Cognitive Changes in Imagery Rescripting: The Role of the Memory-Imagery-Self Relationship” and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

- this work was done wholly or mainly while in candidature for a research degree at this University;
- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
- where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
- none of this work has been published before submission.

Signed:

Date:

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Abbreviations

AM: Autobiographical memory

ANOVA: Analysis of variance

CBT: Cognitive-behavioural therapy

CES: Centrality of Event Scale

DASS: Depression Anxiety Stress Scale

DI: Differential importance in the card-sorting task

DSM-IV-TR: Diagnostic and Statistical Manual of Mental Disorders, Text Revision

IES-R: Impact of Event Scale - Revised

IR: Imagery rescripting

MANOVA: Multivariate analysis of variance

NA: Negative affect

Neg: Proportion of negative attributes used in the card-sorting task

OCD: Obsessive-compulsive disorder

PA: Positive affect

PANAS: Positive and Negative Affect Scales

PTSD: Posttraumatic stress disorder

RSES: Rosenberg's Self-Esteem Scale

SDI: Self-Discrepancy Index

SMS: Self-memory system

SSCCS: State Self-Concept Clarity Scale

SSES: State Self-Esteem Scale

STAI-S: State subscale of the State-Trait Anxiety Inventory

TST: Twenty-Statement Test

CHAPTER 1: Introduction

1.1 Introduction

Imagery is one of the most important components of conscious experience. We cannot, as Pylyshyn (1973) puts it, speak of consciousness without considering the existence of mental images. Nevertheless, this concept remains enigmatic. Its nature has eluded philosophers and psychologists who have tried to understand it and its function in cognition since the time of Aristotle and Plato (see Horowitz, 1970; Yuille & Marschark, 1983). Because its study relied mainly on problematic methodologies such as introspection, very little progress was made in its investigation until the second half of the 20th century (Pani, 1996).

Developments such as the growing use of hallucinogenic drugs and the use of more rigorous research methods in the 1960s made many psychologists turn their attention to mental imagery (Pani, 1996; Richardson, 1983). At this time, Paivio (see Paivio, 1969, 1991) conducted a series of experiments from which he concluded that cognition consists of activity in two related but independent systems: imagery and verbal information. He argued that concrete stimuli (which can use both systems) are easier to remember than abstract ones (which can use only the verbal system) because images mediate associative learning and memory formation (Paivio, 1969). Thus, Paivio showed not only that mental imagery is important, but also that it can be investigated using the experimental method. This led to a proliferation of studies and theories focusing on imagery that made this topic one of the most active research areas within cognitive psychology. Soon, however, it became obvious that imagery was important for clinical psychology as well.

Imagery has been used for therapeutic purposes throughout history (see Sheikh & Jordan, 1983). The healing tradition of shamanism, for example, has for centuries employed visual imagery to diagnose and cure diseases (Noll, 1985). However, the first person to use imagery as a *psychological* cure was Pierre Janet (1898, as cited in Sheikh & Jordan, 1983), who observed that his hysterical patients benefited from the substitution of distressing images with positive ones. After Janet's work, imagery started to be used as a component of various types of therapy, such as psychoanalysis (e.g., Jung's [1976] *active imagination* technique) and transpersonal and humanistic therapy (e.g., Perls' [1973] *Gestalt therapy*) (see Edwards, 2007;

Sheikh & Jordan, 1983). Within cognitive therapy, Aaron Beck (e.g., Beck, 1976) argued that imagery may create psychological distress and may be used together with verbal thoughts to access maladaptive ideation. He developed a series of techniques aimed at modifying distressing images in anxiety disorders (Beck, Emery, & Greenberg, 1985).

The end of the 1990s and the beginning of the 21st century witnessed an impressively growing use of imagery within therapy. Mary Anne Layden (e.g., Layden, Newman, Freeman, & Morse, 1993) and Jeffrey Young (e.g., Young, 1999) started to incorporate mental images into the treatment of borderline personality disorder. Smucker, Dancu, Foa, and Niederee (1995) then published the first paper on imagery rescripting (IR), a therapeutic technique aimed at modifying the meaning of negative/traumatic memories which they developed primarily to alleviate the posttraumatic stress disorder (PTSD) intrusions experienced by victims of childhood sexual abuse. Meanwhile, research (e.g., Day, Holmes, & Hackmann, 2004; Hackmann, Clark, & McManus, 2000; Reynolds & Brewin, 1999) was revealing that mental images contribute to the onset and maintenance of various forms of psychopathology. Its findings made many clinicians feel the need for effective therapeutic methods focusing on imagery. This need, coupled with the evidence on the effectiveness of IR (e.g., Ohanian, 2002; Rusch, 2007; Wild, Hackmann, & Clark, 2007, 2008), led to an increasing use of imagery techniques in therapy. Within a century, imagery and IR became a hot topic (Holmes, Arntz, & Smucker, 2007) in clinical psychology. Despite this fact, however, IR still remains a novel technique.

Clinicians at the moment seem to be focused on the effectiveness of IR in treating disorders characterised by distressing intrusive images. Research (e.g., Brewin et al., 2009) shows that it reduces the vividness and emotional impact of intrusions and alleviates disorder-specific symptoms. The positive results obtained so far are very encouraging, but there is a growing need to understand this technique better. Why is it effective? What changes does it bring about in individuals? What impact does it have on individuals' sense of self? The current PhD project tried to address these questions and to extend the knowledge we have about this technique. An improved understanding of the mechanisms through which it operates may allow us to refine it in order to make it more effective. This issue is particularly important at a time in which there is considerable pressure on the field of clinical psychology to

increase the efficiency and the cost-effectiveness of the available treatments. The first step toward achieving this goal, according to many psychologists (e.g., Carey, 2011; Kazdin, 2007, 2009), is to understand the mechanisms of change involved in therapy. The aim of this research project was to make this first step in the area of IR.

The aim of this chapter is to present a review of the theoretical and empirical work done so far in the area of imagery and its involvement in psychopathology. I begin by giving a definition of mental imagery and by explaining why this concept is important for clinical psychology. I focus especially on the empirical evidence showing a close link between imagery and emotion, perception, and memory. I proceed by describing the role imagery plays in the relationship between memory and the self. Next, I review research investigating the presence of distressing imagery in psychological disorders. Finally, I focus on IR. After describing the technique, I review the studies that have investigated its effectiveness as a therapeutic tool and present theories regarding the mechanisms of change it may involve.

1.2 Defining Mental Imagery

In the 1970s, there was considerable debate on the nature of mental images. On the one hand, researchers like Horowitz (1970) argued that images are analogue representations: they are the product of perceptual experience and contain only perceptual information stored in memory. According to these researchers, images consist of *pictures* that contain elements from different sensory modalities. On the other hand, researchers like Pylyshyn (1973) believed that knowledge is stored in the form of propositions, abstract representations asserting facts about the world that are unrelated to sensory modalities (i.e., to perception) but are deeply embedded in language. Pylyshyn argued that images arise from propositional knowledge and consist of *descriptions* and *interpretations* of scenes rather than pictures.

Both these arguments present problems (for a detailed account, see Kosslyn, 1980). The analogue perspective, for example, seems to ignore the differences between perception and imagery. Perception relies on bottom-up processing of information and is constrained by the senses, whereas imagery relies on top-down processing and is not constrained when it comes to object properties that can be separated cognitively (Mechelli, Price, Friston, & Ishai, 2004; Pani, 1996). We can, for example, imagine a colourless apple, but we are unlikely to perceive such an apple

unless a brain lesion has disrupted our ability to perceive colours. Moreover, patient-based studies show that imagery and perception are dissociable: patients may experience impairments in one of them but not in the other (Bartolomeo, 2002; Behrmann, Moscovitch, & Winocur, 1994; Luzzatti, Vecchi, Agazzi, Cesa-Bianchi, & Vergani, 1998; Moro, Berlucchi, Lerch, Tomaiuolo, & Aglioti, 2008; Servos & Goodale, 1995). The propositional perspective, on the other hand, does not explain why images, if they are unrelated to perception, contain elements from different sensory modalities. Furthermore, the studies supporting this perspective have used inadequate methods such as introspection (which inevitably involves participants' verbal descriptions and interpretations of images) and computer simulations (which focus on specific, limited types of performance) (Kosslyn, 1980). Thus, none of these perspectives seems to offer an adequate explanation of the nature of mental imagery.

In recent years, Kosslyn (e.g., 1980) seems to have reconciled the two opposing perspectives. He argues that propositional knowledge may be integrated within perceptual information. Once they reach the brain, perceptions are processed and organised into units corresponding to objects *and* properties of objects. It is these units, Kosslyn argues, that may be stored in memory and later assembled into images. Images, then, are quasi-pictorial representations containing sensory patterns that have been processed and interpreted. From a clinical perspective, this argument seems plausible. A patient with spider phobia, for example, may have a mental image of a tarantula which is associated with the interpretation of it being dangerous. Therapy addressing this image would focus both on its content and on its interpretation. Although Kosslyn's account seems consistent with the principles behind the use of imagery in therapy, in clinical psychology there seems to be an implicit assumption that images are analogue representations (Stopa, 2009).

Helped by evidence coming from cognitive neuroscience, the analogue perspective of mental imagery seems to have become the dominant one in the last decades. It has been found, for example, that there is a certain degree of isomorphism between images and perceptions (e.g., Mellet, Petit, Mazoyer, Denis, & Tzourio, 1998) and that, as will be described later, imagery and perception rely on the same neural structures (e.g., Ganis, Thompson, & Kosslyn, 2004). Kosslyn (e.g., Kosslyn, Ganis, & Thompson, 2001) himself has argued that imagery occurs when individuals access perceptual information from memory and thus have the subjective experience

of perceiving with the mind's senses. In the light of recent evidence, then, images are defined as cognitive representations which arise in the absence of external sensory input but that nevertheless contain sensory qualities (Pani, 1996). This definition has been implicitly or explicitly adopted in the literature reviewed in this chapter. For this reason, I decided to use it for the purposes of the current research project.

An important implication of the definition of images as analogue cognitive representations is that they can be manipulated. Within clinical psychology, in fact, there is the assumption that images can be transformed and modified (Kosslyn et al., 2001). Their plasticity, according to Stopa (2009), makes them suitable for manipulation in a therapeutic context. The following section explains why images are important within this context.

1.3 Why Study Imagery?

The need to work with images in the clinical field arises from the fact that several disorders are characterised by the presence of intrusive, distressing images. These images, as later sections of this chapter will show, often play a key role in the onset and maintenance of disorders. Their power seems to be related in particular to their link with emotion. In a series of experiments, Holmes and her colleagues (e.g., Holmes & Mathews, 2005; Holmes, Mathews, Dalgleish, & Mackintosh, 2006; Holmes, Mathews, Mackintosh, & Dalgleish, 2008) found a causal effect of imagery on both positive and negative emotions: holding an image in mind has a greater emotional impact than thinking verbally about the scenario depicted in the image. Based on this evidence, Holmes and Mathews (2010) have proposed that imagery acts as an emotional amplifier. According to these authors, there are at least three ways in which it triggers affective responses:

- direct influence on the brain's emotional systems
- use of the same neural structures as perception
- recall of past autobiographical memories (AMs)

Below is a brief description of these three mechanisms.

1.3.1 Imagery and Emotional Systems

In his bio-informational theory of emotion, Lang (1979) argues that images can contain information about the stimuli they depict as well as about individuals'

behavioural response to these stimuli. When they contain such response propositions, images may trigger emotional responses. Emotions in this case are conceptualised as action dispositions or “states of vigilant readiness” (Lang, 1995, p. 372), which prepare organisms to respond to stimuli both when they perceive such stimuli and when they visualise them.

Lang (1995) argues that emotions are evolutionary products that are driven by two motivational systems: appetitive (e.g., obtaining food) and aversive (e.g., avoiding threat). On a brain level, these systems involve primitive, subcortical circuits. Because they evolved before higher cognitive processes such as language, they may remain more sensitive to sensory events signalling rewards or threats (Holmes & Mathews, 2010). In the case of sensory stimuli such as pictures, then, perceptual input may not follow the usual pathway from the sensory organs to the sensory cortex (Lang, 1995). Instead, it may avoid cortical high level processing by passing directly to the thalamus and then to the amygdala, which mediates emotion expression. This may produce an automatic response such as fight or flight that is accompanied by physiological changes. It may account for the affect changes experienced by individuals in studies investigating emotional responses to pictures (see Lang, 1995).

1.3.2 Imagery and Perception

Behavioural experiments (e.g., Broggin, Savazzi, & Marzi, 2011) suggest that imagined and perceived stimuli may be processed through similar mechanisms. Neuroimaging studies have confirmed and extended this finding by indicating that imagery and perception draw on the same neural machinery: there is a significant overlap between the cortical areas activated while perceiving an object and those activated while having an image of it (for reviews, see Albers, 2011; Kosslyn et al., 2001). This is the case, for example, in auditory imagery and motor imagery (see Kosslyn et al., 2001). In the visual modality, O’Craven and Kanwisher (2000) found that the fusiform face area is activated both when individuals visualise faces and when they perceive them. Similarly, the parahippocampal place area is activated both when individuals visualise scenes with a spatial layout and when they perceive them. Many studies (see Albers, 2011; Kosslyn et al., 2001) have also found activation of the early visual cortex (which receives input from the eyes) during mental imagery

tasks. These studies have identified the precuneus, an area located in the internal part of the parietal lobe, as a key area for visual imagery. Fletcher and colleagues (1995) indeed argue that the precuneus may be what researchers call the *mind's eye*.

One of the most interesting findings regarding visual imagery is the extent of the overlap with visual perception. In an fMRI study, Ganis and colleagues (2004) tried to get an estimate of this overlap. In the imagery condition, participants formed mental images of previously studied line drawings and then made judgments on their properties (e.g., height, width). In the perception condition, they made the judgments while seeing faint pictures of the lines on a computer screen. The researchers found that there was a 92% overlap between the brain areas activated during the imagery task and those activated during the perceptual task. The activation similarity was greatest in the frontal cortex and in the parietal cortex. It was smallest in the occipital cortex (the site of the visual cortex), where activation was greater for perception. According to the authors, these results suggest that the brain regions involved in visual imagery are a subset of those involved in visual perception.

An important implication of the neural activation overlap between imagery and perception is that, on a physiological level, they may elicit the same responses. Several studies (see Kosslyn et al., 2001) have in fact shown that imagery can activate the autonomic nervous system and the amygdala, which are significantly involved in the experience and expression of emotion. It can thus affect the body by changing, for example, the heart rate, breathing rate, and skin conductance.

1.3.3 Imagery and Memory

Mental images seem to be associated with specific AMs. Holmes and colleagues (2008), for example, found that their participants experienced images associated with personal memories and that memory involvement significantly mediated the relationship between imagery and reported emotion. In addition, Brewer and Pani (1996) found that there is a significant imagery component in different types of memories, including memories for abstract knowledge and motor tasks. In particular, they noted that *all* the recent memories and 97% of the old memories reported by their participants involved vivid images. This particular image-memory link has been recently confirmed by neuroscience.

Memory and imagery seem to share part of their neural machinery. Several studies (e.g., Mellet et al., 2000; Slotnick, Thompson, & Kosslyn, 2011) have found that a number of cortex areas (e.g., frontal-parietal control regions and occipital-temporal sensory regions) which are activated during visual imagery tasks, are also activated during visual memory tasks. They have also suggested that the precuneus, which is activated by imagery, is also activated during episodic memory recall (see Mechelli et al., 2004; Mellet et al., 1998). In the areas in which there is an overlap between visual imagery and visual memory tasks, activation seems to be greater in the memory tasks, but the difference in the patterns of activation is only quantitative (Slotnick et al., 2011). The *quality* of these patterns remains similar.

One of the implications of the evidence described above is that retrieving images related to specific AMs may elicit the emotions experienced when the event depicted in the memory originally happened. Thus, images related to negative experiences may trigger negative emotional responses and affect individuals' psychological well-being. The impact of these images may be more significant when they involve the self and are thus more relevant for the individual. The following section explores in greater detail the link between imagery, AM, and the self.

1.4 Memory and the Self

1.4.1 Functions of Autobiographical Memory

An AM is an explicit declarative memory of an event that occurred in a specific place and time (Nelson & Fivush, 2004). Its main functions can be categorised into three groups: social, directive, and self (Bluck, Alea, Habermas, & Rubin, 2005). In the social sphere, AM allows individuals to develop and nurture interpersonal relationships (Bluck et al., 2005). It facilitates interaction and the creation of significant social bonds by helping individuals to get to know, understand, and empathise with each other. In the behavioural sphere, AM guides individuals' present and future behaviour (Bluck, 2003; Bluck et al., 2005). It helps them, for example, to use the past to solve novel problems, to establish goals and make plans for the future, to attribute meaning to their life, and to update and refine their understanding of the causes for past events as well as the meanings they have attached to these events (Bluck et al., 2005). In the personal sphere, AM helps individuals construct a personal identity and gives them a sense of stability and

continuity of the self across time (Bluck, 2003; Bluck et al., 2005; Nelson, 2003).

There is, in fact, considerable evidence that AM and current self-views influence each other (for a review, see Wilson & Ross, 2003). There is also evidence suggesting that AM helps individuals maintain a relatively stable, accurate, and coherent sense of self even when they have suffered partial memory loss, as in the case of amnesia (Rathbone, Moulin, & Conway, 2009), or have difficulties in retrieving specific memories, as in the case of autism (Klein, Cosmides, Costabile, & Mei, 2002).

It may be argued that the preservation of a coherent sense of self is the most important function of AM. After all, it would be difficult to make decisions or to interact with others if both one's self and others were constantly changing. Despite this fact and the considerable empirical evidence on the self-memory relationship, little work has been done to bring together the existing evidence. An influential model that has tried to do this and that accounts for the self-memory relationship in a comprehensive way is that of the self-memory system (SMS) proposed by Martin Conway and his colleagues (e.g., Conway, 2005; Conway & Pleydell-Pearce, 2000; Conway, Singer, & Tagini, 2004). Below is a description of this model.

1.4.2 The Self-Memory System (SMS)

1.4.2.1 Structure of the SMS.

According to Conway, Singer, et al. (2004), the SMS has three main components: the long-term self, the working self, and the episodic memory system (see Figure 1.1). The long-term self is the result of the interaction between the autobiographical knowledge base and the conceptual self. The autobiographical knowledge base consists of lifetime periods which reflect overarching goals and activities (e.g., childhood years), general event knowledge structures (categories of events occurring at the same time period or sharing the same themes, such as dating experiences), and a life story schema (the individual's understanding of the normative life story in their culture, such as the life of a career woman in the 21st century). The conceptual self consists of abstract knowledge about the self, such as one's values, personality, and attitudes. This knowledge comes from memories of specific events and by the experience of socialisation into one's culture. It is organised in the form of schemas, which are cognitive structures that contain an individual's core beliefs about

the self, others, and the world. These schemas represent specific self-representations (the working selves described below) that have been experienced in the past.

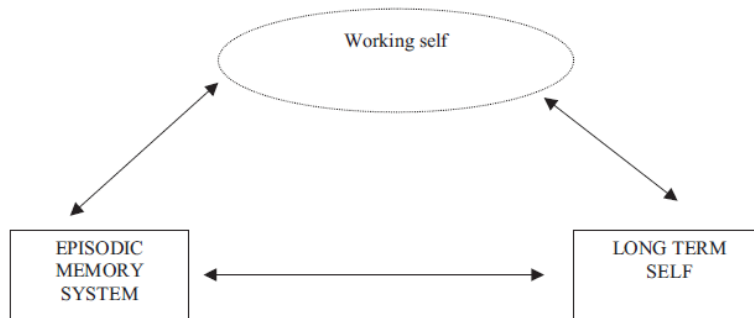


Figure 1.1. The structure of the self-memory system. From “The Self and Autobiographical Memory: Correspondence and Coherence” by M. A. Conway, J. A. Singer, and A. Tagini, 2004, *Social Cognition*, 22(5), p. 494. Copyright 2004 by Guilford Press. Reprinted with permission.

Drawing from the theories of Markus and colleagues (Markus & Nurius, 1986; Markus & Ruvolo, 1989), Conway, Singer, et al. (2004) argue that, at any time, a subset of an individual’s total number of schemas is active. This subset constitutes the working self, which is the constantly changing, moment to moment characterisation of the self. Within the SMS model, the working self is conceptualised as a structure containing self-images and a hierarchy of goals and subgoals that modulate cognition, affect, and behaviour. Conway and his colleagues (e.g., Conway, Singer, et al., 2004; Singer & Conway, 2011) argue that it is task driven and uses the information available in the long-term self to organise and manage goal processes as it evaluates current experience and specifies action sequences that will enable the individual to adapt to this experience. This idea is in line with Brewin’s (2006) retrieval competition hypothesis, which argues that individuals possess multiple self-representations that compete for retrieval and whose retrieval success depends on factors such as situational triggers and frequency of rehearsal (this hypothesis is described in greater detail in Section 1.6.5).

The third component of the SMS, episodic memory, contains sensory, cognitive, and affective elements related to past experiences that help individuals relive these experiences (Conway, Singer, et al., 2004). Within the model, episodic memory is seen as different from AM. Although there is still considerable debate on whether AM is the same as episodic memory or a specific case of it, evidence from neuroimaging studies (for a review, see Gilboa, 2004) seems to support the SMS model: it indicates that these memories differ in their functional neuroanatomy and are thus distinct from each other. Conway (e.g., Conway, 2009) argues that episodic memory stores information that is relevant to goal processing (e.g., goal generation, plan execution, and action outcomes) so that progress with goals can be assessed. He also argues that most episodic memories are lost within a short time, typically within a few days after being formed. As the following section will show, the idea is that only memories that are relevant for long-term goals are turned into AMs and retained.

1.4.2.2 Functions of the SMS.

According to the SMS model, there is a reciprocal relationship between the AM and the self (Conway, 2005; Conway & Pleydell-Pearce, 2000). On one hand, the working self modulates the formation of memories and determines their accessibility. On the other hand, AM influences working self activation and constrains the working self by ensuring that its goals are realistic (i.e., grounded in autobiographical knowledge). Ultimately, the aim of this relationship and of the SMS in general is to help individuals adapt to their current circumstances (i.e., achieve adaptive correspondence) while maintaining a stable sense of self over time (i.e., self-coherence) (Conway, 2005). What helps the SMS reach and maintain a balance between correspondence and coherence is the working self goal hierarchy.

Conway and his colleagues (e.g., Conway, Singer, et al., 2004) view goals as processes that contain a standard or ideal, mechanisms for assessing the discrepancy between the actual state and this ideal, and plans for reducing or increasing the discrepancy. This view is related to Higgins' (1987) self-discrepancy theory, which argues that individuals may experience discrepancies among three major self domains: the actual self (how they think they are), the ideal self (how they would like to be), and the ought self (how they think they should be).

Drawing from Carver and Scheier's (1990) self-regulation theory, Conway and Pleydell-Pearce (2000) argue that the working self goal hierarchy is involved in negative and positive feedback control systems which regulate behaviour. In negative feedback loops, the standard represents a state of the world that is to be achieved or at least approximated (e.g., becoming popular). The plans generated by the goal hierarchy in this case aim to reduce the discrepancy between the actual state and the standard (Carver & Scheier, 1990; Conway, Meares, & Standart, 2004). In positive feedback loops, on the other hand, the standard represents a state of the world that is to be avoided as much as possible (e.g., being publicly humiliated). In this case, the goal hierarchy aims to increase the discrepancy between the actual state and the standard (Carver & Scheier, 1990; Conway, Meares, et al., 2004).

In both positive and negative feedback loops, the SMS assesses progress in goal attainment (Conway, Singer, et al., 2004) and this assessment is experienced as emotion (see Figure 1.2).

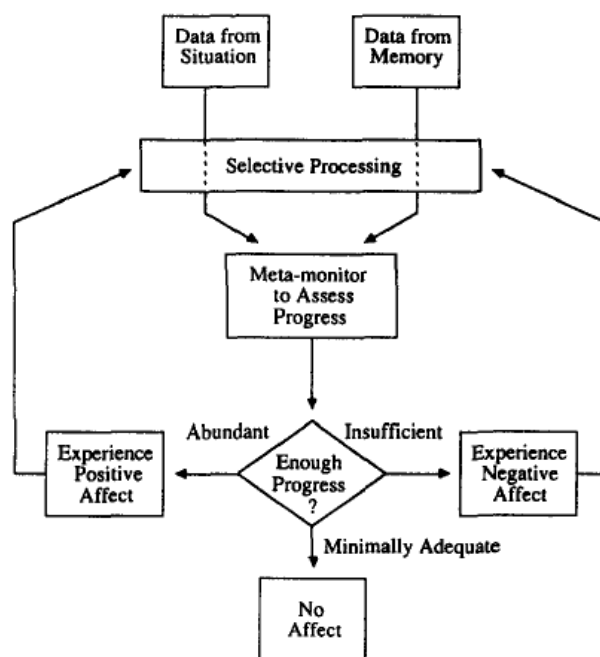


Figure 1.2. Experience of affect during goal progress monitoring. From "Origins and Functions of Positive and Negative Affect: A Control-Process View," by C. S. Carver and M. F. Scheier, 1990, *Psychological Review*, 97(1), p. 28. Copyright 1990 by the American Psychological Association. Reprinted with permission.

As Figure 1.2 shows, positive emotions reflect a satisfactory progress in goal attainment, whereas negative emotions reflect an unsatisfactory one. Any transition in goal status, whether it is achievement or blocking of goals, triggers an affective response. When this happens, the SMS has to adapt to the transition (i.e., achieve correspondence). The working self tries to evaluate the goal status change and begins a search through the autobiographical knowledge base for AMs related to past working selves that may be relevant to the current transition. The search finally yields a specific memory together with a self-representation, a goal-action-outcome sequence, and an affective response. A new working self is thus activated to match the demands of the current circumstances and these circumstances are interpreted in the light of past experience. This means that the newly created episodic memory fits the narrative sequence of the activated past memory. If it contains information that is relevant for the long-term self, this episodic memory will be stored in the AM (Conway, Singer, et al., 2004). The interaction of the long-term self and the episodic memory system, which is mediated by the working self, will thus yield a new AM from which conceptual knowledge about the self, others, and the world may be abstracted (see Figure 1.3).

There is ample evidence that supports the arguments of the SMS model. Conway and Haque (1999), for example, found that only events that are novel and relevant to the self are stored and remain highly accessible in the long-term memory. Sutin and Robins (2005) found that individuals tend to report similar emotions and motives across their AMs, regardless of their context and time at which they occurred. As the authors put it, individuals interpret their experiences “through a distinctive affective and motivational lens” (p. 818) and construct their memories in a similar way, just as the SMS model suggests. Negative memories may play a significant role in this process. Rasmussen and Berntsen (2009) found that memories serving self and directive functions (see pp. 8-9) tend to be seen as more central to one’s identity and life story than memories that serve social functions. They also found that, whereas positive memories are more likely to serve self and social functions, negative memories are more likely to serve a directive function. The authors argue that it may be more important for individuals to remember the consequences of negative experiences and use the lessons learnt from them to guide

their behaviour. This may explain why, for example, negative memories are rated as easier to recall than positive memories (Rasmussen & Berntsen, 2009).

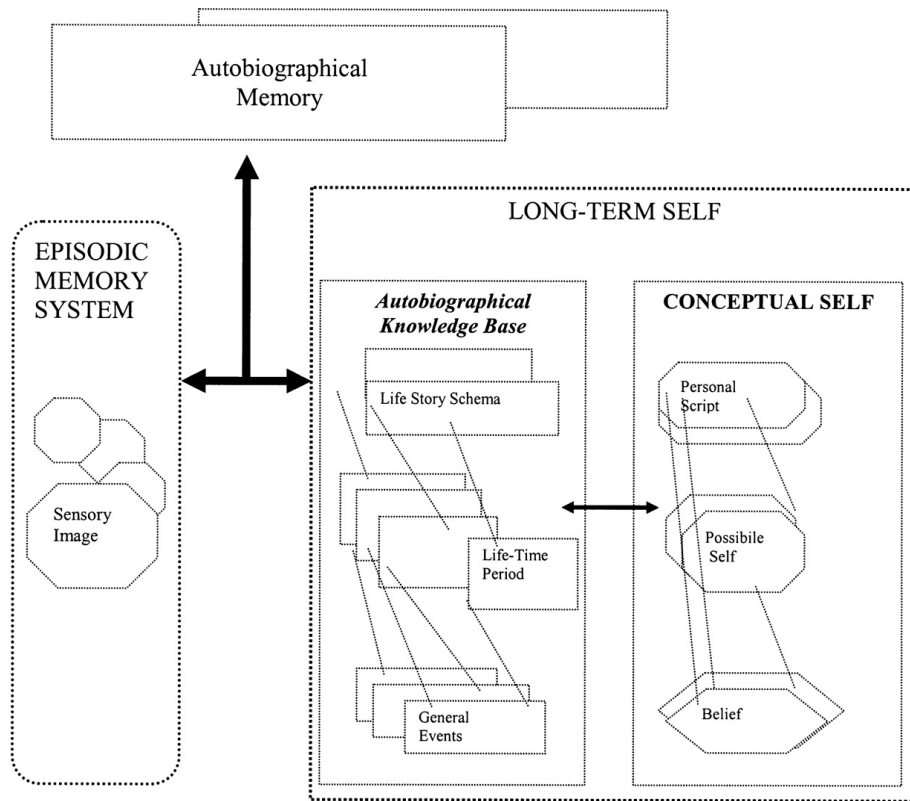


Figure 1.3. Generation of autobiographical memories. From “The Self and Autobiographical Memory: Correspondence and Coherence,” by M. A. Conway, J. A. Singer, and A. Tagini, 2004, *Social Cognition*, 22(5), p. 498. Copyright 2004 by Guilford Press. Reprinted with permission.

1.4.3 Self-Defining Memories

Conway and colleagues (e.g., Conway, Singer, et al., 2004) argue that the memories that are retrieved when the self faces a goal transition tend to be self defining. Self-defining memories were first described by Singer and Salovey (1993), who found that memories associated with pride and happiness are linked to the achievement of goals, whereas memories associated with anger, embarrassment, and sadness are linked to the failure to achieve goals. These types of memory, then, seem

to contain knowledge of the progress on goal attainment and to indicate the things individuals are motivated to achieve or avoid (Blagov & Singer, 2004). According to Singer and Salovey, these memories remain affectively charged and vivid if they are perceived to be relevant to one's present or future.

Self-defining memories are seen as having five main properties (Blagov & Singer, 2004; Singer & Salovey, 1993). They:

- evoke intense emotion when retrieved
- contain a high level of vivid self-related imagery
- are highly accessible and are repeatedly retrieved either voluntarily or involuntarily
- are linked to memories which contain similar narrative themes and affective sequences
- are related to individuals' most important concerns and conflicts

According to Conway and Pleydell-Pearce (2000), these characteristics are related to the fact that self-defining memories remain strongly associated with working self goals. This idea is supported by evidence that highly accessible memories were particularly self-relevant when originally encoded and that working self goals influence memory encoding and accessibility. Rathbone, Moulin, and Conway (2008), for example, found that individuals tend to retrieve AMs about specific self-images (aspects of their identity) from around the life period in which those images emerged. Similarly, Conway and Holmes (2004) found that the memories recalled by older adults are related to Erikson's (1950) psychosocial stages. Because these stages are defined by specific goals which the self has to achieve at different points along the life course (e.g., identity during adolescence, intimacy in young adulthood), self-defining memories formed in any of them may reflect the achievement or thwarting of these goals.

Self-defining memories are important for adjustment because they may help individuals attach meaning to experiences or draw life lessons (Conway, Singer, et al., 2004). In fact, Blagov and Singer (2004) found that individuals who reported more self-defining memories containing reflective themes or messages displayed optimal levels of self-restraint and emotional expression, eschewing impulsiveness and excessive restraint. This, the authors argue, may be due to the fact that finding meaning in life experiences helps individuals cope with negative emotions. In

addition, meaning and other abstract information derived from self-defining memories may become part of the life story schema within the autobiographical knowledge base, thus contributing to the development of the individual's sense of identity (Blagov & Singer, 2004).

The life story schema is conceptualised as a cognitive structure that is used to produce life narratives (Bluck & Habermas, 2000). According to McAdams (2001, 2008), identity is an evolving life story, a constant "work in progress" that is formed as a result of life experiences. Bluck and Habermas (2000) argue that it is formed when individuals repeatedly reflect upon and speak about their experiences. This process of autobiographical reasoning, also referred to as meaning making (Blagov & Singer, 2004), enables individuals to link their life experiences to each other and to their sense of self. It allows them to think about these experiences in a more abstract way and to subsequently integrate them within their life story. In accordance with the SMS model (e.g., Conway, 2005), the ultimate purpose of this process is to create a coherent life story which follows a particular chronology, is related to cultural concepts about the normative life course, is organised around overarching themes, and contains links between life experiences and the self in terms of motivations and causality (Bluck & Habermas, 2000).

This account of how AMs are organised and contribute to the development of individuals' sense of self seems to suggest that integration occurs for all memories as long as individuals reflect on them and share them with others. In reality, not all self-defining memories are naturally integrated within the autobiographical knowledge base. Evidence suggests that, whereas positive events are easily integrated and simply need to be remembered to have a positive impact on individuals, negative or traumatic experiences require individuals to make a bigger effort to understand and assign a meaning to them (McAdams, 2008; Thorne, McLean, & Lawrence, 2004). These memories may be processed differently compared to other memories. The distinctive features of trauma memories are discussed below.

1.4.4 Trauma, Goals, and Imagery

The Diagnostic and Statistical Manual of Mental Disorders, Text Revision (DSM-IV-TR; American Psychiatric Association, 2000) defines trauma as an event which involves actual or threatened harm and is accompanied by feelings of intense

fear, helplessness, or horror. Traumatic experience is thought to present a threat to self-coherence (Conway & Pleydell-Pearce, 2000; Conway, Singer, et al., 2004) as it triggers questions about one's identity and place in the social world (Brewin, 2003). According to the SMS model, it disrupts the functioning of the working self that is active when the trauma occurs because the goal hierarchy of this working self cannot guide its processing. As a result, the experience is either not encoded at all (producing amnesia) or is encoded but not integrated with the rest of the autobiographical knowledge (Conway & Pleydell-Pearce, 2000). In both cases, the trauma remains highly accessible and strongly associated with the working self that was active when it occurred. In fact, evidence indicates that the more individuals retrieve negative or traumatic self-defining memories, the more likely they are to report trauma-related goals such as "I want to get over the pain" or "I want to be safe again" (Sutherland & Bryant, 2005). One consequence of this lack of integration is that the trauma memory may become intrusive.

Conway, Meares, et al. (2004) assume that the goals driving cognition operate on an unconscious level, but we can experience consciously their outcomes (e.g., actions) and the mental representations derived from them (e.g., images, emotions, verbal statements). Self-images associated with specific memories, then, are strongly related to goals and play a central role within the SMS. As part of the conceptual self (and, consequently, of the working self), they are thought to be involved in the feedback loops described earlier (Conway, 2005; Conway, Meares, et al., 2004). According to Conway, Meares, et al., images related to negative or traumatic experiences may become the standard to be avoided in positive feedback loops and may thus be associated with discrepancy-increasing goals. Each time these goals are activated, the traumatic memory is likely to be retrieved and the images associated with it may intrude into consciousness and "hijack" attention (Conway, Meares, et al., 2004). This may have a negative impact on individuals. Conway, Pleydell-Pearce, and Whitecross (2001) found that memories retrieved in response to emotional cues have longer retrieval times than memories retrieved in response to neutral cues. This suggests that emotional memories trigger affective states which may destabilise the working self's current goal structure. In fact, Johannessen and Berntsen (2010) found that memories that come to mind involuntarily tend to have a more negative impact on mood than memories that are recalled voluntarily.

According to the SMS model, intrusive recollections of the trauma may persist until the memory is integrated with the existing autobiographical knowledge base and the goal structure of the working self changes to adapt to the individual's new life circumstances (Conway & Pleydell-Pearce, 2000). This change, however, is very difficult. As was previously mentioned, the SMS is conservative in that it tries to maintain a stable self. It avoids goal change because the cognitive and affective costs of such a change are high (Conway, 2005; Conway, Singer, et al., 2004). First, change in one goal is likely to involve change in other goals, so the stability of the self and the efficiency of its interaction with the world may be compromised (Conway, 2005). Second, there is no guarantee that the new goals will be more efficient than the old ones (Conway, Singer, et al., 2004). Consequently, when faced with a traumatic experience, the SMS resists goal change. It struggles to maintain the *status quo*, for example, by distorting or suppressing the trauma memory and associated images (e.g., Conway, 2005). This may lead to the development of dysfunctional beliefs and eventually to a pathological state.

Among the consequences of the trauma and intrusive recollections is a re-organisation of identity and reduced well-being. Conway (2005) believes that, because the trauma maintains a strong association with the working self, with time the individual's identity may come to centre on the trauma. In fact, evidence suggests that traumatic experiences are considered to have had more serious implications than positive memories (Byrne, Hyman, & Scott, 2001) and that they may mark turning points in individuals' life that then become central to the organisation of their identity and life story (Berntsen & Rubin, 2006, 2007). The continuous rehearsal of the traumatic memory may influence how central the trauma will become in memory and, consequently, in a person's self-definition (Berntsen & Rubin, 2007). The degree to which a negative memory is seen as central to one's identity and life story is related to how it influences individuals. Negative memories that are perceived as more central are associated with greater reliving and more negative emotions (Boals, 2010). The centrality of negative and trauma memories for identity is also correlated with PTSD symptoms and depression, as well as with poorer physical health (Boals, 2010; Smeets, Giesbrecht, Raymaekers, Shaw, & Merckelbach, 2010). There is also evidence that the ability to disengage from goals perceived as unattainable and the ability to reengage in new goals independently predict subjective well-being and are

associated with low levels of perceived stress and intrusive thoughts (Wrosch, Scheier, Miller, Schulz, & Carver, 2003).

The impact trauma and intrusive images have on the self will be discussed in greater detail in the next section. Before moving on, however, it is important to note that cultural factors may influence this impact. The content of memories differs across cultures (e.g., Conway, Wang, Hanyu, & Haque, 2005; Jobson & O’Kearney, 2008a). The influence of the self on memory formation as described by the SMS model, however, seems to be culturally independent and traumatic events seem to activate an independent, autonomous working self regardless of culture (Conway et al., 2005; Jobson & O’Kearney, 2006). This may be problematic in non-Western cultures, where the self is viewed as interdependent with the surrounding environment and where the expression of trauma-related cognitions or emotions such as anger and frustration (which reflect the blocking of *individual* attributes such as goals) is discouraged (Markus & Kitayama, 1991). Cultural expectations in this case may modulate the impact of the trauma on the self. Evidence (Jobson & O’Kearney, 2006, 2008b) suggests that the relationship observed in individuals from Western cultures between a trauma-centred self-definition and posttraumatic symptoms is not present in individuals from non-Western cultures.

1.5 Imagery and Psychopathology

1.5.1 Intrusive Images in Psychological Disorders

In recent years there has been a proliferation of studies investigating mental images in a number of Axis I disorders. In PTSD, acute stress disorder, and obsessive-compulsive disorder (OCD), the presence of intrusive distressing images has been known for a long time and constitutes a diagnostic criterion in the DSM-IV-TR (American Psychiatric Association, 2000). The presence and role of images in other types of disorders, however, has attracted the attention of researchers only in the last two decades although clinical experience (e.g., Beck et al., 1985) has long suggested that images are important elements in psychopathology. In fact, there are still disorders like borderline personality disorder (an Axis II disorder) which clinical experience (see Kellogg & Young, 2006; Layden et al., 1993; Young, Klosko, & Weishaar, 2003) has shown to involve imagery but on which no systematic empirical work has been carried out yet.

Because research in this area is still in its infancy, the nature and role of images in psychopathology is not yet completely clear. However, the studies conducted so far have found some similarities in the characteristics of intrusive images featuring in different disorders. In addition, they all suggest that these images play a role in both the onset and the maintenance of disorders. The following sections review the main findings of these studies. The review focuses only on disorders involving images of the self because of the importance of these images for IR. Disorders such as specific phobias (in which imagery is often of feared objects or situations) are not discussed here. As Pratt, Cooper, and Hackmann (2004) found in their study on spider phobia, images in these disorders may be linked to negative beliefs about the self and others but do not always involve the self.

1.5.2 Characteristics of Intrusive Images

The content of the intrusive images and memories varies according to the disorder and tends to match patients' verbal cognitions. Table 1.1 presents a summary of the content of intrusions in the main disorders that have been studied to date.

Most patients report that their intrusive images are recurrent (e.g., Hackmann et al., 2000; Muse, McManus, Hackmann, Williams, & Williams, 2010; Osman, Cooper, Hackmann, & Veale, 2004; Somerville, Cooper, & Hackmann, 2007). They experience them spontaneously, usually in the presence of specific situational stimuli. Patients with social phobia, for example, experience images of the self before and during anxiety-provoking social situations (Clark & Wells, 1995; Hackmann et al., 2000). Bulimic patients report experiencing images when they worry about their eating, shape, or weight (Somerville et al., 2007) or prior to vomiting during a bingeing/vomiting episode (Hinrichsen, Morrison, Waller, & Schmidt, 2007).

The perspective from which patients see themselves in their images varies across disorders. Patients with disorders like bulimia nervosa (Somerville et al., 2007), social phobia (e.g., Wells, Clark, & Ahmad, 1998; Wells & Papageorgiou, 1999), and body dysmorphic disorder (Osman et al., 2004) tend to see themselves from an observer perspective (i.e., as external observers), whereas patients with disorders like OCD (Lipton, Brewin, Linke, & Halperin, 2010; Speckens, Hackmann, Ehlers, & Cuthbert, 2007) tend to see themselves from a field perspective (i.e., through their own eyes).

Table 1.1

Content of Intrusions in Psychological Disorders

Disorder	Content of Intrusive Memory/Image
Agoraphobia	Physical or mental catastrophes, disorientation, lack of resources to cope with agoraphobic situations, panic (e.g., passing out while crossing the road, getting stuck in a place with no escape) (Day et al., 2004; Hackmann, Day, & Holmes, 2009)
Social phobia	Worst fears about one's behaviour in social situations being realised (e.g., blushing intensely, appearing stupid or awkward) (e.g., Hackmann et al., 2000; Hackmann, Surawy, & Clark, 1998)
Obsessive-compulsive disorder	Events related to themes such as unacceptable ideas of harm (e.g., inappropriate aggressive or sexual acts), contamination and somatic complaints (e.g., seeing the self covered in faeces and urine), and social rejection (being evaluated negatively and humiliated) (Lipton et al., 2010; Speckens et al., 2007)
Health anxiety	Events related to themes such as receiving the news of having a serious illness, suffering from a serious illness, death and dying (e.g., being accidentally buried or cremated alive), and the impact of one's death or illness on other people (Muse et al., 2010; Wells & Hackmann, 1993)
Posttraumatic stress disorder	Brief sensory fragments of the trauma, such as having a gun pointed to the head or hearing glass shattering (Grey & Holmes, 2008; Hackmann, Ehlers, Speckens, & Clark, 2004; Holmes, Grey, & Young, 2005)
Depression	1) Past experiences such as own or significant other's illness or injury, threatened or actual assault, and interpersonal problems (Patel et al., 2007; Reynolds & Brewin, 1999) 2) Flash-forwards to future suicidal behaviour (e.g., jumping in front of a train, slashing wrists, seeing own funeral) (Crane, Shah, Barnhofer, & Holmes, 2011; Holmes, Crane, Fennell, & Williams, 2007)
Bipolar disorder	Negative experiences related to themes such as isolation and victimisation (e.g., interpersonal problems, abuse, assault) and positive experiences related to themes such as positive events (e.g., winning an award) or positive interactions with others (Gregory, Brewin, Mansell, & Donaldson, 2010; Mansell & Hodson, 2009)
Body dysmorphic disorder	Exaggerated pictures of and sensations such as tingling in the body parts of concern (e.g., skin, teeth) (Osman et al., 2004)
Bulimia nervosa	Pictures of the self being overweight and unattractive, sensations such as clothes being tight or feeling bloated (Hinrichsen et al., 2007; Somerville et al., 2007)
Psychosis	Feared events related to paranoia or persecutory delusions (e.g., being put in an oven), traumatic experiences (e.g., being assaulted), perceived sources of auditory hallucinations (e.g., spirits of friends), content of auditory hallucinations (e.g., stabbing someone) (Morrison et al., 2002)

The perspective from which patients experience their images is important because it has different effects on emotion. Emotional memories (both positive and negative) are more likely to be recalled from a field perspective than neutral memories (D'Argembeau, Comblain, & Van der Linden, 2003). However, the perspective may vary across emotional memories. Recalling events from a field perspective is associated with the activation of emotion-related brain regions such as the right amygdala (Eich, Nelson, Leghari, & Handy, 2009) and may produce a greater emotional response because it allows a greater engagement with the image (see Holmes & Mathews, 2010). Adopting the observer perspective, on the other hand, is associated with the deactivation of emotion-related regions such as the left and right insula (Eich et al., 2009) and may facilitate emotion regulation and distancing so that individuals relive experiences as detached observers (Eich, Handy, Holmes, Lerner, & McIsaac, 2011). Memories recalled from an observer perspective are in fact accompanied by a weaker sense of reliving than memories recalled from a field perspective (Libby & Eibach, 2002). The observer perspective has also been found to reduce positive affect (Holmes, Coughtrey, & Connor, 2008), maybe because it increases self-focused attention and promotes unfavourable self-comparisons (Kuyken & Howell, 2006). In fact, Libby and Eibach (2002) found that individuals are more likely to recall from an observer perspective memories that are incompatible with their current self.

Interestingly, the intrusions experienced by patients are always rated as very distressing regardless of the perspective adopted. They tend to be associated with negative emotions such as fear, helplessness, anger, guilt, anxiety, sadness, and shame (e.g., Cooper, Todd, & Wells, 1998; Gregory et al., 2010; Reynolds & Brewin, 1999; Speckens et al., 2007). They may also be associated with emotions related to disorder-specific symptoms. In obsessive-compulsive patients with contamination fears, for example, distressing images may be related to feelings of disgust (Speckens et al., 2007). These findings seem to confirm those of Holmes and colleagues (e.g., Holmes et al., 2008) regarding the relationship between imagery and emotions. The arousal of emotions may be related to the fact that images are very vivid and contain elements from different modalities. The visual modality is the dominant one, but other modalities may also be present. In bulimia nervosa, for example, images may include cutaneous sensations (e.g., the clothes being tight) or organic elements (e.g., a

sense of heaviness) (Somerville et al., 2007). In OCD, they may include sounds, smells, tastes, and bodily sensations (Speckens et al., 2007). This high level of vividness may make the images feel more real and contribute to the patients' feeling that the events depicted in the image are happening in the present. The similarity of images with perceptual experience may thus trigger an emotional response accompanied by physiological arousal, as described in Section 1.3.2. The fact that images are associated with specific AMs may also contribute to this response.

1.5.3 Origin of Intrusive Images

Empirical evidence consistently shows that intrusive images tend to be related to past aversive experiences. A significant proportion of patients can in fact identify a specific memory that is linked to their intrusions. Percentages vary from 67% of patients in bulimia nervosa (Somerville et al., 2007) to 96% in social phobia (Hackmann et al., 2000) and 100% in agoraphobia (Day et al., 2004). The images and memories that patients identify as associated to them tend to resemble each other. In disorders like OCD (Speckens et al., 2007), body dysmorphic disorder (Osman et al., 2004), bulimia nervosa (Somerville et al., 2007), and social phobia (Hackmann et al., 2000), they share characteristics such as themes, sensory modalities, and emotional tone. These findings are consistent with research showing that images are important elements of memories and may elicit the emotions originally experienced when the event depicted in the associated memory happened (see pp. 7-8).

The memories that give rise to intrusive images seem to be similar across disorders. Neglect and physical, psychological, and sexual abuse are linked to the recurrent images experienced by patients with agoraphobia (Day et al., 2004), health anxiety (Wells & Hackmann, 1993), bipolar disorder (e.g., Tzemou & Birchwood, 2007), and OCD (Speckens et al., 2007). The experiences related to the images, however, are not always severe traumas. In body dysmorphic disorder, for example, the main themes of the memories are being teased or bullied at school and being conscious about physical changes in adolescence (Osman et al., 2004). In depression, intrusive memories may involve interpersonal problems such as disputes with significant others (e.g., Patel et al., 2007). In bulimia, the memories are related to themes of being humiliated or abused and being abandoned (Hinrichsen et al., 2007), as well as to negative comments of others about the individual's weight/shape and to

self-consciousness about appearance (Somerville et al., 2007). In social phobia, the memories are of experiences of being criticised, others pointing out an anxiety symptom, lack of interest from others, feeling bad about one's self-image, and so on (Hackmann et al., 2000). Negative social experiences (e.g., being humiliated or berated) are also linked to recurrent images in agoraphobia (Day et al., 2004), health anxiety (Wells & Hackmann, 1993), bipolar disorder (e.g., Mansell & Lam, 2004), and OCD (Speckens et al., 2007).

There is some indirect evidence suggesting that adverse experiences may also be related to intrusions in other disorders, even though little or no empirical work has been done on these disorders to date. Clinical experience, for example, shows that patients with borderline personality disorder often experience flashbacks (Layden et al., 1993). Because these patients tend to have histories of childhood neglect and sexual, physical, or emotional abuse (Arntz, Dietzel, & Dreessen, 1999; Lobbestael, Arntz, & Sieswerda, 2005), the flashbacks may be related to such experiences. Similarly, the intrusions of psychotic patients are often related to experiences such as abuse, assault, or previous hospitalisations (Morrison et al., 2002). Many researchers (e.g., Holmes & Steel, 2004; Morrison, 2001; Morrison, Frame, & Larkin, 2003; Steel, Fowler, & Holmes, 2005) argue that psychosis resembles PTSD. They believe that hallucinations and delusions may be trauma-related intrusions which psychotic patients misinterpret because they fail to understand their origins.

An important point to mention is that not all intrusive images arise directly from an adverse experience or correspond exactly to what happened during this experience. Apart from veridical images (which correspond to reality), individuals often experience non-veridical images. The latter are often products of the individuals' imagination. In PTSD, for example, they include composite images (formed from a combination of events, such as repeated traumas), reconstructed images (formed, for example, from imagining a trauma which occurred to a dear person), and worst-case scenarios (resulting from peri-traumatic images of what might be about to happen or from later images of what could have happened) (Grey, 2009). Research has shown that intrusive visual images may develop even from simply listening to the verbal description of a trauma and imagining it (Krans, Näring, Holmes, & Becker, 2010). Bryant and Harvey (1998) found that the intrusive image content of PTSD patients who were amnesic for the trauma was not consistent with

the trauma accounts of third parties. Similarly, Merckelbach, Muris, Horselenberg, and Rassin (1998) found that 22% of the participants who reported experiencing a trauma said that their intrusions were exaggerated versions of the trauma and represented worst-case scenarios.

1.5.4 Role of Images in Disorder Onset and Maintenance

The fact that intrusive images are related to specific AMs may help explain the role they play in the onset of psychopathological conditions. Studies focusing on health anxiety (Muse et al., 2010), agoraphobia (e.g., Day et al., 2004), body dysmorphic disorder (Osman et al., 2004), and social phobia (e.g., Hackmann et al., 2000), for example, have found a close temporal relationship between the occurrence of the event depicted in the memory linked to the intrusions and the onset of the disorder. Most of the patients interviewed in these studies reported that their symptoms either appeared or worsened after they experienced this event.

Images also seem to be involved in the maintenance of disorders. They may interact with other disorder-specific cognitive biases to prevent the disconfirmation of patients' fears or maladaptive core beliefs. As Hirsch, Clark, and Mathews (2006) propose in their combined cognitive biases hypothesis, cognitive biases can influence and/or interact with each other, thus producing a greater impact than the one they would produce were they to act in isolation. Negative core beliefs seem to be especially important in this process. According to Wells and Hackmann (1993), such beliefs are encapsulated within intrusive images and contain the meaning the individual has attached to the event depicted in the associated memory. The main beliefs about the self revolve around issues of inadequacy and worthlessness. In health anxiety (Wells & Hackmann, 1993), OCD (Speckens et al., 2007), and psychosis (Morrison et al., 2002), for example, core beliefs include "I am bad/unlovable/a failure." They also include "I deserve to be punished" in health anxiety (Wells & Hackmann, 1993) and psychosis (Morrison et al., 2002) and "I am powerless/not protected" in agoraphobia (Day et al., 2004). Core beliefs about others revolve around issues of trust. Psychotic patients, for example, associate their intrusions with beliefs such as "If people think I'm vulnerable, they'll attack me" or "Others can't be trusted" (Morrison et al., 2002).

The evidence on the ways in which intrusive images contribute to the maintenance of psychological disorders is still limited. It is known, for example, that intrusive memories and an impaired ability to experience positive prospective imagery may influence depressed patients' ability to cope and to imagine a positive future (Holmes, Lang, & Deeprose, 2009; Holmes, Lang, Moulds, & Steele, 2008). Future-oriented, suicide-related images may contribute to the severity of the suicidal ideation in depressed patients (Holmes et al., 2007) and may make them more likely to commit suicide by habituating them to the idea of death and pain (Selby, Anestis, & Joiner, 2007). In bipolar disorder, images may amplify positive and negative emotions, thus contributing to the patients' unstable mood (Holmes, Geddes, Colom, & Goodwin, 2008). In health anxiety, they may lead to behaviours such as reassurance seeking, rumination, and body/health checking that in the long run may help maintain the anxiety (Muse et al., 2010). In OCD, images trigger anxiety with which many patients cope by engaging in rituals, such as washing or checking (Speckens et al., 2007). In bulimia nervosa, the self-images and associated negative emotions elicited after a bingeing episode may lead to self-induced vomiting (Cooper et al., 1998; Cooper, Wells, & Todd, 2004; Hinrichsen et al., 2007). In social phobia, images experienced in social situations may produce a series of responses (e.g., increased anxiety, greater use of safety behaviours such as gaze avoidance, blocking of the generation of positive inferences about one's performance and/or others' reactions) which affect negatively the patients' performance and make them appear aloof (Clark & Wells, 1995; Hirsch et al., 2006; Hirsch, Clark, Mathews, & Williams, 2003; Hirsch, Mathews, Clark, Williams, & Morrison, 2003; Hirsch, Meynen, & Clark, 2004; Spurr & Stopa, 2003; Stopa & Clark, 1993; Vassilopoulos, 2005).

One of the disorders that have been researched the most with regards to imagery is PTSD. Ehlers and Clark's (2000) cognitive model of PTSD and the existing empirical evidence on this disorder give a clear account of the processes that are involved in its maintenance and of the impact images have on patients' sense of self and behaviour. Because imagery is a transdiagnostic process (Brewin, Gregory, Lipton, & Burgess, 2010) and because this PhD project focuses on how IR may influence patients' sense of self, the evidence on PTSD may help illustrate the extent to which imagery can affect individuals and their perceptions of themselves. For this reason, the following section presents this evidence.

1.5.4.1 Imagery and posttraumatic stress disorder.

In their model of PTSD, Ehlers and Clark (2000) argue that one of the main features of PTSD is a sense of impending threat that is exacerbated by the fact that trauma-related intrusions are accompanied by a sense of “nowness.” When images intrude into consciousness, patients relive the trauma with all its emotions and sensory impressions as if it is happening in the “here and now” (Ehlers, Hackmann, & Michael, 2004; Hackmann et al., 2004). The patients’ appraisals of the trauma and/or its sequelae and the nature of the trauma memory itself may contribute to the image characteristics and to the sense of threat.

According to Ehlers and Clark (2000), individuals make a series of negative appraisals of the trauma and its sequelae. They may come to believe, for example, that catastrophic events are more likely to happen than they really are or that their feelings and/or reactions during the traumatic experience were inappropriate. In addition, they may perceive negatively their PTSD symptoms or other people’s reactions to their experience. They may, for example, interpret symptoms such as flashbacks as signs that they are going insane. These negative appraisals, the authors argue, help to maintain PTSD by eliciting negative emotional responses (e.g., fear, anxiety) or by making individuals use maladaptive coping strategies (e.g., avoidance) which prevent the disconfirmation of their unrealistic fears.

With regards to the nature of the trauma memory, Ehlers and Clark (2000) point out that PTSD patients often find it difficult to retrieve intentionally a complete memory of the trauma but, at the same time, experience involuntary intrusive memories of it. They argue that voluntary recall of the trauma is difficult because the trauma memory is poorly elaborated and integrated into its temporal, spatial, and informational context. Involuntary recall, on the other hand, is facilitated by priming and associative learning. Stimuli perceived shortly before or during the event (e.g., traffic lights before a car crash) become associated with the idea of danger to the self and are more likely than other stimuli to be noticed because there is strong perceptual priming for them. In fact, research shows that, compared to neutral objects present in neutral contexts, neutral objects present in traumatic contexts are more strongly primed (Ehlers, Mauchnik, & Handley, 2011). This may explain why intrusions are activated when patients encounter cues that unconsciously trigger responses (especially on an emotional level) that were originally experienced during the trauma.

There is still a great deal of controversy surrounding trauma memories and PTSD because research yields inconsistent results (for a review, see Brewin, 2007). However, the account that Ehlers and Clark (2000) give of the trauma memory and its lack of integration is in line with the SMS model (e.g., Conway & Pleydell-Pearce, 2000) and the dual representation theory of PTSD (Brewin, Dalgleish, & Joseph, 1996; Brewin et al., 2010). These authors argue that, during a traumatic event, there is a shift from verbal, conceptual processing to visuospatial, sensory processing. Individuals focus on sensory impressions rather than on the meaning and context of what is happening to them. This leads to the formation of sensory representations that are disconnected from the contextually-bound representations of the trauma and that may correspond to Conway's (2009) episodic memory system (Brewin et al., 2010). The trauma memory may thus be rich in sensory detail which is not integrated with the trauma context and the rest of the autobiographical knowledge on a conceptual level, just as the SMS model suggests.

The arguments put forward by Ehlers and Clark (2000) and Brewin et al. (e.g., 2010) regarding the nature of trauma memories are supported by evidence that trauma memories are very vivid (Wenzel, Pinna, & Rubin, 2004) and that perceptual, but not conceptual, memory for stimuli presented in emotional contexts is superior to that of stimuli presented in neutral contexts (Arntz, de Groot, & Kindt, 2005). They are also supported by studies using the trauma film paradigm, which involves showing participants trauma films (e.g., footage from road traffic accidents) and investigating resulting intrusions (for a review, see Holmes & Bourne, 2008). In a series of experiments, Holmes and her colleagues (e.g., Holmes, Brewin, & Hennessy, 2004; Holmes, James, Kilford, & Deerprouse, 2010; Stuart, Holmes, & Brewin, 2006), for example, have found that engaging in visuospatial tasks such as Tetris or plasticine moulding while watching trauma films is associated with fewer intrusive memories of the film than engaging in verbal interference tasks or in no tasks at all. The authors explain this finding with the fact that visuospatial tasks interfere with sensory processing and may thus be more likely to affect the formation of intrusions.

With regards to the aspects of the trauma that become intrusive, there are currently two main accounts: the hotspot theory and the warning signal hypothesis. The hotspot theory argues that intrusions reflect the worst moments of the trauma. Hotspots are highly distressing fragments of the trauma memory that may be difficult

to recall voluntarily and are associated with intense reliving of the trauma (Grey, Holmes, & Brewin, 2001). A series of studies (e.g., Grey & Holmes, 2008; Grey et al., 2001; Holmes et al., 2005) have found that most of the intrusions reported by PTSD patients match a specific hotspot. Hotspots are characterised by trauma-related emotions and cognitions. Apart from fear, helplessness, and horror, emotions experienced during hotspots also include shame, guilt, sadness, surprise, anger, and disgust (Grey & Holmes, 2008; Grey et al., 2001; Holmes et al., 2005). Cognitions revolve around two main themes: threat to one's physical integrity (e.g., injury, death) and threat to one's sense of self (e.g., self-blame, abandonment) (Grey, 2009; Grey & Holmes, 2008; Holmes et al., 2005). These cognitions seem to be strongly related to emotions. Regambal and Alden (2009) found that emotional reactivity during a trauma film is linked to peri-traumatic cognitive processing: greater emotional reactions increased the probability that the trauma film would be processed in terms of its sensory details and would give rise to intrusions. This may explain why hotspot cognitions are related to PTSD symptoms. Holmes, Creswell, and O'Connor (2007) found that intrusive imagery combined with peri-traumatic feelings of threat predicted PTSD symptom persistence in a sample of London school children who were exposed to the attacks of September 11, 2001 through the media.

Other studies have failed to replicate the results of the hotspot studies. Hackmann et al. (2004), for example, found that only 17% of the intrusive memories reported by the PTSD patients in their sample were related to the worst moment of the trauma. Both Ehlers et al. (2002) and Hackmann et al. found that most intrusions contained stimuli which preceded the onset of the traumatic event or signalled a shift for the worse in the meaning of the event. A traffic accident survivor that took part in the study of Ehlers et al., for example, had intrusive images of her mother's worried face in hospital because at that point she realised she could have died in the accident. This finding may be related to the fact that perceiving an event boundary (i.e., the shift from one event to another) leads to greater perceptual processing because it requires the individual to understand the new event or situation (Swallow et al., 2011). Ehlers et al. suggest that intrusions may include stimuli which, due to their temporal association with the trauma, become warning signals that indicate impending danger if encountered again. They thus contribute to the continuous sense of threat experienced by PTSD patients.

The differences in the results of the hotspot and the warning signal studies may be due to methodological issues. The former focus only on the worst moments of the trauma. Participants are generally asked to identify their intrusions and the worst moments of the trauma and then state whether their intrusions match any of these moments. The latter, on the other hand, focus more on the meanings of the intrusions and of the worst moments of the trauma. Hackmann et al. (2004), for example, asked participants to identify their main intrusion and its meaning, the worst moment of the trauma, the events that happened before and after the moment depicted in the intrusion, and the exact moment in which the fragment depicted in the intrusion happened. Despite the differences in their findings, both hotspot and warning signal studies are important because they show the importance of trauma-related intrusive images in PTSD and the relation of these images to the sense of threat to the self.

1.5.5. Imagery in Psychopathology: Implications for Therapy

Most of the studies mentioned in this section have relied heavily on patients' self-reports (e.g., interviews) and may thus lack the objectivity guaranteed by the experimental method. Nevertheless, with the support of laboratory experiments involving patient and non-patient populations, they strongly suggest that intrusive memories and images are an essential component of psychological disorders. An important implication of their findings is that therapy needs to address imagery instead of relying exclusively on the verbal aspect of patients' concerns and maladaptive core beliefs. In the last decades, a number of imagery-focused cognitive-behavioural techniques have been developed that are used as tools to facilitate assessment (e.g., asking patients to focus on how they feel when they experience images related to troubling memories), as part of traditional CBT (e.g., guided imagery), or as stand-alone interventions (e.g., prolonged exposure) (for a more detailed account, see Stopa, 2009). Because the aim of the current research project is to investigate IR, the remainder of this chapter will focus on this technique.

1.6 Imagery Rescripting (IR)

1.6.1 Description of IR

IR is a cognitive-behavioural technique that aims to change the meaning of memories of adverse experiences that involve a significant imagery component and

seem to be related to the origin of psychological disorders (Arntz & Weertman, 1999; Smucker & Boos, 2004; Smucker et al., 1995; Smucker & Niederee, 1995). It may be used as a stand-alone treatment or as an adjunct to other CBT techniques (e.g., cognitive restructuring). Because of the high affect it generates, it is generally not recommended for some categories of patients, such as patients who are suicidal, do not want to talk about their traumatic experiences, experience extreme symptoms (e.g., anxiety), or are in pain (Rusch, 2007; Wheatley et al., 2007).

The term *imagery rescripting* is often used loosely to refer to interventions aimed at modifying intrusive recurrent images experienced by patients that help maintain their psychological disorders. The method described in this section is the one developed by Smucker et al. (1995) and then modified by Arntz and Weertman (1999). These authors are the only ones who have developed comprehensive treatment protocols focusing exclusively on imagery modification. Smucker and his colleagues originally developed IR to address the intrusions experienced by PTSD sufferers who had been victims of childhood sexual abuse. For this reason, their protocol focuses mainly on helping patients develop feelings of mastery as they imagine their adult self enter the abuse scene and then intervene to stop the abuse and nurture the child self. Arntz and Weertman, on the other hand, followed what Stopa (2009) calls a “parallel path” (p. 87). They modified Smucker et al.’s protocol so that it would target not only intrusive images, but also related maladaptive beliefs and complex issues experienced by patients with personality disorders. In addition, they wanted to help patients with such disorders to integrate the new perspective of the trauma memory experienced from the adult self perspective. These patients reported understanding and accepting (perhaps at a cognitive level only) that the perpetrator’s behaviour was wrong and that the child was not to blame, but not “feeling” it. As a result, Arntz and Weertman added another stage to IR which involves the patient imagining the intervention of the adult self into the memory from the young self perspective and asking the adult for whatever he/she needs to feel better. Their protocol, therefore, consists of three main stages:

- imaginal exposure
- rescripting from the current self perspective
- rescripting from the young self perspective

The following sections provide a more detailed description of these three stages, highlighting some of the differences between the protocol of Smucker et al. and that of Arntz and Weertman. In order to illustrate how IR is applied, childhood sexual abuse is used as an example of a traumatic experience.

1.6.1.1 Imaginal exposure.

At the beginning of an IR session, the therapist helps patients decide on the memory to target (Smucker & Boos, 2004; Smucker et al., 1995). This may be a specific episode in which the patients were sexually abused. It may also be another episode which is not related to the abuse but has influenced their beliefs about the self, others, and the world. In fact, unlike Smucker and his colleagues (1995), who focus on trauma, Arntz and Weertman (1999) argue that the memory targeted in IR does not have to be traumatic. For them, what matters is that the event represented in this memory has contributed to the patients' schema development, can be clearly visualised, and triggers a strong affective response.

Once a decision has been made about which memory to target (e.g., a specific abuse episode), the therapist explains the treatment rationale so that patients know why IR is being used and what effects it may have. If patients agree to proceed, imaginal exposure begins. Patients are asked to close their eyes and relive the abuse, describing it in the present tense and providing as much detail as possible. The aim is to activate the memory (together with its associated images, emotions, thoughts, and beliefs) in order to make it more amenable to examination and modification (Grunert, Smucker, Weis, & Rusch, 2003; Smucker & Niederee, 1995). One of the main tasks of the therapist in this stage is to support patients and make them feel safe so that they stay with the imagery as they prepare for the rescripting stages.

1.6.1.2 Rescripting from the current self perspective.

Rescripting begins with patients closing their eyes and visualising the scene from their current (e.g., adult) self perspective. Once again, they are asked to describe what they see, feel, and think. This time, however, they are also asked whether they, as adults, want to intervene to help the child. The aim is to make them develop a sense of mastery and modify their beliefs related to powerlessness, vulnerability, and helplessness so that they feel empowered and no longer see themselves as victims

(Smucker & Niederee, 1995). If they do want to intervene, they imagine their adult self entering the scene. Normally the adult rescues the child (e.g., by stopping the abuse, taking the child to a safe place, or sending the perpetrator away). Patients are encouraged to try out different interventions until they are satisfied.

Once the child is rescued, the therapist encourages adult-child interaction. The adult self may, for example, comfort, reassure, or hug the child self. The aim is to help patients learn how to soothe and nurture themselves. This stage may be difficult for some patients. They may, for example, blame the child for the abuse. When this happens, the therapist helps them to express openly their anger toward the child and to understand the child's suffering and blamelessness. This is assumed to help patients "develop positive feelings toward the child that are empathic, apologetic, and conciliatory in nature" and modify beliefs related to mistrust, unlovability, badness, and abandonment (Smucker & Niederee, 1995, p. 71). These beliefs are thought to be most effectively modified when the adult understands the child's pain, perceptions, and frame of reference and is able to put the responsibility for the abuse on the perpetrator (Smucker & Niederee, 1995). For Smucker et al. (1995), rescripting finishes when the adult has comforted the child and is ready to leave the abuse scene. At that point, the therapist asks patients to let the imagery fade away and open their eyes. For Arntz and Weertman (1999), however, rescripting continues.

1.6.1.3 Rescripting from the young self perspective.

According to Arntz and Weertman's (1999) protocol, in this stage patients visualise the abuse scene and the adult-child interaction from the child's perspective. They are asked to express the child's thoughts and feelings about the adult's intervention and to state what they want the adult to do next so that the child's needs are satisfied. This, according to Arntz and Weertman, allows new meanings and views to be integrated into schemas from the same perspective (e.g., the child's) from which the negative event was originally experienced. Moreover, it makes the emotional processing of rescripting more intense and teaches patients to acknowledge and express needs which they probably learnt to suppress in childhood.

At the end of the rescripting phase, the therapist discusses what happened in the imagery scene with the patients. The discussion focuses, for example, on the difficulties patients encountered (e.g., in driving away the perpetrator or in nurturing

the child) and the reasons that might lie behind these difficulties. In the end, patients are usually given homework which may involve listening to the audiotaped session daily, recording discomfort before and after listening, and keeping a diary of experiences and/or symptoms (Smucker et al., 1995). Before patients leave the therapy room, the therapist makes sure that they have recovered from the negative affect elicited during the session.

1.6.2 Additional Features of IR

It is important, at this point, to mention some additional features of IR. First, therapists remain non-directive throughout an IR session (Arntz & Weertman, 1999; Smucker et al., 1995). They ask questions and rely on Socratic imagery, a form of Socratic dialogue used in an imagery modification context whose aim is to empower and give patients a sense of control by encouraging them to develop their own images and come up with their own interventions/solutions (Grunert et al., 2003; Smucker & Boos, 2004). They may, for example, encourage patients to interact with the child by asking “How can you comfort the child?” (Smucker et al., 1995). If patients blame the child for the abuse, the therapist may ask questions like “Can you approach the child and tell him/her why he/she is guilty?” and “How does the child respond when you say this?” (Smucker et al., 1995).

Second, patients are frequently asked to rate their level of distress during the session, usually on a scale from 0 (*no distress*) to 10 (*extreme distress*). These ratings help the therapist understand the patients’ emotional state and identify key themes or aspects of the imagery scene which may require further therapeutic intervention (Grunert et al., 2003; Smucker & Boos, 2004). They may also indicate that the patients are significantly distressed and that the imagery exercise may need to be interrupted and discussed (see Arntz & Weertman, 1999), or that they are making progress in therapy.

Third, IR allows for a great degree of flexibility as its length and structure can be tailored to meet the needs of each individual patient. The protocol outlined by Smucker and his colleagues (1995) consists of 9 sessions. However, as the following section will show, the number of sessions may vary depending on the patients’ problems. With regards to session structure, Arntz and Weertman (1999) suggest a number of variations which may be used, especially if patients encounter difficulties

during rescripting. If they feel guilty for not having stopped the abuse when they were children, for example, the therapist can help them understand what chances they had of doing so given their age and circumstances. If they feel powerless to stop the abuse and confront the perpetrator, they can imagine themselves becoming larger and stronger or bringing a helper (e.g., family member, teacher) into the scene.

1.6.3 Application of IR

Although it was originally developed to treat PTSD and personality disorders, in recent years IR has been used to treat other disorders as well. There is some evidence that it (or elements of it, such as the intervention of a rescuer into the trauma scene) may help alleviate symptomatology in personality disorders (e.g., Giesen-Bloo et al., 2006; Weertman & Arntz, 2007) and psychosis (e.g., Morrison, 2004). There is also evidence that it may be successful with specific phobias such as snake fear (Hunt & Fenton, 2007). Because the present research project is concerned with the impact of IR on individuals' sense of self and because most studies investigating the effectiveness of IR use (with some variations) the protocol described earlier, the following sections will present only the evidence regarding the application of this technique on patients who experience distressing images involving the self.

1.6.3.1 Eating disorders.

Imagery has been used in various ways in the treatment of eating disorders (see Mountford & Waller, 2006; Cooper, Todd, & Turner, 2007). To date, however, the only report on the use of IR based on Smucker and Niederee's (1995) protocol is that of Ohanian (2002). Ohanian used IR with a patient, Joanna, whose disorder seemed to be related to a cold family atmosphere in early life and a critical mother. Initially, Joanna had 8 sessions of standard CBT for bulimia nervosa, which reduced her bingeing/vomiting by 50% and increased her self-confidence and sense of control over eating and life in general. However, her eating problems continued, so she was administered one session of IR. She rescripted the memory of a childhood episode in which her mother made comments suggesting that she was ugly. Entering the scene as an adult, Joanna confronted the mother for being insensitive and comforted the child by telling her, among other things, that she was pretty and that her mother was selfish. At 4-week follow-up, she reported a 75% decrease in bingeing/vomiting, an

improved ability to identify binge triggers, successful dealing with criticism, reduced anxiety and depression, and greater confidence and sense of control. At the 14-week follow-up, the treatment gains were maintained. The bingeing/vomiting behaviour had almost disappeared and Joanna reported a further improvement in self-esteem.

1.6.3.2 Social phobia.

Wild et al. (2007, 2008) conducted two studies with patients suffering from social phobia. In both studies, participants initially went through a semi-structured interview in which they explored their recurrent images in social situations and their associated memories and meanings. Next, they were administered a single IR session following Arntz and Weertman's (1999) procedure which, in both cases, began with cognitive restructuring. In the first study (Wild et al., 2007), this session was given immediately after the interview. In the second study (Wild et al., 2008), on the other hand, it was given one week after the interview. The treatment outcomes were similar in both studies. In the first study, IR led to the belief encapsulated in the recurrent image getting weaker and to the image and related memory becoming less distressing and less vivid. At the 1-week follow-up, these gains were maintained, although the finding on the image being less vivid and distressing was no longer significant. In addition, patients reported experiencing fewer negative social concerns in the previous week and less severe symptoms (e.g., avoidance, self-focused attention). In the second study, the authors found that, compared to the control session (the semi-structured interview), the IR session led to a greater reduction in the strength of the encapsulated belief, in memory distress, and in the anxiety experienced while visualising the most feared social situations. The changes, including a reduction in fear of negative evaluation and in image distress and vividness, were maintained 1 week after the IR session, but not 1 week after the control session.

1.6.3.3 Posttraumatic stress disorder.

PTSD is the disorder in which slightly more work involving imagery has been carried out compared to other disorders. Imagery rehearsal and rescripting techniques have been successfully used, for example, to modify the distressing images of trauma-related nightmares, thus improving sleep quality and alleviating PTSD symptoms (Davis & Wright, 2005, 2006; Krakow et al., 2001). However, one of the

main aims of imagery work in this disorder is to eliminate trauma-related intrusions. The three main reports of such work are described below.

Smucker and Niederee (1995) present a case study involving the use of Smucker et al.'s (1995) procedure with a patient, Sarah, who as a child had been sexually abused by her father for several years and who experienced very distressing recurrent flashbacks related to the abuse. IR focused on her most distressing image: that of her father raping her at the age of 8. After 8 sessions of IR, Sarah no longer met criteria for PTSD. Her rape-related flashbacks disappeared and her depression and suicidality diminished. In addition, she reported becoming more assertive and independent in her relationship with family members.

Grunert and his colleagues (2003) used IR with two industrial accident victims suffering from PTSD. Initially, the patients were given several sessions of prolonged exposure, but this exacerbated their symptoms and seemed to strengthen their sense of powerlessness and helplessness. This finding is to be expected since exposure involves mere activation of memories and may not always provide corrective information. However, it contrasts the finding of Arntz, Tiesema, and Kindt (2007) that, although imaginal exposure combined with IR is associated with greater reduction in PTSD-related variables (e.g., anger, guilt), its overall effectiveness in treating PTSD symptoms is the same as that of exposure used on its own. After the failure of exposure, the patients described by Grunert et al. were given a single session of IR in which they imagined their survivor self enter the accident scene and comfort the traumatised self. After this session, both patients reported experiencing a reduction in PTSD and other clinical symptoms (e.g., avoidance, intrusions, depression, anxiety) and an improvement in other areas (e.g., sleep, concentration). At 1-, 3-, and 6-month follow-ups, they seemed to have maintained their treatment gains and to have experienced an improvement in their general quality of life. After 6 months, one of the patients reported no PTSD or other clinical symptoms.

Rusch, Grunert, Mendelsohn, and Smucker (2000) conducted a study with 11 patients experiencing posttraumatic symptoms related to industrial accidents, motor vehicle accidents, depression, and non-epileptic seizures. Not all patients met PTSD criteria at the time of data collection. After describing the images and their impact, patients received psychoeducation regarding imagery. Treatment consisted of 1 session and involved 4 trials of imaginal exposure to the image, IR, and then re-

exposure to the original image. Results showed that exposure did not have any beneficial effects on the impact of intrusive images on patients, but IR did. Apart from reducing the distress associated with these images, IR also caused a significant reduction in their frequency which persisted 6-10 weeks after the session.

1.6.3.4 Acute stress disorder.

Rusch (2007) reports the use of IR with two patients suffering from acute stress disorder after experiencing motor vehicle accidents. In both patients, 2 sessions of imaginal exposure to the accident produced no symptom relief. One session of IR was subsequently used. Patients first received psychoeducation about trauma and its impact. They then focused on their most distressing image and visualised their survivor self entering the accident scene and comforting the victim. In particular, the survivor comforted the victim by telling him/her that he/she was not going to die and clarifying wrong impressions the victim had at the time of the accident. One patient, for example, told the victim that the warm fluid running down her neck was not brain tissue (as she thought), but blood, so the head injury was not very serious. After the IR session, both patients experienced improvements in accident-related image distress, sleep, nightmare and intrusion frequency, anxiety, and depression. Treatment gains were still observed at 5- and 7-day follow-up.

1.6.3.5 Depression.

Wheatley and colleagues (2007) report using IR with two patients who suffered from severe recurrent depression and experienced intrusive images. One patient had had three pregnancy terminations and consequently believed she was bad. The other patient had been sexually abused by her brother in childhood, had experienced the sexual advances of an uncle in adolescence, and had suffered severe domestic violence in young adulthood. Nine sessions of IR with the first patient and 13 sessions with the second one produced significant changes. At the end of treatment, both patients no longer met criteria for major depressive disorder, reported reduced distress, did not exhibit negative views of themselves as bad or worthless, and showed spontaneous behavioural changes (e.g., increased assertiveness). None of them met criteria for major depressive disorder at 3-, 6-, and 12-month follow-ups.

The patients described by Wheatley et al. (2007) were part of a larger study, the results of which are reported by Brewin et al. (2009). Brewin and his colleagues used IR as a stand-alone treatment for 10 patients suffering from chronic depression and experiencing frequent intrusive visual images related to memories of negative experiences. IR focused on the main intrusive memory as well as on additional intrusions that surfaced in the course of therapy. It continued until the patients were no longer experiencing intrusions. On average, each patient received 8 sessions of IR. Results showed that patients experienced significant improvement in depression severity from initial assessment to post-treatment. About 50% of them fully recovered after treatment and the gains made by each patient were maintained at 1-year follow-up. Although treatment involved no supporting cognitive therapy, verbal challenging to correct distorted negative beliefs, or attempts to modify behaviour, many patients also experienced a decrease in rumination, as well as spontaneous changes in behaviour and distorted beliefs.

1.6.4 Problems with IR Research and the Importance of Understanding IR

The evidence presented in the previous section strongly suggests that IR may be a powerful tool in bringing about change in patients suffering from disorders that involve an imagery component. However, to date there has been no major randomised controlled trial investigating the effectiveness of this technique. The existing evidence is still incomplete and presents a series of problems that raise questions as to the generalisability of the findings.

First, the existing reports of the application of IR concern small numbers of patients. Sample sizes range from one (e.g., Ohanian, 2002) to 14 (Wild et al., 2007) patients. It is difficult to draw important conclusions on the effectiveness of IR and generalise for entire patient populations from such small samples.

Second, the measures used to assess treatment outcomes are not always adequate or sufficient. Some researchers (e.g., Wheatley et al, 2007; Wild et al., 2007) have relied on standardised questionnaires such as the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) or the Fear of Negative Evaluation Scale (Watson & Friend, 1969) to assess change in specific symptoms of the disorders they were investigating (in this case, depression and social phobia). Others, however, have relied mainly on patients' self-reports and distress ratings.

Ohanian (2002), for example, does not report using any standardised measures for assessing the changes experienced by her bulimic patient, such as the reduction in anxiety and depression. Smucker and Niederee (1995) do not report the measures used to assess the reduction in depression and suicidality experienced by their PTSD patient. Similarly, Rusch et al. (2000) used only subjective ratings to assess the distress associated with the intrusive images experienced by their participants. The change promoted by IR, then, has not always been assessed objectively. This gives a very patchy picture of what IR can do and how it can affect symptomatology.

Third, clinicians have often combined IR with other therapeutic techniques and have rarely taken measures to ensure adherence to treatment protocols. Joanna, Ohanian's (2002) bulimic patient, was administered standard CBT before having the single session of IR. The social phobia patients of Wild et al. (2007, 2008) had an exploratory interview and cognitive restructuring before the actual rescripting. The patients with posttraumatic symptoms treated in Rusch et al. (2000) and those suffering from acute stress disorder treated in Rusch (2007) received psychoeducation about imagery and trauma before the imagery intervention. In addition, most researchers have used IR without having any formal assessment of the extent to which the therapists administering it adhered to the treatment protocol. Where some form of assessment was used (e.g., in the study of Brewin et al., 2009), it was informal and involved, for example, simply ensuring that other cognitive-behavioural techniques were not used in addition to IR. Given this evidence, the change experienced by patients in these studies cannot be attributed solely to IR because the other interventions therapists used – either as part of the study protocol or unknowingly – may have contributed to it. Disentangling the effects produced by the different interventions is difficult, if at all possible.

Because of these problems, it is difficult to understand how IR works. Although the existing evidence is very encouraging, it gives little indication as to what IR actually does. In particular, it does not explain the impact it has on patients' sense of self. Given the potential this technique seems to have for treating disorders simply by targeting intrusive images and the fact that it is not yet regularly used in clinical settings, understanding how and why it works may help us refine it to make it more effective and raise its profile within clinical psychology. As mentioned at the beginning of this chapter, understanding the mechanisms of change behind

psychological treatments is a pressing issue for clinical psychology at the moment (Carey, 2011; Kazdin, 2007, 2009). Knowledge of these mechanisms may enable us, among other things, to use techniques that target very specific change processes, to tailor treatments to patients' needs, and to understand human functioning beyond the therapy room (Kazdin, 2007, 2009). Ultimately, it may facilitate recovery in a shorter period of time, thus ensuring both person- and cost-effectiveness (Carey, 2011).

Despite the advantages of IR and of understanding its mechanisms of change, empirical evidence on these mechanisms is limited. The discussion of these changes seems to be still on a theoretical level. Currently, there are two main positions on how IR works: 1) schema modification and, 2) schema accessibility modification. Following is a discussion of the arguments for each position.

1.6.5 Mechanisms of Change in IR

1.6.5.1 Schema modification argument.

Since it was originally developed, CBT has been assumed to promote cognitive change mainly by modifying the content and structure of patients' existing maladaptive schemas (e.g., Beck & Weishaar, 2005; Dobson & Dozois, 2001; Padesky, 1994). It has been argued that therapists facilitate this modification by making patients realise that their negative beliefs and assumptions are distorted and helping them incorporate new, positive information about themselves in these existing structures. This explanation has in recent years been applied to IR. As described in Section 1.6.1, IR is believed to modify patients' schemas related, for example, to helplessness or worthlessness (e.g., Smucker & Niederee, 1995). Most clinicians who have used this technique (e.g., Arntz & Weertman, 1999; Smucker et al., 1995; Wild et al., 2007, 2008) believe the changes are related to the fact that, by activating disturbing memories and associated emotions and images, IR facilitates access to the schemas which may have been formed as a result of the events depicted in these memories. Activation, then, makes schemas more amenable to modification.

Arntz and Weertman (1999) argue that schema modification results from the reappraisal of the negative experience. Thanks to IR, individuals may, for example, make external attributions for the causes of this experience and see their traumatised self as deserving of support and compassion (Ohanian, 2002; Wild et al., 2007, 2008). At the same time, they may come to see the experience as an exception rather than as

the rule (Arntz & Weertman, 1999). A person who has been physically abused, for example, may realise that not all people are untrustworthy or abusive.

The above explanation is plausible and may account for the reduction in the strength of the encapsulated belief observed by Wild and colleagues (2007, 2008) in their studies on IR for social phobia. However, to my knowledge, there is no empirical evidence to support the idea that the experience reappraisal in IR and CBT produces schema modification. These assumptions remain largely untested. It is true, as Brewin (2003) points out, that it is difficult to define or measure schemas because they are simply constructs. It may thus be difficult to investigate their content and the *change* of their content over time. Nevertheless, it may be possible to get a glimpse of schema processes from existing evidence on treatment outcomes. In a review of 16 meta-analyses focusing on CBT outcomes for 16 psychological disorders (e.g., depression, social phobia, PTSD) or populations (e.g., chronic pain sufferers), Butler, Chapman, Forman, and Beck (2006) found that CBT is highly effective and produces changes that are maintained over time. However, evidence also shows that it does not always prevent relapse (see Brewin, 2006; Roth & Fonagy, 2005).

To date, there is no evidence on relapse rates for IR and there is a bias towards publishing only the reports of successful cases. Nevertheless, the evidence on CBT seems to suggest that the schema modification argument may need to be revised. As Brewin (2006) argues, if patients' negative schemas have been modified in therapy, the chances of relapse occurring should be minimal. Relapse may be due to the creation of new maladaptive schemas as a result of negative life events experienced after the termination of therapy. However, it may also be due to a resurfacing of negative beliefs that had not disappeared as a result of therapy. If this is the case, a mechanism other than schema modification may lie behind IR and CBT.

1.6.5.2 Schema accessibility modification argument.

As described in Section 1.4, recent work indicates that individuals possess multiple positive and negative working selves or self-representations that are activated in specific situations (e.g., Conway, Singer, et al., 2004; Markus & Nurius, 1986). Patients with social phobia, for example, endorse positive beliefs about themselves when they are alone or with familiar people they think are not evaluating them (Clark & Wells, 1995). This may suggest that CBT and IR work on several self-

representations rather than just the maladaptive ones. As mentioned earlier, Brewin et al. (2009) found that the depressed patients with whom they used IR exhibited significant behavioural changes as a result of therapy (e.g., being more assertive, becoming involved in different activities). These changes occurred spontaneously, without any behavioural experiments or skills training during therapy. They suggest, according to the authors, that IR worked on positive self-representations the patients already had and activated behaviours the patients had already learnt. It may have done so by making the existing positive self-representations more salient and accessible. This explanation is in line with Brewin's (2006) retrieval competition hypothesis.

Brewin (2006) argues that the multiple self-representations controlling cognition, affect, and behaviour compete for retrieval. Their activation or retrieval is influenced by factors such as valence, distinctiveness, situational triggers, and frequency of rehearsal. Situational triggers, for example, may play an important role. In times of stress or negative life experiences, negative representations may become active while positive ones remain latent. Similarly, highly rehearsed memories and related representations may be more likely than others to be activated because their rehearsal reduces the activation of the competing memories. Following this line of reasoning, according to Brewin, it may be argued that CBT alters the *accessibility* of representations rather than their content. It may do so either by strengthening existing positive representations or by creating new alternative representations that can compete for retrieval with the maladaptive ones (Brewin, 2006).

To date, no studies have tested the retrieval competition hypothesis with reference to CBT as a whole or to specific cognitive-behavioural techniques such as IR. However, this hypothesis provides a plausible explanation of the changes promoted by this type of therapy and seems to be supported by preliminary evidence on IR (e.g., Brewin et al., 2009). It also seems to fit with the theoretical and empirical work on trauma, self, and imagery that was reviewed in this chapter. In fact, many researchers (e.g., Brewin et al., 2010; Steel et al., 2005; Stopa, 2009) nowadays agree with Conway and colleagues (e.g., Conway, Singer, et al., 2004) with regards to the impact of negative or traumatic experiences on the self. They argue that the shift from conceptual to sensory processing that occurs during a trauma and the threat the trauma presents to the self and its goals contribute to the formation of a vivid self-defining memory that is not contextualised and integrated with the rest of the

individual's autobiographical knowledge. This vividness and the importance of the memory for the self may contribute to making this memory and self-representations related to it more salient and, consequently, more likely to win the competition for retrieval against the positive self-representations. It may therefore be argued that IR makes trauma-related self-representations less salient and therefore less likely to be accessed and intrude into consciousness. The way it may do so, which is the focus of this research project, is described in the following section.

1.6.6 Current Research Project: Proposed Mechanism of Change in IR

The retrieval competition account (Brewin, 2006) may be more helpful than the schema modification argument for explaining the outcomes of IR – at least in the initial stages of the investigation of this phenomenon – partly because it is supported to a certain extent by the existing literature (see above) and partly because it may be easier to test. For this reason, this account was adopted in the current PhD project to investigate the mechanisms of change operating in IR. Because it is in line with the SMS model (e.g., Conway, Singer, et al., 2004), which offers a detailed cognitive account of the impact of traumatic experiences on the self, the two perspectives were combined to explain the cognitive and self changes that are promoted by IR. The proposed mechanism of change is presented in Figure 1.4.

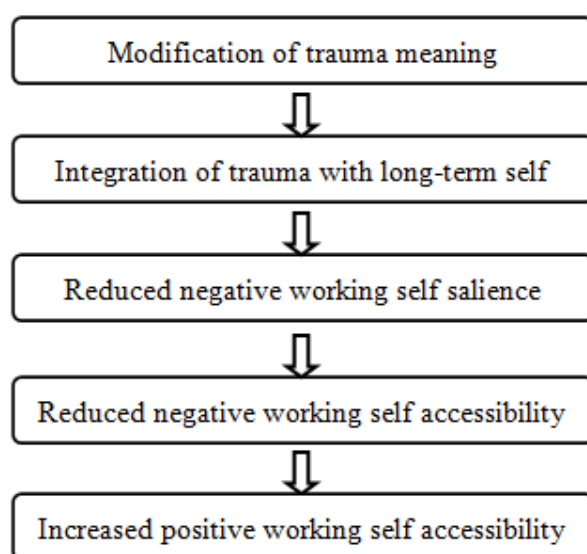


Figure 1.4. Proposed mechanism of change operating in imagery rescripting.

It is proposed that the first stage in the chain reaction of changes promoted by IR is the modification of the meaning the individual has attached to the trauma. As mentioned earlier, the argument that IR leads to meaning modification (Arntz & Weertman, 1999; Smucker et al., 1995) is supported by evidence that this technique leads to a reduction in the strength of the belief encapsulated in the intrusive image (e.g., Wild et al., 2007, 2008). It is also supported by evidence that an increase in the perceptual processing of the trauma during IR is highly correlated with an increase in conceptual processing (which may involve reappraisal of this trauma) immediately after the termination of treatment and that both these factors predict the outcome of IR for PTSD (Kindt, Buck, Arntz, & Soeter, 2007). Seeing the trauma in a more objective way and assigning a more benign meaning to it may allow individuals to make links between this memory and other AMs present in their autobiographical knowledge base. Once the memory no longer threatens their self-coherence, as the SMS model suggests, individuals may integrate it within their long-term self and see it as part of their life story (e.g., Conway, Singer, et al., 2004). As a result of this integration, the salience of the trauma-related working self and, consequently, its retrieval advantage compared to positive working selves, may be reduced. As Brewin (2006) argues, the salience of self-representations is one of the key factors that influence their activation. The less salient they are, the less likely they are to be accessed. The reduction in the vividness, distress, and frequency of intrusive images observed following IR (e.g., Rusch et al., 2000; Wild et al., 2007, 2008) may be an indicator of this reduced salience and accessibility of the trauma-related working self.

Apart from reducing the accessibility of negative working selves, IR may also make existing or newly-created positive working selves more salient. It may facilitate their rehearsal during therapy sessions, thus making them distinctive and attention-grabbing in the presence of negative situational cues (e.g., trauma reminders). This increased accessibility of positive working selves and reduced accessibility of negative ones may then lead to the other changes IR produces, such as symptom alleviation and behavioural transformations. A patient who is suffering from PTSD after a serious car accident, for example, may experience recurrent accident-related images and see the self as helpless and powerless. After a number of IR sessions in which he is helped by the therapist to develop mastery feelings and see the self as a survivor who is in control of his life, his positive working selves may become more

distinctive and more likely to be accessed even when the patient finds himself in situations (e.g., traffic jams) that prior to the beginning of treatment would trigger his flashbacks. His negative helplessness/powerlessness working selves are likely to remain deactivated. This change may then help alleviate his PTSD symptoms (e.g., decrease hypervigilance) and influence his behaviour (e.g., improve interactions with family members, which may have been tense after the accident).

Based on the existing evidence, the current research project relied on the hypothesis outlined above to understand the impact of IR on individuals. Specifically, it focused on the relationship between memory, memory-related images, and working self activation, as well as on how IR may influence this relationship. It represents one of the first attempts to understand the mechanisms of change involved in IR and thus contributes to filling in a significant gap in the current literature.

1.7 Conclusion

The present chapter provided a review of the literature concerning the involvement of imagery in psychopathology and its use as a therapeutic tool. It focused on the nature of mental images as well as on their links with emotion and individuals' sense of self. It also described the role distressing recurrent images play in various disorders and how these images may be addressed in therapy using IR, a promising technique that has been shown to bring about significant symptom alleviation. As highlighted in this chapter, empirical evidence on IR is still scarce. Research so far has focused mainly on the outcomes of this technique rather than on the basic cognitive processes these outcomes result from. The main aim of this PhD research project, then, was to investigate IR focusing especially on the mechanisms through which it operates and on the impact it has on the self. The main theoretical framework used was Brewin's (2006) retrieval competition account of CBT.

CHAPTER 2: Impact of Positive and Negative Self-Defining Memory Recall on the Working Self

2.1 Introduction

As described in Chapter 1, IR is a promising therapeutic technique that focuses on changing the meaning of intrusive distressing images that are involved in the onset and maintenance of psychological disorders. The aim of this research project was to investigate the mechanisms of change operating in this technique, focusing particularly on its impact on individuals' sense of self. The main hypothesis being tested, which was based on a combination of the retrieval competition account of CBT (Brewin, 2006) and the SMS model (e.g., Conway, Singer, et al., 2004), was that IR modifies the accessibility of trauma-related working selves. It was proposed that it does so by modifying the meaning individuals have attached to their traumatic experience and facilitating the integration of the trauma with their long-term self. Once integration is achieved, more benign working selves are activated when the individual recalls the trauma memory because these working selves are more likely to win the retrieval competition against the negative working selves whose salience has now been reduced.

Inherent to the above description of the mechanisms of change that might be involved in IR is the assumption that memory recall influences working self activation. As described at the beginning of Chapter 1 (see Section 1.4), working self activation is thought to be determined by factors such as the individuals' internal states and external environment (Brewin, 2006; Conway, Singer, et al., 2004; Markus & Nurius, 1986; Markus & Ruvolo, 1989). Conway and his colleagues (e.g., Conway, Singer, et al., 2004) argue that this happens because the SMS helps individuals adapt to their environment (i.e., achieve adaptive correspondence). When there is a change in environmental demands, the goals of the working self shift. The working self thus begins a search through the individuals' autobiographical knowledge base, which leads to the retrieval of AMs related to past working selves that may be relevant to the new environmental circumstances (see pp. 11-14). As a result of the search, a new working self that matches the demands of these circumstances is activated and helps the individual respond adequately to the change. The retrieved AMs are thought to be self defining.

Self-defining memories are vivid, emotional memories that are repeatedly retrieved, are linked to similar memories, and revolve around individuals' unresolved issues or enduring concerns (Blagov & Singer, 2004; Singer & Salovey, 1993). They contain information about the individual's progression on goal attainment, such as successes and failures (Singer & Salovey, 1993). Because they are so important, their retrieval may exert a particularly strong influence on the working self. If an individual recalls the memory of an occasion in which he/she won an important competition, for example, working selves containing core beliefs related to feelings of pride and competency may be activated. If, however, he/she recalls the memory of an occasion in which he/she was bullied, working selves containing core beliefs related to feelings of inadequacy and worthlessness may come to the foreground. Some indirect support for this argument comes from the evidence on the impact intrusive images related to traumatic memories (which are one type of self-defining memory) have on individuals when they are activated. As mentioned in Chapter 1, these images are often linked to negative beliefs about the self, others, and the world (e.g., Wells & Hackmann, 1993). In addition, many patients report that, when the images come to mind, they trigger negative emotional responses which resemble those experienced when the event depicted in the memory originally occurred (e.g., Gregory et al., 2010; Speckens et al., 2007). The fact that intrusions are linked with specific beliefs and emotions may suggest that, when experienced, they trigger the activation of negative working selves they are part of or related to. The SMS model, in fact, postulates that working selves, as fragments of the long-term self, contain core beliefs which are part of the conceptual self. Furthermore, their activation is accompanied by an affective response (Conway, Singer, et al., 2004).

Despite the fact that evidence strongly suggests that the activation of memory-related images influences working self activation, to my knowledge no studies to date have investigated this influence. In addition, the work on the SMS and the work on self-defining memories have often been conducted independently. Although it would be reasonable to explain the influence of self-defining memories on the self in terms of the SMS, to date there is little evidence linking these two concepts. The only authors that have started to tackle this link are Beike, Kleinknecht, and Wirth-Beaumont (2004).

Beike and her colleagues (2004) speak about the sense of closure in memory, which is similar to the concept of meaning making (Blagov & Singer, 2004) or autobiographical reasoning (Bluck & Habermas, 2000) described in Section 1.4.3. They argue that the emotion linked with AMs may or may not fade with time. When it fades, the memory is said to be *closed* as individuals have understood it and left it behind them. When it is retained, on the other hand, the memory is said to be *open* and is described as unfinished business, a memory the individual has not understood or come to terms with yet. The authors report two studies in which they focused on the impact that the recall of open memories has on self-esteem. Their hypothesis was that the recall of open memories disrupts the smooth functioning of the SMS by increasing self-focused attention and lowering self-esteem, whereas the recall of closed memories triggers an externally focused description of the self and therefore has no impact on self-esteem. This hypothesis is very important for the research on IR because, if supported, it may help clarify the influence of negative or traumatic experiences on the self. It may show that the recall of such experiences activates negative working selves and that IR, by changing the meaning attributed to these experiences, helps close the memories for these experiences, thus reducing their role in the activation of negative working selves. This may thus support this PhD project's hypothesis that IR works by altering working self accessibility.

In the first study, Beike and colleagues (2004) asked participants to indicate which of the events present in a checklist they had experienced, to rate the closure of their memory for the event, and to indicate the time the event occurred. Then, they asked participants to fill in Janoff-Bulman's (1989) World Beliefs Scale, which includes items from Rosenberg's (1965) Self-Esteem Scale (RSES). Results showed that memory closure was positively associated with self-esteem: individuals with open memories for their experiences had lower self-esteem than individuals with closed memories or individuals who had not experienced any of the events. These findings are encouraging because they suggest an association between open memory recall and the working self. However, no important conclusions can be drawn from them given the limitations of the study. First, as the authors themselves point out, the study is correlational. It is thus impossible to determine whether recalling open memories lowers self-esteem or individuals with low self-esteem find it difficult to obtain closure. Second, the study focused only on negative memories. Although

Beike and Wirth-Beaumont (2005) found that memories for pleasant events tend to be closed, some positive memories may be open. Finally, the measurement of self-esteem is problematic. The authors did not use a standardised measure of this construct: they based their analysis on the results obtained in a scale which contains only some items from the RSES. In addition, the use of the RSES may not be entirely appropriate for the purposes of a study investigating the impact of memory recall on the working self since this scale measures *trait* (i.e., global, stable) self-esteem. Perhaps a measure of *state* (i.e., momentary) self-esteem may be more suitable in this case.

In their second study, Beike and colleagues (2004) tried to find a causal relationship between open memories and low self-esteem. Half of their participants first retrieved and briefly described an open or a closed pleasant or unpleasant memory. They then rated memory closure and indicated the time the event depicted in the memory took place. Finally, they completed a task in which they described their past and current self, indicating the positivity of the traits they listed. The other half of the participants initially listed things they liked or disliked about themselves in both the past and the present. After liking for the self was measured, they retrieved and briefly described either an open or a closed memory. In the end, they rated memory closure and indicated the time the memory event took place. Results from this study showed that memory closure influenced the self (participants provided more positive self-descriptors after recalling closed memories than after recalling open ones), but that the positivity of the self-descriptors (used as an indicator of self-esteem) did not influence memory closure. In addition, recalling open memories seemed to increase self-focused attention. Participants described the self with more internal-referent words (e.g., words referring to thoughts and emotions) after recalling an open memory and with more external-referent words (e.g., words referring to social roles and relationships) and context words (i.e., words referring to time and place) after recalling a closed memory.

The second study of Beike et al. (2004) is important for several reasons. First, it shows that there is a causal relationship between open memory recall and self-esteem. Second, it seems to suggest that this relationship may be influenced by the self-focused attention open memory recall triggers. Third, the fact that participants used more emotion-related words to describe themselves after recalling open

memories than after recalling closed ones may indicate that, as a result of the memory recall, there was a shift in working self activation that was accompanied by an emotional response. The problem with this study, however, is that the authors again did not use a standardised measure of self-esteem. They relied instead on participants' self descriptions, using evidence (e.g., Showers, 1992) showing that individuals with high self-esteem believe they have a greater number of positive traits.

As we can see, despite the number of theories on the self-memory relationship, there is little direct evidence about the impact of memory recall on the self. The studies conducted so far have focused on open or closed memories, which may or may not be self defining. In addition, they have not considered the presence of the images associated with the memories. Finally, they have focused only on self-esteem, the person's global self-evaluation. However, memory recall may influence other aspects of the self, such as self-concept clarity and self-discrepancies. Self-concept clarity refers to the extent to which an individual's self-concept contents are "clearly and confidently defined, internally consistent, and temporally stable" (Campbell et al., 1996, p. 141). Self-discrepancies, on the other hand, refer to the discrepancies individuals experience among three major domains of the self: the actual self (who they are), the ideal self (who they would like to be), and the ought self (who they think they should be) (Higgins, 1987). Evidence suggests that these self-aspects are closely related. Self-esteem and self-concept clarity are positively correlated (Baumgardner, 1990; Campbell, 1990; Campbell & Lavalley, 1993; Nezlek & Plesko, 2001). Low self-esteem is also associated with high discrepancies between the actual and the ideal self (see Higgins, 1987). It could be, then, that memory recall influences all these aspects of the self. Since it is hypothesised to influence the working self rather than the long-term self which, according to Conway, Singer, et al. (2004), is more stable, memory recall may actually influence how individuals feel about themselves momentarily rather than generally.

The aim of Study 1 was to test Brewin's (2006) and Conway's (e.g., Conway, Singer, et al., 2004) theories regarding the role of AM recall on working self activation. Obtaining an understanding of this role is an important first step towards understanding how self-images influence the self and, consequently, how IR works. If the negative core beliefs and emotional responses patients experience when intrusive images come to mind are due to the sudden activation of image-related negative

working selves, then, as the current research project is hypothesising, IR may work by reducing the images' power to activate these working selves. For this reason, Study 1 investigated the impact of self-defining memory recall on the working self. The choice of self-defining memories was based on the fact that they are relevant for the self, contain a high level of imagery, and are characterised by high emotional intensity. This makes them potentially more likely than other types of memories to elicit a response from individuals when recalled. Their recall was in fact expected to influence working self activation. Self-esteem, self-concept clarity, and self-discrepancies were used to assess aspects of the working self activated following memory recall. It was predicted that the working self would be more negative after the retrieval of a negative self-defining memory and more positive after the retrieval of a positive self-defining memory. Specifically, it was expected that, after recalling negative memories, participants would report higher self-discrepancies and lower state self-esteem and state self-concept clarity than after recalling positive ones.

2.2 Method

2.2.1 Participants

Forty undergraduate and postgraduate students (34 females, 6 males) at a local university participated in the study in return for course credits or payment. For the purposes of the study, it was necessary to ensure that the memories participants recalled were self-defining. In particular, it was important to ensure that they had a high valence and were significant for participants. Six participants were consequently eliminated because their rating of the influence the memories had had on them and of the valence of these memories fell above or below 2 *SDs* from the sample means for these ratings (the ratings for memory characteristics are presented in Table 2.3). Another participant was eliminated because of incomplete data. The results presented below concern the remaining 33 participants (28 females, 5 males). Their ages ranged from 18 to 29 years ($M = 20.94$ years, $SD = 2.38$).

2.2.2 Design

The study used a within-subjects design. Participants recalled a positive self-defining memory on one occasion and a negative one on another. On both occasions, they also completed self-related measures before and after the memory recall. These

measures focused mainly on self-esteem, self-concept clarity, and self-discrepancies. Because depression, stress, and anxiety are negatively correlated with self-esteem (e.g., Greenberg et al., 1992; Pyszczynski & Greenberg, 1987; Smith & Greenberg, 1981; Zuckerman, 1989) and positively correlated with self-discrepancies (e.g., Higgins, Ruth, & Strauman, 1985), their level could influence the outcome of the experimental manipulation if it differed from one session to the other. For this reason, at the beginning of each session participants also completed a measure of the depression, stress, and anxiety experienced in the previous week.

2.2.3 Measures and Instruments

Ratings of memory characteristics. After recalling their self-defining memory in each session, participants were asked to rate, on a scale from 0 (*not at all*) to 100 (*extremely*), the extent to which they thought the memory had influenced the way they saw themselves, how clear and how distressing the memory was, and how vivid the associated images were. In addition, they rated the valence of the memory on a scale from -7 (*extremely negative*) to +7 (*extremely positive*). The purpose of these ratings was to ensure that the positive and the negative memories were comparable in terms of their properties and could therefore be assumed to exert a similar (though oppositely valenced) influence on the working self when retrieved.

Rosenberg's self-esteem scale (RSES; Rosenberg, 1965). In each session, prior to the memory recall, participants completed this 10-item questionnaire that measures generalised, global feelings of self-worth and self-acceptance. The aim was to ensure that any differences between the memory conditions in terms of the post-recall measures could not be attributed to any differences in the way individuals felt about themselves before recalling the memory. The questionnaire requires individuals to respond on a scale from 1 (*strongly agree*) to 4 (*strongly disagree*) to statements referring to feelings about the self, such as "*I feel that I have a number of good qualities*" and "*At times I think I am no good at all.*" Negatively phrased items are reversed scored. Responses to individual items are summed to create a global score which ranges from 10 to 40. Higher scores indicate higher trait self-esteem. The scale has good reliability and validity. In the current study, it demonstrated high internal consistency. Cronbach's α was .93 in the positive memory condition and .92 in the negative memory condition.

Self-concept clarity scale (SCCS; Campbell et al., 1996). This scale consists of 12 items designed to measure the clarity, internal consistency, and temporal stability of individuals' self-beliefs. It was administered to participants at the beginning of each session for the same purpose as the RSES. In this questionnaire, individuals respond on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*) to items such as “*My beliefs about myself seem to change very frequently*” and “*Sometimes I feel that I am not really the person that I appear to be.*” After reverse scoring the negatively phrased items, the responses to the individual items are summed. Total scores range from 12 to 60. A high score indicates high self-concept clarity. The scale has very good psychometric properties (see Campbell et al., 1996). In this study, Cronbach's α was .89 in the positive memory condition and .90 in the negative memory condition.

Depression anxiety stress scale (DASS; Lovibond & Lovibond, 1995). This questionnaire consists of three subscales with 14 statements each that assess the extent to which depression, anxiety, and stress have been experienced over the past week. Individuals indicate how much the statements applied to them in the last week on a scale from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*). Three overall scores (one for each subscale) are obtained by summing the responses to items in each subscale. These scores range from 0 to 42. The scale has been found to have good psychometric properties in both clinical and non-clinical populations (Brown, Chorpita, Korotitsch, & Barlow, 1997; Lovibond & Lovibond, 1995). In the positive memory condition, Cronbach's α was .96 for the depression subscale, .83 for the anxiety subscale, and .91 for the stress subscale. In the negative memory condition, it was .95 for the depression subscale, .80 for the anxiety subscale, and .92 for the stress subscale.

State self-esteem scale (SSES; McFarland & Ross, 1982). This scale consists of 12 items taken from the self-esteem factors proposed by McFarland and Ross (1982): *pride, inadequate, competent, confident, incompetent, stupid, worthless, smart, resourceful, effective, ashamed, and efficient*. Respondents rate how they feel about themselves “right now” with regards to these items on a scale from 1 (*not at all*) to 11 (*extremely*). After the scores for the negative adjectives are reversed, the scores for each item are summed. Total scores range from 12 to 132. A high score indicates a high state self-esteem. In this sample, the scale demonstrated high internal

consistency. Cronbach's α was .93 in the positive memory condition and .95 in the negative memory condition.

State self-concept clarity scale (SSCCS; Nezlek & Plesko, 2001). The 4 items constituting this scale are taken from Campbell et al.'s (1996) SCCS. Nezlek and Plesko (2001) chose these items based on factor loadings reported by Campbell and colleagues and on appropriateness for daily administration. The scale focuses on self-concept clarity changes in response to daily events. Respondents indicate the extent to which the statements apply to them "right now" on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). All the items are reverse scored and then the individual scores are summed. Total scores range from 4 to 20. A high score indicates high state self-concept clarity. In this sample, Cronbach's α for the scale was .88 in the positive memory condition and .89 in the negative memory condition.

Self-discrepancy index (SDI; Dittmar, Beattie, & Friese, 1996; Halliwell & Dittmar, 2006). In this scale, individuals describe aspects of themselves that they would like to change and state how they would ideally like to be. Initially, they report discrepancies between their actual and their ideal selves by completing up to five sentences of the format "*I am... but I would like...*" They then indicate, for each statement, the magnitude of the discrepancy (i.e., how different they are from their ideal) and the salience of the discrepancy (i.e., how concerned they are about the difference). They do this on a scale from 1 (*a little different/concerned*) to 6 (*extremely different/concerned*). The magnitude and salience scores are multiplied and the products of each statement are summed. The total sum is divided by the number of statements the individual has provided to yield a self-discrepancy index which may range from 1 to 36. A higher index indicates greater self-discrepancies. The SDI has been validated in several studies (e.g., Dittmar, 2005).

Me/not me task (Markus, 1977). This is a computer task designed to assess aspects of self-concept clarity such as the internal consistency of individuals' self-descriptions and the accessibility of the self-concept. It employs adjectives which are divided into pairs of opposites (e.g., *decisive - indecisive, modest - boastful*). The adjectives appear in the centre of the computer screen one at a time in a randomised order for each participant. Participants are instructed to indicate whether the adjectives describe them or not by pressing "Y" if they do and "N" if they do not. Each adjective remains on the screen until participants respond or 8 seconds elapse.

The time taken to respond, measured in milliseconds, is recorded. An asterisk then appears in the centre of the screen for 1 second. It is followed by a confidence rating scale. Participants are asked to indicate how confident they are about their answer on a scale from 1 (*not at all confident*) to 7 (*extremely confident*) by pressing the respective number keys. Once again, the time taken to reply is recorded.

In the present study, the task involved 10 practice trials (5 pairs of adjectives) and 50 experimental trials (25 pairs). The adjectives used as stimuli were taken from Anderson's (1968) list of 555 trait adjectives rated in terms of likeableness. Anderson's likeableness ratings were initially used to generate a list of 70 pairs of opposite traits. Because the value attached to traits may have changed in the last decades and consequently the likeableness ratings found by Anderson may no longer be valid, it was decided to have the selected adjectives rated in terms of their valence. The 139 adjectives (the adjective *friendly* appeared in two different pairs) were listed in a random order and were given to 20 postgraduate students at a local university. These students rated the traits' valence on a scale from -3 (*very negative*) to +3 (*very positive*). The average rating for each adjective was then used as a valence index. On the basis of this rating, 25 pairs of opposite adjectives were chosen (see Table 2.1). The positive and the negative adjectives did not differ in terms of the magnitude of their valence, $t(48) = 0.95, p = .35$.

The me/not me task yields three measures of self-concept clarity: consistency, confidence ratings, and reaction times. Participants are said to be consistent when they respond "yes" to one adjective and "no" to its opposite. Consistent responses are given a score of 1, whereas inconsistent responses are given a score of 0. The scores for each pair are summed. The total score may range from 0 to 25. High scores indicate greater consistency of the participants' self-descriptions. Reaction times, on the other hand, indicate the accessibility of the self-concept. High reaction times indicate a low accessibility. Confidence ratings and reaction times were not relevant for the purposes of the current study and were thus ignored. Moreover, the overall consistency score was divided into positive and negative consistency because it does not indicate whether participants are consistent because they endorse positive self-descriptors or negative ones. Positive consistency indicates the number of consistent responses in which participants said "yes" to the positive adjectives and "no" to their opposite. Negative consistency, on the other hand, indicates the number of consistent

responses in which participants said “yes” to the negative adjective and “no” to its opposite. The scores for both positive and negative consistency may vary from 0 to 25. Higher scores indicate greater positive or negative consistency.

Table 2.1

Adjectives Used in the Me/Not Me Task

Positive Adjectives	Negative Adjectives
Honest	Insincere
Intelligent	Foolish
Considerate	Thoughtless
Sociable	Unfriendly
Interesting	Boring
Responsible	Irresponsible
Cheerful	Gloomy
Rational	Irrational
Pleasant	Disagreeable
Creative	Unimaginative
Courageous	Cowardly
Skilled	Incompetent
Tidy	Messy
Optimistic	Pessimistic
Confident	Insecure
Generous	Selfish
Tactful	Tactless
Mature	Childish
Good-tempered	Moody
Appreciative	Ungrateful
Amiable	Hostile
Amusing	Tiresome
Sympathetic	Unsympathetic
Modest	Boastful
Decisive	Indecisive

2.2.4 Procedure

Each participant was tested individually in two different laboratory sessions 1 to 2 weeks apart ($M = 8.27$ days, $SD = 1.79$). In the first session, participants first provided informed written consent to participate in the study and some demographic information. They were then asked to fill in the DASS, RSES, and SCCS in a counterbalanced order.

The next stage of the experiment involved the memory recall. Participants were asked to recall a specific positive or negative self-defining experience (memory order was counterbalanced). The instructions they received were adapted from Jobson and O’Kearney (2008a) and Beike and Wirth-Beaumont (2005). They were as follows:

The event you need to recall must be one that you often think about. It should be one that you do not currently understand and have not yet put behind you, but that has influenced the way in which you see yourself and that helps you to understand who you are as a person. It is an event that you would describe to someone if you wanted them to understand you on a deeper level. It is an experience that is very important to you, that you remember very clearly, that elicits strong feelings when you recall it, and that brings images to mind.

Please, take some time to write down a description of this memory.

In the negative memory condition, I emphasised the fact that the memory should not be traumatic. The experiment was not set up to deal with very traumatic experiences, mainly because it was too early in the research process to investigate such experiences. A basic understanding of the influence self-defining memories in general have on the self was needed first. In addition, at that point I did not have sufficient training to provide professional support to participants in case they felt distressed during the recall of a trauma.

After they finished writing a description of their memory, participants completed a sheet with questions about the characteristics of this memory. They indicated whether the memory involved any images and rated the influence of the memory on the way they saw themselves, memory clarity, the distress associated with the memory, and the vividness of the memory-related images on a scale from 0 (*not at all*) to 100 (*extremely*). They also rated the valence of the memory on a scale from -7 (*extremely negative*) to +7 (*extremely positive*). Next, they completed the me/not

me task on a laptop computer. Finally, they filled in the SSES, SSCCS, and SDI in a counterbalanced order. Participants were instructed to keep in mind the memory they had just recalled while completing the me/not me task and filling in the questionnaires.

The procedure of the second session was the same as that of the first one. There were only two differences. First, participants recalled and wrote a description of a negative experience if they had recalled a positive experience in the first session and vice versa. Second, at the end of the session, participants were given an extra SDI sheet which contained the statements about the actual and ideal self they had provided in the first session. They were asked to indicate the magnitude and the salience of the discrepancies they had come up with in the first session while keeping in mind the memory that they recalled in the second session. Because the SDI consists of open-ended statements, individuals are likely to report discrepancies among different self-aspects each time they complete it. It may thus be difficult to compare their responses on different occasions. The extra SDI could make such comparisons easier. At the end of the experiment, participants were fully debriefed.

2.3 Results¹

2.3.1 Pre-Recall Measures

Table 2.2 shows participants' mean scores on the DASS, RSES, and SCCS, as well as the differences between the memory conditions in terms of these scores. Participants reported having experienced low levels of depression, stress, and anxiety in the week prior to each session. They also reported high levels of trait self-esteem and moderate levels of trait self-concept clarity at the beginning of each session.

As mentioned earlier, in this study it was necessary to ensure that the outcome of the experimental manipulation was not influenced by differences between memory conditions in terms of the participants' pre-recall status. Paired samples *t*-tests showed that there were no significant differences between the pre-recall scores in the positive and negative memory conditions (see Table 2.2). It can therefore be concluded that the way participants were feeling about themselves was similar at the beginning of the two experimental sessions.

¹An alpha level of .05 was used for all the statistical tests reported in this section.

Table 2.2

Pre-Recall Measures: Mean Scores and Differences between Memory Conditions

Measure	Positive Memory		Negative Memory		<i>t</i> (32)	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
DASS-Depression	7.76	9.19	7.76	9.12	0.00	1.00
DASS-Anxiety	5.39	5.57	5.21	5.09	0.23	.82
DASS-Stress	12.85	8.49	11.61	8.34	1.24	.22
RSES	28.79	5.81	28.30	5.64	1.62	.11
SCCS	34.11	9.28	34.48	9.39	-0.40	.69

Note. DASS = Depression Anxiety Stress Scale; RSES = Rosenberg's Self-Esteem Scale; SCCS = Self-Concept Clarity Scale.

2.3.2 Memory Characteristics

The content of the self-defining memories described by participants varied. Examples of positive memories included being baptised, receiving the university acceptance letter, and performing successfully at a concert. Examples of negative memories included being ridiculed in front of others, failing the first university assignment, and experiencing a relationship breakdown. All the memories were reported to involve images.

Table 2.3 presents the descriptive statistics for the characteristics of both the positive and the negative self-defining memories. As the table shows, both memories tended to be rated as having had a high influence on the way participants saw themselves. In addition, they tended to be very clear and to be associated with very vivid images. Because the study aimed to investigate the impact of memory recall on the working self, it was necessary that memories were similar in terms of characteristics other than valence and associated distress. As a manipulation check, paired samples *t*-tests were conducted to compare the properties of the positive and negative memories as rated by participants (see Table 2.3). There were no significant differences between the positive and the negative memories in terms of the extent to

which participants thought the event depicted in these memories had influenced the way they saw themselves. As expected, there was a significant difference in the distress that accompanied the memories: negative memories were rated as more distressing than the positive ones. With regards to the other characteristics, there were significant differences between the memories. Specifically, positive memories were more positive than the negative memories were negative. They were also clearer and involved more vivid images than the negative memories.

Table 2.3

Mean Memory Characteristic Ratings and Differences between Positive and Negative Memories

Variable	Positive Memory		Negative Memory		<i>t</i> (32)	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Memory influence	77.88	11.18	74.70	12.87	1.23	.23
Memory valence	6.21	0.96	-4.94 ^a	1.14	4.86	< .001
Memory clarity	91.82	8.08	86.06	11.64	2.80	.01
Memory distress	9.39	19.99	68.18	17.22	-13.53	< .001
Image vividness	88.27	11.33	81.82	13.57	2.44	.02

^aThe *t*-test was carried out taking the absolute value of the negative memory valence mean (4.94).

2.3.3 Outcome of the Memory Valence Manipulation

Table 2.4 shows participants' average me/not me positive and negative self-consistency scores and their average scores on the post-recall questionnaires (SSES, SSCCS, and SDI).

A correlational analysis showed that there were moderate to strong correlations between the outcome measures in both conditions. In the positive memory condition, positive consistency was positively correlated with state self-esteem ($r(33) = .74, p < .001$) and state self-concept clarity ($r(33) = .44, p = .01$).

Negative consistency was correlated with state self-esteem ($r(33) = -.75, p < .001$) and self-discrepancies ($r(33) = .49, p = .004$). State self-esteem was also correlated with state self-concept clarity ($r(33) = .54, p = .001$) and self-discrepancies ($r(33) = -.52, p = .002$). In the negative memory condition, positive consistency was correlated with state self-concept clarity ($r(33) = .46, p = .008$), self-discrepancies ($r(33) = -.64, p < .001$), and state self-esteem ($r(33) = .73, p < .001$). Negative consistency was correlated with state self-esteem ($r(33) = -.70, p < .001$) and self-discrepancies ($r(33) = .66, p < .001$). State self-esteem was correlated with state self-concept clarity ($r(33) = .65, p < .001$) and self-discrepancies ($r(33) = -.72, p < .001$). Finally, state self-concept clarity in the negative memory condition was negatively correlated with self-discrepancies ($r(33) = -.44, p = .01$). As these correlations show, in general, high levels of state self-esteem, state self-concept clarity, and positive consistency were associated with low levels of negative consistency and self-discrepancies.

Table 2.4

Outcome Measures in the Two Memory Conditions

Variable	Positive Memory		Negative Memory	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Positive Consistency	17.61	5.78	15.27	6.21
Negative Consistency	2.58	3.80	4.03	4.42
SSES	100.91	16.81	77.18	24.10
SSCCS	11.91	3.96	9.91	3.95
SDI	15.43	7.89	15.82	6.94

Note. SSES = State Self-Esteem Scale; SSCCS = State Self-Concept Clarity Scale; SDI = Self-Discrepancy Index.

The scores in the five outcome measures were compared using a repeated-measures multivariate analysis of variance (MANOVA) with memory valence as within-subjects factor. As expected, there was a significant multivariate difference

between the positive and negative memory conditions, $F(5, 28) = 7.20, p < .001$, Wilks' $\lambda = .44$. Univariate tests revealed that, in the positive memory condition, participants reported lower negative self-consistency ($F(1, 32) = 5.29, p = .03$) and higher positive self-consistency ($F(1, 32) = 9.47, p = .004$), state self-esteem ($F(1, 32) = 37.07, p < .001$), and state self-concept clarity ($F(1, 32) = 12.21, p = .001$) than in the negative memory condition. Contrary to expectation, there were no significant differences between the conditions in the spontaneously generated self-discrepancies, $F(1, 32) = 0.10, p = .76$.

As mentioned earlier, apart from the blank SDI sheet, in the second session participants were given an extra SDI sheet in which they had to rate the magnitude and salience of the discrepancies they had reported in the first session. Due to counterbalancing, half the participants completed this extra sheet in the positive memory condition and the other half completed it in the negative memory condition. Consequently, participants were divided into two groups: those who recalled the positive memory first ($n = 17$) and those who recalled the negative memory first ($n = 16$). For participants who recalled the positive memory first, the mean score in the extra SDI (completed in the negative memory condition) was 18.95 ($SD = 7.85$). For participants who recalled the negative memory first, the mean score in the extra SDI (completed in the positive memory condition) was 15.30 ($SD = 7.71$). There were no significant differences between participants' ratings in the first session and the ratings for the same discrepancies in the second session for both the participants who recalled the positive memory first ($t(16) = -1.47, p = .16$) and those who recalled the negative memory first ($t(15) = .21, p = .84$).

2.4 Discussion

The aim of the present study was to investigate the impact of positive and negative self-defining memory recall on the working self. Results showed that there was a significant difference between the memory conditions in the linear combination of the five dependent variables that were used to capture aspects of the working self activated following memory recall: state self-esteem, state self-concept clarity, positive and negative self-consistency, and self-discrepancies. Univariate tests revealed that, compared to the negative memory recall, positive memory recall was associated with lower negative self-consistency and higher state self-esteem, state

self-concept clarity, and positive self-consistency. There were no differences between the conditions in terms of self-discrepancies.

The results partially support the original hypothesis regarding the working self being more positive following the retrieval of a positive memory and more negative following the retrieval of a negative memory. They thus support Brewin's (2006) retrieval competition hypothesis and Conway's (e.g., Conway, Singer, et al., 2004) SMS model as they suggest that there is indeed a competition for activation of self-representations or working selves and that environmental stimuli may trigger the retrieval of specific memories, which in turn determine which self-representations become active and which ones remain latent. In the current study, the differences between the conditions in the post-recall measures suggest that the retrieval of a self-defining memory led to the activation of a working self that was congruent with, or related to, this memory. Using the SMS model, this change may perhaps be explained in terms of adaptive correspondence. The request to describe a memory may have triggered a shift in the goals of the participants' active working self and given rise to the need for participants to adapt to the task at hand. The conscious search for a memory may have led, as Conway suggests, to the activation of this memory and associated self-representations. An environmental stimulus such as an experimental demand may have thus facilitated the activation of memory-related self-representations to the detriment of other self-representations. As participants completed the post-recall questionnaires and task, for example, positive working selves may have had preferential access in the positive memory condition and remained latent in the negative memory condition.

The working selves activated following memory recall may have been related to themes of success or failure which, as Singer and Salovey (1993) found, are essential characteristics of self-defining memories. Although in the present study participants' memory descriptions were not subjected to content analysis, they seemed to revolve around personal successes in the positive memory condition (e.g., concert performances, being accepted at university) and failures in the negative memory condition (e.g., failing an assignment, relationship breakdowns). Because working selves are believed to modulate cognition, affect, and behaviour (e.g., Brewin, 2006), it may have been these success- or failure-related working selves that influenced participants' responses in the questionnaires and the me/not me task.

The findings of the current study support and extend those of Beike and colleagues (2004) regarding the influence of open memory recall on self-esteem. Although, as the next chapter will show, some self-defining memories may be closed in the sense that individuals have integrated them within their autobiographical knowledge base, their high emotional intensity makes them resemble what Beike and colleagues call *open* memories. Apart from showing that retrieving such memories may influence self-esteem (as Beike and her colleagues did), the current study showed that it may also influence other aspects of the self that are related to self-esteem, such as self-concept clarity. In fact, in agreement with other studies (e.g., Campbell, 1990), it found significant correlations between self-esteem and self-concept clarity (positive and negative consistency, as stated earlier in this chapter, are aspects of self-concept clarity). Apart from the focus on different self-aspects, another advantage of the current study over those of Beike et al. is that it used standardised questionnaires assessing specific constructs instead of relying exclusively on tools such as participants' self-descriptions. Furthermore, it used questionnaires focusing on state self-esteem and state self-concept clarity to assess how participants felt about themselves following memory recall since this recall is more likely to influence the momentary characterisation of the self (i.e., the working self) rather than the stable long-term self and therefore trait measures may be inadequate. The failure to find differences between the memory conditions in self-discrepancies may be related to this issue: the SDI, despite consisting of open-ended statements, focuses on stable, global self-discrepancies and may thus not be sensitive enough to detect changes in the state discrepancies between the actual and the ideal self.

As described earlier, all the self-defining memories reported by participants involved relatively vivid images which may have played a role in the differences observed in the self measures. In fact, one of the main implications of the findings of the present study is that, if the retrieval of self-relevant AMs influences working self activation, intrusive images related to such AMs may have the same effect. In the case of psychological disorders characterised by intrusions related to past adverse experiences, experiencing the intrusion in response to a specific environmental stimulus (e.g., a social situation for a patient with social phobia) may lead to the activation of a working self that is related to the adverse experience. This may explain

why patients report negative emotions and core beliefs related to this experience when intrusive images come to mind (e.g., Speckens et al., 2007).

Following the above line of reasoning, one can speculate that cognitive-behavioural therapeutic techniques such as IR which reduce the frequency, vividness, and distress of intrusions (e.g., Wild et al., 2007, 2008) may work by reducing the impact these intrusions have on the working self. As a result of therapy, intrusions may come to exercise a weaker influence on the activation of working selves. Their reduced frequency, vividness, and distress may ensure that the negative self-representations related to them no longer have retrieval advantages over positive self-representations. More benign representations may thus become more likely to be accessed when the individual faces a shift in environmental circumstances than they were prior to therapy. If this is the case, Brewin's (2006) argument regarding the modification of schema accessibility in therapy may be correct. For clinical practice, this implies that therapeutic outcomes may be enhanced if patients are trained to *deliberately* access more positive self-representations. Patients with social phobia, for example, may be helped to access benign, realistic images of the self when they enter social situations. These may be the images of the self formed as a result of video feedback, a therapeutic technique in which patients are videotaped as they engage in social activities (e.g., talking to a stranger) so that they can then watch the video and see objectively how they come across when they interact with others (e.g., Clark, 2001). Therapists may help these patients learn how to deliberately access the more positive, objective self-representation rather than their recurrent distorted one when they are in social situations.

As the above discussion suggests, the findings of this exploratory study are very encouraging for the future investigation of the mechanisms of change involved in IR. However, they need to be seen in the light of several limitations. First, the memory manipulation may not have been entirely successful. Despite the attempts to ensure that memories had a high valence and relevance for the participants, comparisons showed that these memories were not entirely comparable. Positive memories were more positive than the negative memories were negative. They were also clearer and involved more vivid images than the negative memories. These characteristics of the positive memories may have influenced the results. However, it may be argued that they influenced the *magnitude* of the difference between the

memory conditions and that this difference would have probably been observed even if the memories were equally clear or vivid.

Second, the design of the study does not allow for any conclusions regarding causality to be drawn. It is not possible to conclude that the memory recall *caused* the change in state self-esteem, state self-concept clarity, and self-consistency. Perhaps a different design, such as one involving a control condition (e.g., neutral memory recall) or state measures administered both *before* and *after* the memory recall, could have provided baseline measures against which to compare the positive and negative memory condition post-recall measures. In addition, little control of factors that could influence the results was exercised. Although there were no differences between the conditions in terms of depression, stress, and anxiety experienced in the week prior to the session, factors such as trait anxiety or anxiety experienced during the session itself may have influenced the results. The differences between the conditions in terms of the self-related aspects, in fact, may have been due to a change in overall mood following memory recall. Previous research (e.g., Josephson, Singer, & Salovey, 1996) has shown that individuals deliberately recall positive memories to lift their mood following negative mood induction in an experimental setting. In the current study, the positive and negative memory recall may have served as a mood induction activity for participants. In the absence of post-recall affect measures and of a control condition involving the recall of emotional *non*-self-defining memories, it is thus not possible to ascertain exactly what accounted for the differences between the memory conditions. Adding a control condition in which participants recalled positive and negative emotional memories that were not related to the self, for example, would have provided further evidence to explain the findings. If, following the recall of such memories, participants still reported higher state self-esteem and state self-concept clarity in the positive memory condition, a mood shift rather than the activation of a memory-related working self would have been more likely to have produced the differences between the positive and the negative memory conditions.

Third, it may be argued that the study relied heavily on participants' self-reports and addressed only a limited number of self-aspects. Although standardised questionnaires were used, participants' responses to them may have been biased by demand characteristics. The *me/not me* task, because of its nature (e.g., adjectives organised in pairs of opposites, short stimulus presentation times), may be less likely

to suffer from these problems. Nevertheless, it still relies completely on participants' judgements. In addition, state self-esteem and self-concept clarity may not be sufficient for assessing the working self that is active at any one time. Given the difficulty of operationalising a construct such as the working self, initial attempts to assess it, like the ones being made in this research project, should focus even on other self-aspects. Further research may need to use a greater variety of measures – ideally ones that do not rely completely on self-reports – to try and capture as complete a picture of the working self as possible.

Finally, the analyses conducted (especially the repeated-measures MANOVA) do not allow for any conclusive statements to be made regarding the self-aspects that differed between the conditions. Because the dependent variables were correlated, the MANOVA does not say whether they were influenced by the memory recall or by the change in the variables they were correlated with. The difference between the memory conditions in self-consistency, for example, may have been due to the difference in state self-concept clarity rather than due to the memory manipulation. Similarly, the difference in self-concept clarity may have been due to the difference in state self-esteem. It may thus be argued that memory recall influenced the way participants temporarily perceived and evaluated their self-representations without necessarily triggering the activation of a whole new working self. Future research needs to provide stronger evidence that supports the working self activation argument and discards this and other alternative explanations of the findings.

2.5 Conclusion

This chapter presented an exploratory study investigating differences in self-related aspects following self-defining memory recall. Taken together, the findings of this study suggest that the recall of such memories is associated with changes in different self-aspects that may be due to the activation of memory-related working selves. These findings need to be replicated and the limitations of the study need to be addressed. Nevertheless, this is the first study of its kind. Given the scarce existing evidence on the relationship between memory recall and working self activation, its findings are very encouraging. Because they support Brewin's (2006) hypothesis, which is the primary hypothesis used in this project to investigate how IR works, they lay the foundation on which the other studies of this research project are based.

CHAPTER 3: Self-Defining Memory Characteristics and their Role in the Impact of Memory Recall on the Working Self

3.1 Introduction

The findings of Study 1 suggested that the recall of a self-defining memory may be associated with the activation of a working self that is related to it. As described in the previous chapter, the only self-defining memory characteristics that participants were asked to rate in that study were valence, extent of influence on self-views, clarity, distress, and image vividness. These ratings were mainly used to ensure that the positive and negative memories described by participants were comparable in terms of their properties and that therefore any differences between the memory conditions in terms of the post-recall measures could not be attributed to a difference in the characteristics of the two memories. Because participants were asked to recall open memories that they had not yet come to terms with, it was assumed that, as long as these memories were comparable in terms of the properties rated, the effect they would have on the working self would be the same. Literature, however, suggests that other characteristics of self-defining memories may influence the impact that the recall of these memories has on the self. Following is a description of these characteristics.

The first characteristic of self-defining memories that may influence the impact of their recall on the self is affect. It refers to both the valence and the intensity of the emotions experienced when the memory is recalled (Blagov & Singer, 2004). Hence, questions such as the one used in Study 1 regarding the overall valence of the memory may be too general or vague to assess it. Some individuals may, for example, respond based on how positive or negative the memory seemed to be when it happened, whereas some others may respond based on their current interpretation of it. Alternatively, the emotions experienced at recall may not be strongly related to the valence of the event as perceived when it occurred. If individuals have achieved what Beike and her colleagues (2004) call *closure*, for example, they may experience positive emotions when recalling the memory even if it depicts a negative experience. Assessing the impact of memory recall on the self, therefore, requires more specific questions regarding the affect associated with the memory.

The second characteristic, specificity, refers to the amount of sensory detail and spatiotemporal information present in the self-defining memory (Blagov & Singer, 2004; Singer & Blagov, 2000). Specific self-defining memories describe a unique event (e.g., car accident, receiving an award) that happened within a 24-hour period. They usually contain a significant amount of detail about this event (e.g., location, time, actions, emotions and thoughts experienced, people involved, dialogue among the people involved). Non-specific self-defining memories, on the other hand, describe one or more general events that happened over a long period of time (e.g., studying for a degree) or were repeated over time (e.g., family Christmas holidays). They contain only general descriptions of the context of the event and the people involved.

Meaning is the third characteristic of self-defining memories. It refers to the extent to which individuals have drawn some abstract meaning and learnt lessons about the self, relationships, and life from the experience depicted in the memory (Blagov & Singer, 2004; Singer & Blagov, 2000). As described in Chapter 1 (see pp. 15-16), the process of meaning making (Blagov & Singer, 2004) or autobiographical reasoning (Bluck & Habermas, 2000) allows individuals to make links among their life experiences or between life experiences and the self. These abstract links may facilitate the integration of a self-defining memory within an individual's life story in the autobiographical knowledge base and may thus contribute to the development of his/her sense of self (Bluck & Habermas, 2000; Conway, 2005; McAdams, 2001, 2008). Singer and Blagov (2000) distinguish integrative self-defining memories from non-integrative ones by the fact that, when individuals describe them, they refer to the meaning they have attached to the experience or to lessons learnt from it.

The final characteristic on which self-defining memories may vary is content. Thorne and McLean (2001) suggest that, when content themes are taken into account, these memories can be divided into seven mutually exclusive categories: 1) life-threatening events, 2) exploration/recreation events, 3) relationship events, 4) achievement events, 5) guilt/shame events or doing right vs doing wrong, 6) drug, alcohol, or tobacco use, and 7) not classifiable (events that do not fit into any of the other categories). According to these authors, a memory's content is the main theme emphasised in its description and reflects one of the individual's primary concerns.

Research investigating the relationship between memory characteristics is recent and does not always focus on self-defining memories. Nevertheless, it gives important insights into how memory characteristics may be related and how they may affect individuals following retrieval. Evidence suggests, for example, that specificity is linked to affect. Compared to neutral memories, emotional memories (which are often self-defining) are clearer and contain more detail regarding the feelings and thoughts experienced at the time the event they represent occurred (Schaefer & Philippot, 2005). In addition, negative memories contain less context-related information (e.g., detail about time, location) than positive memories (D'Argembeau et al., 2003; Schaefer & Philippot, 2005). Specificity is also related to memory content: memories for life-threatening events are the most specific, whereas memories for achievement events are the least specific (Lardi, D'Argembeau, Chanal, Ghisletta, & Van der Linden, 2010). The reason why affect, specificity, and content are important is that they seem to be related to the emotional impact memories have on individuals when recalled. The intensity of the emotions experienced during recall is positively correlated with sensory detail for negative memories, but not for positive ones (Schaefer & Philippot, 2005). The recall of specific self-defining memories is associated with a greater increase in negative affect than the recall of non-specific memories (Lardi et al., 2010). When content is taken into account, the recall of life-threatening events is associated with the greatest increase in negative affect, whereas the recall of leisure events is associated with the greatest increase in positive affect (Lardi et al., 2010).

Unlike specificity, integration does not seem to be related to affect changes or to content (Blagov & Singer, 2004; Lardi et al., 2010). There is some evidence, however, that integration is most prevalent in life-threatening and relationship memories, which are more likely than other memories to be characterised by tension (discomfort, disagreement, or unease experienced by the individual or other people present when the event happened) (Thorne et al., 2004). Tension, on the other hand, is moderately correlated with integration, thus suggesting that memories characterised by tension are more likely to be processed in depth and to be assigned meaning (Thorne et al., 2004).

The studies mentioned above, together with the findings of Study 1, suggest that because the recall of different memories affects individuals in different ways, it

may also activate different working selves. The recall of life-threatening events that are characterised by negative affect, high specificity, and lack of integration, for example, may have a more negative impact on the self than the recall of achievement events that are characterised by positive affect, low specificity, and integration. The shifts in affect observed following recall may indicate a shift from one working self to another. One possibility is that the affect shift leads to the activation of a new working self. As described in Section 1.4.4, a study by Conway et al. (2001) suggests that the affective response triggered by the retrieval of emotional memories may destabilise the working self. The SMS may perceive this as a change in the circumstances of the self and respond by searching through the long-term self for a working self which is more congruent with the memory retrieved. As a result of this search, a new working self may be activated that brings some stability to the SMS. Another possibility, as the SMS model suggests, is that the retrieval of an emotional memory directly activates a different working self with a different set of beliefs about the self, others, and the world. The affective response may be related to the activation of these new beliefs or cognitions (see p. 13).

Given the elusive nature of the self, determining whether affect change precedes or follows the activation of a working self may be difficult, if possible at all. Existing research does not go beyond investigating the affective responses triggered by memory recall. In addition, despite few exceptions (e.g., Lardi et al., 2010), it tends to focus mostly on emotional memories without determining whether they are self-defining or not. Because they have contributed to the development of the individual's sense of self (Singer & Salovey, 1993), self-defining memories may be more appropriate for investigating the post-recall working self. Furthermore, measures that focus on aspects of the working self may provide better insights into it compared to measures that focus on other outcomes of the memory recall (e.g., affective responses). Study 1 showed that state self-concept clarity and state self-esteem scales are a good way of assessing aspects of the working self. Nevertheless, these scales measure the extent to which individuals are clear about the content of their self-concept and their evaluation of this content, respectively. In order to understand how memory recall affects the working self and the role memory characteristics play in this process, measures that focus directly on the *content* of the working self may be more appropriate.

According to the SMS model (e.g., Conway, 2005), the working self contains a hierarchy of goals and associated self-images or self-cognitions that enable individuals to adapt to shifts in environmental demands. They are part of the conceptual knowledge of the long-term self and are formed as a result of significant life experiences such as traumas. As described in Chapter 1 (see p. 12), goals are involved in positive and negative feedback loops that generate plans to regulate individuals' behaviour by reducing or increasing the discrepancy between the individual's actual state and a standard feared or desired state (Conway, Meares, et al., 2004). Research has shown that individuals who report more trauma-related goals are more likely to recall negative or traumatic self-defining memories (Sutherland & Bryant, 2005). In addition, in Western cultures, individuals suffering from PTSD report more trauma-themed goals and self-cognitions than individuals without PTSD (Jobson & O'Kearney, 2008b). Also, as Beike and colleagues (2004) found, individuals tend to use more words referring to internal states (e.g., thoughts, emotions) to describe themselves after recalling an open memory and more words referring to external factors (e.g., social roles, relationships, time, place) after recalling a closed memory (see p. 50).

The close relationship of memories with goals and self-cognitions suggested by the SMS model and by the studies mentioned above may indicate that the retrieval of memories that are associated with specific goals and self-cognitions could lead to the activation of working selves whose goals and cognitions are related to those of the memory. The measures adopted by previous research, the measure of personal goals (e.g., Emmons, 1986) and the Twenty-Statement Test (Kuhn & McPartland, 1954), ask participants to describe their goals and themselves in their own words and are therefore likely to tap onto aspects of the long-term self (see Rathbone et al., 2009; Rhee, Uleman, Lee, & Roman, 1995; Sutherland & Bryant, 2005; Tanweer, Rathbone, & Souchay, 2010). Because of their open-ended nature, however, they may provide a good insight into the content of the working self activated following memory recall and may vary depending on the characteristics (affect, content, specificity, integration) of the memory recalled.

To date, no studies have directly investigated the relationship between memory recall and the content of the post-recall working self or the relationship between the characteristics of the memory recalled and those of the post-recall

working self. The current study aimed to fill this gap in the literature by replicating and extending the findings of Study 1. The questions it tried to address were: 1) How does the recall of positive and negative self-defining memories influence the working self? 2) How do self-defining memory content, specificity, and integration influence the characteristics of the post-recall working self? 3) Does memory valence interact with any other memory characteristics to influence the characteristics of the post-recall working self? Addressing these questions is important for understanding the cognitive change processes involved in IR. If memory characteristics influence the post-recall working self characteristics and if IR affects trauma memory characteristics (e.g., affect and integration) as it modifies the meaning attached to these memories, it may be argued that this technique indirectly causes a change in the working self automatically activated following the recall of a trauma. This change may be due to an influence of IR on the accessibility of trauma-related working selves, as this research project is proposing.

Study 2 used a between-subjects design and involved asking participants to complete measures focusing on different self aspects (state self-esteem, state self-concept clarity, goals, and self-cognitions) after recalling a positive or a negative self-defining memory. Established manuals were used to code memories for content, specificity, and integration; goals for content (recreation/exploration, relationship, and achievement); and self-cognitions for content (personal characteristics, social identities, and emotional states), valence (negative vs positive and neutral), and quality (abstract vs specific). Results were expected to show that the recall of positive self-defining memories is associated with a more positive working self than the recall of negative self-defining memories and that memory characteristics influence working self characteristics. Based on the findings of Study 1 regarding the impact of positive and negative memory recall on the self, the findings of Beike et al. (2004) regarding open memories (which may be non-integrative) being associated with the reporting of more internal-focused self-descriptors and closed memories (which may be integrative) being associated with the reporting of more external-focused self-descriptors, as well as the findings of Lardi et al. (2010) regarding negative affect increases being greater following the recall of specific memories than following that of non-specific ones, it was expected that:

- the recall of negative memories would be associated with lower state self-esteem, lower state self-concept clarity, and a greater proportion of negative self-cognitions than the recall of positive memories,
- the recall of specific memories would be associated with lower state self-esteem, lower state self-concept clarity, and a greater proportion of negative self-cognitions than the recall of non-specific memories, and
- the recall of integrative memories would be associated with the reporting of more self-cognitions related to social identities (i.e., external factors) and fewer self-cognitions related to emotional states (i.e., internal states) than the recall of non-integrative memories.

Because this was the first study to investigate memory characteristics and post-recall working self characteristics, there were no evidence-based hypotheses regarding the influence of memory integration on other post-recall working self characteristics or regarding possible interactions of valence with specificity, integration, or content. Similarly, there were no specific hypotheses regarding the way memory valence, specificity, content, and integration influence the quality of self-cognitions and the content of goals and self-cognitions. For all these variables, the study had an exploratory purpose.

3.2 Method

3.2.1 Participants

One hundred and forty-eight students at a local university (123 females, 25 males) completed the study online in return for course credits. Just as in Study 1, measures were taken to exclude participants from the data analysis if their data presented issues that might affect the outcome of the experimental manipulation. Specifically, they were excluded if:

- they failed to complete one or more parts of the study or simply named their self-defining memory without describing it ($n = 11$)
- they spontaneously indicated that their memories were less than 1-year old, so according to the definition of Singer and Blagov (2000) could not be considered self defining ($n = 3$)
- the rating of the influence the memories had had on them fell above or below 2 *SDs* from the sample mean ($n = 6$)

- the ratings of the memory valence and emotion intensity indicated that the memories were not clearly positive or clearly negative ($n = 26$)

For a more detailed account of the exclusion criteria, see Appendix A.

The final sample consisted of 102 participants (91 females, 11 males). Their ages ranged from 18 to 26 years ($M = 19.77$ years, $SD = 1.54$ years). The positive memory condition comprised 53 participants (7 males) whose ages ranged from 18 to 26 years ($M = 19.83$ years, $SD = 1.60$ years). The negative memory condition comprised 49 participants (4 males) whose ages ranged from 18 to 26 years ($M = 19.71$ years, $SD = 1.49$ years). There were no significant differences between the participants in the two conditions in terms of gender ($\chi^2(1) = 0.67, p = .41$) or age ($t(100) = 0.38, p = .71$).

3.2.2 Design

The study used a between-participants design and was conducted online. Participants were randomly assigned to either a positive or a negative memory condition by the software used to run the study. They were instructed to recall and describe in writing a positive or a negative self-defining memory. Following the memory recall, they completed measures of state self-esteem, state self-concept clarity, personal goals, and self-cognitions. In order to ensure that participants in the two conditions were matched in terms of characteristics that might influence the outcome of the experimental manipulation, they also completed measures of trait self-esteem, depression, anxiety, stress, and exposure to traumatic experiences.

3.2.3 Measures and Instruments

Ratings of memory characteristics. After recalling their memory, participants were asked to rate, on a scale from 0 (*not at all*) to 10 (*extremely*), to what extent they thought the memory had influenced the way they saw themselves, how positive and how negative the memory was, how strong or intense the positive and the negative emotions associated with the memory were, how clear the memory was, and how vivid the images associated with the memory were. The ratings aimed to ensure that the positive and negative memories were similar in terms of their properties and that therefore any differences between the conditions in terms of the post-recall measures could not be attributed to differences in memory characteristics.

The purpose of the influence, clarity, and vividness ratings was to ensure that the memories were equally self-defining and detailed. The purpose of the memory valence and emotion intensity ratings was twofold. First, as described in Section 3.1, these ratings aimed to obtain a more complete assessment of the memory-related affect than would be obtained by memory valence ratings only. Second, they aimed to ensure that the positive and negative memories were clearly positive or clearly negative and differed in terms of the *valence*, but not in terms of the *intensity*, of their affect. In this way, the memories could be expected to exert an oppositely-valenced influence of the same emotional intensity on participants when recalled.

Depression anxiety stress scale - 21 (DASS-21; Lovibond & Lovibond, 1995). As described in Chapter 2, self-esteem is associated with levels of depression, anxiety, and stress. This questionnaire was used to ensure that participants in the two memory conditions were matched in terms of these characteristics. It consists of 21 items taken from the Depression Anxiety Stress Scale (DASS; Lovibond & Lovibond, 1995) that was used in Study 1. The items are divided into three subscales that assess the extent to which depression, anxiety, and stress have been experienced over the past week. Individuals indicate how much the statements applied to them in the last week on a scale from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*). Three overall scores (one for each subscale) are obtained by summing the responses to items in each subscale and multiplying the sum by 2 in order to create a score that can be compared to that of the full version of the scale. Higher scores indicate higher levels of distress. In this study, Cronbach's α was .88 for the depression subscale, .80 for the anxiety subscale, and .89 for the stress subscale.

Self-esteem and self-concept clarity measures. The Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), State Self-Esteem Scale (SSES; McFarland & Ross, 1982), and State Self-Concept Clarity Scale (SSCCS; Nezlek & Plesko, 2001) were previously described in Study 1. Because high trait self-esteem may buffer individuals from the negative impact of daily life events (e.g., Campbell, Chew, & Scratchley, 1991) and the resulting fluctuations in state self-esteem in response to these events, the RSES was used to ensure that participants in the positive and negative memory conditions did not differ in terms of trait self-esteem. The SSES and SSCCS were used to assess aspects of the post-recall working self. In the present

study, all three questionnaires demonstrated good internal consistency. Cronbach's α was .90 for RSES, .91 for SSES, and .75 for SSCCS.

Twenty-statement test (TST; Kuhn & McPartland, 1954). This task assesses individuals' self-cognitions and, unlike standardised questionnaires assessing self-concept or schemas, it does not investigate only certain pre-determined self-aspects. It requires participants to provide 20 answers to the question "*Who am I?*" Following the instructions of Kuhn and McPartland (1954), participants in the current study were asked to: "Answer as if you were giving the answers to yourself, not to somebody else. Write the answers in the order that they occur to you. Don't worry about logic or importance and try to reply as fast as you can." The self-cognitions participants generated were coded in terms of content (traits or attributes, social identities, emotional states), valence, and quality (abstract vs specific) using the coding strategies proposed by Addis and Tippett (2004), Rhee et al. (1995), and Wang (2004). The coding process is described in Section 3.2.5.

Measure of personal goals (e.g., Emmons, 1986; Sutherland & Bryant, 2005). In order to complete this measure, participants are instructed to "List 15 goals that you feel are important for you to achieve." In the present study, the goals reported by participants were coded for content using the categories of themes present in self-defining memories described by Thorne and McLean (2001). The aim was to facilitate the comparison of goals to the self-defining memories recalled. Section 3.2.5 provides a description of the coding system.

Questionnaire on exposure to traumatic experiences. As described earlier in this chapter, traumatic experiences may influence the types of goals (Sutherland & Bryant, 2005) and self-cognitions (Jobson & O'Kearney, 2008b) individuals report. In order to ensure that participants in the two conditions were matched in terms of their exposure to such experiences, a questionnaire originally developed for the purposes of Study 4 (see Chapter 5) was used. The questionnaire consists of two main parts (see Appendix B). In the first part, which was adapted from the Posttraumatic Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997) and the Stressful Life Events Screening Questionnaire (SLESQ; Goodman, Corcoran, Turner, Yuan, & Green, 1998), individuals have to indicate which of the 15 stressful/traumatic life events listed (e.g., personal injury or illness, serious accident, physical abuse, emotional abuse, sexual and non-sexual assault) they have experienced. In the second

part, they have to indicate whether any of the events they have experienced triggered emotions of fear, helplessness, or horror; whether they have experienced any of the events more than once; and whether any of the events is ongoing. In each case, participants have to state the event(s) in question. For the purposes of the current study, the type and nature of the traumatic experiences participants reported was not taken into account. Participants were compared only in terms of the total number of traumas they had experienced.

3.2.4 Procedure

The study was developed using an online research facility and was advertised to students at a local university. Participants could access it using its URL and complete it in their own time. Initially, they provided informed consent to take part in the study and some demographic information, including age, gender, and past or present treatment for psychological problems. They then completed the RSES and DASS-21 in a counterbalanced order. Next, they were randomly allocated to the positive or to the negative memory condition by the online research facility and were asked to describe in writing a self-defining memory. The memory recall instructions used in Study 1 were reformulated and made to include a small addition (*italicised below*) adapted from Raffard et al. (2009) that was thought to illustrate better how familiar and well-rehearsed self-defining memories are. Participants were instructed as follows:

What I would like you to do is recall a positive [negative] experience that happened at a specific time and place. It should be an experience that has influenced the way in which you see yourself and that helps you to understand who you are as a person. It should be an experience that you would describe to someone if you wanted them to understand you on a deeper level. The experience must be one that you often think about because it is very important to you. *It must be familiar to you like a picture you have looked at for a long time or like a song you have learnt by heart.* Also, it must be an experience that you remember very clearly, that elicits strong feelings when you recall it, and that brings images to mind.

After describing their memory, participants answered a series of questions about its characteristics. Specifically, they rated on scales from 0 (*not at all*) to 10

(*extremely*) the influence the memory had had on the way they saw themselves, the affect of the memory (positive and negative valence, as well as the intensity of the positive and the negative emotions associated with it), the clarity of the memory, and the vividness of the associated images. Next, they completed the SSES, SSCCS, personal goals measure, and TST in a randomised order. Finally, they completed the questionnaire on past traumatic experiences. Although this questionnaire served to compare participants in the two conditions, it was not presented with the measures serving the same purpose (RSES and DASS-21) at the beginning of the study because thinking about past traumas might affect participants in a negative way and could thus have a detrimental effect on the outcome of the experimental manipulation.

At the end of the study, participants were debriefed and given my contact details in case they had questions about the study. All participants, regardless of the condition to which they were assigned, were then given the opportunity to listen to and engage in a relaxation exercise that was audio recorded by a qualified clinical psychologist. The aim of this exercise was to help restore mood if participants were distressed after recalling their self-defining memories and/or their past traumatic experiences. No participants chose to listen to the exercise. On average, participants took 27 minutes ($SD = 13.26$ min) to complete the study.

3.2.5 Coding System

In line with the research on self-defining memories described earlier in this chapter and in order to answer the research questions of the current study, I coded participants' memory descriptions, self-cognitions, and goals in terms of their characteristics. In order to avoid potential bias, I coded each characteristic while blind to the condition participants belonged to and to their responses to the measures other than the one I was coding at the moment. An undergraduate research assistant, blind to the design and hypotheses of the study, rated approximately 20% of the memory descriptions, self-cognitions, and goals. This subset of data was randomly selected from the sample pool. Cohen's κ (Cohen, 1960) was used to calculate inter-rater reliability. Following is a description of the coding process, together with the inter-rater reliability for each variable.

Memory content. The basic content of the memories (i.e., the primary concern they reflected) was assessed using the manual developed by Thorne and

McLean (2001). All the content theme categories listed in p. 72 were retained for the purposes of the current study. Life-threatening events (e.g., first episode of self-harming, death of a friend or family member, suicide attempt of a family member) involved risk to one's self or to others. Recreation/exploration events (e.g., going to the Glastonbury festival, skydiving, trip to Ghana) emphasised recreation, play, and exploration. Relationship events (e.g., being bullied at school, parents' divorce, surprise birthday party) were about "moving toward, away, or against" one or more significant persons (Thorne & McLean, 2001, p. 8). Achievement events (e.g., doing well in A-level exams, receiving an award, failing to get through an audition for a TV programme) emphasised successful or failed attempts to achieve specific goals in which participants had invested an amount of effort. Guilt/shame events (e.g., being made to feel ashamed about one's past by partner, intervening to free a dog that was being beaten by owner, guilt for having led best friend to depression and suicide attempt) focused on participants' sense of responsibility and emphasised right or wrong decisions. Drug, alcohol, and tobacco use events focused on the use of these substances, regardless of the purpose (recreation, thrill, or suicide attempt). Finally, events were categorised as "unclassifiable" if they emphasised more than one concern or theme and thus did not fit into any of the previous categories. Previous studies using this coding system have found it to have substantial inter-rater reliability, with Cohen's κ ranging from .66 (Blagov & Singer, 2004) to .80 (Lardi et al., 2010). In the current study, Cohen's κ for memory content was .66.

Memory specificity. Singer and Blagov's (2000) manual was used to code memories as specific or non-specific. In line with the manual's guidelines, memory descriptions were coded as specific if they contained at least one single-event statement (a sentence in which the participant focused on a unique event that happened within a 24-hour period, such as "an awards evening at the end of sixth form ... where I received the award for the most outstanding student in all three of my subjects") and were characterised by significant detail regarding the setting and the individuals involved. They were coded as non-specific if they did not contain single-event statements and focused on events that lasted longer than a day or on a series of general events that were repeated over time (e.g., parents repeatedly arguing during a difficult divorce). Singer and Blagov report high inter-rater reliability when scoring

for specificity (Cohen's κ ranging from .80 to .98). The present study supported their finding (Cohen's $\kappa = .86$).

Memory integration. This feature of self-defining memories was assessed using Singer and Blagov's (2000) manual. A memory was coded as integrative if it contained statements about the meaning the participant had attached to it, such as lessons learnt about life (e.g., "The experience has taught me to never take anything for granted as you never know what is around the corner"), new understandings about the self (e.g., "This experience taught me that I am capable of doing anything I put my mind to"), and functional uses of the memory (e.g., "Every time when I feel like I will not be able to graduate, I think about how [the Professor] looked at me and the things he told me and I start to believe in myself again"). It was coded as non-integrative if it contained only a description of the event, without any reference to its context or significance for the participant's life. Singer and Blagov found that the coding system has adequate inter-rater reliability (Cohen's $\kappa = .70$). In this study, the inter-rater reliability was substantial (Cohen's $\kappa = .77$).

Self-cognition content and quality. The coding system developed by Rhee et al. (1995) was adapted in the current study to code participants' responses to the TST for content and quality (see Table 3.1). Responses were coded for content depending on the self-aspects they referred to. In order to facilitate data analysis while still allowing for a comparison to be made between participants in the two conditions, the categories developed by Rhee et al. were collapsed into three broad categories. Self-cognitions were categorised as referring to personal characteristics, social identities, or emotional states. Responses such as *field* and *finished* were coded as non-sense and were completely excluded from the analysis. Responses such as *valued* or *lucky*, on the other hand, did not fit into any of the content categories and were excluded from the content analysis only. Based on their content, self-cognitions were also coded for level of specificity (i.e., quality). Self-cognitions referring to characteristics that were situationally bound were coded as specific, whereas self-cognitions referring to characteristics that did not vary with time and context were coded as abstract.

The proportion of self-cognitions falling into each content or quality category was calculated by dividing the number of responses in that category with the total number of responses generated by the participant. Following Addis and Tippett (2004), the proportion of abstract self-cognitions was used as a measure of identity

quality. The coding system of Rhee et al. has good reliability. Inter-rater correlations vary between .73 (Addis & Tippett, 2004) and 1.00 (Rhee et al., 1995). In the current study, Cohen's κ was .88 for the content of self-cognitions and .77 for their quality.

Table 3.1

Coding System Used to Assess Self-Cognitions' Content and Quality

Categories and Subcategories	Abstract / Specific
Personal Characteristics	
Pure traits (e.g., friendly, honest)	Abstract
Qualified traits (e.g., around certain people, sometimes)	Specific
Preferences (e.g., love shopping, hate being late)	Specific
Aspirations (e.g., become a psychologist)	Specific
Activities (e.g., play badminton)	Specific
Evaluative descriptions (e.g., good listener)	Specific
Physical descriptions (e.g., beautiful, tall, blue eyes)	Specific
Peripheral information (e.g., tired, live in Hampshire)	Specific
Global descriptions (e.g., human, me, myself)	Abstract
Social identities	
Name	Specific
Gender (e.g., female, boy)	Specific
Family information (e.g., daughter, brother, niece)	Specific
Ethnicity / Race / Nationality	Specific
Origin (e.g., from London)	Specific
Religion (e.g., Christian)	Specific
Role / Status (e.g., student, employee)	Specific
Occupation (e.g., mental health worker, waitress)	Specific
Self-ascribed identities (e.g., dancer, singer)	Specific
Emotional states	
General emotion (e.g., happy, scared, irritated)	Abstract
Social emotion (e.g., in love)	Specific

Note. Adapted from "Spontaneous Self-Descriptions and Ethnic Identities in Individualistic and Collectivistic Cultures," by E. Rhee, J. S. Uleman, H. K. Lee, and R. J. Roman, 1995, *Journal of Personality and Social Psychology*, 69(1), p. 145. Copyright 1995 by the American Psychological Association.

Self-cognition valence. Following Wang's (2004) example, self-cognitions generated in the TST were coded in terms of their valence. They were divided into two main groups. The first group comprised both positive (e.g., smart, pretty) and neutral (e.g., female, half-Italian) self-cognitions. The second group comprised only negative self-cognitions (e.g., anxious, panicky, worried). Because for the purposes of this study it was necessary to compare the participants in the two memory conditions in terms of the negative self-cognitions, the proportion of the negative self-cognitions was calculated by dividing the number of the negative self-cognitions generated by each participant with his/her total number of self-cognitions. For this feature, inter-rater reliability was adequate (Cohen's $\kappa = .62$).

Goal content. The content of the goals generated by participants when completing the measure of personal goals was coded using the content categories of self-defining memories proposed by Thorne and McLean (2001). The analysis revealed that participants' goals fell into three of these categories: recreation or exploration, relationship, and achievement. Goals were coded as recreation or exploration goals if they were related to recreational activities such as travelling and hobbies (e.g., travel to South America, go skydiving). They were coded as relationship goals if they referred to a wish to get close to or involved with others (e.g., get married, be there for other people, make new friends, be a good daughter). Finally, they were coded as achievement goals if they referred to an activity or state of being that seemed to require some effort on the participants' part. This category comprised, for example, goals related to education and career (e.g., graduate, get a PhD, establish a career), goals related to behavioural changes or improvements in the self (e.g., give up smoking, lose weight, become more confident), and goals related to learning new skills (e.g., be able to play the piano, learn to speak French fluently). The proportion of goals falling into each content category was calculated by dividing the number of goals in that category by the total number of goals provided by the participant. Cohen's κ for this variable was .79.

3.3 Results

An alpha level of .05 was used for all the statistical analyses reported in this section. Parametric tests were used for most analyses. When the assumptions of specific tests (e.g., normal distribution of the data, homogeneity of variances) were

violated, non-parametric tests such as Mann-Whitney U tests or alternative tests such as Fisher's Exact Test were used.

3.3.1 Descriptive Measures

Table 3.2 shows the mean scores participants obtained in the DASS-21, RSES, and the questionnaire on past traumatic experiences.

Table 3.2

Mean Scores and Standard Deviations for Trait Self-Esteem, Measures of Distress, and Number of Traumatic Experiences

Descriptive measure	Positive Memory Condition		Negative Memory Condition	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Depression	9.81	8.02	12.20	9.08
Anxiety	7.06	5.85	9.55	7.61
Stress	13.28	8.88	16.73	9.31
Trait self-esteem	20.62	3.90	21.92	5.68
Number of traumas	3.25	2.19	3.49	1.60

According to the DASS severity ratings proposed by Lovibond and Lovibond (1995), participants in both conditions reported having experienced normal to moderate levels of depression, anxiety, and stress in the week prior to completing the study. As Table 3.2 shows, they reported average levels of trait self-esteem and low levels of trauma exposure. There were no significant differences between the participants in the two conditions in terms of trait self-esteem, $t(100) = -1.35, p = .18$; depression, $t(100) = -1.41, p = .16$; anxiety, $U = 1080.00, p = .14$; stress, $t(100) = -1.92, p = .06$; and exposure to traumatic experiences, $U = 1131.50, p = .26$.

Five participants in the positive memory condition (9.4%) and eight participants in negative memory condition (16.3%) reported having received

treatment (counselling, CBT, or medication) for psychological problems (mainly depression and anxiety) in the past. One participant in the positive memory condition (1.9%) and four participants in the negative memory condition (8.2%) were being treated for their problem at the time of data collection through medication ($n = 2$), therapy ($n = 1$), or a combination of medication and therapy ($n = 2$). There were no significant differences between conditions in terms of past ($\chi^2(1) = 1.09, p = .30$) or present (Fisher's exact $p = .57$) psychological treatment.

3.3.2 Self-Defining Memory Characteristic Ratings

Table 3.3 shows the mean ratings participants provided about their self-defining memory characteristics. Participants tended to rate the memories as very emotional (both in terms of valence and of the intensity of the emotions associated with them), highly influential for the way they saw themselves, very clear, and associated with vivid images. Based on these ratings, it can be concluded that the memories they reported met the criteria for being classified as self defining.

Table 3.3

Mean Ratings and Differences between Conditions in Terms of Memory Characteristics

Memory characteristic	Positive Memory Condition		Negative Memory Condition	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Influence on self	8.00	1.21	7.57	1.53
Positive valence	9.38	0.82	1.45	0.71
Negative valence	1.49	0.72	8.96	1.04
Positive emotion intensity	8.48	1.11	1.61	1.04
Negative emotion intensity	1.47	0.72	8.61	1.27
Clarity	8.91	1.06	8.73	1.06
Image vividness	7.64	1.44	7.57	1.45

Positive and negative memories were compared using independent samples *t*-tests or Mann-Whitney *U* tests to check whether they were comparable in terms of their properties despite being clearly positive or negative. There were no significant differences between them in terms of influence on the self, $t(100) = 1.58, p = .12$; clarity, $t(100) = 0.82, p = .42$; and image vividness, $t(87)^2 = 0.22, p = .83$. As expected, there were significant differences in terms of valence and emotion intensity (for all variables, $U = 0.00, p < .001$). Compared to the memories recalled by participants in the negative memory condition, the memories recalled by participants in the positive memory condition were characterised by significantly higher positive valence, lower negative valence, more intense positive emotions, and less intense negative emotions. Finally, there was a significant difference between the memories in terms of absolute valence ($t(99) = 2.29, p = .02$), but not in terms of absolute emotion intensity ($t(99) = -.55, p = .58$). Positive memories were more positive than the negative memories were negative, but the positive emotions associated with them were as intense as the negative emotions associated with the negative memories. It can thus be concluded that the memories recalled by the participants in the two conditions were clearly positive or negative and comparable in terms of all their properties except absolute valence.

3.3.3 Self-Defining Memory Content, Specificity, and Integration

Figure 3.1 shows the frequencies of the content themes present in the self-defining memories recalled by participants in the two memory conditions. When considering the sample as a whole, the most common themes present in the self-defining memories were relationships (36.3%) and achievement (35.3%). They were followed by life-threatening events (15.7%), recreation/exploration (5.9%), unclassifiable events (3.9%), and guilt/shame (2.9%). No participants described memories related to drug, alcohol, or tobacco use. There was a significant relationship between memory valence and the content theme emphasised in the memory (Fisher's exact $p < .001$). As Figure 3.1 shows, whereas positive memories revolved around achievement, negative ones were mainly about relationship and life-threatening events.

²Degrees of freedom in this and other sections of this chapter vary due to missing data.

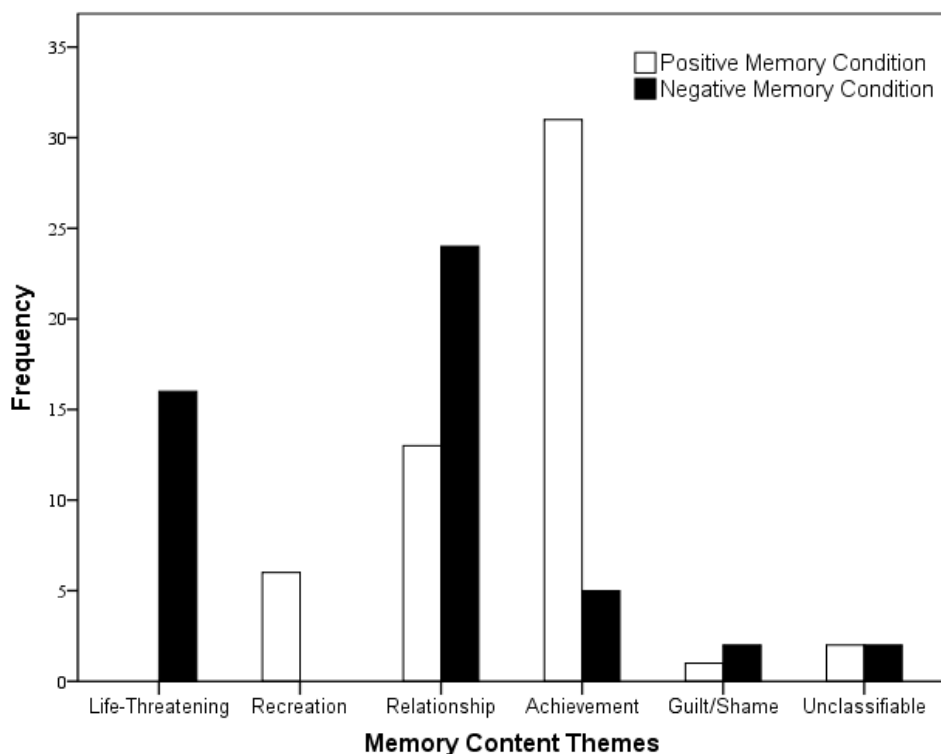


Figure 3.1. Frequencies of content themes present in the self-defining memories recalled by participants in the two memory conditions. No participants in the positive memory condition recalled life-threatening events. No participants in the negative memory condition recalled recreation/exploration events.

Despite the fact that the instructions they received required them to report specific self-defining memories, only 82.4% of the participants reported specific memories. About 61.8% of them recalled integrative memories. In the positive memory condition, 44 memories (83.0%) were specific and 36 memories (67.9%) were integrative. In the negative memory condition, on the other hand, 40 memories (81.6%) were specific and 27 memories (55.1%) were integrative. There were no significant differences between positive and negative memories in terms of specificity ($\chi^2(1) = 0.03, p = .85$) or integration ($\chi^2(1) = 1.77, p = .18$). There was no relationship between memory content and specificity (Fisher's exact $p = .38$) or between content and integration (Fisher's exact $p = .66$).

3.3.4 Post-Recall Self Measures

Table 3.4 presents participants' scores on the post-recall measures.

Table 3.4

Mean Scores and Standard Deviations in Post-Recall Self Measures

Variable	Positive Memory Condition		Negative Memory Condition	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
State self-esteem	94.49	16.52	83.49	17.35
State self-concept clarity	11.98	3.18	11.27	3.67
TST negative self-cognitions	.18	.13	.23	.20
TST personal characteristics	.78	.22	.82	.18
TST social identities	.15	.19	.15	.19
TST emotional states	.03	.04	.03	.04
TST abstract self-cognitions	.61	.27	.67	.26
Achievement goals	.59	.13	.65	.16
Relationship goals	.28	.12	.26	.13
Recreation/exploration goals	.13	.09	.09	.10

Note. TST = Twenty-Statement Test. The values shown for the valence and/or content categories of self-cognitions and goals represent the proportion of self-cognitions and goals in each category.

As Table 3.4 shows, participants in both conditions reported average levels of state self-esteem and state self-concept clarity. The majority of the self-cognitions they provided were abstract, indicating that their identity had a predominantly abstract quality. Self-cognitions referred mainly to personal characteristics, whereas goals were mostly achievement related. There were no significant differences between the participants in the positive memory condition ($M = 18.56$, $SD = 3.47$) and those in the negative memory condition ($M = 18.39$, $SD = 3.53$) in terms of the number of self-cognitions they generated in the TST, $t(99) = 0.24$, $p = .81$. Similarly, there were no significant differences between the participants in the positive memory condition ($M = 13.92$, $SD = 2.47$) and their counterparts in the negative memory condition ($M = 13.73$, $SD = 2.48$) in terms of the number of goals they listed in the

personal goals measure, $t(100) = 0.39, p = .70$. In order to test the main hypotheses of the study regarding the impact of memory recall on the self and on the role memory characteristics play in this impact, one-way and two-way ANOVAs were conducted using condition, content, specificity, and integration as fixed factors.

One-way ANOVAs showed that there was a significant effect of condition on state self-esteem ($F(1, 100) = 10.76, p = .001$), on the proportion of achievement goals ($F(1, 100) = 4.06, p = .047$), and on the proportion of recreation/exploration goals ($F(1, 100) = 4.10, p = .045$). Participants in the positive memory condition reported higher state self-esteem, fewer achievement goals, and more recreation/exploration goals following memory recall than participants in the negative memory condition (see Table 3.4). In addition, there was an effect of memory integration on the proportion of emotional states participants reported when describing themselves in the TST, $F(1, 99) = 7.32, p = .008$. Participants who recalled non-integrative memories used a greater proportion of words referring to emotional states than participants who recalled integrative memories (Non-integrative: $M = .04, SD = .05$; Integrative: $M = .02, SD = .03$). There were no significant differences between participants who recalled specific memories and those who recalled non-specific ones in terms of any of the post-recall measures (all $ps > .28$). Similarly, there were no differences in post-recall measures depending on the content theme of the memory participants recalled (all $ps > .19$).

Two-way ANOVAs confirmed the results of the one-way ANOVAs regarding the main effects of each of the four memory characteristics on the post-recall measures. In addition, a 2 (positive vs negative memory condition) x 2 (integrative vs non-integrative) ANOVA showed that there was a non-significant trend for an interaction on state self-esteem ($F(1, 98) = 2.85, p = .09$) and on the proportion of recreation/exploration goals ($F(1, 98) = 3.19, p = .08$). In the positive memory condition, state self-esteem and the proportion of recreation/exploration goals were marginally higher when the memory was non-integrative ($M = 96.94, SD = 14.98$ and $M = .14, SD = .08$, respectively) than when it was integrative ($M = 93.11, SD = 17.48$ and $M = .12, SD = .09$, respectively). In the negative memory condition, on the other hand, they were marginally higher following the recall of an integrative memory ($M = 87.11, SD = 15.11$ and $M = .11, SD = .10$, respectively) than following that of a non-integrative one ($M = 79.05, SD = 19.19$ and $M = .07, SD = .08$, respectively). There

was no significant interaction between condition and specificity (all $ps > .12$). Two-way ANOVAs investigating the interaction between content and the other memory characteristics were not conducted due to the low frequency of memories in each content category and the resulting low power of the test to detect any effects.

3.4 Discussion

Study 2 aimed to replicate the findings of Study 1 regarding the impact of self-defining memory recall on the working self and to extend them by exploring the role memory characteristics play in this process and focusing on the content of the working self. Results partially supported the findings of Study 1 and the original hypothesis about the recall of self-defining memories affecting both the content of the working self and the individual's perception and evaluation of it (i.e., state self-concept clarity and state self-esteem). They showed that the recall of positive self-defining memories is associated with higher state self-esteem, but not higher state self-concept clarity, than the recall of negative self-defining memories. In addition, they showed that memory characteristics other than valence may influence the working self either on their own or by interacting with each other. Specifically, memory valence also influences the content of the goals individuals report following recall. Compared to negative memory recall, positive memory recall is associated with a lower proportion of achievement goals and a higher proportion of recreation/exploration goals. The extent to which the memory is integrated within the life story influences post-recall self-cognitions and, by interacting with valence, even state self-esteem and the proportion of recreation/exploration goals. Individuals are more likely to describe themselves by referring to emotional states after recalling non-integrative memories than after recalling integrative ones. They also tend to report marginally higher state self-esteem and proportion of recreation/exploration goals after recalling positive non-integrative and negative integrative memories than after recalling positive integrative and negative non-integrative memories.

None of the memory characteristics (valence, content, specificity, and integration), either alone or in interaction with others, influenced reports on the proportion of abstract self-cognitions (i.e., the quality of identity), the proportion of self-cognitions related to personal characteristics, and the proportion of relationship-related goals. As stated at the beginning of this chapter, the study had no specific

hypotheses about these variables. It only aimed to get a more complete picture on the aspects of the self that are influenced by memory recall. The fact that they were not influenced is not surprising. The measures used to assess these variables, the TST and the personal goals measure, ask individuals to answer the question “*Who am I?*” and to list goals they want to achieve without specifying a time frame (e.g., “right now”), as state measures such as SSES and SSCCS do. Their instructions may therefore lead individuals to believe that they need to provide a global description of themselves and of goals they wish to achieve in the long run. Even in previous research (e.g., Jobson & O’Kearney, 2008b; Sutherland & Bryant, 2005), these measures have been used to assess stable aspects of the self and long-term goals, which are affected by exposure to traumatic experiences. Consequently, they may be more likely to capture aspects of the long-term self and less likely to detect changes in the fragments of the long-term self that are active at any one time (i.e., in the working self). This is demonstrated by the fact that in the current study the vast majority of the self-cognitions generated by participants referred to personal characteristics (e.g., honest, good listener, tall) and social identities (e.g., female, student, dancer), which are relatively stable aspects of the self (see Tables 3.1 and 3.4). It is to be expected that recalling a memory, even if it is self defining, will not destabilise individuals to such an extent that their conceptual self will be affected. As mentioned at the beginning of this chapter, the fact that the self-cognitions and goals measure might tap into the long-term self was known when the study was designed. Nevertheless, these measures were still used given the fact that the study had an exploratory purpose and that it is difficult to identify measures that are likely to tap exclusively onto the working self because it is difficult to operationalise this construct.

The fact that the self characteristics mentioned above did not change in response to memory recall may be related to the fact that there were no differences between participants in the two memory conditions in terms of state self-concept clarity. Self-concept clarity is the extent to which individuals are clear about the contents of their self-concept (or long-term self) and describe them consistently over time. One explanation for the fact that it did not fluctuate in Study 2 is that memory recall does not influence the extent to which individuals are clear about who they are because it does not affect the contents of their long-term self. This explanation, however, does not explain the significant state self-concept clarity differences found

in Study 1 following the recall of positive and negative self-defining memories. Another explanation is that methodological issues may have influenced the results. First, participants in the two memory conditions were matched in terms of trait self-esteem, but not in terms of trait self-concept clarity. Although these constructs are correlated, they are distinct from one another (see Campbell et al., 1996). Participants in the negative memory condition may not have been affected by memory recall because they had higher trait self-concept clarity than those in the positive memory condition. Second, participants completed the post-recall measures in a randomised order. Reflecting about who they are in the TST and what they want in the goals measure may have helped participants in the negative memory condition to feel more clear about the contents of their self-concept even if recalling the memory had an initial negative impact on their state self-concept clarity. Third, the fact that negative memories were less negative than positive memories were positive may mean that they exerted a weaker influence on state self-concept clarity than the positive ones. This, however, does not explain the state self-esteem differences observed between participants in the two memory conditions. In addition, despite the difference in absolute valence, positive and negative memories did not differ in terms of the intensity of the emotions associated with them (as mentioned earlier, memory affect is indicated by both the valence and the intensity of the emotions associated with it).

Although it was an expected finding, the difference between participants in the positive and negative memory conditions in terms of state self-esteem was surprising given the absence of an effect of memory valence on the content of self-cognitions and on the proportion of negative self-cognitions. This finding may be explained by the fact that the TST tapped into the long-term self and that individuals tend to portray themselves in a good light. First, memory recall, as stated earlier, may have influenced the way participants evaluated themselves at that moment without affecting what they think about themselves in general. Second, the self-positivity bias may have been more likely to influence their responses to the TST than to the SSES. The self-positivity bias is individuals' tendency to associate information about the self with a positive valence and to make more internal, global, stable attributions for positive events than for negative ones. It is a universal phenomenon, even though it varies depending on factors such as age, culture, and psychopathology (see Mezulis, Abramson, Hyde, & Hankin, 2004). It is lower, for example, in depressed or anxious

patients. Because the sample in the current study was relatively healthy and there were no differences between the conditions in terms of present psychological treatment, the self-positivity bias may explain why participants in the negative memory condition did not report more negative self-cognitions in the TST than their positive memory condition counterparts, even though they reported lower state self-esteem. It may be argued that the self-positivity bias is more likely to influence responses to an open-ended measure such as the TST than responses to measures such as the SSES whose purpose may be more difficult to guess.

Another important finding of the present study is that memory valence had a significant influence on the proportion of achievement and recreation/exploration goals participants reported following memory recall. Participants in the negative memory condition reported more achievement goals and fewer recreation/exploration goals than participants in the positive memory condition. As described earlier, achievement goals were mainly related to activities or states of being that participants wanted to achieve and required some degree of effort, such as studying for a master's degree or becoming more confident. Recreation/exploration goals, on the other hand, were about recreational activities such as travelling and hobbies. Although the content of the memories did not affect goal content, memory valence did. This finding is in line with Singer and Salovey's (1993) finding that positive self-defining memories associated with pride and happiness are about goal achievement, whereas negative self-defining memories associated with feelings such as anger and sadness are about goal thwarting. It suggests that recalling a negative event related to blocked goals (e.g., illness of family member, failing an exam) is associated with the activation of goals about attempts to achieve desired activities/states. When memories about achieved goals (e.g., getting into university, winning an award) are recalled, on the other hand, attention seems to shift to other priorities, such as recreation. The activation of a new working self may account for this shift in priorities. This proposal is explained in more detail below.

The SMS model (e.g., Conway, Singer, et al., 2004) argues that the goal hierarchy of the working self activated in response to a change in environmental demands enables the individual to respond to the change. According to Conway, Meares, et al. (2004), images related to negative or traumatic experiences become a standard to be avoided in the positive feedback loops regulating behaviour. Recalling

such memories and the images associated with them may therefore trigger the activation of an achievement-related working self whose goal hierarchy generates plans to increase the discrepancy between the individual's actual state and the failure-related standard. This may explain why, for example, Jobson and O'Kearney (2008b) found that individuals with PTSD report more trauma-related goals such as "I want to be safe" than those without PTSD. If trauma, as the SMS model argues, threatens the achievement of long-term goals, trauma survivors may be more focused on distancing themselves from it and its aftermath.

Apart from valence, the only other memory characteristic that seemed to influence the post-recall working self was integration. The recall of non-integrative memories was associated with a greater proportion of emotional states (e.g., scared, worried, happy, in love, anxious) used to describe the self in the TST than the recall of integrative memories. Because of the open-ended nature of the TST, it was not possible to determine whether some of the emotional states (e.g., anxious or happy) referred to emotions experienced immediately following recall or to emotions that participants experienced frequently. Measures focusing specifically on trait and on post-recall affect would have helped make this distinction. Nevertheless, findings do suggest that, compared to recalling integrative memories, recalling memories one has not come to terms with and has not integrated within the life story may trigger a greater emotional response or, more generally, may direct individuals' attention to their emotions. They thus provide some support for the finding of Beike et al. (2004) that the recall of memories individuals have not come to terms with (i.e., open memories) is associated with a greater use of internal-referent (e.g., emotional) words to describe the self than the recall of closed memories, perhaps because it leads to an increase in self-focused attention. The findings, however, seem to contradict Lardi and colleagues' (2010) finding that integration is not related to the affective response to self-defining memory recall. They also contradict Lardi et al.'s finding that specificity is related to affect changes and, consequently, the hypothesis of the current study that the recall of specific memories would be associated with a more negative working self. The difference in the results of the current study and those of Lardi et al.'s study may be due to methodological differences between the two studies. First, the current study, unlike that of Lardi et al., did not measure affect before and after memory recall and focused on self-aspects only. Second, Lardi et al. instructed

participants to recall self-defining memories and assumed that they followed these instructions. They analysed all the memory scripts provided by participants without taking any measures to ensure that they were indeed self defining. It may be that some memories were not self defining and their recall consequently affected the results. In the current study, on the other hand, strict measures were taken to ensure that participants had followed the instructions.

The findings of the present study regarding integration need to be replicated before it can be concluded that methodological issues did indeed affect the findings of Lardi and colleagues (2010). However, they seem to support the SMS model. As described in Chapter 1, Conway, Meares, et al. (2004) argue that trauma memories may become intrusive and hijack attention unless they are integrated within the autobiographical knowledge base. It may be argued, therefore, that the activation of memories that are not integrated has a more negative, destabilising effect on the self than the recall of integrated ones. In fact, Johannessen and Berntsen (2009) found that involuntary memories have a more negative impact on mood than memories that are recalled voluntarily. It could be that they are more likely than other memories to be intrusive and therefore non-integrated within the individual's autobiographical knowledge base. In the present study, the finding on integration suggests that attaching a meaning to a memory and/or learning a lesson from it, perhaps making links between it and other memories or the self, attenuates the impact of memory recall on the self.

The fact that integration may be associated with an attenuated emotional response to memory recall suggests that it may be more useful for negative memories (and their associated negative emotions) than for positive ones (and their associated positive emotions). The trend for an interaction between memory valence and integration on state self-esteem and the proportion of recreation/exploration goals seems to support this view. Participants tended to report higher state self-esteem and a greater proportion of recreation/exploration goals after recalling a positive non-integrative or a negative integrative memory than after recalling a positive integrative or a negative non-integrative memory. The interaction was not significant and therefore this finding should be treated with caution. Nevertheless, it does suggest that integration may be more beneficial for negative memories than for positive ones because it reduces their negative impact on the self. It may help individuals to

evaluate themselves more positively and to focus on positive activities such as recreation after they have recalled a memory.

Taken together, the findings of the current study provide further evidence in support of Brewin's (2006) retrieval competition hypothesis and Conway's (e.g., Conway, Singer, et al., 2004) SMS model. Just like the findings of Study 1, they are consistent with the argument that, when environmental stimuli trigger the recall of self-defining memories, specific working selves may be activated that contain specific goals, self-cognitions, and evaluations about one's self-worth. In addition, the findings suggest that memory characteristics such as valence and level of integration within the life story may play a role in determining which working selves are activated. One implication of these findings is that trauma memories, which are negative and often not integrated within the individual's life story, may exert a powerful influence on the self when recalled. When environmental, perhaps trauma-related, stimuli trigger their recall or simply activate images associated with them, a working self characterised by low state self-esteem, more achievement-related goals, and emotional self-cognitions may be activated. The powerful emotional response associated with intrusive images may be a result of the activation of this working self.

If the above explanation is correct, it may help shed light on the mechanisms of change involved in IR. In fact, the argument seems to support the main hypothesis of this PhD project (see Figure 1.4). If the recall of self-defining memories is associated with the activation of a specific working self depending on the valence of the memory and the extent to which it has been processed and integrated within the autobiographical knowledge base, it may be argued that IR works by making the memory less negative and by promoting its integration. When it does this, the newly-integrated memory and its associated images may have a less detrimental influence on the self when activated. First, they may lead to the activation of a working self that is associated with a more positive evaluation of the self (i.e., higher state self-esteem), fewer emotional self-cognitions or reduced emotional response, and goals that are not overly focused on achieving and therefore compensating for what the trauma blocked. Second, the fact that the individual finds links between the trauma memory and other similar memories, attaches a more benign meaning to it, and sees how it is placed within the context of his/her life story means that the accessibility of this memory and its associated images may be reduced. Consequently, the negative working self or

selves associated with them may lose their retrieval advantage over more positive working selves and may therefore no longer intrude into consciousness. When the individual is faced again with stimuli that would previously activate trauma-related images and working selves, he/she may no longer experience these images but instead experience a more positive working self.

One of the implications of the above explanation regarding the cognitive changes promoted by IR is that therapy may need to explicitly focus on the integration of trauma memories into the life story. Therapists may need to encourage patients not only to modify the meaning they have attached to their traumatic memories, but also to see how these memories are linked to memories of other experiences they have had and to their sense of self. This direct focus on integration, coupled with the effectiveness of IR, may facilitate recovery and the alleviation of disorder-specific symptoms. In addition, by making negative working selves less accessible and by teaching patients to actively control the accessibility of these working selves, it may also reduce the likelihood of relapse.

The findings of Study 2 give a better understanding of the impact of memory recall on the self. However, they need to be seen in the light of several limitations. First, as stated earlier, participants were not matched in terms of trait self-concept clarity and methodological issues such as the fact that the post-recall measures were administered in a random order may have influenced the results, particularly the finding that memory recall did not affect state self-concept clarity. Second, the limited sample size did not allow for analyses checking for the interaction between memory content and other memory characteristics to be conducted. Because memory content according to Thorne and McLean (2001) indicates individuals' primary concerns, it might have a strong influence on the self when it interacts with other memory characteristics, such as valence. Third, the sample used in the study was taken from a university student population and consisted of young adults. As Erikson's (1950) theory of psychosocial development suggests, the way these individuals perceive themselves and their goals may be different from those of individuals at other stages in life. Focusing on achievements such as graduating or on relationship goals such as creating a family might be more typical of this population. Consequently, the findings may not generalise to the population at large, in particular to older adults. Fourth, just as Study 1 (see pp. 67-68), even this study did not include

a control condition involving the recall of emotional non-self-defining memories and did not control for all the factors which may have influenced the results.

Consequently, alternative explanations of the findings cannot be discarded. Memory recall, for example, may have influenced participants' mood, which then influenced their responses in the self measures. Alternatively, it may have influenced only the participants' evaluation of themselves (their state self-esteem) without triggering the activation of a memory-related working self. This may explain why state self-esteem, but not state self-concept clarity, differed between the memory conditions. Finally, as it has been frequently mentioned in this chapter, the measures for assessing the impact of memory recall, in particular those related to the content of the self-concept (i.e., the TST and the personal goals measure) might not have been entirely appropriate for the purposes of the current study. They may not be sensitive enough to detect changes in working selves and may therefore provide only a patchy picture of the way individuals see or feel about themselves following memory recall. Further research needs to operationalise the working self construct more accurately and subsequently identify better measures for assessing it.

3.5 Conclusion

This chapter presented a second study investigating working self activation following positive and negative self-defining memory recall. Taken together, the findings of this study suggest that the recall of such memories may be associated with the activation of different working selves, depending on factors such as the valence of the memory and the extent to which it is integrated within the individual's autobiographical knowledge base. Following the retrieval of these memories, both the way individuals evaluate the contents of their self-concept (i.e., their state self-esteem) and some aspects of the content of the working self (e.g., emotional self-cognitions and types of goals) may change. These findings need to be replicated and the many limitations of the study need to be addressed before it can be claimed that memory recall *leads* to the activation of different working selves. Despite this, however, the current study is the first attempt to date to investigate the impact of memory recall directly on the components of the working self. The fact that some of its hypotheses were supported despite the use of measures that may not have been entirely suitable for assessing working selves active at any one time is very

encouraging. It indicates that intrusive trauma-related images are disruptive and distressing because they are related to the self and that therapeutic techniques used to address them may function by targeting the accessibility of the working selves associated with them. The study, therefore, provides some initial support for the main hypothesis of the current research project regarding the cognitive change mechanisms lying behind the effectiveness of IR.

CHAPTER 4: Impact of Exposure on the Way Memories are Perceived and on their Impact on the Working Self

4.1 Introduction

The findings of Studies 1 and 2 suggested that the recall of positive and negative self-defining memories is associated with the activation of specific working selves. As indicated in Chapter 1, self-defining memories are associated with vivid images. It may be argued, then, that the activation of images related to particular memories may in itself influence which working selves become activated and which ones remain latent. If this is the case, therapeutic techniques such as IR that target intrusive images associated with negative or traumatic memories may work by modifying the impact these images have on working self activation. The main hypothesis of this PhD project regarding IR facilitating access to positive working selves and reducing access to negative, trauma-related working selves, therefore, may be correct. In order to understand exactly how this technique works, however, it is important to first understand how its components work and what role they play in the integration of the trauma memory into the individual's autobiographical knowledge base and in the subsequent reduction of the accessibility of the trauma-related working selves and associated images.

As described in Chapter 1, IR involves two principal components: imaginal reliving and rescripting from a current self and a younger self perspective. Exposure to the trauma memory, therefore, is an important element of this technique. In vivo or imaginal exposure to distressing stimuli or situations is a common feature of most types of psychotherapy (see Carey, 2011; Foa & Kozak, 1986), perhaps because it facilitates the processing of these stimuli/situations. According to Foa and Kozak's (1986) theory of emotional processing, in fact, fear or other structures/memories that patients suffering from psychological disorders avoid need to be activated before corrective information can be incorporated into them. By helping patients sustain their attention onto distressing material and process this material on an emotional level, exposure may enable them to develop new insights or attach new meanings to it (Carey, 2011; Foa & Kozak, 1986). Research tends to support this argument. Foa and colleagues (2005), for example, conducted a study involving PTSD patients who had experienced sexual or non-sexual assault or childhood sexual abuse. They assigned

these patients to one of three conditions: 1) prolonged exposure (in vivo exposure to avoided trauma-related situations/activities and imaginal exposure to the trauma memory), 2) prolonged exposure accompanied by cognitive restructuring, or 3) waiting list. Results showed that, after 9-12 weekly sessions, patients in the first two conditions experienced an improvement in their PTSD and depression, as well as in their work and social functioning. Adding cognitive restructuring to prolonged exposure did not enhance treatment outcome. In a similar study, Jaycox, Foa, and Morral (1998) found that adding stress inoculation training to prolonged exposure did not change the treatment outcome. In addition, they found that PTSD patients who initially responded to the imaginal reliving of their trauma with high anxiety but then showed high habituation benefited more from it than patients who responded with high or moderate anxiety but then showed low habituation.

The studies mentioned above suggest that exposure facilitates the processing of trauma memories once individuals are able to engage with these memories. The fact that additional therapeutic techniques did not enhance treatment outcomes suggests that patients experienced a shift in the way they perceived their memories or themselves as a result of exposure. According to Foa and Kozak (1986), in fact, although emotional processing occurs on an unconscious level, we may observe its outcomes such as changed beliefs and attitudes or increased self-efficacy. Some support for this argument comes from a study in which Hayes, Beevers, Feldman, Laurenceau, and Perlman (2005) investigated the predictors of change in an integrative therapy for depression. Apart from components such as skill development (e.g., stress management, problem solving), mindfulness, and exposure to the negative self-views and cognitions related to depression (e.g., failure and hopelessness), this therapy also involved asking patients to write essays about their depression every week for 20 minutes. After analysing the patients' essays, the researchers found that the level of processing (defined as exploring and questioning depression-related issues, accompanied by new insights and shifts in perspective) was especially high during the exposure stage of the therapy. They also found that it was associated with improvement in depression, as well as with the expression of more hope and more positive self-views in the essays. The authors relied on a coding system to analyse the essays. They assessed the presence of positive self-views, for example, by focusing on whether patients described themselves as "worthwhile,

competent, deserving of respect, and otherwise acceptable” (Hayes et al., 2005, p. 117). Although they did not use standardised measures focusing on self-views, their findings do give some indication that being exposed to distressing material and processing it may lead to more positive self-views being developed – or to existing positive self-views or self-representations becoming more accessible.

In the context of IR, exposure to the trauma memory at the beginning of the rescripting process is thought to activate the memory with all its sensory components, emotions, and beliefs in order to make it more amenable to modification (e.g., Arntz & Weertman, 1999; Grunert et al., 2003; Smucker & Niederee, 1995). This step may be especially important when individuals avoid thinking about the memory or when this memory is fragmented and therefore detached from its context (see p. 28). In these cases, complete exposure to the trauma in its context may facilitate the synthesis of its sensory representations with the contextually-bound representations which, as Brewin’s (Brewin et al., 1996; Brewin et al., 2010) dual representation theory argues, are separated. Kindt and colleagues (2007), in fact, found that an increase in perceptual processing of the trauma memory in PTSD patients during treatment (10 sessions of IR) was highly correlated with an increase in conceptual processing of this memory immediately after treatment.

Because activation of the trauma memory facilitates its updating, exposure to this memory in the first stage of IR may already begin the process of the meaning modification and the subsequent integration of the memory within the individual’s autobiographical knowledge base. Kindt et al. (2007), in fact, argue that the transformation of emotional memories from a perceptual to a conceptual level may occur during imaginal exposure itself or may be brought about by the subsequent rescripting. Research tends to support this argument. Grunert et al. (2003), for example, found that prolonged exposure to the trauma exacerbated the PTSD symptoms of two patients who had suffered industrial accidents. One session of IR, on the other hand, brought about significant clinical change (including PTSD symptom alleviation) that was maintained over time, thus suggesting that in some cases exposure may need to be supplemented by other interventions. In another study, Arntz et al. (2007) found that imaginal exposure used on its own is as effective as imaginal exposure combined with IR in treating PTSD symptoms. This finding, unlike that of Grunert and colleagues, seems to suggest that exposure may bring

about improvement even when used as a stand-alone treatment. Because of these seemingly contradictory findings, it is difficult to determine the role exposure to a trauma memory during IR plays in the processing of this memory and subsequent changes in meanings, insights, or self-views. Given the key role it seems to play, however, understanding what it does in IR may be an important first step toward understanding the cognitive change processes involved in this therapeutic technique.

Seen from the theoretical framework adopted in this PhD project, exposure may be said to facilitate the integration of distressing negative or traumatic memories within the autobiographical knowledge base. Once individuals process these memories and attach new meanings to them, they may be better able to see them as part of their life story. An indirect consequence of this may be that, when recalled, the negative memories have a less disruptive impact on individuals as they cease to activate negative working selves as they did prior to the exposure. Another indirect consequence may be that, once they process a negative memory and incorporate it into their life story, individuals no longer avoid it (thus experiencing fewer intrusions related to it) (see Brewin et al., 1996; Reynolds & Brewin, 1999) and come to see it as less central to their identity than they did before. As described in Chapter 1 (see p. 18), negative or traumatic memories may be perceived as turning points in individuals' lives and may become central to their identity and life story (Berntsen & Rubin, 2006, 2007; Conway, 2005). One reason for this may be the increased accessibility of the negative memory-related working selves. If these working selves are frequently accessed, it may be easy for individuals to perceive them as a very important part of who they are. It could be that, once these working selves become less accessible as a result of therapy, individuals may perceive them and the memories they are associated with as less central to their sense of identity.

Study 3 aimed to provide support for the explanation presented above by investigating the impact of exposure to negative self-defining memories on the way individuals process these memories and the subsequent impact the memories have on the working self when recalled. Given the fact that IR, unlike other cognitive-behavioural techniques such as cognitive restructuring, focuses on images more than on words, this study at the same time tried to understand how this technique may differ from more verbal methods. Specifically, it tried to understand whether exposure to negative memories through words or through images has different

outcomes on the characteristics of the memory and on the impact of their recall on the working self. Because processing information through imagery has a greater emotional impact than processing it verbally (Holmes & Mathews, 2005; Holmes et al., 2006; Holmes et al., 2008), recalling and processing negative memories through these routes may have different outcomes. Emphasis on one of them or the other in a therapeutic setting may influence the way individuals process memories and, consequently, the meaning they have attached to them and the extent to which they are integrated within the autobiographical knowledge base. In particular, processing memories through imagery may activate them to a greater extent and may therefore allow better updating and meaning modification than simply verbalising them.

The current study set out to investigate the impact of verbal and imagery-based exposure to negative self-defining memories on the memory characteristics and on their influence on working self activation by using a mixed design. Given the evidence that the recall of different self-defining memories influences some aspects of the self (see Chapters 2 and 3) and triggers affective responses (e.g., Lardi et al., 2010), measures of state self-esteem, state self-concept clarity, and state affect were used to assess the working self activated following memory recall. Participants were initially asked to describe a negative self-defining memory and then complete measures of memory characteristics, centrality of the event depicted in the memory, memory-related intrusions, and self-aspects. They were then instructed to recall their memory again on two different occasions over a 1-week period focusing either on the images associated with it (imagery exposure condition) or on the words they would use to describe it (verbal exposure condition). After these two exposure sessions, they were tested again in a session that was identical to the first one. Results were expected to show that both imagery and verbal exposure to the self-defining memories would facilitate their processing thus leading to them being perceived differently and becoming associated with more positive working selves. Specifically, in the post-exposure testing session, participants were expected to rate their memory as less negative, less distressing, less vivid, less central for their identity, and less intrusive than in the pre-exposure one. In addition, they were expected to exhibit higher levels of state self-esteem, state self-concept clarity, and positive affect and lower levels of negative affect after recalling the memory. The changes experienced were expected to be greater in the imagery exposure condition.

4.2 Method

4.2.1 Participants

One hundred sixteen undergraduate students at a local university (99 females, 17 males) completed the study as part of a compulsory psychology research module. Nine participants were excluded from the data analysis for failing to comply with the instructions regarding the time and modality of completing the exposure stage of the study. The final sample consisted of 107 participants (92 females, 15 males). Their ages ranged from 19 to 42 years ($M = 20.50$ years, $SD = 3.15$ years). Fifty-two participants (44 females, 8 males) were randomly assigned to the imagery exposure condition. Their ages ranged from 19 to 42 years ($M = 20.60$ years, $SD = 3.93$ years). Fifty-five participants (48 females, 7 males), on the other hand, were assigned to the verbal exposure condition. Their ages ranged from 19 to 34 years ($M = 20.42$ years, $SD = 2.21$ years). There were no differences between the participants in the two conditions in terms of gender ($\chi^2(1) = 0.16, p = .78$) or age ($t(105) = 0.29, p = .77$).

4.2.2 Design

The study used a mixed design with time of testing (pre- vs post-exposure) as within-subjects factor and exposure condition (imagery vs verbal) as between-subjects factor. In the pre-exposure experimental session (Session 1), participants described in writing a negative self-defining memory and completed measures of memory characteristics, self characteristics, and affect. In the following week, they were randomly assigned to an imagery or to a verbal exposure condition and were asked to complete online two sessions in which they recalled their memory relying either on the words used to describe it or on the images associated with it. One week later, all participants took part in a post-exposure experimental session (Session 2) similar to Session 1. In order to ensure that participants in the two conditions were matched in terms of characteristics that might affect the outcome of the experimental manipulation, they also completed a measure of trait self-esteem in Session 1 and a measure of pre-recall affect in Sessions 1 and 2.

4.2.3 Measures

Ratings of memory characteristics. In both Sessions 1 and 2, participants were asked to rate the characteristics of their memory after recalling it. On scales

from 0 (*not at all*) to 10 (*extremely*), they rated the extent to which the memory was negative, the distress associated with the memory, and the vividness of the memory-related images. The aim of these ratings was to ensure that the memories recalled by the participants in the imagery and verbal exposure conditions were comparable in terms of their properties. In this way, any differences between participants' scores in the post-recall measures in Session 2 could not be attributed to initial differences in the memory characteristics.

Self-esteem and self-concept clarity measures. The Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), State Self-Esteem Scale (SSES; McFarland & Ross, 1982), and State Self-Concept Clarity Scale (SSCCS; Nezlek & Plesko, 2001) were described in Chapters 2 and 3. Whereas the RSES was used to ensure that participants in the imagery and verbal exposure conditions did not differ in terms of trait self-esteem, the SSES and SSCCS were used to capture aspects of the post-recall working self in both Sessions 1 and 2. In the current sample, all three questionnaires demonstrated high internal consistency. Cronbach's α was .91 for RSES, .93 (Session 1) and .92 (Session 2) for SSES, and .80 (Session 1) and .83 (Session 2) for SSCCS.

Positive and negative affect scales (PANAS; Watson, Clark, & Tellegen, 1988). This questionnaire consists of two 10-item subscales designed to assess positive affect (PA) and negative affect (NA). The PA subscale contains items reflecting an individual's pleasant engagement with the environment (e.g., *strong, enthusiastic, proud*). The NA subscale, on the other hand, contains items reflecting distress and unpleasant engagement (e.g., *upset, scared, ashamed*). In the current study, participants were instructed to indicate to what extent they were experiencing the emotions listed in the questionnaire "right now," that is before and after recalling their self-defining memory in both Sessions 1 and 2. They did so on a scale from 1 (*very slightly or not at all*) to 5 (*extremely*). Responses to the positive and negative items in this questionnaire were summed separately. Total scores for each subscale ranged from 10 to 50. The higher the score, the greater the positive and negative affect experienced by the participants. In the current study, the internal consistency of the PA subscale varied from .89 to .93, whereas that of the NA subscale varied from .77 to .88.

Centrality of event scale (CES; Berntsen & Rubin, 2006). This 20-item questionnaire measures the extent to which individuals perceive an event as being

central to their identity, as a turning point in their life, and as a reference point for generating expectations and attributing meaning to other events. It consists of items such as “*I feel that this event has become part of my identity,*” “*My life story can be divided into two main chapters: one is before and one is after this event happened,*” and “*This event has coloured the way I think and feel about other experiences.*” Participants are asked to rate the extent to which they agree with the items constituting the questionnaire on a scale from 1 (*totally disagree*) to 5 (*totally agree*). The overall score is calculated by summing the responses to the individual items. It varies from 20 to 100, with higher scores indicating a greater centrality of the event for the person’s identity and life story. In the current study, the questionnaire demonstrated high internal consistency. Cronbach’s alpha was .93 in Session 1 and .94 in Session 2.

Impact of event scale - Revised (IES-R; Weiss, 2004). The IES-R is a 22-item questionnaire that assesses the distress caused by a specific stressful life event. It consists of three subscales: avoidance of event reminders (e.g., “*I tried to remove it from my memory*”), intrusions (e.g., “*I thought about it when I didn’t mean to*”), and hyperarousal (e.g., “*I was jumpy and easily startled*”). Respondents are asked to indicate how distressing the difficulties described by each item have been in the past seven days on a scale from 0 (*not at all*) to 4 (*extremely*). Scores for each subscale are calculated by obtaining the mean for each individual item making up the scale. The higher the score, the higher the participants’ avoidance to trauma reminders, level of intrusion, and hyperarousal. Because the current study focused on intrusions related to the memory recalled by participants, only the data from the intrusions subscale were included in the analysis. Cronbach’s alpha for the whole scale was .94 in both Sessions 1 and 2, indicating excellent internal consistency.

4.2.4 Procedure

As mentioned earlier, the study consisted of three stages: a pre-exposure testing session, two exposure sessions, and a post-exposure testing session.

Stage 1: Pre-exposure session. All participants were asked to attend this group testing session taking place in a lecture hall. After being reminded that completing the study was a compulsory part of their psychology research module but they had the right not to consent to their data being used for the purposes of this PhD

project, participants were asked to fill in a demographic sheet. Specifically, they were asked to provide information about age, gender, past and present treatment for psychological problems, and the nature of these problems (if applicable). They then completed the RSES and the pre-recall PANAS in a counterbalanced order. Next, participants were instructed to recall and describe in writing a negative self-defining memory. The instructions they received were similar to those used in Study 2 (see p. 79). Participants were instructed to take about 15 minutes to write a description of their memory and to give as much detail related to it as possible.

When they finished describing their memory, participants rated on a scale from 0 (*not at all*) to 10 (*extremely*) how negative and distressing their memory was, and how vivid the images associated with it were. Next, they completed in a randomised order the questionnaires asking them to indicate how they felt immediately following the recall (SSES, SSCCS, and PANAS) and the questionnaires asking them to indicate how important and how distressing the memory they described was (CES and IES-R). At the end of the session, participants were given the opportunity to ask questions about the study and were informed about the second stage of the study.

Stage 2: Exposure to the memory. On the day following Session 1, all participants received an email with the instructions about the exposure stage of the study and a link to one of two webpages they needed for the exposure sessions. They were randomly assigned to the imagery or to the verbal exposure condition. Each condition had a different webpage that was created through the online research facility used for the purposes of Study 2. When they accessed the webpage, participants in both conditions were instructed to recall in detail the negative memory they described in Session 1 and relive it as if it was happening in the present. They received prompts that aimed to facilitate the reliving. Specifically, they were asked to remember the location in which the event depicted in their memory took place, what they were doing, other people who were present, how the event unfolded, and what thoughts and emotions they experienced at the time. For participants in the imagery condition, these instructions and prompts were audio recorded and the audio file was made available in their webpage. These participants were instructed to close their eyes and follow the prompts provided in the audio file as they focused on the images and sensations they had of the event depicted in their memory. For participants in the

verbal condition, on the other hand, the instructions and prompts were written in the webpage. These participants were instructed to focus on words to describe their memory and not pay any attention to the images they had of the event depicted in it. They were asked to describe the memory in the present tense in a text box provided in their webpage.

All participants were instructed to access their webpage and complete two exposure sessions in the week following Session 1. They could do so in their own time, provided that they completed the exposure sessions on two different days. Each time they accessed their webpage, they were asked to provide their student identification number so that I could identify them and monitor their compliance with the instructions.

Stage 3: Post-exposure session. Exactly one week after Session 1, participants attended another group testing session. This session took place in the same venue as Session 1 and followed a similar procedure. Participants first reported the affect they were experiencing before recall in the PANAS. Next, they were instructed to recall and describe in writing their negative self-defining memory and to rate its characteristics. Finally, they completed the SSES, SSCCS, PANAS, CES, and IES-R in a counterbalanced order. At the end of the study, a debriefing document was made available online for all participants in the webpage of their psychology research module. My contact details were provided in case participants had queries about the study.

4.3 Results

An alpha level of .05 was used for all the statistical analyses reported in this section. Seventeen participants (12 in the imagery condition and five in the verbal condition) completed only 1 session of exposure to their negative memory. Data analyses revealed that the exclusion of these participants did not significantly affect the outcome of the intervention. In order to preserve high statistical power, I thus decided to conduct all the analyses on the whole sample ($N = 107$). For the variables for which the exclusion of the 17 participants from the data analysis made a relevant difference, I report the results obtained by analysing the data of the 90 participants who completed both exposure sessions in footnotes (see Sections 4.3.2 and 4.3.3). Three research assistants helped with data entry in this study.

4.3.1 Descriptive Measures

Table 4.1 shows participants' mean scores in the RSES and pre-recall PANAS in Sessions 1 and 2.

Table 4.1

Descriptive Statistics for Trait Self-Esteem and Pre-Recall Affect in Sessions 1 and 2

Variable	Imagery Exposure Condition		Verbal Exposure Condition	
	Session 1	Session 2	Session 1	Session 2
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Trait self-esteem ^a	20.96 (5.25)	-	19.05 (4.76)	-
Pre-recall PA	23.54 (6.62)	19.52 (7.46)	24.51 (7.40)	19.07 (7.30)
Pre-recall NA	13.29 (3.88)	13.96 (4.49)	13.18 (3.59)	13.65 (3.95)

Note. PA = Positive Affect; NA = Negative Affect.

^aTrait self-esteem was measured only in Session 1.

As Table 4.1 shows, participants in both exposure conditions reported average levels of trait self-esteem, moderate levels of pre-recall positive affect, and low levels of pre-recall negative affect in both Sessions 1 and 2. There were no significant differences between the participants in the two conditions in terms of trait self-esteem, $t(105) = 1.97, p > .05$; pre-recall positive affect in Session 1 ($t(105) = -0.71, p = .48$) and in Session 2 ($t(105) = 0.31, p = .76$); and pre-recall negative affect in Session 1 ($t(105) = 0.15, p = .88$) and in Session 2 ($t(105) = 0.38, p = .71$).

Four participants in the imagery exposure condition (7.7%) and 10 in the verbal exposure condition (18.2%) reported past treatment (medication or therapy) for psychological problems (depression, panic disorder, bipolar disorder, eating disorder, and substance abuse). One participant in the imagery exposure condition (1.9%) and four participants in the verbal exposure condition (7.3%) were receiving treatment for their problem at the time of data collection. There were no significant differences

between participants in the two conditions in terms of past ($\chi^2(1) = 2.59, p = .15$) or present (Fisher's exact $p = 1.00$)³ psychological treatment.

4.3.2 Aspects of the Self-Defining Memories

The content of the negative self-defining memories participants recalled and were then exposed to varied. Examples of memories included illness or death of a family member or friend, physical assault by one or more strangers or family members, best friend attempting suicide, parents' divorce, argument with a friend, breaking up with partner, losing an important sporting event, making an inappropriate comment in public, and first day at a new school.

Table 4.2 shows the mean ratings of the memory characteristics participants in the two exposure conditions provided in Sessions 1 and 2.

Table 4.2

Descriptive Statistics for Memory Characteristics in Sessions 1 and 2

Memory feature	Imagery Exposure Condition		Verbal Exposure Condition	
	Session 1	Session 2	Session 1	Session 2
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Valence	8.14 (1.39)	7.54 (1.74)	7.78 (1.77)	6.76 (2.14)
Distress	7.75 (1.51)	6.96 (2.03)	7.24 (1.89)	6.24 (2.09)
Image vividness	7.32 (1.95)	7.29 (1.92)	8.04 (1.41)	7.33 (1.88)
CES	56.59 (14.72)	51.00 (16.95)	55.61 (15.88)	49.64 (15.77)
IES-R Intrusions	1.19 (0.88)	1.37 (0.95)	0.86 (0.84)	1.09 (0.97)

Note. CES = Centrality of Event Scale; IES-R Intrusions = Impact of Event Scale – Revised (Intrusion subscale).

³Fisher's Exact Test was used for present treatment because the assumption of chi-square tests that up to 20% of the expected frequencies are < 5 was violated (75% of the cells had expected counts < 5).

All participants tended to rate their self-defining memories as very negative, distressing, and vivid both before and after the exposure stage of the study. They perceived their memories as moderately important for their identity and reported low levels of intrusions related to them. Independent samples *t*-tests were initially conducted to check whether the memories reported by the participants in the imagery and verbal exposure conditions were comparable in terms of their properties prior to exposure. These tests showed that in Session 1 there were no significant statistical differences between the memories of participants in the two conditions in terms of valence, $t(105) = 1.14, p = .26$; distress, $t(105) = 1.55, p = .12$; and centrality for identity and the life story, $t(103)^4 = 0.33, p = .75$. There was, however, a significant difference in terms of image vividness ($t(104) = -2.16, p = .03$) and a non-significant trend in terms of memory-related intrusions ($t(105) = 1.99, p = .05$). Prior to the exposure stage of the study, participants in the verbal exposure condition rated their memories as more vivid and as slightly (but not significantly) less intrusive than participants in the imagery exposure condition. These results indicate that, apart from the significant difference in image vividness, the memories participants in the two conditions recalled were comparable in terms of their properties in Session 1. It may therefore be assumed that they had a similar effect on the working self when recalled in this session and that the differences between participants' memories in Session 2 were more likely to be a result of exposure to the memory than to initial differences between them.

In order to understand the impact of exposure on memory characteristics, mixed two-way ANOVAs were conducted with testing time (pre- vs post-exposure) as within-subjects factor and condition (imagery vs verbal exposure) as between-subjects factor. Results showed that there was a main effect of testing time on memory valence, $F(1, 104) = 34.32, p < .001$; memory distress, $F(1, 104) = 35.91, p < .001$; image vividness⁵, $F(1, 104) = 5.27, p = .02$; centrality of event, $F(1, 98) =$

⁴Degrees of freedom vary due to missing data. Some participants failed to answer all the questions or to complete all the questionnaires.

⁵When the data of the 17 participants who completed only 1 exposure session were excluded from the analysis, there was only a trend (in the same direction) for an effect of testing time on image vividness, $F(1, 87) = 3.76, p = .06$.

40.96, $p < .001$; and memory-related intrusions⁶, $F(1, 105) = 6.51, p = .01$. As expected, in Session 2 all participants rated their self-defining memories as less negative, less distressing, less vivid, and less central to their identity than they did in Session 1. Contrary to expectations, they rated the memories as more intrusive in Session 2 than they did in Session 1.

There was no significant effect of exposure condition on image vividness and centrality of event (all $ps > .23$). There was, however, a non-significant trend for an effect on memory valence, $F(1, 104) = 3.13, p = .08$; distress, $F(1, 104) = 3.57, p = .06$; and intrusions⁷, $F(1, 105) = 3.70, p = .06$. Participants in the verbal exposure condition rated their memories as marginally less negative, less distressing, and more intrusive, than participants in the imagery exposure condition.

There was no significant interaction between time of testing and exposure condition on memory valence, memory distress, centrality of event, and memory-related intrusions (all $ps > .13$). There was, however, a significant interaction when it came to image vividness, $F(1, 104) = 4.46, p = .04$. The decrease in image vividness observed for all participants from Session 1 to Session 2 was greater for the participants in the verbal exposure condition than for their counterparts in the imagery exposure condition.

4.3.3 Post-Recall Self and Affect Measures

Table 4.3 presents participants' scores on the questionnaires measuring state self-esteem, state self-concept clarity, and state positive and negative affect immediately following the recall of the self-defining memory in Sessions 1 and 2.

Mixed two-way ANOVAs with testing time (pre- vs post-exposure) as within-subjects factor and condition (imagery vs verbal exposure) as between-subjects factor were conducted using the self and affect measures as dependent variables. Results showed that there was a main effect of testing time on state self-esteem, $F(1, 103) = 7.72, p = .006$; positive affect, $F(1, 105) = 12.57, p = .001$; and negative affect, $F(1,$

⁶When the data of the 17 participants who completed only 1 exposure session were excluded from the analysis, there was only a trend (in the same direction) for an effect of testing time on intrusions, $F(1, 88) = 3.83, p = .05$.

⁷When the data of the 17 participants who completed only 1 exposure session were excluded from the analysis, the main effect of condition on intrusions became significant, $F(1, 88) = 4.37, p = .04$.

104) = 9.04, $p = .003$. Compared to Session 1, in Session 2 all participants reported higher state self-esteem and lower positive and negative affect after recalling their self-defining memory. Contrary to expectations, there was no effect of testing time on state self-concept clarity, $F(1, 105) = 0.16, p = .69$. Participants reported similar levels of state self-concept clarity after recalling their memory in both Session 1 and Session 2. There was no significant main effect of the exposure condition on the self and affect measures (all $ps > .49$).

Table 4.3

Descriptive Statistics for Post-Recall Self and Affect Measures in Sessions 1 and 2

Scale	Imagery Exposure Condition		Verbal Exposure Condition	
	Session 1	Session 2	Session 1	Session 2
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
SSES	83.55 (19.98)	83.61 (20.94)	83.16 (22.00)	89.75 (17.99)
SSCCS	12.38 (3.97)	11.95 (3.78)	11.80 (3.22)	12.46 (3.75)
Post-recall PA	23.38 (7.49)	19.65 (7.79)	21.00 (8.18)	20.04 (9.01)
Post-recall NA	18.31 (7.03)	16.75 (6.66)	17.93 (7.70)	15.69 (5.01)

Note. SSES = State Self-Esteem Scale; SSCCS = State Self-Concept Clarity Scale; PA = Positive Affect; NA = Negative Affect.

There was a significant interaction between time of testing and exposure condition on positive affect⁸ ($F(1, 105) = 4.37, p = .04$), but not on negative affect ($F(1, 104) = 0.32, p = .57$). The reduction in post-recall positive affect observed between Session 1 to Session 2 was greater for the participants in the imagery exposure condition than their counterparts in the verbal exposure condition. For state self-esteem⁹ and state self-concept clarity, there was only a trend towards significance

⁸When the data of the 17 participants who completed 1 exposure session were excluded from the analysis, the interaction for positive affect became non-significant, $F(1, 88) = 2.97, p = .09$.

⁹When the data of the 17 participants who completed only 1 exposure session were excluded from the analysis, the interaction for state self-esteem became significant, $F(1, 87) = 4.51, p = .04$.

for the interaction between testing time and exposure condition ($F(1, 103) = 3.38, p = .07$ and $F(1, 105) = 3.46, p = .07$, respectively). Participants in the verbal exposure condition reported a marginally higher increase in state self-esteem and state self-concept clarity from Session 1 to Session 2 compared to participants in the imagery exposure condition.

4.3.4 Correlations among Post-Recall Measures

In order to understand the relationship among memory characteristics, self, and affect measures and the way exposure might have affected this relationship, a correlational analysis was conducted with the data of the sample as a whole. This section reports only the main significant correlations that may help explain the findings of this study.

Results showed that memory characteristics were moderately to highly correlated with each other. Memory valence was positively correlated with the distress associated with the memory (Session 1: $r(107) = .79, p < .001$; Session 2: $r(106) = .83, p < .001$), image vividness (Session 1: $r(106) = .28, p = .004$; Session 2: $r(106) = .27, p = .006$), centrality of the event for identity (Session 1: $r(105) = .46, p < .001$; Session 2: $r(101) = .37, p < .001$), and experience of memory-related intrusions (Session 1: $r(107) = .32, p = .001$; Session 2: $r(106) = .42, p < .001$). In both the pre- and the post-exposure sessions, the more negative the memory was, the more it was reported to be distressing, vivid, central for identity, and intrusive.

The other memory characteristics were also related to each other. Memory distress, for example, was positively correlated with image vividness (Session 1: $r(106) = .21, p = .03$; Session 2: $r(106) = .31, p = .001$), centrality of event for identity (Session 1: $r(105) = .39, p < .001$; Session 2: $r(101) = .45, p < .001$), and experience of intrusions (Session 1: $r(107) = .37, p < .001$; Session 2: $r(106) = .49, p < .001$). The more distressing the memory was reported to be, the more vivid, central for identity, and intrusive it was. In addition, the centrality of the event depicted in the memory for identity was moderately correlated to intrusions in both sessions (Session 1: $r(105) = .45, p < .001$; Session 2: $r(102) = .39, p < .001$). The more central and important for identity participants reported the event to be, the more intrusions related to it they experienced.

The self and affect measures were also correlated among them. State self-esteem was positively correlated with positive affect (Session 1: $r(106) = .57, p < .001$; Session 2: $r(106) = .44, p < .001$) and state self-concept clarity (Session 1: $r(106) = .32, p = .001$; Session 2: $r(106) = .33, p < .001$), and negatively correlated with negative affect (Session 1: $r(106) = -.52, p < .001$; Session 2: $r(105) = -.41, p < .001$). In both sessions, the higher the state self-esteem, the higher the positive affect and state self-concept clarity and the lower the negative affect. State self-concept clarity was significantly correlated only with negative affect in Session 2, $r(106) = -.31, p = .001$. In this session, the higher the state self-concept clarity reported by participants, the lower the negative affect they experienced.

Finally, there were few significant correlations between the memory and the self characteristics. The extent to which the memory was considered to be distressing, for example, was positively correlated with negative affect in Session 1 only, $r(107) = .25, p < .01$. The more distressing the memory was, the greater was the negative affect experienced after recalling it. The extent to which the memory was intrusive was also correlated with negative affect in both sessions (Session 1: $r(107) = .34, p < .001$; Session 2: $r(106) = .31, p = .001$) and with state self-concept clarity in Session 2 ($r(107) = -.21, p = .03$). In both sessions, the more intrusive the memory had been in the week prior to the session, the greater was the negative affect experienced after recalling it. In Session 2 only, the more intrusive the memory had been in the week prior to the session (i.e., in the week in which the exposure stage of the study took place), the lower was the state self-concept clarity participants experienced after recalling it.

4.4 Discussion

The aim of Study 3 was to investigate the impact of imagery and verbal exposure to a negative self-defining memory on the memory characteristics and on its impact on the self upon recall. It was hypothesised that exposure would lead to enhanced processing of the memory and would therefore make participants perceive it as less negative and distressing, less vivid, less intrusive, and less central to their identity. This change in the memory characteristics, in turn, was hypothesised to influence the impact of the memory would have on the working self when recalled. Participants were expected to report higher state self-esteem and state self-concept

clarity, as well as greater positive and lower negative affect when recalling the memory after the two exposure sessions. Because exposure to the negative self-defining memories through images may make them more open to modification and may have a greater emotional impact on individuals, the exposure-related gains in memory characteristics and post-recall self and affect measures were expected to be greater in the imagery exposure condition.

The findings of the study partially supported the original hypotheses. Exposure to the memory did seem to influence both memory characteristics and the impact of the memory on the working self upon recall. As expected, when they recalled the memory in Session 2, regardless of the condition they were assigned to, participants reported the memory to be less negative, less distressing, less vivid, and less central for their identity than they did in Session 1. Interestingly, they all reported the memory to be more, rather than less, intrusive. In addition, as hypothesised, they reported higher state self-esteem and lower negative affect after recalling the memory in Session 2 compared to Session 1. Contrary to expectations, however, they reported lower positive affect and no significant changes in state self-concept clarity.

The exposure condition to which participants had been assigned seemed to have little influence on the outcome measures. There was only a trend for a main effect of condition on memory valence, distress, and intrusions. Participants in the verbal exposure group tended to report their memories as less negative and distressing, and as more intrusive than participants in the imagery exposure condition. Furthermore, there was a significant interaction between time of testing and exposure condition in terms of the vividness of the memory-related images and the positive affect reported following memory recall. Participants in the verbal exposure condition reported a greater reduction in image vividness and a smaller reduction in positive affect from Session 1 to Session 2 compared to their counterparts in the imagery exposure condition. Finally, there was a trend for an interaction on state self-esteem and state self-concept clarity: compared to Session 1, participants in the verbal exposure condition reported a marginally greater increase in these variables in Session 2 than the participants in the imagery exposure condition.

The findings on the main effect of testing time on memory characteristics seem to support the argument that exposure to the negative self-defining memories may have facilitated the processing of these memories. An enhanced processing

accompanied by a reattribution of meaning may account for the shift in perspective all participants seemed to experience following exposure. This shift was suggested by the fact that in Session 2 participants saw their memory as less negative and distressing, and as less central for their sense of self and for their life story than they did in Session 1. Exposure to their negative memory may have helped participants achieve new insights about the memory and accept it as part of their life story, thus achieving what Beike and her colleagues (2004) call *closure* and other authors (e.g., Singer & Blagov, 2000) call *meaning making*. Although the memories reported by participants were only moderately central to identity, they were very negative and distressing. It may be argued that for some participants, especially for those whose memory was not integrated within their sense of self, the exposure may have facilitated the finding of meaning and perhaps integration within the autobiographical knowledge base. This may explain the reduction in the vividness of the memory-related images following exposure. As described in Section 4.3.4, the memory characteristics were intercorrelated among them. It is therefore difficult to establish any causality and determine, for example, whether it was the reduction in memory valence or distress that caused the reduction in the centrality of the event depicted in the memory or whether the reduction in centrality caused the reduction in memory valence or image vividness. However, the fact that these changes were related to each other provides a good indication that processing negative memories and modifying the meaning attached to them may change their characteristics and make them less troubling for individuals.

According to Conway (2005), trauma memories remain vivid and intrusive as long as they are not integrated within the autobiographical knowledge base. In line with this theory, the current study hypothesised that, once the memories were processed as a result of exposure and had become less central and vivid, they would also become less intrusive. The fact that the findings do not support this hypothesis may show that the extent to which memories are intrusive does not depend on their characteristics and the extent to which they are processed, thus indicating that the SMS model in this point is not correct. An increase in intrusions following exposure to the trauma memories may actually explain why the two industrial victims mentioned by Grunert and colleagues (2003) experienced an exacerbation of their PTSD symptoms. However, the fact that in the present study the extent to which

memories had been intrusive in the week prior to the testing sessions was positively correlated with memory characteristics such as valence, distress, and centrality of event *does* support the SMS model. It is more likely that the increase in intrusions was an artificial increase resulting from the fact that participants had to recall their memory four times in a 1-week period. It is therefore plausible to argue that during this period they may have found themselves thinking about and having intrusions related to it more often than they would normally. In fact, these intrusions and this frequent thinking about the memory may have actually contributed to the processing of the memory and to the modification of the meaning attached to it. Asking participants to keep a diary with their reflections about the memory over the 1-week period, in a procedure similar to the one followed by Hayes and colleagues (2005) with their depressed patients, might have produced a clearer picture of the change in perspective and understanding of the memory participants experienced.

As stated earlier, the hypotheses of the current study with regards to the impact memory recall would have on the self following exposure were partially supported. The findings gave a complex picture of the post-recall working self. The higher state self-esteem and the lower negative affect reported by participants in Session 2 suggested that, arguably as a result of the enhanced processing of the memory, in this session participants experienced a more positive self-view after recalling their memory. This finding seems to link to that of Hayes et al. (2005) that exposure to distressing material is associated with more positive self-views. It suggests that a more positive working self may have been activated in Session 2 following memory recall compared to Session 1, and thus supports the hypothesis of the study. However, the fact that memory recall in Session 2 was not accompanied by an increase in post-recall positive affect and state self-concept clarity relative to Session 1 seems to contradict this argument.

One alternative explanation for the lack of increased positive affect in Session 2 is that the recall of the self-defining memory in this session elicited a generally weaker emotional response than it did in Session 1, as indicated by the fact that the levels of both positive and negative affect were lower. This explanation fits with the finding of Study 2 that the recall of integrative memories is associated with the use of fewer emotional states to describe the self after recall. It may be that, once the memory is integrated, it triggers a weaker emotional response and has a less

destabilising effect on the working self. This may support Beike and colleagues' (2004) argument that the affect associated with memories fades when closure (or integration) is achieved. It may explain, for example, why memories were perceived as less negative and less distressing in Session 2 compared to Session 1.

With regards to the lack of difference in state self-concept clarity between Session 1 and Session 2, there are several possible explanations. First, the extent to which a memory is processed and/or integrated within the autobiographical knowledge base may not affect the extent to which individuals are clear about the contents of their self-concept after recalling it. Perhaps the finding of Study 1 about state self-concept clarity being different after the recall of a positive memory and of a negative one was simply due to the difference in valence between the memories. Second, memory recall may not have affected participants' perceptions of their identity because the memories, as mentioned earlier, were not extremely central to this identity. Perhaps the recall of memories that are more central, such as severe traumatic experiences, may have a stronger impact on the self. This explanation, however, does not account for the increase in state self-esteem in Session 2 and for the fact that there was no significant correlation between state self-concept clarity and the centrality of the event. Third, the lack of differences in state self-concept clarity between participants in the two memory conditions may have been due to a difference in *trait* self-concept clarity. Just as in Study 2, even in the current study participants' trait self-concept clarity was not assessed and therefore it is not clear whether the participants in the two conditions were matched in terms of this characteristic. A final explanation is that other variables that were not taken into account in this study may have confounded the results. One such variable – self-structure – is described in Chapter 5 and was taken into account in the final study of this PhD project.

Finally, the findings of the study did not support the hypothesis that the beneficial effects of exposure on memory characteristics and post-recall self aspects and affect would be greater in the imagery exposure condition than in the verbal exposure one. Where there was a significant interaction between time of testing and exposure condition (i.e., on image vividness) or a non-significant trend for an interaction (i.e., on state self-esteem and state self-concept clarity), the beneficial effect of exposure was greater in the verbal exposure group. The only variable in which the imagery exposure group experienced a bigger change than the verbal

exposure one from Session 1 to Session 2 was positive affect, which was reduced. Even though this indicated a weaker emotional response to the memory recall, it did not necessarily indicate a beneficial effect. Given the greater emotional impact of imagery compared to verbal material (e.g., Holmes & Mathews, 2005) and the role it is thought to play in facilitating the updating of the memory (Arntz & Weertman, 1999), these findings are surprising. They may be due to several factors, which are described in the next paragraphs.

First, participants in the verbal exposure condition may have found it difficult to focus on the words they were using to describe the memory while ignoring completely the images associated with this memory. As described in Chapter 1 (see pp. 7-8), most types of memories contain images and it may be difficult to suppress these images when thinking about a memory. It may have been particularly difficult for the participants in the verbal exposure condition since their memories were significantly more vivid than those of their counterparts in the imagery exposure condition in Session 1 (i.e., prior to exposure). Reliving their memory thinking both about words and images may have led to a more complete processing of the memory in these participants. One way of checking participants' difficulty or ease in separating images from words would have been to actually ask them about it (e.g., ask them to rate the extent to which they managed to stick with one or the other) and then include this factor as a covariate in the analyses.

Second, participants in the imagery exposure condition may not have complied with the instructions completely and this may have influenced negatively the impact of exposure on their memory. These participants were not asked to do anything else apart from closing their eyes and reliving their memory during the exposure sessions. Because these sessions were conducted online, there was no way of controlling that they were complying with the instructions other than checking for how long they remained online and ensuring that it was enough time for them to have listened to all the audio recorded instructions and prompts (the duration of their permanence online was carefully monitored). This limitation was known when the study was designed. However, it was decided not to add a way of controlling for compliance in this condition (e.g., asking participants to provide tangible evidence for it, just like participants in the verbal exposure condition had to provide a written

description of the memory) because it was thought that this might introduce the verbal element to the reliving of the memory and thus defeat the purpose of the study.

Third, the finding regarding the greater benefits of verbal exposure compared to imagery exposure may suggest that language is essential to the processing of distressing material. Reliving a negative or traumatic memory in one's imagination without putting it in words may not be sufficient for altering the meaning attached to it. This takes us to the debate regarding the nature of imagery between researchers like Pylyshyn (1973) and Horowitz (1970), and the way Kosslyn (1980) seems to have resolved it (see pp. 3-5). As mentioned in Chapter 1, Kosslyn argues that images are quasi-pictorial representations that contain *both* information coming from the senses *and* elements related to the way this information has been processed and interpreted. According to him, there is a verbal component related to images. It may be argued that this component is the meaning attached to them, which Wells and Hackmann (1993) call *encapsulated belief* in the case of memory-related images. Addressing images focusing only on their sensory elements may therefore ignore this verbal component, especially if the meaning attached to them needs to be modified. In the current study, verbal exposure may have been more beneficial than imagery exposure simply because participants in the verbal exposure condition found it easier to access the verbal components (i.e., meanings) of their memory and modify them.

Taken together, the findings of the current study imply that exposure to distressing memories might be essential to the outcome of therapy, especially when patients' psychological problems are related to specific negative or traumatic memories. These findings cannot be generalised to clinical populations since the sample came from a generally healthy population and not all the memories participants described were traumatic. Nevertheless, they do provide some evidence that exposure to negative memories, both through imagery and through words, is beneficial because it may help individuals modify the meaning they have attributed to them and put them into perspective, seeing them as less negative and perhaps reorganising their identity or life story so that it no longer centres around these memories. Seen in the context of the SMS model (e.g., Conway, 2005) and of the retrieval competition hypothesis (Brewin, 2006), these findings may mean that exposure begins or at least facilitates the process of the memories' meaning update. The modification in meaning may in turn help the integration of this memory into the

autobiographical knowledge base of the long-term self, reduce the salience of the memory-related working selves, and therefore reduce the accessibility of these working selves, as Figure 1.4 (see p. 44) suggests. This may explain why therapeutic techniques like IR are effective. By combining imaginal reliving with the verbal component in its initial stage (as described in Chapter 1, participants have to describe the negative event to the therapist in the present tense while they relive it), this technique facilitates access to the meanings associated with the memory and therefore makes their modification easier in the rescripting stages. This modification may then lead to the association of the memory with a more positive working self characterised by features such as high state self-esteem and low negative affect. When the memory is retrieved following successful rescripting, this positive working self may be more likely to win the retrieval competition against the negative working selves, just as Brewin's retrieval competition account of the effectiveness of CBT suggests.

An implication of the above argument for clinical practice is that exposure to distressing memories that lie at the root of psychological problems may need to be included in therapy and used in conjunction with other techniques such as IR or cognitive restructuring. Addressing patients' maladaptive core beliefs and problematic behaviours without targeting the roots of these beliefs and behaviours may be successful initially but might be a cause of relapse. In the long run, a therapy that addresses memories related to patients' psychological problems and perhaps intrusive distressing images may be more cost-effective.

The findings of Study 3 of course need to be seen in the light of several limitations the study presented. Some of these limitations, such as the fact that participants in the two exposure conditions were not matched in terms of trait self-concept clarity or the fact that the extent to which participants managed to separate the words they would use to describe the memory from the memory-related images, were mentioned earlier. Other limitations were related to the methodology used and the analyses conducted. The study, for example, could not determine whether exposure was actually associated with the modification of the meaning attached to the memories or with the integration of the memories within the long-term self. Participants were not asked to indicate the meaning they had attached to their memory and the extent to which they believed in the statement encapsulating this meaning before and after exposure. A comparison in pre- and post-exposure meaning

was therefore not possible. A change in meaning could only be assumed from the change in the variables investigated. In addition, the extent to which participants had drawn some abstract meaning or learnt a lesson from the event depicted in their memory could not be assessed before and after exposure. The memory descriptions they provided could have been coded for integration using Singer and Blagov's (2000) manual and the procedure followed in Study 2, but this coding would have been more accurate in Session 1 than in Session 2. By the time participants described the memory in Session 2, they had recalled the memory three times in 1 week and therefore there may have been a repetitive pattern to the way they described it. The lack of meaning statements that would lead to the memories being coded as non-integrative would therefore not be a sure sign that the memory was not integrated within participants' sense of self. It may have been due to several confounding variables and would therefore not be a valid means of assessing integration.

Finally, the analyses conducted on the data from this study do not allow for any conclusions regarding causality to be made. It is not completely clear what role exposure played in the changes observed and how the change in each variable was related to the change in the other variables. As described in Section 4.2.4, in the pre- and post-exposure testing sessions participants had to write a description of their memory. The process of remembering and writing in itself may have allowed participants to reflect about the memories and process them. Adding a control condition involving no intervention (i.e., no online exposure) would have helped to clarify the role that exposure and the simple act of writing played in the emotional processing of the memory. Further research, therefore, needs to address the limitations of this study and use a different methodology that will allow for testing of causality and will help discard alternative explanations of the findings. In particular, it should involve a control condition, exert greater control over confounding variables, and investigate how memory characteristics are related to post-recall working self characteristics and whether they predict them.

4.5 Conclusion

This chapter presented a study that tried to begin to understand the cognitive changes promoted by therapeutic techniques like IR that involve an exposure component. In addition, this study tried to understand the differential impact of

imagery and verbal exposure to distressing material on the processing of this material. The findings are not conclusive and need to be seen in the light of several limitations the study presented. However, they do suggest that exposure to negative self-defining memories may have a beneficial impact on the way individuals perceive these memories and on the role the memories have on working self activation following their recall. As such, they give a first, albeit blurred, picture into the cognitive change mechanisms that may operate in techniques like IR and provide a good basis for Study 4, which is presented in the next chapter.

CHAPTER 5: Impact of One Session of IR on Memory Characteristics and on the Post-Recall Working Self

5.1 Introduction

As described in Chapter 1, the intrusive images experienced by patients suffering from different psychological disorders are vivid, recurrent, and associated with negative emotions such as anger, fear, or guilt (e.g., Hackmann, et al., 2000; Reynolds & Brewin, 1999; Speckens et al., 2007). They contain encapsulated core beliefs about the self, others, and the world, such as “I am unloveable” or “Others cannot be trusted” (e.g., Morrison et al., 2002; Wells & Hackmann, 1993). When activated, these images may produce behavioural responses (e.g., rituals in obsessive-compulsive patients, self-induced vomiting in bulimic patients) which, in the long run, may help maintain the disorder (see Section 1.5.4). Given the fact that these images are often related to negative/traumatic experiences (e.g., Hinrichsen et al., 2007; Patel et al., 2007; Wells & Hackmann, 1993) and that AM is closely related to the self, the SMS model (e.g., Conway, Singer, et al., 2004) may help explain the negative impact intrusive images have on individuals when they are activated.

Conway and his colleagues (e.g., Conway, Singer, et al., 2004) argue that, when the self faces a transition in the goals it is trying to achieve, it searches through the autobiographical knowledge base for past AMs that may help it adapt to this transition. The end product of this search is a specific AM, a related working self that contains a goal-action-outcome sequence, and an affective response (see p. 13). The working self that is activated guides the individual’s cognitive, behavioural, and affective responses as he/she tries to cope with the change in his/her environment. As mentioned in Chapter 1, self-images are part of the working self (e.g., Conway, 2005). In the context of psychological disorders associated with intrusive self-images, it may be argued that specific environmental stimuli (e.g., social situations for patients with social phobia) may trigger the activation of working selves related to past negative/traumatic experiences that contain the intrusive images. This working self, with its core beliefs, emotions, and action sequences may then produce the affective and behavioural responses mentioned earlier.

One of the central arguments of the above explanation is that the retrieval of specific memories triggers the activation of related working selves. Studies 1 and 2

provided some preliminary evidence supporting this argument. These studies found that at least some aspects of the self (e.g., state self-esteem, content of goals, and emotion-related self-cognitions) may vary after the retrieval of a self-defining memory depending on the characteristics of the memory (e.g., its valence and the extent to which it has been integrated with the rest of the individual's autobiographical knowledge base). Their findings are consistent with the idea that the recall of memories that have played a significant role in shaping individuals' sense of self and the experience of the images related to these memories may be associated with the activation of specific memory-related working selves.

One of the implications of Studies 1 and 2, as well as of the literature mentioned earlier regarding the impact of intrusive images on patients, is that therapy needs to address the impact the trauma memory has when activated. Specifically, it needs to modify the extent to which patients' cognitions, emotions, and behaviour are affected by the activation of the trauma memory and/or associated intrusive images. This research project is proposing that IR is an effective therapeutic technique precisely because it accomplishes this. In line with the retrieval competition account of CBT (Brewin, 2006) and with the SMS model (e.g., Conway, 2005), it argues that, by modifying the meaning patients have attached to negative/traumatic AMs that are at the root of their intrusions, IR facilitates the integration of these experiences with the long-term self (see p. 44). It thus contributes to making intrusions less vivid and less distressing, which in turn makes the working selves containing them less salient. Ultimately, this makes the negative or trauma-related working selves less likely to be activated when patients find themselves in distressing situations or in the presence of stimuli that may trigger the recall of the trauma memory and/or the activation of the intrusive images.

As shown in Chapter 1, evidence coming from studies investigating the effectiveness of IR seems to support the above hypothesis. After one or more sessions of IR, the core belief encapsulated in the intrusive image becomes weaker; the images and associated memories become less vivid, less distressing, and less frequent; and disorder-specific symptoms are alleviated (e.g., Brewin et al., 2009; Grunert et al., 2003; Wild et al., 2007, 2008). Some supporting evidence also came from Study 3, which showed that exposure to negative memories (which is one of the main components of IR) affects the characteristics of these memories (e.g., vividness, the

extent to which they are perceived as negative and central to one's identity) and the impact they have on the self when recalled (e.g., state self-esteem and affect). Both the previous studies investigating IR and Study 3, however, present a series of problems and give only few indications as to how IR works. Previous research on IR, for example, has limitations such as small sample sizes, over-reliance on self-report measures, combination of IR with other therapeutic techniques, and lack of assessment of clinicians' adherence to the IR protocols used (see Section 1.6.4). In addition, it has mainly focused on symptom and behavioural changes, paying little attention to the changes in patients' sense of self, which may be at the root of all the other changes. Study 3, on the other hand, assumed that the changes in the way participants perceived the memory after exposure indicated a change in the meaning they had attached to the memory but did not directly investigate this meaning. The reduction in the strength of the encapsulated belief observed in previous IR research and the reduction in the extent to which participants saw their memories as negative and central for their identity in Study 3 suggest a major shift in the way participants saw their negative memories and themselves. These changes are an important indicator of this shift, but they may not be sufficient for understanding the transformation patients go through and the cognitive changes promoted by IR that lead to this transformation. Self-reported ratings of encapsulated belief strength or centrality of the memory for identity may need to be supported by other measures focusing on different aspects of the self to investigate the outcomes of IR.

The previous three studies of this research project identified some potentially useful ways of assessing the working self that is active at any one time. Study 1 found that post-recall state self-esteem and state self-concept clarity varied depending on the valence of the memory recalled: they were greater following the positive memory recall than following the negative memory recall. Study 2 replicated this finding for state self-esteem, but not for state self-concept clarity. In addition, it found that the recall of memories that are not integrated within the autobiographical knowledge base leads to a greater use of words referring to emotional states to describe the self than the recall of integrated ones, thus suggesting that affect measures might be useful for understanding the impact of memory recall on the self. Finally, Study 3 found that, following exposure, participants reported higher state self-esteem and reduced affect when they recalled the memory. In this study, post-recall state self-concept clarity did

not change following exposure. Nevertheless, the findings of all three studies still suggest that measures of state self-esteem, state self-concept clarity, and affect may capture aspects of the working self activated after the retrieval of a self-defining memory. The following paragraphs present theory and empirical evidence that explain why this may be the case.

Whereas self-esteem is the individual's evaluation of the overall *content* of his/her self-concept, self-concept clarity represents more an aspect of the *structure* of the self-concept (Showers, Limke, & Zeigler-Hill, 2004) as it refers to how certain the individual is of his/her different self-representations or working selves and to how stable his/her self-concept contents are. Research suggests that the content and structure of the self-concept are related to each other and to psychological well-being (Campbell, Assanand, & Di Paula, 2003). Self-concept clarity, for example, is positively correlated with self-esteem and negatively correlated with neuroticism, negative affect, anxiety, depression, and perceived stress (e.g., Campbell et al., 2003; Campbell et al., 1996; Constantino, Wilson, Horowitz, & Pinel, 2006). It may thus be reasonable to assume that therapy leads to an increase in both self-concept clarity and self-esteem.

Another aspect of the self-structure that seems to be related to self-esteem and other aspects of psychological well-being is the evaluative organisation of the self-concept. Showers (1992) distinguishes between two types of organisation: compartmentalised and integrative. In a compartmentalised self-structure, positive and negative beliefs about the self or attributes are separated into different self-aspects, which may be referred to as different working selves. In this structure, each self-aspect contains mainly positive or negative information. An individual with such a structure, for example, may see him/herself as a "caring, considerate, loyal friend" and as a "mediocre, careless, unoriginal musician." In an integrative self-structure, on the other hand, self-aspects contain a combination of positive and negative beliefs or attributes. An individual with such a structure, for example, may have a self-aspect (e.g., student) that he/she describes as "hard-working, intelligent, selfish, determined, pessimistic, and aloof."

The compartmentalised and integrative self-structures may be either positive or negative, depending on which attributes and self-aspects (positive or negative) are important or salient for the individual. The valence of the self-structure is particularly

important because it influences which working selves are activated in response to environmental demands (Showers, 1995). Depending on the valence of the working self elicited by an event or situation, compartmentalised individuals may be overwhelmed by either positive or negative information. Integrative individuals, on the other hand, will access a working self containing both positive and negative information. This difference in the accessibility of working selves means that compartmentalised and integrative individuals react differently to changes in their environment. In response to a positive event, compartmentalised individuals are more likely to feel good and experience high self-esteem than integrative ones. In response to a negative event, however, integrative individuals are more likely to feel good than compartmentalised ones because the positive attributes contained in the activated working self serve a protective function (e.g., Showers, 1992; Showers & Kling, 1996; Zeigler-Hill & Showers, 2007). Showers (1992) argues that compartmentalisation is more likely to be beneficial for self-esteem and mood when positive self-aspects are more important and accessible, whereas integration is more likely to be beneficial when negative self-aspects are more important and accessible (importance of a self-aspect or working self is assumed to be positively related to the extent to which it is accessible).

To date, research findings tend to support Showers' (1992) evaluative organisation model. It has been found, for example, that there is a negative relationship between compartmentalisation and depression or low self-esteem and that the importance of positive and negative self-aspects mediates this relationship (Showers, 1992). When positive self-aspects are important, compartmentalisation is associated with high levels of self-esteem and low levels of depression. The opposite happens when negative self-aspects are important. An implication of these findings and of the evaluative organisation model is that compartmentalised individuals may be more prone to shifts in self-esteem, whereas integrative individuals may have a relatively stable self-esteem. In fact, research shows that, when trait self-esteem is high, the state self-esteem of compartmentalised individuals fluctuates more in response to daily events than that of integrative individuals (when trait self-esteem is low, state self-esteem is unstable regardless of the self-structure) (Zeigler-Hill & Showers, 2007). Compartmentalised individuals are more responsive to daily events than integrative ones, experiencing extreme increases and decreases in self-esteem.

Zeigler-Hill and Showers (2007) argue that this may be due to the fact that the isolation of positive and negative attributes may make compartmentalised individuals see their self-aspects as more different from each other. This may result in low self-concept clarity, which leads compartmentalised individuals to rely more on their environment for cues related to their evaluation of themselves and therefore makes their self-esteem more prone to fluctuations in response to environmental stimuli. Ditzfeld and Showers (2011), in fact, found that compartmentalised individuals display a greater emotional reactivity to stimuli than integrative ones.

Self-structure may provide an insight into the mechanisms of change involved in therapy not only because of its relationship with self-esteem and self-concept clarity, but also because it may change with time. Showers and her colleagues (2004) argue that self-structure is dynamic. They believe that positive compartmentalisation may be the baseline self-structure since most individuals struggle to maintain their positive attributes salient, as indicated by the prevalence of the self-positivity bias (Mezulis et al., 2004) (see p. 93 for a description of this bias). If specific experiences (e.g., traumas) make negative attributes more salient, however, individuals may become negative compartmentalised (and consequently experience negative effects such as depression) or shift to an integrative self-structure to protect themselves temporarily. When the impact of negative experiences fades, individuals may return to the original positive compartmentalised self-structure. If the trauma memory remains salient, however, the integrative self-structure may persist. This is likely to occur with experiences that have had a profound effect on individuals. Showers, Zeigler-Hill, and Limke (2006) found, for example, that individuals who reported high levels of both sexual and emotional maltreatment displayed more integrative self-structures than those who had experienced only sexual maltreatment or only emotional maltreatment.

According to Showers et al. (2004), the fact that self-structure is dynamic means that it can be modified in the course of psychological treatment. These authors argue that, in individuals seeking treatment, negative attributes are highly salient and this produces negative mood and low self-esteem. Most of these individuals are likely to have a negative compartmentalised self-structure, but some (e.g., highly anxious individuals) may have a negative integrative self-structure and some others (e.g., individuals who repress their negative self-aspects) may have a positive

compartmentalised self-structure. Cognitive-behavioural techniques, according to the authors, promote integrative thinking as they encourage patients to acknowledge and link positive attributes to negative ones. They thus encourage the development of a positive integrative self-structure regardless of what the pre-treatment structure was. When patients leave treatment, Showers and her colleagues argue, they may:

- maintain the positive integrative self-structure, acknowledging negative self-aspects but not dwelling on them;
- develop a negative integrative self-structure, dealing with salient negative attributes that they did not manage to compartmentalise during treatment by mixing them with positive attributes; or
- shift back to a positive compartmentalised self-structure.

Because IR is a cognitive-behavioural therapeutic technique that aims to modify the meanings individuals have attached to negative experiences and, consequently, their memories of these experiences and the impact they have had on their sense of self, a change in self-structure following its administration may shed light on the cognitive changes it promotes. The present study set out to test this PhD project's main hypothesis on how IR works in the light of the findings of the previous three studies and of Showers and colleagues' (2004) account of self changes as a result of treatment. Because its aim was to investigate the *basic* cognitive changes involved in IR, it relied on a non-clinical population. In order to address the limitations of previous studies focusing on IR, this study relied on a larger sample size, involved an assessment of the therapists' adherence to the intervention protocol, and tried to capture a complete picture of the self by employing a series of standardised measures, not all of which were based solely on self-report. Participants were asked to describe a significant negative self-defining memory which was then rescripted in a single session of IR administered by a qualified clinical psychologist. After the IR, participants attended another session in which they described their self-defining memory one more time. The impact the recall of this memory had on the participants' working self was captured before and after the intervention through measures of self-characteristics (state self-esteem, state self-concept clarity, consistency of the self-description) and measures of mood (positive and negative affect, anxiety). In addition, ratings about the memory characteristics were obtained and participants' self-structure was assessed both before and after the intervention.

Results were expected to show that, following one session of IR, the characteristics of the rescripted memory would change and the memory would exercise a smaller influence on participants when recalled. Specifically, it was hypothesised that, compared to the pre-intervention session, in the post-intervention session participants would report:

- reduced memory vividness,
- reduced memory distress,
- reduced strength of the belief encapsulated in the memory,
- higher state self-esteem,
- higher state self-concept clarity,
- greater consistency of the self-description,
- greater positive affect and reduced negative affect, and
- reduced anxiety.

Despite the clear account of Showers et al. (2004) regarding patients' self-structure at the end of therapy, the current study did not have clear hypotheses about any possible shifts participants might experience as a result of IR. First, Showers and colleagues base their arguments on clinical experience and the study involved a non-clinical sample. Second, the intervention administered in this study consisted of only one session of IR, which might not be sufficient to cause a change in self-structure. The assessment of self-structure in the study, therefore, had an exploratory purpose as it could provide some more evidence on how IR affects the self.

5.2 Method

5.2.1 Participants

The study was advertised to students and staff members at a local university who were "troubled by negative memories" and experienced negative images related to them. A research assistant helped with participant recruitment and the initial stages of data collection. Individuals who were interested in taking part in the study were emailed the link to the questionnaire on exposure to traumatic experiences that was used for the purposes of Study 2 (see Appendix B). The aim of this questionnaire was to screen potential participants for exposure to stressful, potentially traumatic experiences and to subsequently exclude individuals with serious issues for whom one session of IR might be too distressing and/or for whom long-term treatment

might be more appropriate. Thirty-nine individuals completed the screening questionnaire online. Of these, 10 individuals were excluded from the study because they indicated that they:

- suffered from serious long-term medical conditions
- were suffering from a psychological disorder (e.g., eating disorder)
- had engaged or were engaging in self-harming behaviours
- had experienced sexual abuse or assault by a stranger, family member, or other known person
- had been exposed to multiple traumas (including several different types of abuse)

I took the decision to exclude these participants based on their answers to the questionnaire items. When uncertainties arose with regards to the nature of the experiences participants had reported, I took the decision after consulting the two clinicians involved in the study. Excluded participants were informed of services they could use if they felt they needed psychological support.

Of the 29 individuals who were invited to take part in the study after completing the online questionnaire, 24 responded to the invitation. Four participants failed to complete all the stages of the study and were thus excluded from the data analysis. The final sample consisted of 20 undergraduate and postgraduate students and university staff members (19 females, 1 male) who took part in the study in return for course credits or payment. Their ages ranged from 18 to 41 years ($M = 22.05$ years, $SD = 5.59$). Four participants reported having received treatment for psychological problems (depression, stress/anxiety, eating disorder) in the past. None of the participants was receiving treatment at the time of data collection.

In the screening questionnaire, participants reported having experienced between 1 and 6 of the stressful events listed ($M = 3.30$, $SD = 1.42$). The events they reported were:

- personal injury or illness ($n = 12$)
- injury, illness, or death of a family member ($n = 17$)
- injury, illness, or death of a friend ($n = 5$)
- abortion ($n = 1$)
- serious accident ($n = 6$)
- divorce or separation of parents ($n = 8$)

- drug or alcohol problems of parents ($n = 2$)
- physical abuse ($n = 2$)
- emotional abuse ($n = 11$)
- non-sexual assault by a family member or other known person ($n = 1$)
- natural disaster ($n = 1$)

For 19 participants, at least one of the stressful events (range 1 to 5) had triggered feelings of fear, helplessness, or horror. Eleven participants reported having experienced at least one of the events (range 1 to 3) more than once. Only two participants reported that one of the distressing events (illness of family member, emotional abuse) was going on at the time of data collection.

5.2.2 Design

The study used a within-subjects design and consisted of three sessions. In Session 1, participants were asked to think of a negative self-defining memory and describe it during a semi-structured interview. In Session 2, they were helped to rescript their self-defining memory by an experienced clinical psychologist. In the final session, they recalled and described their memory one more time in the course of the same semi-structured interview used in the first session. In Sessions 1 and 3, participants rated the characteristics of their memory during the interview and completed two tasks (card-sorting task and me/not me task) focusing on self-structure and on the consistency of the self-description. At the end of each session, they completed self and affect measures.

5.2.3 Measures and Instruments

Ratings of memory characteristics. During the semi-structured interview in which they described their negative self-defining memory, participants were asked to rate, on a scale from 0 (*not at all*) to 10 (*extremely*), how negative the experience depicted in the memory was, to what extent they thought this experience had influenced the way they saw themselves, how vivid the memory-related images were, how distressing the event was for them when it happened, and how distressed they were after recalling the memory. During the IR session, participants were asked to rate on the same scale how vivid the memory-related images were in their mind as they were reliving and rescripting their negative self-defining memory.

Strength of encapsulated belief. At the end of the interview in Session 1, participants were asked to summarise in a single statement the meaning they had attached to their negative experience. They were then asked to rate how much they believed the statement on a scale from 0 (*not at all*) to 10 (*extremely*). In Session 2, participants were asked to rate how much they believed the statement during every stage of the rescripting process. They were then asked the same question at the end of the interview in Session 3.

Ratings of affect intensity during rescripting. In Session 2, participants were asked to rate the intensity of the emotions they were experiencing in every stage of the IR on a scale from 0 (*not at all intense*) to 10 (*extremely intense*). The study did not have specific hypotheses regarding affect changes *during* rescripting. These subjective ratings were used for exploratory purposes.

Self-esteem, self-concept clarity, and affect measures. The State Self-Esteem Scale (SSES; McFarland & Ross, 1982), State Self-Concept Clarity Scale (SSCCS; Nezlek & Plesko, 2001), me/not me task (Markus, 1977), and the Positive and Negative Affect Scales (PANAS; Watson et al., 1998) were described in previous chapters. In the present study, the me/not me task included the same adjectives it employed in Study 1 and was used to assess the overall consistency of participants' self-descriptions after recalling their negative memory in Sessions 1 and 3. The questionnaires were used to assess aspects of the working self following memory recall in Sessions 1 and 3 and following IR in Session 2. They all demonstrated good internal consistency in each session. Cronbach's α varied from .90 to .95 for SSES, from .83 to .93 for SSCCS, and from .81 to .95 for the PANAS subscales.

State subscale of the state-trait anxiety inventory (STAI-S; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). This scale consists of 20 items that measure the intensity of anxiety feelings experienced at a particular moment. Respondents are asked to indicate how they feel "right now" by responding on a scale from 1 (*not at all*) to 4 (*very much so*) to items such as "*I feel satisfied*" and "*I am tense.*" Scores range from 20 to 80. A high score indicates a high level of anxiety that is influenced by environmental stimuli which are seen as signalling danger or by thoughts related to past traumatic experiences which are seen as associated with the present moment (Spielberger & Reheiser, 2009). In the current study, the internal consistency of the scale varied from .93 to .95.

Card-sorting task (Showers, 1992, adapted from Linville, 1987). This task is designed to assess the content and structure of the self-concept. Participants are given a deck of 40 cards. Each card contains a self-descriptive adjective. Twenty cards contain positive adjectives, whereas the remaining 20 contain negative ones. Participants are asked to sort the cards into groups that describe different aspects of themselves or their life. They are told that they can form as many groups as they wish, that they can use as many cards as necessary for each group, and that they do not have to use all the cards. After forming the groups, participants are provided with sheets in which they have to indicate how positive, negative, and important each of the self-aspects they generated is for them. They do this on a scale ranging from 1 (*not at all*) to 7 (*very*).

The adjectives used to form the deck of cards for the current study were selected from Anderson's (1968) list of adjectives using the same procedure as that for selecting the me/not me task adjectives (see Chapter 2). Anderson's results were initially used to generate a list containing 50 adjectives that had high likeableness ratings and 50 adjectives that had low likeableness ratings. These 100 adjectives were then listed in a random order and given to 20 postgraduate students and staff members at a local university who were asked to indicate how positive or negative they considered the adjectives to be on a scale from -3 (*very negative*) to +3 (*very positive*). The average score obtained by each adjective was used as an index of valence. This index served as the basis for the selection of the 40 task adjectives (see Table 5.1), which tried to capture as many different personality traits as possible. There were no significant differences between the positive and the negative adjectives in terms of valence, $U = 148.00$, $p = .16$.

In the present study, the card-sorting task was used to generate three indices:

1. Phi (ϕ) – This coefficient indicates self-organisation. It is obtained by comparing the actual proportion of positive and negative attributes in each self-aspect generated by the participant to a random proportion that would be expected to occur by chance if positive and negative attributes were organised without their valence being taken into account (Ditzfeld & Showers, 2011; Zeigler-Hill & Showers, 2007). It indicates the deviation from a random sort (Showers, 1992). Its value ranges from 0 (*perfect integration*) to 1 (*perfect compartmentalisation*).

2. Differential Importance (DI) – It indicates the relative importance of positive and negative self-aspects and represents the correlation between participants' self-aspect importance ratings and the positive-negative valence difference scores. Its value ranges from -1 (*negative self-aspects rated more important*) to +1 (*positive self-aspects rated more important*).
3. Neg – This score represents the number of negative attributes the participant has used in his/her card sort divided by the total number of attributes making up his/her card sort.

Table 5.1

Adjectives Used in the Card-Sorting Task

Positive Attributes	Negative Attributes
Honest	Domineering
Understanding	Cold
Reliable	Weak
Mature	Boring
Friendly	Self-centred
Conscientious	Immature
Resourceful	Dependent
Patient	Anxious
Easygoing	Unpopular
Competent	Moody
Decisive	Unsociable
Confident	Lonely
Optimistic	Careless
Independent	Helpless
Courageous	Cowardly
Intelligent	Incompetent
Considerate	Irresponsible
Popular	Superficial
Cooperative	Unreasonable
Interesting	Lazy

5.2.4 Procedure

Participants attended 3 individual sessions held approximately 1 week apart.

Session 1: Initial memory recall. At the beginning of the first session, participants were asked to sign a consent form and to provide some demographic information (e.g., age, gender, past and present psychological treatment). They were then asked to think of a negative self-defining memory. The instructions they received were similar to those used in the previous studies. Participants were told:

People often experience events that change the way in which they see themselves. Despite the passage of time, they tend to remember these events very clearly. When they recall them, many people tend to experience strong feelings and images related to them. What I'd like you to do now is recall such an event. It must be a negative experience that occurred at a specific time and place. This experience must be one that you often think about and have not yet put behind you, but that has influenced the way in which you see yourself.

Can you think of such an experience?

After a specific memory had been identified, participants were asked to rate how negative the event depicted in it was and to what extent they thought it had influenced the way they saw themselves on a scale from 0 (*not at all*) to 10 (*extremely*). If any of the ratings was below 5, participants were asked to think of another memory. This arbitrary cut-off point was used because for the purposes of the study it was essential to ensure that the memories to be rescripted were negative and had shaped participants' sense of self. First, it was important that the memories were as similar as possible to the memories patients report in therapy and that lie at the origin of their intrusive images. In this way, the findings of the study could provide a good understanding of the cognitive changes promoted by IR that could be generalised to clinical populations. Second, it was important to exclude the possibility that, if no changes were observed after the memory had been rescripted, this was not due to the memory's not being self-defining and sufficiently negative or important for the participants.

Once participants came up with a suitable self-defining memory, they were administered a semi-structured interview (see Appendix C) adapted from Hackmann et al. (2000). They were asked to close their eyes, focus on the event depicted in the memory in order to make it as vivid as possible in their mind, and then describe it as

if it was happening in the present. Whenever it was necessary, the interviewer probed for more information. Participants were asked to report the emotions, thoughts, and physical sensations they experienced as the event occurred. They were also asked to rate, on a scale from 0 (*not at all*) to 10 (*extremely*), how vivid the memory and associated images were in their mind, how distressed they were when the event happened, and how distressed they were after recalling the memory. The meaning participants had attached to the memory was elicited through questions such as “In what ways do you think this experience has influenced you? What does the memory say about you as a person? Does it say anything about other people / the world in general? What?” In the end, participants were asked to summarise the meaning of the memory in a single statement (the encapsulated belief) and to rate how strongly they believed in this statement on a scale from 0 (*not at all*) to 10 (*extremely*). The interview lasted approximately 30 minutes and was audio recorded.

After the interview, participants completed the SSES, SSCCS, PANAS, and STAI-S in a randomised order. They then completed the me/not me task and the card-sorting task. In the me/not me task, they were instructed to indicate as quickly as possible whether the adjectives appearing on a laptop computer screen described them or not and to rate how confident they were about their answer on a scale from 1 (*not at all confident*) to 7 (*extremely confident*). For the card-sorting task, they were given instructions adapted from Linville (1987). The instructions were as follows:

This is a task which involves thinking about different aspects of yourself or your life. Here you have 40 cards and three recording sheets. Each card contains an adjective which refers to a personality trait or characteristic. What I'd like you to do is form groups of traits that go together and describe an aspect of you or your life. These aspects may include different roles you have in life, such as a student or a friend. The sheets with the columns are your recording sheets. In these sheets, each column will correspond to one of your groups. Please start off by labelling a group at the top of the column. After doing so, go over the pack of cards and then list the characteristics that fit into this group underneath. Instead of writing the name of the characteristic, write only the number found in the corner of each card. The order in which you record the groups or list the traits within a group is not important. Each group may contain as many traits as you wish. You can use each trait in more than

one group. You can form as many groups as you like. It may be a good idea to continue forming groups until you feel that you have formed the important ones, those that you think are meaningful to you in describing yourself. Stop when you feel that it is becoming difficult to form more groups.

After they formed the groups representing their self-aspects, participants were given sheets in which they had to indicate on a scale from 1 (*not at all*) to 7 (*very*) how positive, negative, and important each of the self-aspects they generated was.

Session 2: IR intervention. In the second session, participants were administered one session of IR by one of the two qualified clinical psychologists involved in the study. Both clinicians had extensive previous experience in using IR and other imagery techniques. Before each session, they were given a written summary of the participant's memory description, including the ratings of the memory characteristics, emotions, thoughts, physical sensations, and encapsulated belief. This summary helped their preparation for the session.

The protocol used for the IR session (see Appendix D) was based on the protocol developed by Arntz and Weertman (1999). Rescripting proceeded through three stages. In Stage 1, participants relived the event depicted in their negative self-defining memory and described it in the present tense. They were encouraged to make the memory as vivid as possible in their mind and to remain with it.

In Stage 2, participants relived the memory from the perspective of their current self and, if they wished, intervened in the memory. Interventions consisted mainly of the current self introducing elements or people that changed the way the event unfolded. One participant who, as a child, witnessed the mother having a panic attack due to the absence of the medication she was addicted to and believed the mother's claims that she was going to die if she did not get the medication, decided to take the younger self away until the mother calmed down and to reassure the younger self that her mother was not going to die. Another participant, who discovered that her boyfriend had been lying to her for a long time and had been arrested over serious accusations, reassured the younger self that what had happened was not her fault and that she was not stupid for having believed him. She also introduced into the scene her father, who hugged her and managed to get more information about her boyfriend's arrest and thus helped her understand better what had happened.

In Stage 3, participants took the perspective of their younger self as they relived the experience with the adult self or other people intervening into the memory. The younger self was asked to express any other wishes or needs he/she had and to imagine these wishes or needs being satisfied. The participant whose mother had a panic attack, for example, imagined her mother apologising to her younger self for what had happened and reassuring her that she was not going to die. The participant who learnt about her boyfriend's arrest imagined her father comforting her and holding her hand as he took her for a walk so she could have some fresh air. IR lasted about 50 minutes and was video recorded. In each stage of the rescripting, participants were asked to rate, on a scale from 0 (*not at all*) to 10 (*extremely*), the strength of their encapsulated belief, the vividness of the memory-related images, and the intensity of the emotions they were experiencing. Once the rescripting was over, participants completed the PANAS, SSES, SSCCS, and STAI-S in a random order.

Session 3: Follow-up. The final session took place approximately 1 week after the IR session. Its structure was similar to that of the first session. Participants rated how negative and how influential the experience depicted in their self-defining memory was and were then administered the same semi-structured interview used in Session 1. They described the experience in detail, reporting emotions, thoughts, and physical sensations and rating the vividness of the memory, the distress experienced when the event occurred, and the distress they were experiencing after recalling the memory in the session. They were also asked to indicate how much they believed at that moment in the statement encapsulating the meaning of the memory that they provided in Session 1. The interview was audio recorded. It lasted about 20 minutes, mainly because in this session, unlike in Session 1, there was no need to identify a memory or explore its meanings. Finally, participants completed the same tasks and questionnaires used in Session 1. At the end of the session, they were fully debriefed about the purposes of the study and given the opportunity to ask questions about it.

5.2.5 Adherence to the Intervention Protocol

As mentioned both in Chapter 1 and at the beginning of this chapter, one of the problems with existing IR research is that therapists' adherence to the treatment protocol has not been assessed objectively. This makes it difficult to ascertain to what extent therapists administered the intervention they claim to have administered and,

in those cases in which IR was used as a stand-alone treatment, whether elements of other cognitive-behavioural therapeutic techniques were combined with IR. One of the implications of this phenomenon is that we cannot be sure to what extent the outcomes of therapy can be considered to be a result of IR.

In order to overcome this limitation in my study and to ensure that the two clinicians administering the IR session followed the same procedure, I collaborated with these clinicians to develop a scale assessing adherence to the intervention protocol (see Appendix E). The scale was divided into two parts. The first part assessed whether the clinicians followed Arntz and Weertman's (1999) IR protocol, as adapted for the purposes of the current study. The items constituting this part reflected the steps clinicians had to follow during the session. Raters had to indicate whether the clinicians followed each step or not while watching the video recordings of the sessions. The second part of the scale focused on some aspects of the clinicians' style in conducting the session: responsiveness to participants' distress, the use of empathic statements and open-ended questions, and summarising and reflecting to keep the participant focused. For this part, raters had to indicate how skilfully the therapists performed each of the actions reflected in the items on a scale from 0 (*not at all skilfully*) to 100 (*extremely skilfully*).

I used the scale to assess therapists' adherence to the IR protocol in all 20 sessions. A qualified clinical psychologist who had experience with imagery work in clinical settings and had no other involvement in this study assessed therapists' adherence in 4 randomly selected sessions (20%). For the first part of the scale, the assessment was made by summing the number of steps the therapists had followed and dividing it by the total number of steps. For the second part of the scale, the average rating for the four style items was used. Inter-rater reliability for adherence to the protocol (Part 1 of the scale) was substantial (Cohen's $\kappa = .74$). My ratings showed that therapists completed 94% of the steps prescribed in the intervention protocol and administered the intervention skilfully (average rating = 92.63, $SD = 3.85$). There was no significant statistical difference between the two clinicians in terms of the extent to which they adhered to the protocol ($U = 44.50, p = .66$)¹⁰ or of their style in conducting the session ($t(18) = 1.33, p = .20$).

¹⁰A Mann-Whitney Test was conducted to compare adherence to the protocol because the data violated the assumption of homogeneity of variances.

5.3 Results¹¹

5.3.1 Features of the Memories Reported by Participants

All participants were able to identify a negative memory that satisfied the criteria for being considered self defining. The age at which the event depicted in the memory had occurred varied between 7 to 30 years ($M = 17.73$ years, $SD = 5.07$). Examples of memories reported included the death of a family member or friend, a serious car accident involving a family member, finding out that parents were going to divorce, discovering that boyfriend had been arrested over serious accusations, conflicts with close friends or abusive partners, and having major life-changing surgery. Participants reported that the memory had components of different sensory modalities ($M = 3.20$ modalities, $SD = 0.77$). All of them (100%) reported that the memory had a visual component. Eighteen participants (90%) reported that the memory had an auditory component, with common sounds heard being people's voices and music. Nineteen participants (95%) said that the memory included bodily sensations such as feeling tense, shaky, nauseous, or dizzy; sweating; breathing difficulties; and a sensation of heaviness. For five participants (25%), the memory included at least one particular smell (e.g., alcohol, hospital smell). Only two participants (10%) reported that their memory included a particular taste (e.g., taste of anaesthetic).

The encapsulated core beliefs that were elicited during the interview revolved mainly around the self, but they also concerned other people and life in general. Typical beliefs about the self were "I am helpless and hopeless," "I am stupid," "I am a failure." Beliefs about others seemed to revolve around issues of trust. Participants reported beliefs such as "I cannot rely on anyone" and "You cannot trust people." Beliefs about the world, on the other hand, seemed to be related to its being dangerous and unpredictable. For some participants, the meaning of the negative memory was "Anything can happen and everything can go in the split of a second."

Core beliefs seemed to be related to the emotions participants experienced as the event was unfolding. Common emotions reported included anger ($n = 8$), upset ($n = 8$), shock ($n = 6$), confusion ($n = 6$), helplessness ($n = 6$), fear ($n = 5$), sadness ($n = 5$), disappointment ($n = 3$), guilt ($n = 3$), and frustration ($n = 3$).

¹¹An alpha level of .05 was used for all the statistical tests reported in this section.

5.3.2 Memory and Belief Characteristics Pre- and Post-Intervention

Table 5.2 presents the ratings participants provided about the characteristics of their self-defining memory and the strength of the belief encapsulated in it during the Session 1 and Session 3 semi-structured interviews. As this table shows, the memories participants recalled tended to be very negative and vivid and to be seen by participants as having had a considerable influence on the way they saw themselves. The events represented in them had been very distressing when they happened, although participants reported experiencing only moderate distress after recalling them during sessions. The strength of the encapsulated belief also tended to be very high at the beginning of the study.

Table 5.2

Session 1 and Session 3 Mean Ratings of and Differences in Memory and Belief Characteristics

Variable	Session 1		Session 3		$F(1, 19)$	p
	M	SD	M	SD		
Memory valence	8.88	1.10	8.23	1.32	6.05	.02
Memory influence	7.34	1.43	6.38	1.42	6.11	.02
Image vividness	7.68	0.98	7.55	1.20	0.13	.73
Post-event distress	9.13	0.86	9.01	0.80	0.43	.52
Post-recall distress	5.80	1.58	4.07	2.24	14.88	< .01
Belief strength	7.40	2.64	5.80	2.75	13.36	< .01

Participants' Session 1 and Session 3 ratings of the memory characteristics and the encapsulated belief strength were compared using a repeated-measures MANOVA with session as within-subjects factor. As expected, there was a significant multivariate difference between the two sessions, $F(6, 14) = 3.02$, $p = .04$, Wilks' $\lambda = .44$. Univariate tests revealed that, compared to Session 1, in Session 3

participants reported their memory to be less negative and to have had a smaller influence on the way they saw themselves. In addition, in Session 3 they reported experiencing significantly less distress after recalling the memory and to believe less strongly in the statement representing their encapsulated belief. The reduction in post-recall distress occurred even though there were no significant statistical differences between Session 1 and Session 3 in terms of the distress participants reported experiencing when the event originally happened. Their perception of how distressing the event was did not seem to change as a result of IR. The same was true for the vividness of the memory and its associated images.

5.3.3 Image Vividness, Belief, and Affect Ratings during IR

As described in Section 5.2.4, in each stage of the IR participants rated the vividness of the memory-related images, the strength of the encapsulated belief, and the intensity of the emotions they were experiencing. The ratings they provided are presented in Table 5.3. Because they often reported different emotions in different stages and/or the clinicians did not always obtain the ratings for each emotion, only the emotions that were experienced in every stage and for which ratings were always obtained were taken into consideration. The mean emotion intensity rating for each stage was obtained by summing the intensity of all the emotions and dividing it by the total number of emotions the participant reported. The emotions participants experienced while rescripting their memory were similar to those they reported having experienced when the event depicted in the memory occurred (see p. 145).

Table 5.3

Mean Ratings for Image Vividness, Belief Strength, and Affect Intensity in Session 2

Variable	Stage 1		Stage 2		Stage 3	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Image vividness	8.05	0.94	7.33	1.31	7.97	1.25
Belief strength	7.71	1.90	4.88	2.11	4.15	2.32
Negative affect intensity	8.63	0.95	5.47	1.59	4.15	2.16

As mentioned earlier in this chapter, there were no specific hypotheses about possible changes in the ratings participants provided in each stage of the IR. These ratings had an exploratory purpose. They were compared using a repeated-measures MANOVA with stage of rescripting as within-subjects factor. This analysis revealed that there was a statistically significant multivariate difference between the stages in terms of these ratings, $F(6, 40)^{12} = 12.56, p < .001$, Wilks' $\lambda = .12$. Univariate tests showed that there was a significant effect of rescripting on the encapsulated belief strength ($F(2, 22) = 16.30, p < .001$) and on the intensity of the negative emotions ($F(2, 22) = 57.78, p < .001$), but not on image vividness ($F(2, 22) = 1.12, p = .34$).

Pairwise comparisons were used to understand how image vividness, the strength of the encapsulated belief, and negative emotion intensity changed during each stage of the IR session. These comparisons showed that image vividness did not change significantly between stages (all $ps > .24$). The strength of the encapsulated belief was significantly reduced from Stage 1 to Stage 2 ($p = .001$) and from Stage 1 to Stage 3 ($p < .001$), but not from Stage 2 to Stage 3 ($p = .16$). Negative emotion intensity, on the other hand, was significantly reduced from Stage 1 to Stage 2 ($p < .001$), from Stage 2 to Stage 3 ($p = .01$), and from Stage 1 to Stage 3 ($p < .001$). Overall, these results showed that, whereas image vividness did not change during IR and negative affect was progressively reduced, the strength of the encapsulated belief changed in Stage 2 and this change was then maintained in Stage 3. For the shift in belief strength, rescripting the memory from the current self perspective seemed to be the crucial stage.

5.3.4 Affect and Self Measures Following Memory Recall and IR

Table 5.4 presents participants' scores on the affect and self measures they completed after memory recall in Sessions 1 and 3 and after IR in Session 2. Participants' levels of state self-esteem, state self-concept clarity, positive and negative affect, and state anxiety in all three sessions were compared using a repeated-measures MANOVA with time of testing as within-subjects factor. Results showed that there was no significant multivariate difference between the three sessions, $F(10, 64) = 1.51, p = .16$, Wilks' $\lambda = .65$. Univariate tests showed that there

¹²Degrees of freedom vary due to missing data. For some participants, the therapists did not obtain ratings in all three stages of the IR for any of the emotions reported.

was a significant effect of testing on state self-esteem, $F(2, 36) = 5.09, p = .01$; positive affect, $F(2, 36) = 3.68, p = .04$; negative affect, $F(2, 36) = 4.35, p = .02$; and anxiety, $F(2, 36) = 4.77, p = .01$. The effect of testing on state self-concept clarity was not significant, $F(2, 36) = 1.39, p = .26$.

Table 5.4

Descriptive Statistics for Affect and Self Measures in Sessions 1, 2, and 3

Variable	Session 1		Session 2		Session 3	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
State self-esteem	81.15	26.82	93.15	18.43	94.45	19.96
State self-concept clarity	13.73	3.76	14.43	3.95	14.70	4.26
Me/not me consistency ^a	20.35	2.85	-	-	20.25	3.39
Positive affect	23.15	8.15	26.11	8.35	28.25	9.88
Negative affect	18.75	7.28	16.16	5.09	13.65	4.18
State anxiety	45.30	10.63	40.20	12.92	36.00	12.59

^aThe me/not me task was administered only in Sessions 1 and 3.

Pairwise comparisons were used to investigate the differences between sessions in terms of the self and affect measures. These comparisons showed that state self-esteem did not change significantly from Session 1 to Session 2 ($p = .06$) or from Session 2 to Session 3 ($p = .46$), but it did so from Session 1 to Session 3 ($p < .01$). State self-concept clarity did not change significantly from Session 1 to Session 2 ($p = .23$), from Session 2 to Session 3 ($p = .72$), or from Session 1 to Session 3 ($p = .22$). Positive affect did not change significantly from Session 1 to Session 2 ($p = .09$) or from Session 2 to Session 3 ($p = .52$), but it did so from Session 1 to Session 3 ($p < .01$). Negative affect did not change significantly from Session 1 to Session 2 ($p = .20$), but it did so from Session 2 to Session 3 ($p = .03$) and from Session 1 to Session 3 ($p = .02$). Finally, state anxiety did not change significantly from Session 1 to

Session 2 ($p = .21$) and from Session 2 to Session 3 ($p = .06$), but it did so from Session 1 to Session 3 ($p < .01$). Overall, the results showed that participants' scores in the self and affect measures did not change significantly from Session 1 to Session 2. Similarly, with the exception of negative affect (which was significantly reduced), these scores did not change significantly from Session 2 to Session 3. However, when Session 1 and Session 3 scores were compared, it was found that participants reported higher state self-esteem and positive affect, as well as lower negative affect and state anxiety after recalling their negative self-defining memory in Session 3 than they did in Session 1 (see Table 5.4).

Because participants' overall consistency of the self-description was measured using the me/not me task only in Sessions 1 and 3, it was analysed separately using a repeated-measures ANOVA. Results showed that there was no significant change in this variable from Session 1 to Session 3, $F(1, 19) = 0.02$, $p = .89$. Participants reported similar post-recall levels of consistency of their self-description both before and after their negative self-defining memory was rescripted.

5.3.5 Self-Structure Pre- and Post-Intervention

Showers and colleagues (e.g., Ditzfeld & Showers, 2011; Showers, 1992) argue that the evaluative organisation model does not apply to individuals whose self-concept contains no negative content. These individuals "have no alternative to a perfectly compartmentalised sort" (Ditzfeld & Showers, 2011, p. 120). For this reason, the authors argue that individuals whose card sort contains less than two negative attributes need to be excluded from the data analysis. Following their recommendation, two of the participants in the current study were excluded from the analysis of the card-sorting task data because they reported no negative attributes in Session 1 or in Session 3 (as mentioned earlier, this task was administered only in these two sessions). Another participant was excluded due to failure to comply with the instructions. The results presented below concern the remaining 17 participants.

On average, participants generated 5.94 self-aspects in Session 1 ($SD = 1.78$) and 6.06 self-aspects in Session 3 ($SD = 1.71$). Each self-aspect contained an average of 12.61 items ($SD = 3.62$) in Session 1 and 12.94 items ($SD = 3.14$) in Session 3. Paired-samples t -tests revealed that there was no significant difference between Session 1 and Session 3 in terms of the number of self-aspects generated ($t(16) = -.29$,

$p = .78$) and of the average number of self-attributes used to describe each self-aspect ($t(16) = -.58, p = .57$). Participants' scores on the three main card-sorting task indices used for the purposes of this study are shown in Table 5.5.

Table 5.5

Card-Sorting Task Results: Mean Scores and Differences in Self-Structure, Differential Importance, and Proportion of Negative Attributes between Session 1 and Session 3

Variable	Session 1		Session 3		$F(1, 16)$	p
	M	SD	M	SD		
Phi	.39	.14	.38	.18	0.07	.79
DI	.31	.36	.44	.47	1.33	.27
Neg	.23	.11	.21	.13	2.08	.17

Note. Phi = index of self-structure; DI = differential importance; Neg = proportion of negative attributes present in card sort.

The results of the card-sorting task showed that participants tended to display an integrative self-structure, to consider their positive self-aspects as more important than their negative ones, and to report a low proportion of negative attributes both in Session 1 and in Session 3. A repeated-measures MANOVA with session as within-subjects factor was used to compare the Phi, DI, and Neg values obtained in these two sessions. It showed that there was no significant multivariate difference between the sessions in terms of these values, $F(3, 14) = 1.44, p = .27$, Wilks' $\lambda = .76$. The results of the univariate ANOVAs (see Table 5.5) were not significant either. Even after IR, participants continued to display the positive integrative self-structure they displayed in Session 1.

5.3.6 Correlational Analysis

As mentioned in Section 5.1, the self and affect aspects measured in this study in an attempt to capture the working self activated following memory recall tend to be

correlated with each other. In order to see whether this was true in this study and to understand whether these aspects were related in any way to the other variables, a correlational analysis was conducted. This analysis confirmed the findings of previous studies and added new insights into the relationships between the variables under consideration. Below is a summary of the main significant correlations.

In each session, state self-esteem was significantly correlated with affect. In Session 1, it was moderately correlated with positive affect ($r(18) = .64, p = .003$), negative affect ($r(18) = -.65, p = .002$), and state anxiety ($r(18) = -.59, p = .006$). In Session 2, it was strongly correlated with positive affect ($r(17)^{13} = .83, p < .001$) and state anxiety ($r(18) = -.75, p < .001$), and moderately correlated to negative affect ($r(17) = -.50, p = .03$). In Session 3, state self-esteem was strongly correlated with positive affect ($r(18) = .90, p < .001$) and state anxiety ($r(18) = -.89, p < .001$), and moderately correlated with negative affect ($r(18) = -.69, p = .001$). As the correlations show, in each session, the higher the state self-esteem reported by participants after recalling or reliving their negative self-defining memory, the higher their positive affect and the lower their negative affect and state anxiety.

As expected, scores on the affect measures were also correlated with each other. Positive affect was significantly correlated with negative affect only in Session 2 ($r(17) = -.48, p = .04$) and in Session 3 ($r(18) = -.63, p < .001$). In these sessions, the higher the positive affect, the lower the negative affect reported by participants. Positive affect was also negatively correlated with state anxiety in Session 1 ($r(18) = -.63, p < .001$), Session 2 ($r(17) = -.73, p < .001$), and Session 3 ($r(18) = -.82, p < .001$). In each session, the higher the positive affect, the lower the state anxiety. This relationship, as the magnitude of Pearson's r shows, was particularly strong in the follow-up session. Finally, negative affect was positively related with state anxiety in Sessions 1, 2, and 3 ($r(18) = .70, p = .001$; $r(17) = .84, p < .001$; $r(18) = .85, p < .001$ respectively). In each case, the higher the negative affect, the higher the state anxiety.

Surprisingly, within each session, state self-concept clarity and participants' overall consistency of the self-description were not significantly related with state self-esteem, affect, or the self-structure indices. They were, however, moderately correlated with each other in Session 1 ($r(18) = .52, p = .02$) and in Session 3 ($r(18) =$

¹³One participant failed to complete the PANAS (Watson et al., 1988) in Session 2.

.45, $p = .04$). The higher the state self-concept clarity exhibited by participants in the self-report questionnaire, the greater their consistency in the me/not me task.

A final interesting correlation present in the data was that between memory valence and the proportion of negative attributes participants used to describe themselves in the card-sorting task (i.e., Neg) in Session 1, $r(15) = .58, p = .01$. In this session, the more negative participants rated their self-defining memory to be, the greater the proportion of negative attributes they used in their card sort. This correlation was not significant in Session 3.

5.4 Discussion

This study set out to test the main hypothesis of this PhD project regarding the mechanisms of change involved in IR. Combining Brewin's (2006) retrieval competition account of CBT with Conway's (e.g., Conway, Singer, et al., 2004) SMS model, the study hypothesised that IR facilitates the integration of negative/traumatic experiences within individual's autobiographical knowledge base, thus making the images related to these experiences less vivid and less distressing and the self-representations (working selves) containing them less salient and less accessible. Results were expected to show that one session of IR would lead to a change in the characteristics of the rescripted memory (reduced memory vividness, memory distress, strength of encapsulated belief) and to the activation of a more positive working self following the recall of this memory in a follow-up session (as indicated by higher state self-esteem, higher state self-concept clarity and consistency of the self-description, greater positive affect, and lower negative affect and state anxiety). Following the proposal of Showers et al. (2004) regarding self changes as a result of psychological treatment, the current study also assessed participants' self-structure to investigate any possible changes in it as a result of IR and possible relationships of this aspect of the self with the other variables measured in the study.

The results of the study partially support the original hypotheses. Data analysis revealed that, when they recalled their negative self-defining memory at the 1-week follow-up, participants rated it as less negative and less influential on their self-views than they did prior to IR. In addition, they were less distressed after recalling it and believed less strongly in the statement containing the meaning they had attached to it. The intensity of the negative emotions experienced while reliving

the memory was reduced progressively throughout the IR session, whereas the strength of the encapsulated belief was significantly reduced after the memory was rescripted from the current self perspective. With regards to the working self activated following memory recall, results showed that, compared to the pre-intervention session, in the post-intervention session participants reported higher state self-esteem and positive affect and lower negative affect and state anxiety. No significant changes were observed in the vividness of the memory-related images, in participants' perceptions of how distressing the event depicted in their memory was when it happened, in state self-concept clarity, in overall consistency of the self-description, and in self-structure.

The findings of the study are in line with those of previous research showing that IR leads to a reduction in the strength of the encapsulated belief and makes the images related to the rescripted memories less distressing (e.g., Brewin et al., 2009; Wild et al., 2007, 2008). They also add to existing evidence by showing that, following IR, participants rated the event represented in the rescripted memory as less negative and as having a reduced influence on their self-views than they did in the first session. This suggests that, even though their perception of how distressing the event was when it originally occurred remained the same, their evaluation of it and of the impact it currently had on them actually changed. This finding, added to that of the reduced strength of the encapsulated belief, may indicate that IR helped participants update the meaning they had attached to the memory. It may explain why, during the IR session, the strength of the encapsulated belief was reduced significantly only after the memory was relived and rescripted from the current self perspective. It may also explain anecdotal evidence obtained during the data collection process. At the end of the IR session or of the follow-up session, some participants mentioned that up to that point they had not realised how much they had grown and matured since their negative experience had taken place. This realisation may have helped them deal with encapsulated beliefs such as "I am helpless" or "I am stupid." Because they often reported actively trying not to think about the memories because they found them upsetting, they may not have had the chance to process and re-evaluate them. It may be speculated that reliving these experiences with all their images, emotions, and thoughts may have helped participants put them into the

context of their current life, perhaps see them in a more realistic way, and integrate them within their autobiographical knowledge base.

The fact that some participants anecdotally reported trying to suppress the rescripted memories may account for the fact that no changes in image vividness were observed either during or following IR. Reliving their experiences on three occasions in the course of the study may have actually brought a lot of forgotten detail into the foreground and thus made the images very vivid. In addition, although the hypothesis on reduced image vividness was based on the findings of previous IR studies, the findings of these studies with regards to image vividness are not always consistent. Wild et al. (2008), for example, found that IR led to a reduction in the vividness of the intrusions of their socially phobic patients that was maintained at 1-week follow-up. In a previous study (Wild et al., 2007), however, they had found that the vividness reduction they initially observed was not maintained at 1-week follow-up. In both the present study and in that of Wild and colleagues (2007), the other gains observed following IR were either maintained or enhanced. It could be, then, that a reduction in image vividness is not essential for the other changes promoted by IR to occur. Perhaps the meaning update is the only factor needed to facilitate the integration of the memory with the autobiographical knowledge base and to then change working self accessibility.

If the above explanation is correct, then the change in memory distress and encapsulated belief rating may be at the root of the findings regarding the self and affect characteristics measured following memory recall. As Table 5.4 showed, there was a progressive (though not always statistically significant) increase in state self-esteem and positive affect, and a reduction in negative affect and state anxiety from Session 1 to Session 2 and from Session 2 to Session 3. When participants' Session 1 and Session 3 scores in these variables were compared, the differences were statistically significant. In line with Brewin's (2006) retrieval competition hypothesis and Conway's (e.g., Conway, Singer, et al., 2004), these findings suggest that, as a result of IR, participants were able to access a more positive working self when they recalled the memory in the follow-up session. The moderate-to-high correlations observed among state self-esteem and the affect measures, in fact, seem to indicate that these measures provide a relatively good tool for capturing different aspects of the working self activated in response to a specific stimulus.

Unlike Study 1 and previous research (e.g., Campbell et al., 2003; Constantino et al., 2006), the present study found no correlation between state self-concept clarity and consistency of the self-description and self-esteem and affect. In addition, it found no significant increase in participants' scores for these two variables, as hypothesised. There may be two explanations for this finding. First, although the memories participants recalled in the study were negative, were often accompanied by emotions that frequently accompany traumatic experiences (e.g., fear, helplessness, and shock), and contained significant encapsulated beliefs, they may not have been absolutely central to their identity, as traumatic memories may become for some individuals (see p. 18). Recalling these memories before and after IR, therefore, may not have confused participants as to the contents of their self-concept. Unlike trauma victims, who may perceive a great difference between their pre-trauma and post-trauma self (see Berntsen & Rubin, 2006, 2007), the participants in this study may have had a more consistent, continuous perception of their identity. That is why IR did not seem to affect their self-concept clarity. The second explanation for this finding is that participants' self-structure may have "protected" their self-concept clarity throughout the study. As mentioned earlier, participants tended to have a positive integrative self-structure. Their self-aspects (or working selves), therefore, contained a mixture of positive and negative attributes (e.g., Showers, 1992). It could be argued that, because their positive and negative attributes were not isolated from each other, they were more likely to perceive a continuation between their pre-recall and their post-recall working selves although their state self-esteem fluctuated greatly between sessions in response to memory recall. Consequently, they did not have to rely significantly on their environmental circumstances (in this case, the memory recall) for their evaluation of the contents of their self-concept (see Zeigler-Hill & Showers, 2007).

As mentioned at the beginning of this chapter, the current study had no specific hypotheses regarding any possible changes in self-structure that participants might experience following IR. Results showed that participants did not experience any such changes. They tended to maintain a positive integrative self-structure. This finding is not surprising. First, participants did not come from a clinical population and did not display the self-structures that individuals seeking psychological treatment tend to display according to Showers and colleagues (2004) (i.e.,

positive/negative compartmentalised, negative integrative). They rated their positive self-aspects as more important and already seemed to have an adaptive self-structure that buffered them to a certain extent from the potentially negative impact of the memory recall on self-concept clarity. Second, participants were only administered one session of IR. It could be that, for a change in self-structure to occur, longer treatment is needed. Showers (1992) argues that, when positive self-aspects are more important than negative ones, the self-structure that is most likely to be beneficial is the positive compartmentalised one. Perhaps we would have been able to observe a shift towards this structure in the current sample had the treatment been longer.

Apart from offering a possible explanation with regards to the finding on self-concept clarity, the assessment of self-structure in this study also offered an additional insight into the way individuals describe themselves following memory recall. As reported in Section 5.3.6, the proportion of negative attributes participants used to describe their self-aspects in the card-sorting task was positively correlated with the valence of the memory in Session 1 but not in Session 3. The more negative the memory was, the greater the proportion of negative attributes in participants' card sort. Although correlations do not imply causality, the fact that no significant correlation was found between these variables in Session 3 may suggest that memory valence influenced the extent to which participants reported negative attributes following memory recall in Session 1 and that IR modified the impact this recall had on them in Session 3. IR may have led to the activation of a more positive working self regardless of the memory valence.

Although its findings do not support all the original hypotheses, this study makes a significant contribution to our understanding of IR. It strongly suggests that IR may change the accessibility of positive and negative self-representations and that this change may lie at the root of the symptom alleviation patients experience as a result of it. We cannot understand symptom alleviation without understanding the basic cognitive changes operating behind IR. In addition, the study suggests that it is important, in therapy, to focus not only on core beliefs and on how they can be dealt with, but also on the patients' broader sense of self. This implies that therapists perhaps need to understand the relationship between core beliefs and patients' selves in order to understand better and then address the influence of these core beliefs on behaviour. As this study showed, it is not just a core belief that comes to the

foreground when a working self is activated: it is a whole package of beliefs, images, attributes, emotions, and so on. Finally, the findings of the current study suggest that it may be important to develop techniques and/or exercises that train patients to have more control over the accessibility of their working selves so that they are able to inhibit the activation of negative selves when they find themselves in stressful or demanding situations.

Despite its importance for our understanding of IR, this study needs to be seen in the light of a series of limitations. First, its findings on the cognitive changes promoted by IR may not necessarily generalise to a patient population. As described earlier in this chapter, the current sample had a relatively low previous exposure to traumatic experiences. This may mean that, although their memories were vivid, distressing, and emotional and contained encapsulated beliefs just like the intrusive memories/images of individuals suffering from psychological disorders, their way of coping with the activation of these memories may have been different. Second, it is difficult to be certain that the changes observed in the follow-up session were a result of the rescripting of the memory. The addition of a pre- and a post-intervention session ensured that the impact of IR could be understood better through the repeated measurement of the variables under investigation. However, it meant that participants were exposed to their memory on three occasions within a relatively short period of time. As Study 3 showed, exposure may influence the processing of negative memories and the subsequent impact their recall has on the working self. In the current study, simply describing the memory, reliving it, and answering questions about its relevance and meaning may have helped participants process this memory. Rescripting may have played only a minor role – if any. Including a control condition involving no intervention and one involving exposure to the memory without rescripting would have provided more detailed evidence on how IR works. Future research needs to include such control conditions in addition to the IR condition and then compare their impact on the working self activated following memory recall. In addition, as mentioned earlier, future research needs to extend our knowledge of self-structure changes following psychological treatment in general and IR in particular. If, as Showers (1995) argues, self-structure influences which self-aspects (working selves) are more accessible, it could be that the impact of IR on working self activation is actually mediated by a change in self-structure.

5.5 Conclusion

This chapter presented the first study to date to investigate the cognitive changes promoted by IR. Its findings suggest that IR helps individuals update the meaning they have attached to negative experiences and facilitates the activation of more positive self-representations when the memories of these experiences come to mind. In this way, it reduces the negative impact the recall of these memories may have on individuals' sense of self. The study presents some important limitations that need to be addressed by future research. In addition, its findings need to be replicated. Nevertheless, it is very encouraging and presents an important step forward in the understanding of IR. It moves away from traditional clinical research focusing exclusively on treatment effectiveness and behavioural changes towards a deeper understanding of this effectiveness that is rooted in a better understanding of the self.

CHAPTER 6: General Discussion

6.1 Overview

The present thesis aimed to investigate the mechanisms of change involved in imagery rescripting (IR), a cognitive-behavioural therapeutic technique which focuses on modifying the meaning individuals have attached to memories of negative or traumatic experiences (e.g., Arntz & Weertman, 1999; Smucker et al., 1995; Smucker & Niederee, 1995). This technique is mainly used to address recurrent intrusive images associated with such experiences. Research has shown that intrusive images are an important feature of several psychological disorders, such as bulimia nervosa (e.g., Somerville et al., 2007), social phobia (e.g., Hackmann et al., 2000), PTSD (e.g., Grey & Holmes, 2008), OCD (Speckens et al., 2007), and health anxiety (Muse et al., 2010). They are often associated with negative emotions such as fear, helplessness, shame, or anger (e.g., Reynolds & Brewin, 1999) and with negative core beliefs about the self, others, and the world such as “I am a failure” or “Others can’t be trusted” (e.g., Morrison et al., 2002; Wells & Hackmann, 1993). Partly because of this connection with emotions and core beliefs, intrusive images contribute to the maintenance of disorders (e.g., Hinrichsen et al., 2007; Hirsch et al., 2003; Holmes et al., 2007; Muse et al., 2010).

Given the evidence that intrusions trigger emotional responses and are often related to negative/traumatic past experiences and dysfunctional beliefs, the present project tried to understand how memories and associated images influence the self when they are retrieved and how IR may modify this influence. The theoretical framework that was adopted was Brewin’s (2006) retrieval competition account of CBT. Moving away from the traditional assumption that CBT modifies the content of individuals’ maladaptive schemas or self-representations, Brewin proposes that it actually modifies the *accessibility* of these self-representations. This modification reduces the probability that maladaptive self-representations will be activated when individuals find themselves in the presence of distressing stimuli. The current thesis presented four studies that aimed to test Brewin’s hypothesis. It combined theory and empirical evidence coming from clinical, social, and cognitive psychology to try to explain the changes involved in this therapeutic technique. It was hypothesised that, by modifying the meaning of negative or traumatic memories that lie at the origin of

distressing intrusions, IR helps individuals integrate these memories with the rest of their autobiographical knowledge. This makes memory-related self-representations containing these images less salient and therefore less likely to win the retrieval competition against positive self-representations when environmental stimuli trigger the retrieval of the memories.

The aim of this closing chapter is to discuss the findings of this research project. I begin with a summary of the main findings of the studies conducted as part of the project. I then focus on the implications of these findings, particularly those for clinical practice. Finally, I highlight some of the main limitations and strengths of the project and suggest issues that future research needs to address.

6.2 Summary of Main Findings

As mentioned earlier, this research project was hypothesising that IR modifies the extent to which self-representations (referred to as *working selves*) related to negative/traumatic memories are likely to be activated in the presence of cues that trigger the activation of these memories. Given the limited evidence on the relationship between memory retrieval and working self activation, Study 1 tried to set the ground for the following studies by investigating the impact of the recall of positive and negative self-defining memories on the working self. Using a within-subjects design and relying on selected self measures to assess the working self, the study found that participants reported higher state self-esteem and state self-concept clarity after recalling a positive self-defining memory than after recalling a negative one. The results were consistent with the hypothesis that positive memory recall is associated with the activation of a more positive working self than negative memory recall and therefore supported Brewin's (2006) retrieval competition hypothesis.

Study 2 aimed to replicate and extend the findings of Study 1 by focusing on the content of the working self (self-cognitions and goals) and investigating whether characteristics of self-defining memories other than valence influence the impact of memory recall on the self. The study used a between-subjects design. Results showed that participants who recalled a positive memory reported higher state self-esteem, fewer achievement-related goals, and more recreation/exploration goals than participants who recalled a negative self-defining memory. In addition, the extent to which participants had drawn meaning or learnt a lesson from their memory

influenced the way they described themselves following memory recall. Participants who recalled non-integrative memories (i.e., memories from which they had not abstracted any meaning) used more words referring to emotional states to describe themselves than participants who recalled integrative memories. Although it was not significant, there was also a trend for an interaction between memory valence and integration in terms of state self-esteem and proportion of recreation/exploration goals (they were marginally higher after the recall of positive non-integrative and negative integrative memories). The content of memories and the amount of sensory detail they contained (i.e., their specificity) did not influence the post-recall working self. The findings of Study 2 thus provided further evidence that the recall of positive self-defining memories is associated with the activation of a more positive working self than the recall of negative ones. They also showed that the extent to which individuals have drawn meaning from the experience depicted in the memory may influence the characteristics of the post-recall working self.

Study 3 used the findings of the previous two studies to investigate the impact of imagery and verbal exposure to a negative self-defining memory on memory characteristics, on individuals' perception of this memory, and on the impact that the memory has on the working self when recalled. The study used a mixed design. Results showed that, following exposure to the memory, participants rated their memory as less negative, less distressing, less vivid, and less central to their identity than they did prior to exposure. In addition, they experienced higher state self-esteem and a weaker emotional response (i.e., reduced positive and negative affect) after recalling the memory. The positive outcomes of exposure seemed to be greater in the verbal exposure condition than in the imagery exposure one. Participants who recalled the memory focusing on its verbal description, for example, reported a significantly greater reduction in image vividness than participants who focused on memory-related images. Results suggested that exposure to negative memories may help individuals process them and update the meaning they have attached to them. This processing may then influence the impact that the memories have on the working self upon recall. Because exposure to negative/traumatic memories is one of the key elements of IR, Study 3 gave some insights into how this technique might work. In particular, it suggested that, because it requires individuals to relive negative/traumatic experiences and talk about them, IR may allow an in-depth

processing of these experiences at an imagery and a verbal level. This complete activation of the memory may facilitate the modification of the meaning attached to the experiences and subsequently lead to a change in memory and post-recall working self characteristics.

Study 4 focused directly on IR. It investigated the outcome of one session of IR on the characteristics of the rescripted memory, on the subsequent impact of memory recall on the working self, and on self-structure. It used a within-subjects design and relied on a non-clinical population. Results showed that one session of IR changed the way participants viewed the memory. Following rescripting, participants reported a reduced strength of the belief encapsulated in the memory and rated the memory as less negative, less distressing, and less influential on the way they saw themselves. In addition, they reported higher state self-esteem and positive affect, and reduced state anxiety and negative affect after recalling the memory. The results were in line with those of previous research on the effectiveness of IR (e.g., Wild et al., 2007, 2008) which shows that this technique is associated with modification of the meaning attached to the negative/traumatic experience associated with patients' intrusions. In addition, they suggested that this meaning modification may influence the impact that the retrieval of the memory has on the working self. The findings of this study therefore seemed to support Brewin's (2006) retrieval competition account of CBT and the main hypothesis of this PhD project regarding one of the mechanisms of change involved in IR.

6.3 Discussion and Implications for Clinical Practice

The present research project aimed to investigate the cognitive changes lying behind the effectiveness of IR. It focused on the relationship between memory, memory-related images, and the self. In particular, it tried to understand how memories and associated images influence the self when they are retrieved and how IR may intervene to modify this influence.

The first two studies of this project suggested that the recall of positive and negative memories that have helped shape individuals' sense of self affects the momentary, online construal of the self (i.e., the working self) in different ways. The recall of positive self-defining memories is associated with a more positive evaluation of the self and goals that are focused on recreation/exploration activities. The recall of

negative self-defining memories, on the other hand, is associated with a more negative evaluation of the self and goals that are focused on achievement (e.g., graduating with a first-class degree, quitting smoking). Because negative memories tend to be associated with blocked or thwarted goals (Singer & Salovey, 1993), individuals may be more motivated to achieve and thus compensate for these blocked goals when such memories come to mind. In addition, Study 2 found that the extent to which individuals have attributed a meaning to their memory (i.e., the extent to which the memory is integrative) influences the way in which they describe themselves after they recall it. In accord with Beike et al.'s (2004) finding that open memories (i.e., memories individuals have not come to terms with) lead to the use of more emotional self-descriptors, this study found that if individuals have not been able to attribute meaning to their memory, they may shift their attention to their emotions and/or experience a more intense emotional response. They also seem to experience a more positive working self (as indicated by higher state self-esteem and a greater proportion of recreation/exploration goals) when their positive memory is non-integrative and their negative memory is integrative.

Taken together, the findings of the first two studies suggest that memory recall may influence the working self that is active at any time. The way in which it does this depends on its characteristics, mainly valence and level of integration. Because both studies focused on memories that had had a significant influence on the self, were often traumatic, and were rated as very vivid, their findings may help explain why negative/traumatic memories and related intrusions have such a negative impact on patients. Below is a description of the chain of events that may be set off when such memories are retrieved.

In the context of the SMS model (Conway, Singer, et al., 2004), which argues that there is a reciprocal relationship between AM and the self, it may be argued that the retrieval of specific memories leads to the activation of related working selves. Thus, when environmental stimuli trigger the recall of a memory the individual has not come to terms with or has not integrated within his/her autobiographical knowledge base, a negative working self related to this memory may be activated. According to the SMS, the working self contains self-images and a hierarchy of goals that drive cognition, affect, and behaviour. In addition, its activation is associated with an affective response (see p. 13). This may explain why, when they encounter

stimuli that trigger the recall of negative/traumatic memories, patients may experience intrusive images related to these memories, negative core beliefs encapsulated within these images, and negative emotions. For a patient with social phobia, for example, having to give a speech may trigger the retrieval of a memory depicting an episode in which he/she was publicly humiliated. The retrieval of this memory may in turn lead to the activation of a working self containing an image of the self appearing foolish in front of others and associated core beliefs such as “I am inadequate.” The experience of the intrusive image and the negative core beliefs may then influence the way the patient feels about him/herself and the emotions he/she experiences when in front of the audience. The findings of Studies 1 and 2 suggest that the patient in this case may experience low state self-esteem and turn his/her attention inwards, focusing on his/her emotional state. In line with the cognitive model of social phobia (Clark & Wells, 1995) and existing evidence on this disorder (e.g., Hackmann et al., 2000), the patient may feel anxious and scared.

The activation of a memory-related working self in response to environmental stimuli may also account for the behavioural responses triggered by the experience of intrusions. As described in Chapter 1, many patients react to intrusions by engaging in different behaviours, such as self-induced vomiting (bulimia nervosa: Hinrichsen et al., 2007), reassurance seeking or health checking (health anxiety: Muse et al., 2010), and safety behaviours such as gaze avoidance (social phobia: Clark & Wells, 1995). As the SMS model (e.g., Conway, Meares, et al., 2004; Conway & Pleydell-Pearce, 2000) and the self-regulation theory (Carver & Scheier, 1990) argue, the goal hierarchy of the working self is involved in positive and negative feedback loops that control behaviour (see pp. 11-13). The goals and sub-goals constituting this hierarchy contain a standard state that must be achieved or avoided, mechanisms for assessing the discrepancy between the individual’s actual state and this standard, and plans for reducing or increasing the discrepancy (Conway, Singer, et al., 2004). When these goals are involved in negative feedback loops, the plans they generate (and consequently the individual’s behaviour) aim to reduce the discrepancy between the actual state and the standard in order to reach the standard (Carver & Scheier, 1990; Conway, Meares, et al., 2004). When they are involved in positive feedback loops, the plans aim to increase the discrepancy between the actual state and the standard in order to avoid this standard. Conway, Meares, et al. (2004) argue that individuals may

perceive images related to negative/traumatic experiences as a standard to avoid in positive feedback loops. Following this line of reasoning, it may be argued that the activation of a working self containing self-images related to a negative/traumatic experience will contain goals that aim to distance the individual from the state of the self or of the world represented in these images.

The above argument is supported to an extent by the finding of Study 2 that participants who recalled a negative self-defining memory reported more goals related to achievements than those who recalled a positive one. Since negative/traumatic memories are about thwarted goals (e.g., Singer & Salovey, 1993), individuals may be more motivated to avoid failure and achieve as much as they can when working selves related to such memories are activated. This, then, may influence their behaviour. In the example of the patient with social phobia described earlier, the activation of the image of the self looking foolish before giving a speech may be associated with goals that motivate him/her to *avoid* looking foolish and achieve the opposite effect (i.e., appear relaxed and competent). These goals may then lead this patient to engage in safety behaviours such as self-monitoring that, paradoxically, reduce the probability of achieving the desired goal. Similarly, a patient suffering from bulimia nervosa may engage in self-induced vomiting after a bingeing episode because the working self that is activated when he/she experiences images of being overweight or physical sensations of the clothes being tight (see p. 21 and p. 26) is motivated to *avoid* these states. Of course, as described in Chapter 1, the behaviours triggered by the experience of the intrusions may not be adaptive and in the long run may help maintain the disorder.

Another “side effect” of the relationship between intrusive images and the self is that the repeated activation of these images may make both the images and the associated negative working selves more frequent. As the SMS model (e.g., Conway, Singer, et al., 2004) argues, intrusive images are salient because they are not integrated within the long-term self. This salience makes them more likely to be activated, which means that they are continuously rehearsed. According to Brewin’s (2006) retrieval competition hypothesis, increased rehearsal increases the accessibility of both the intrusive images and the linked working selves. The ease with which these intrusive images are accessed may strengthen the extent to which

they trigger dysfunctional behaviours and may thus increase their contribution to the maintenance of psychological disorders.

One of the implications of the relationship between memories and working selves observed in Studies 1 and 2 is that, with patients who experience intrusions related to past negative/traumatic experiences, therapy may need to target the working self related to these experiences and to reduce its influence on patients' behaviour. Studies 3 and 4 provided some evidence that IR may already do this. In line with the retrieval competition account of CBT (Brewin, 2006) and with the main hypothesis of this research project, these studies suggested that both exposure to a negative memory and IR may influence the characteristics of the memory, its meaning, and its subsequent influence on working self activation. Study 3 found that both verbal and imagery exposure influenced participants' perception of their memory: compared to the pre-exposure session, in the post-exposure session participants rated their memories as less negative, distressing, vivid, and central for their identity. These findings were partially replicated in Study 4, which found that, following IR, participants rated their memories as less negative, less influential on the way they saw themselves, less distressing, and as associated with a weaker negative core belief.

The findings of Studies 3 and 4 support existing literature (e.g., Arntz & Weertman, 1999; Smucker et al., 1995; Wild et al., 2007, 2008) in suggesting that IR helps individuals to modify the meaning that they have attributed to their negative/traumatic experience. Although their perception of how distressing the event was when it happened or the vividness of the intrusive image may remain the same (see Chapter 5), their perception of what this event means to them in the present, what implications it has for their current life, and how it fits with the rest of the AMs making up their life story, may change. As some participants reported in Study 4, IR helped them to update their interpretation of their memories. Because they had actively avoided thinking about these memories, they may not have had the chance to see that they had changed since the event happened and that perhaps other events had taken place which disconfirmed the meaning of the memories (e.g., events which showed that they were not a failure). Although no causal relationships could be determined from these studies, it may be argued that this meaning update facilitated the integration of the negative memory within the autobiographical knowledge base in the long-term self, in a process similar to the one described in Figure 1.4 (see p.

44). The integration may have in turn influenced the memory's ability to influence working self activation. This may explain why, following exposure (Study 3) and IR (Study 4), participants reported a more positive evaluation of themselves and reduced negative affect after recalling their memory. In Study 4, perhaps because of the additional effect of rescripting, they also reported increased positive affect. All these changes suggest that participants were able to access a more positive working self when the memory was retrieved following the interventions (i.e., after integration).

The argument regarding exposure and IR facilitating the integration of the negative/traumatic memories within the autobiographical knowledge base and the importance of integration is supported by the finding of Study 2 that, apart from valence, integration was the only memory characteristic that seemed to influence the working self. This finding needs to be replicated. However, it does suggest that therapeutic techniques can be effective if they help the integration of the negative/traumatic memory and that other changes in memory characteristics may not play a significant role in the treatment outcome. In fact, although Study 3 found a small reduction in image vividness following exposure, Study 4 did not find such a reduction following IR. Both Studies 2 and 4 suggest that a reduction in memory specificity or vividness may not be a necessary step for the other changes associated with IR to take place. In the context of trauma, it may be that, once the sensory representations of the trauma are integrated with the more contextual representations (Brewin et al., 2010), the intensity or vividness of the trauma memory is no longer important and has no influence on the extent to which the trauma memory influences the self when retrieved. This may explain why, for example, self-defining memories remain vivid (Singer & Salovey, 1993) even when individuals have come to terms with them.

The findings of this research project, added to the existing evidence on the application of IR (e.g., Brewin et al., 2009; Wild et al., 2007, 2008) and the retrieval competition account of CBT (Brewin, 2006), suggest that treatment may reduce the accessibility of negative working selves containing recurrent intrusive images without any explicit attempt to do this on the part of the therapist. However, this does not ensure that patients will not experience a relapse as these negative working selves re-emerge, perhaps in response to other negative life experiences. As mentioned in Chapter 1 (p. 43), to date there is no evidence regarding relapse rates following the

administration of IR. The possibility that the intrusive images related to the rescripted memory may be experienced again and that the working selves containing them will become salient in the case of re-traumatisation or other stressful life events, therefore, cannot be excluded. The findings of this PhD project suggest that therapists could try to maximise therapeutic benefits and/or reduce the likelihood of relapse by educating patients regarding the nature of the self (especially the existence of multiple working selves) and by training them to exercise greater conscious control over which working selves become activated in response to changes in environmental demands.

According to Conway, Singer, et al. (2004), working selves (and their associated self-images and goals) are activated when environmental circumstances change and therefore require individuals to adapt and respond accordingly. The activation of these working selves is the attempt of the SMS to help the individual achieve what Conway and his colleagues call *correspondence*. As mentioned earlier, patients experience intrusions in the presence of specific cues. With these patients, then, therapy may need to focus on preventing the activation of intrusions in the presence of these cues after the memories associated with the intrusions have been rescripted. For patients with social phobia, for example, video feedback (Clark, 2001; Clark & Wells, 1995) may be used to help patients develop a realistic image of how they look in social situations such as giving a public speech or staying in the presence of strangers. Therapy may then focus on training the patient to access this image (and the associated working self) when he/she is in such situations. Similarly, a patient with PTSD who has experienced a car accident and has an intrusive image linked to the idea of the self as a vulnerable victim who is about to die, may be trained to access the image (and associated working self) of him/herself as alive and in control of his/her environment in situations in which he/she is likely to feel powerless and vulnerable. This explicit, greater awareness of and focus on image/working self accessibility may give patients greater control over their perception of themselves. In addition, it may make them less susceptible to significant shifts in this perception as their environment and situational demands change.

The suggestion that therapists need to educate patients with regards to the nature of the self and should focus on the memory-self relationship is linked to another important implication of the findings of this PhD project: that clinical psychology needs to rely more on theory and evidence coming from other areas of

psychology. As highlighted at the beginning of this chapter, this thesis relied on theoretical and empirical work coming from clinical, social, and cognitive psychology in order to investigate the changes involved in IR. It used a theoretical framework – the SMS model – which is purely cognitive but is strongly based on social psychological theories of the self. In addition, it employed different measures of self and memory characteristics. Although it presents a number of limitations which will be discussed in the next section, the project provided rich information about the influence of memories on the self and the role therapeutic interventions may play in modifying this influence. It suggested that clinical research can benefit from developments in other areas of psychology in order to understand better the maintenance of disorders and accomplish what many researchers (e.g., Carey, 2011; Kazdin, 2007, 2009) nowadays see as an essential challenge for the area: understanding mechanisms of change in therapy.

Evidence-based cognitive models of psychological disorders such as Ehlers and Clark's (2000) PTSD model are useful for understanding how disorders are maintained and give important indications as to how therapy may bring about symptom alleviation. However, the findings of the current project suggest that they may not be sufficient. These findings suggest that clinical psychology needs to rely particularly on social cognitive theories of the self in order to understand the cognitive changes promoted by therapy. They imply that the behavioural changes and perhaps even the symptom alleviation resulting from therapy may be only one part of the picture and may actually be a result of deeper cognitive changes in the way individuals perceive themselves. These changes may include, but not be limited to, maladaptive core beliefs. Given the close relationship between memory, imagery, and the self demonstrated by this research project, clinicians need to focus on patients' broader sense of self instead of focusing on core beliefs only in order to maximise therapeutic outcomes. Focusing on specific key processes such as working self activation may not only reduce the likelihood of relapse, but may also speed up the recovery process and make therapy more cost-effective.

6.4 Limitations and Strengths of the Present Research

To my knowledge, this was the first project to investigate the mechanisms of change involved in IR by focusing on the memory-imagery-self relationship. Even

though it provided a significant insight into these mechanisms, it presents a series of limitations that must be taken into account when its findings are considered. Some of the limitations were mentioned in previous chapters. Below is a summary of the most significant ones.

First, throughout the project difficulties were encountered in operationalising the working self. Although Conway and colleagues (e.g., Conway, 2005; Conway, Singer, et al., 2004) give a clear description of the contents of the working self and there is considerable research on state variations in affect or self-aspects such as self-esteem or self-concept clarity (e.g., Campbell et al., 1996; Zeigler-Hill & Showers, 2007), to my knowledge to date there has been no research that has attempted to assess the working self. One consequence of the difficulty in operationalising the working self is that the measures used to capture it in the present project did not always seem to be adequate. The Twenty-Statement Test (TST; Kuhn & McPartland, 1954) and the personal goals measure (Emmons, 1986) used to assess the content of the working self (i.e., self-cognitions and goals) in Study 2, for example, seemed to tap mostly into participants' long-term self. Furthermore, the measurement of self-concept clarity with the State Self-Concept Clarity Scale (SSCCS; Nezlek & Plesko, 2001) yielded inconsistent results. Whereas Study 1 found a difference in state self-concept clarity following positive and negative memory recall, the other studies failed to find a difference even after an intervention (exposure and IR) had been administered. Although these findings may be due to the fact that state self-concept clarity does not really fluctuate in response to memory recall, they could also be a result of the SSCCS not being sensitive enough to detect these fluctuations.

Second, the studies conducted as part of this project did not allow for any causal relationships between the variables to be determined. Studies 1 and 2 suggest that the recall of self-defining memories is associated with the activation of memory-congruent working selves. Studies 3 and 4, on the other hand, suggest that a modification in the way participants perceived or interpreted their memories led to a change in the accessibility of these memories so that, when they were recalled following the interventions (exposure or IR), more positive working selves were activated. However, given the nature of the studies and the lack of control conditions (e.g., conditions involving the recall of non-self-defining memories in Studies 1 and 2 and no intervention in Studies 3 and 4), it was not possible to determine which factors

or changes led to which other changes and to exclude alternative explanations of the findings. The results of Studies 1 and 2, for example, may have been simply due to mood induction produced by the memory recall. The results of Studies 3 and 4, on the other hand, may have been produced by the repeated exposure of participants to their negative memories in the testing sessions rather than by the interventions. The project, therefore, cannot claim to have uncovered the precise mechanisms operating in IR. It has identified *potential* mechanisms involved and has provided a theoretical framework through which these mechanisms can be studied, but it has not provided any conclusive evidence.

Third, the theoretical framework adopted in this project presents some problems that may affect the interpretation of the findings. The SMS model (Conway, Singer, et al., 2004), for example, seems to assume that the long-term self is benign and that the integration of negative memories within the life story automatically makes the positive working selves constituting it more likely to be activated. This, however, may not always be the case. In patients with borderline personality disorder, for example, the sense of self is constructed on a largely negative set of self-schemas (e.g., Kellogg & Young, 2006; Young et al., 2003). In these patients, negative working selves may still be more likely to be accessed after the integration of a trauma memory has been achieved. In addition, the SMS model assumes that there is a clear distinction between trauma memories and self-representations. The existence of this distinction is supported by theories of the self and empirical evidence (see Section 1.4.1). Nevertheless, the dividing line may not be clear cut, especially given the central role trauma memories play in the organisation of identity (see p. 18). It may be that, when a trauma-related intrusion is experienced, it is the trauma memory, rather than an associated working self, that is activated. In Studies 3 and 4 of the present project, therefore, the changes in memory characteristics observed following intervention may have been at the origin of the differential impact of memory recall on state self-esteem and affect. Finally, the retrieval competition account of CBT (Brewin, 2006) assumes that negative self-representations are permanent and can always be accessed in the presence of the right retrieval cues. Although, as mentioned in Chapter 1, this account is supported by the evidence on relapse, the traditional argument that CBT changes the content of self-representations cannot be discarded completely. Research (e.g., Kindt, Soeter, & Vervliet, 2009; Schiller et al., 2010)

shows that fear responses can be permanently eliminated under certain conditions (e.g., if the reconsolidation of the fear memories is disrupted or updated). This may indicate that the fear-related working selves have been modified rather than made less accessible. The change in the meaning of the negative memories observed in Studies 3 and 4, then, may have produced a change in the content of the related working selves rather than a change in their accessibility.

Fourth, the project relied on a non-clinical population. Although some participants had suffered or were suffering from psychological disorders such as depression or eating disorders at the time of data collection, their proportion was minimal compared to the total sample. In addition, in those studies which checked for previous exposure to traumatic events (Studies 2 and 4), participants tended to report having experienced few such events. The negative memories participants reported in each study were not always traumatic, but they were all significant experiences that had influenced the way they thought about themselves, other people, or life in general. This may suggest that the impact memory recall had on them and the impact the interventions (exposure and IR) had on their memories may closely resemble the effects we would see in clinical populations. However, the extent to which the findings of these studies may be generalised to clinical populations who might have a higher exposure to traumatic experiences is unclear.

Despite the limitations mentioned above, this research project also has a series of strengths. First, it relied on different designs (within-subjects, between-subjects, mixed) and employed different data collection sources (e.g., self-report ratings, standardised questionnaires, online resources, the computerised me/not me task, the card-sorting task, a semi-structured interview). Although the measures used were not necessarily optimal, they did provide rich data that focused on different aspects of the self and of the memories under investigation. Second, as mentioned earlier, the project highlighted the importance of understanding the self in clinical psychology by looking at it in a broad way instead of relying only on constructs such as schemas. By providing evidence that supports to some extent the SMS model (e.g., Conway, Singer, et al., 2004) and the retrieval competition hypothesis (Brewin, 2006), it suggested that changes in the way individuals perceive themselves when negative/traumatic memories are activated may lie at the root of the other changes promoted by therapy. Finally, this project combined work coming from different

areas of psychology to provide a theoretical framework that may explain what patients experience when their intrusive images come to mind and how techniques like IR operate. In addition, it provided some empirical evidence to support this theoretical framework. In this way, it laid the foundation for future research that may help us obtain a holistic understanding of IR and perhaps of other cognitive-behavioural techniques. As highlighted in Chapter 1 (see pp. 41-44), to date there have been mainly assumptions as to how IR and CBT in general work. These assumptions are understandably difficult to test because the concepts they use to explain therapeutic change (e.g., change in the content or structure of schemas) are difficult or impossible to operationalise. The current project showed that, by drawing on other areas of psychology (especially social psychology), it may be possible to operationalise self-related constructs and to develop testable hypotheses as to how psychotherapy works.

6.5 Directions for Future Research

As mentioned in the previous section, the current project is an early attempt to understand the role of the memory-imagery-self relationship in the cognitive changes associated with IR. As such, it prepares the path for exciting future research into these cognitive changes that can build on its strengths while addressing its limitations.

One of the first things future IR research using the SMS model (e.g., Conway, Singer, et al., 2004) needs to do is provide a more accurate operationalisation of the working self and identify – or develop – suitable measures for assessing it. It also needs to examine in greater detail changes in self-structure following treatment which, as Showers and colleagues (2004) suggest, may be very important for understanding therapeutic change. A better understanding of the working self and of self-structure may enable us to understand this change in greater detail.

Future research also needs to build on the findings of this project by investigating factors that *mediate* and *moderate* therapeutic change which, according to Kazdin (2007, 2009), are essential for understanding this change. It needs to investigate, for example, whether the reduced strength of the belief encapsulated in the intrusive image or other changed characteristics of the rescripted memory (e.g., reduced valence or distress) mediate the outcomes of IR. Following Kazdin's recommendations on research investigating therapeutic change, future research also

needs to involve experimental manipulation, for example in randomised controlled trials. As Chapter 1 pointed out, so far there have been only small-scale studies on IR. Randomised controlled trials involving large sample sizes may be an important step towards understanding this technique.

Finally, future research needs to replicate the findings of the current project using clinical populations. If the findings are replicated, then we can obtain a better understanding of the relationship between memory, imagery, and the self. Moreover, randomised controlled trials involving clinical populations that investigate mediators of change in IR may provide a better picture of what this therapeutic technique can achieve and how it may be refined further.

6.6 Conclusion

To conclude, this thesis tried to investigate the cognitive change processes involved in IR by focusing on the relationship between memory, imagery, and the self and the way this technique may influence this relationship. Using the retrieval competition account of CBT (Brewin, 2006) and the SMS model (e.g., Conway, Singer, et al., 2004), the thesis tested the hypothesis that IR reduces the accessibility of the trauma-related working selves that contain the intrusive images patients experience. Results from the studies conducted as part of the research project suggested that memory recall may influence working self activation depending on memory characteristics such as valence and extent to which individuals have abstracted meaning from these memories. In addition, they suggested that IR may change the way individuals perceive and interpret the rescripted negative/traumatic memories so that, when they recall them again, these memories have a less disruptive effect on the self. Collectively, the findings provide some initial support for both the retrieval competition hypothesis and the SMS model. In addition, they suggest the need for more research on the mechanisms of change in IR using clinical populations and relying on theories and empirical evidence coming from other areas such as social and cognitive psychology.

APPENDIX A

Reasons for Excluding Participants from the Data Analysis in Study 2

Participants in Study 2 were excluded from the data analysis if:

- they provided no written description of the self-defining memory ($n = 3$) or else provided single-word or single-phrase descriptions of their memory ($n = 6$), thus making it impossible to determine whether the experimental manipulation (bringing the memory to mind) was achieved or not and to code the memories in terms of their characteristics
- they spontaneously indicated that their memories were less than 1-year old and thus, according to the definition of Singer and Blagov (2000), could not be considered self defining ($n = 3$)
- they failed to complete all the measures in the study ($n = 2$)
- the rating of the influence the memories had had on them fell above or below 2 *SDs* from the sample mean ($n = 6$)
- they were in the negative memory condition, but indicated that the memory was more positive than negative ($n = 3$)
- the difference between the positive and negative valence of the memory fell above or below 2 *SDs* from the sample mean difference ($n = 10$)
- they were in the negative memory condition, but indicated that the negative emotions associated with the memory were less intense than the positive emotions ($n = 5$)
- they were in the positive memory condition, but indicated that the positive emotions associated with the memory were less intense than the negative emotions ($n = 2$)
- the difference between the intensity of the positive and the negative emotions associated with the memory fell above or below 2 *SDs* from the sample mean difference ($n = 6$)

APPENDIX B

Trauma Checklist Used in Studies 2 and 4

Many people have experienced a distressing, traumatic event at some point in their lives. Below is a list of traumatic events. Please tick the box next to **any** of the events you have experienced.

- Personal injury or illness
- Injury, illness, or death of a family member
- Injury, illness, or death of a friend
- Abortion
- Serious accident (e.g., fire, car crash)
- Divorce or separation of parents
- Drug or alcohol problems of parents
- Physical abuse (e.g., being slapped, punched)
- Emotional abuse (e.g., being ridiculed, bullied)
- Non-sexual assault (e.g., physical attack) by a family member or other known person
- Non-sexual assault (e.g., physical attack) by a stranger
- Sexual assault (e.g., rape, attempted rape) by a family member or other known person
- Sexual assault (e.g., rape, attempted rape) by a stranger
- War
- Natural disaster (e.g., flood, earthquake)

If you ticked any of the above, please answer the following questions.

1. Did you experience emotions of intense fear, horror, or helplessness at the time any of the events occurred? Yes / No

If yes, please list the events that triggered these emotions.

2. Did you experience any of the events more than once? Yes / No

If yes, please list which ones.

3. Are any of the events going on at the moment? Yes / No

If yes, please list which ones.

APPENDIX C

Semi-Structured Interview Used to Elicit Negative Self-Defining Memories in Study 4

People often experience events that change the way in which they see themselves. Despite the passage of time, they tend to remember these events very clearly. When they recall them, many people tend to experience strong feelings and images related to them. What I'd like you to do now is recall such an event. It must be a negative experience that occurred at a specific time and place. This experience must be one that you often think about and have not yet put behind you, but that has influenced the way in which you see yourself. Can you think of such an experience?

If yes, ask: Can you tell me briefly what the memory is about in one or two sentences?

How old were you at that time?

How negative was this experience of on a scale from 0 (*not at all*) to 10 (*extremely*)? _____

To what extent do you think this experience of has influenced the way in which you see yourself on a scale from 0 (*not at all*) to 10 (*extremely*)? _____

Ask the participant to think of another experience if the valence rating and/or the influence rating is below 5. When this happens (e.g., when the memory is not suitable), say, for example:

- *It sounds like this has been a distressing experience for you, but you say that it has not influenced much your sense of self. Can you explain why?*
- *It sounds like this is an important memory, but for this study we are actually looking for memories that are negative but not traumatic / that have influenced people's way of seeing themselves.*

Once a memory that meets the criteria is identified, proceed with the interview.

Now I would like us to explore in greater detail this We will especially focus on the images related to it. Do you have any images of

- *If they say “no,” state the definition of images: Images are mental representations of experiences or objects. They contain different sensory components (e.g., sight, touch, and smell), so you may have an image of the experience even if it does not contain a visual component (i.e., even if you can’t get a picture of it).*

I am going to help you explore the memory and related images by asking you some questions about them. Can you please close your eyes as you try to recall the memory?

After they have closed their eyes, say: I would like you to focus on the experience as if it is happening right now and to make it as vivid as possible.

Allow about 30 seconds and then ask: Do you have a picture of the experience now?

When they say “yes,” start exploring the image.

Where are you?

What are you doing?

Are there any other people present?

If yes, ask: Where are they? What are they doing?

Summarise: So you can see and are

Can you hear anything?

If it’s someone’s voice they are hearing: What does it sound like to hear his/her voice? What tone of voice is that? What is he/she saying?

Do you notice anything else around you, for example any smells or tastes?

Do you feel any sensations in your body? What are they? Can you show me in what part of your body you are feeling this

Now that you are remembering this, how vivid is it in your mind on a scale from 0 (*not at all*) to 10 (*extremely*)? _____

Are you looking through your own eyes or are you looking at yourself as an external observer would?

What are you thinking about in the image?

How are you feeling as you

How distressed were you when on a scale from 0 (*not at all*) to 10 (*extremely*)? _____

How distressed are you now, after recalling this experience, on a scale from 0 (*not at all*) to 10 (*extremely*)? _____

What is the worst thing about this event?

Summarise.

In what ways do you think this experience has influenced you?

What does the memory say about you as a person?

Does it say anything about other people? What?

Does it say anything about the world in general? What?

Can you summarise what you just said into a single statement that, according to you, captures the meaning of the memory and images related to it?

On a scale from 0 (*not at all*) to 10 (*extremely*), how strongly do you believe in this statement right now? _____

Now that we have explored the image, you can slowly let it fade away from your mind. When you are ready, please open your eyes.

APPENDIX D

Imagery Rescripting Protocol Used in Study 4

Introduce self to the participant. Explain the procedure as follows: We are going to do some work on the memory that you described to..... I've got some notes here about it that were made at the last session.

Go through the memory briefly and confirm what emotions are associated with the memory. Use this as a chance to establish rapport with the participant.

We're going to be looking at (*the memory*) in some detail today and I'm going to ask you to relive the memory from different perspectives. For some people, this can be helpful in coming to terms with a difficult and upsetting memory like this one. In a couple of minutes, I'm going to ask you to shut your eyes and to go through the memory as if it was happening now, using the first person present tense (e.g., "I am"). Then I'll take you through things a step at a time. If you have any questions, just ask me and if you want to stop at any time, just let me know. Would you like to ask any questions before we start?

Step One

In a moment, I'll ask you to close your eyes and recall (*the memory*). Try to picture it in your mind in as much detail as possible as if you were there again. Let yourself experience the feelings that you had at that time. OK are you ready?

Shut your eyes and focus on (*the memory*). Try to get as clear a picture as you can. Describe it in the present tense, for example "I am (*insert from the memory*)."

Use prompts:

Roughly how old are you?

What can you see?

What can you hear?

Do you have any sensations (on your skin, in your body)?

What sort of day is it?

What are you wearing?

When you judge that the participant has got a clear picture of the memory and is emotionally engaged with it:

How vivid is the memory where 0 is not at all vivid and 10 is completely clear?

How distressing is it where 0 is not at all distressing and 10 is extremely distressing?

What emotion do you feel while you are imagining this event? (rating: where 0 is not at all, and 10 is extremely)?

Step Two

Keeping your eyes closed..... Now I'd like you to imagine the memory that you've just described from the perspective of your adult self now. So imagine that you are watching what happened as you are now. Can you describe what you can see?

What's happening now?

How do you feel about what's happening to (*insert participant's name*) in the memory?

What do you think about what's happening?

Is there anything that you'd like to do?

[Do you need anyone to come and help (*participant's name*)?]

Repeat as necessary.

Move on to step 3 when you judge that the participant has a clear picture of the memory from the perspective of his/her current self and has found at least one successful intervention.

How vivid is the memory where 0 is not at all vivid and 10 is completely clear?

How distressing is it where 0 is not at all distressing and 10 is extremely distressing?

Rate any individual emotions (e.g., how anxious do you feel?)?

Step Three

Keeping your eyes closed... Now I'd like you to go back to the memory (looking out through the eyes of young/er X). Get a clear picture of (*insert the memory*). Now I'd like you to go through the memory from the perspective of (*young/er X*) and imagine what it was like when you saw (*give example of action / intervention of adult self in Step 2*).

What are you thinking about what (*X*) did?

What are you feeling?

What else would you like (*X*) to do? Ask (*X*) to (*insert action*).

Is there anything (*X*) could do that would make you feel better about what happened?

Ask (*X*) to (*insert action*).

How are you feeling now?

What else would you like to happen?

Continue until you get shift of affect or until the child/earlier self runs out of things to ask the adult to do.

How vivid is the memory where 0 is not at all vivid and 10 is completely clear?

How distressing is it where 0 is not at all distressing and 10 is extremely distressing?

Rate any individual emotions (e.g., how anxious do you feel?)?

OK try to hold on to that feeling of (*insert*) for a couple of minutes. Notice what it's like and any sensations you have in your body while you are feeling (*insert*). *PAUSE*

Then when you're ready, slowly open your eyes.

Clinical Debrief

How are you feeling now?

What was that like? Were you able to concentrate throughout the exercise or did your attention wander? *If yes:* What was that like? (*Check for dissociation.*)

Did anything surprise you?

Did any emotions come up during any parts of the exercise that were unexpected, or troubling in any way? (*Explore if necessary.*)

APPENDIX E

Scale Used to Assess Adherence to the Intervention Protocol in Study 4

Aim of Scale

The aim of this scale is to assess whether the therapists administering one session of imagery rescripting (IR) to participants in the study “Impact of one session of imagery rescripting on the self and memory characteristics” followed the IR protocol outlined by Arntz and Weertman (1999).

The scale is divided into two parts. The first part assesses whether therapists followed every stage of the protocol, as adapted for the purposes of the current study. The second part, on the other hand, focuses on some key characteristics of the therapist’s style in conducting the session. Please make sure you follow the rating instructions for each part.

Part 1 – Adherence to the Protocol

This part focuses on the stages of IR, as outlined by Arntz and Weertman (1999) and adapted for the purposes of the current study. Please indicate whether each item is present (YES) or not (NO) by circling the appropriate response.

Beginning the Session

The therapist introduces herself.	YES	NO
The therapist explains what is going to happen during the session.	YES	NO
The therapist summarises the memory or the part of it that is going to be rescripted and, if necessary, elaborates on the meanings and the emotions associated with it.	YES	NO

Stage 1: Imaginal Exposure

The therapist helps the participant to recall the memory as vividly as possible as if he/she is reliving the experience depicted in it.	YES	NO
The therapist prompts the participant to talk about the experience depicted in the memory in the present tense.	YES	NO
The therapist probes for specific thoughts and beliefs the participant	YES	NO

experiences while reliving the traumatic experience.		
The therapist asks the participant to rate how strongly he/she believes in the thoughts associated with the traumatic experience.	YES	NO
The therapist probes for specific emotions the participant experiences while reliving the traumatic experience.	YES	NO
The therapist asks the participant to rate the intensity of the emotions associated with the traumatic experience.	YES	NO
The therapist asks the participant to report sensory experiences (e.g., body sensations, images, smells) associated with the traumatic experience.	YES	NO

Stage 2: Rescripting from the Current Self Perspective

The therapist instructs the participant to recall the memory from the perspective of his/her current self.	YES	NO
The therapist asks the participant what he/she would like to do to intervene in the memory, what would help him/her.	YES	NO
When needed, the therapist encourages the participant and/or other intervening figure to interact with the younger self.	YES	NO
The therapist prompts the participant to talk about the experience depicted in the memory in the present tense.	YES	NO
The therapist probes for specific thoughts and beliefs the participant experiences while reliving the traumatic experience.	YES	NO
The therapist asks the participant to rate how strongly he/she believes in the thoughts associated with the traumatic experience.	YES	NO
The therapist probes for specific emotions the participant experiences while reliving the traumatic experience.	YES	NO
The therapist asks the participant to rate the intensity of the emotions associated with the traumatic experience.	YES	NO
The therapist asks the participant to report sensory experiences (e.g., body sensations, images, smells) associated with the traumatic experience.	YES	NO

Stage 3: Rescripting from the Younger Self Perspective

The therapist instructs the participant to recall the memory and imagine the intervention of his/her current self and/or of the other intervening figure from the perspective of the younger self.	YES	NO
The therapist encourages the participant's younger self to ask for help from the current self and/or from the other intervening figure as and until needed. ¹⁴	YES	NO
The therapist encourages the participant to take responsibility and choose the intervention he/or she wants to make in the memory (if this did not happen in the previous step).	YES	NO
The therapist prompts the participant to talk about the experience depicted in the memory in the present tense.	YES	NO
The therapist probes for specific thoughts and beliefs the participant experiences while reliving the traumatic experience.	YES	NO
The therapist asks the participant to rate how strongly he/she believes in the thoughts associated with the traumatic experience.	YES	NO
The therapist probes for specific emotions the participant experiences while reliving the traumatic experience.	YES	NO
The therapist asks the participant to rate the intensity of the emotions associated with the traumatic experience.	YES	NO
The therapist asks the participant to report sensory experiences (e.g., body sensations, images, smells) associated with the traumatic experience.	YES	NO
The therapist asks the participant to hold on to the feelings he/she is experiencing after the rescripting and to open his/her eyes when he/she is ready.	YES	NO

¹⁴At some point the participant may spontaneously comment that there is nothing else he/she wants to occur or else it may be clear that there is a shift in affect and therefore no further intervention from the current self is needed.

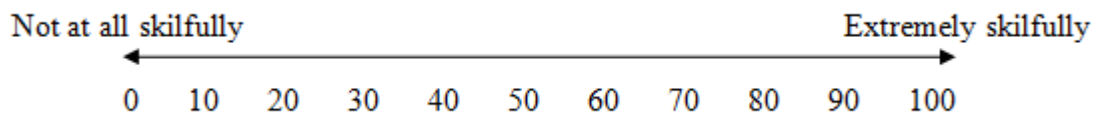
Ending the Session

The therapist checks how the participant is feeling.	YES	NO
The therapist explores the participant's response to the rescripting (e.g., how he/she found it, whether there was anything that surprised him/her).	YES	NO

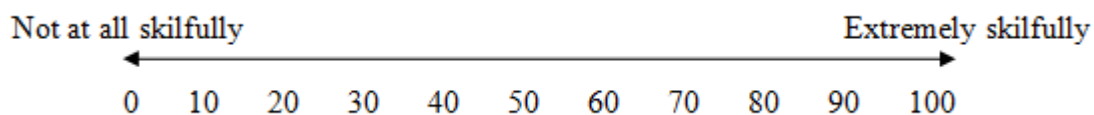
Part 2 – Therapist's Style

This part focuses on the way the therapist conducts the IR session and ensures that the participant remains focused during the session and receives the prompting and reassurance needed. Please rate how skilfully the therapist performs each of the actions reflected in the following items on a scale from 0 (*not at all skilfully*) to 100 (*extremely skilfully*).

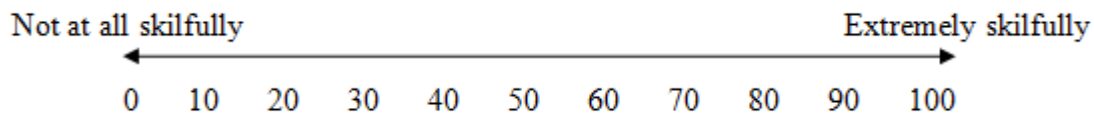
1. The therapist is responsive to the participant's emotional distress.



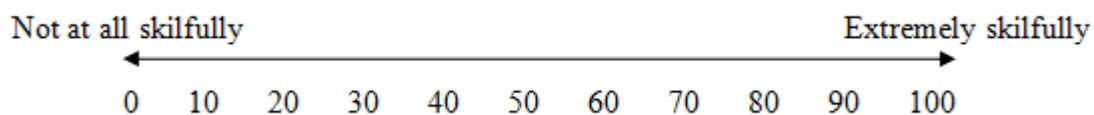
2. The therapist uses empathic statements as appropriate during the session.



3. The therapist asks open-ended questions as necessary (e.g., "What would you like to happen?")



4. The therapist frequently summarises and reflects as necessary to keep the participant focused.



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