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Posttraumatic Stress Disorder, Thought Suppression, and the Self-Regulatory Executive Function Model

By

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Thesis Abstract

The first paper of the thesis commences with a summary of several cognitive models of posttraumatic stress disorder (PTSD). This summary facilitates an understanding of a range of cognitive factors that have been linked with the aetiology and maintenance of traumatic symptoms. A key factor that has been associated with persistent, traumatic intrusions is thought suppression. Ironically, attempts to suppress or avoid thoughts can actually lead to their delayed resurgence, a mechanism termed 'the rebound effect' (Wegner 1994). Within PTSD, the majority of research supports the rebound effect, but not consistently. As a way forward, the Self-Regulatory Executive Function (S-REF) model (Wells & Matthews 1994, 1996) is therefore presented to address potential limitations of Wegner's theory and current cognitive models of PTSD. Most importantly, the S-REF model considers the potential impact of metacognitive factors on traumatic material, including the role of a metacognitive thinking style called detached mindfulness.

The second paper describes an exploratory study which aims to compare the impact of thought suppression with detached mindfulness on the 'rebound effect' in analogue posttraumatic intrusions. The findings indicated that suppression of intrusions did not produce an immediate decrease in their frequency, followed by a delayed increase as expected in the 'rebound effect'. However, using a retrospective analogue measure, the suppression group did report more time thinking about the film compared with the detached mindfulness group during the first and second time periods. Notably, the percentage of time spent thinking about target thoughts recorded by a 5-hour diary measure did not reveal group differences. Limitations of the current study are discussed.

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Comparing the Impact of Thought Suppression with Detached Mindfulness on the Rebound Effect with Analogue Posttraumatic Intrusions.

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Abstract

The prevalence of posttraumatic stress disorder (PTSD) in various trauma populations (Foa & Meadows 1997) highlights the need to identify explicit aetiological and maintenance factors of the disorder. This review summarises the main features of a number of cognitive models of PTSD, and considers some of their limitations. Thought suppression is presented as a key maintaining factor in more recent models, and is a central focus of the review. Thought suppression is defined as a form of cognitive avoidance that sometimes leads to the 'rebound effect', or delayed resurgence of thoughts (Wegner 1994). Although this effect has been reported within the PTSD literature, it has not been consistently detected. A limitation common to the theory of thought suppression and current models of PTSD, is their failure to consider the role of metacognitive factors. This includes the thoughts individuals hold about their own thinking styles (Wells & Purdon 1999). The review proposes that Well's & Matthew's (1994, 1996) Self-Regulatory Executive Function (S-REF) model may offer a way forward. The S-REF model highlights the importance of metacognitive factors and proposes that a detached thinking style called detached mindfulness may have a beneficial impact on the processing of trauma memories.

Posttraumatic Stress Disorder, Thought Suppression, and the Self-Regulatory Executive Function Model

1. Introduction

Posttraumatic stress disorder (PTSD) is a common and often debilitating reaction to distressing events such as disaster, assault, or severe accidents (Fedoroff, Taylor, Asmundson & Kock 2000, Foa & Meadows 1997). Epidemiological studies conducted to date suggest that current prevalence rates range from 4%, to a lifetime prevalence of 8-15% in the general population (Kessler, Sonnega, Bromet, Hughes & Nelson 1995; Stein, Walker, Hazen & Forde 1997). Prevalence rates tend to decrease with time elapsed, although 50% of the individuals diagnosed as having PTSD may continue to have it for many years (Green 1994). Roth & Fonagy (1996) suggest that variation in prevalence rates may partly reflect sampling and design differences across studies.

The high prevalence rate of PTSD in various trauma populations impresses the need for clinicians and researchers to better understand the mechanisms of change within this client group. This review will commence with a brief outline of a number of cognitive models of PTSD which will provide a general introduction to the area. This summary will also highlight the role of several cognitive factors linked with the aetiology and maintenance of the disorder. One particular maintaining factor, thought suppression (Wegner 1994), will then be presented in some detail, including a review of related research within PTSD. A key disadvantage of Wegner's model and current models of PTSD, is that they fail to consider the potential impact of metacognitve factors on

traumatic material (such as thoughts and perceptions about traumatic thoughts). In an attempt to address this limitation, the remainder of the review will consider whether the Self-Regulatory Executive Function (S-REF) model (Wells & Matthews 1994, 1996) can provide a way forward. The S-REF model highlights the role of a metacognitve processing style called detached mindfulness on persistent thought recurrences.

2. Posttraumatic stress disorder: diagnostic features

The criteria for PTSD outlined within The Diagnostic and Statistical Manual of Mental Disorders (4th Ed) (DSM IV, American Psychiatric Association 1994), specifies that the disorder is precipitated by exposure to a traumatic event in which the individual experiences an intense sense of helplessness, fear or horror. This is accompanied by a belief that serious injury, death, or a threat to the physical integrity of self (or others) could occur. The hallmark of PTSD is the re-experiencing and avoidance of trauma-related memories (Carlson 1997, Foa &Meadows 1997), although symptoms also include associated numbing of general responsiveness, and persistent hyperarousal (American Psychiatric Association 1994). Symptoms need to be present for more than one month for a diagnosis of PTSD to be made.

2.1. Risk factors

Individuals exposed to the same trauma often differ extensively in their subsequent levels of distress. In part, this difference is linked to a range of risk factors for PTSD. These include factors such as age at trauma, gender and cultural issues, previous trauma experiences, childhood adversity, and psychiatric history (Brewin, Andrews & Valentine

2000). As outlined below, there are also a number of cognitive factors that may play an important role in determining different responses to trauma.

2.2. Co-morbidity

Post-traumatic stress disorder is rarely diagnosed in isolation, as it shares a number of clinical features with other psychiatric disorders (Davidson & Foa 1991). On average, approximately 80% of PTSD sufferers receive an additional diagnosis which may include depression, anxiety disorder, somatization disorder or psychosis (Davidson, Hughes, Blazer & George 1991). Co-morbidity with depression is especially common (Reynolds & Brewin1999, Roth & Fonagy 1996).

3. A brief summary of the key cognitive models of PTSD

3.1 Horowitz's information processing theory

The information processing approach advocated by Horowitz (1975, 1979, 1986) represents one of the most influential and comprehensive perspectives in understanding post-traumatic reactions (Joseph, Williams & Yule 1997). In his model, Horowitz proposes that individuals have mental models or schemata of the world and themselves, that are used to interpret incoming information. Horowitz further proposes that there is an inherent drive to make our mental models coherent with current information, a process conceptualised as 'the completion principle'. Traumatic events generally require significant schematic changes, and complete integration and cognitive processing of the event often takes some time to occcur. During this time, active memory tends to repeat its representations of the traumatic event causing emotional distress. However, to prevent

emotional exhaustion, there are processes of inhibition, which act as a feedback system controlling the flow of information (Joseph et al 1997).

According to Horowitz (1986), symptoms such as denial and traumatic intrusions observed during stress responses occur as a result of opposite actions of a control system. This control system helps to regulate incoming information to acceptable levels. If inhibitory control fails, intrusive nightmares and flashbacks occur. If inhibitory efforts are too strong in relation to active memory, symptoms reflecting the avoidance stage occur (denial and numbing). Horowitz (1986) suggests that failures of information processing can result in partially processed traumatic information remaining in active memory without being fully integrated. This leads to chronic posttraumatic reactions.

Horowitz has developed a comprehensive and detailed theory of PTSD. Nonetheless, several critics have highlighted limitations with his model. Jones & Barlow (1990) note that although the model accommodates the signs and symptoms of PTSD and is supported by some empirical data, it fails to fully address how psychosocial factors may influence the course of symptoms. In addition, limited attention is given to the role of the individual's interpretations and appraisals that may mediate between the traumatic event and subsequent adjustment (Brewin, Dalgleish & Joseph 1996). This appears to be a very important omission. It is likely that subjective interpretations and expectations, based on previous learning experiences for example, could affect the course of recovery considerably. The term 'active memory' used by Horowitz is also very vague. It is unclear whether this term refers to short-term memory, long-term memory or working memory.

3.2. The theory of victimisation

The theory of victimisation proposed by Janoff-Bulman (1979, 1983, 1989) complements and extends the work of Horowitz. This model places a focus on the pre-existing cognitive schemata that individuals bring to the traumatic event. Briefly stated, Janoff--Bulman suggests that PTSD is largely due to the shattering of basic assumptions that victims hold about themselves and the world. Central to Janoff-Bulman's theory is a core belief in personal invulnerability. Victimisation shatters this core belief, leaving the person feeling vulnerable to future victimisation. This sense of vulnerability appears to be linked with the disruption of three core beliefs which depict the world as benevolent and meaningful, and the self as positive. Coping with victimisation involves the individual coming to terms with these shattered assumptions, and re-establishing a cognitive system that permits effective functioning (Janoff-Bulman 1983, p.1).

From a critical perspective, Janoff-Bulman's work is relevant because it highlights the ways in which trauma-related information is incongruent with the usual assumptions individuals hold about the world. Nonetheless, there is little explanation of how such models are represented, or what cognitive processes are involved when these models are shattered (Brewin et al.1996). A further limitation of this model is that no consideration is given to the impact of historical, psychosocial and/or cultural issues, that might potentially affect assumptions about vulnerability.

3.3. The fear network theory

Foa and colleagues (Foa & Kozak 1986, Foa, Steketee, & Rothbaum 1989, & Foa, Zinbarg & Rothbaum 1992) have proposed a theory of PTSD which focuses on the conditioned formation of a fear network in memory. This network comprises stimulus information about the traumatic event, information about cognitive, behavioural and physiological reactions related to the event, and information that links these stimulus and response elements. Activation of the fear network by 'triggers' (i.e. reminders of the trauma) causes information in the network to enter consciousness. This process results in the symptoms of PTSD. Attempts to suppress such activation produce a range of avoidance symptoms. Positive resolution of the trauma occurs by integrating the information in the fear network with existing memory structures. This integration firstly requires activation of the fear network so that it becomes accessible for modification. Secondly, information that is incompatible with the fear network must be available so that the overall memory structure can be modified (Joseph et al 1997).

According to Foa et al. (1992) the unpredictability and uncontrollability of the traumatic event make it difficult to assimilate into existing cognitive models, where the world is perceived as controllable and predictable. Moreover, factors such as the severity of the event disrupt attention and memory at the time of the trauma. This disruption leads to the formation of a fragmented fear network which is difficult to integrate with pre-existing models.

Foa et al.'s theory is noteworthy because it incorporates the variables of predictability and controllability. These variables are seen as central to the development and maintenance of the fear structure (Jones & Barlow 1990). However, the theory

concentrates exclusively upon fear which is considered to be a drawback (Joseph et al. 1997). Indeed, the model fails to consider the role of other emotions typically linked with PTSD, such as anger. In addition, there is little focus on how existing models of the world are represented by networks, and how integration of new information within such models might take place (Brewin et al. 1996). This appears to be an important limitation, as pre-existing models of the world might well influence the ease with which traumatic information is subsequently integrated into the cognitive architecture.

3.4. Cognitive Action theory

The cognitive action theory proposed by Chemtob, Roitblat, Hamada, Carlson & Twentyman (1988) presents a similar perspective to fear network models described by Foa and colleagues. However, Chemtob et al. provide a more detailed analysis of the structure of the fear network, proposing that fear structures comprise hierarchically arranged and interconnected schematic networks. These networks represent all the elements required for a specific act such as fight or escape, and encompass a store of information about neurochemical and muscular activities, thoughts and associated memories, emotions and behaviours. Chemtob et al. propose that the fear network is permanently activated in individuals with PTSD. This causes them to function in a 'survival mode' that has proved adaptive during the traumatic episode itself - but becomes dysfunctional if it persists. Permanent activation of threat related arousal leads to the symptoms of hyperarousal and intrusion, where the likelihood that individuals will search for and identify threatening information is increased. The remaining elements of the fear network are organised in a feedback loop where threat related arousal prompts threat-

seeking behaviour. This process causes an attentional bias, where ambiguous information is more likely to be interpreted as threatening. When such a threat is perceived, this increases threat-related arousal causing another cycle through the feedback loop (Chemtob et al. 1988, p.253).

Chemtob et al.'s model is important because it attempts to explain both the genesis and maintenance of PTSD symptoms (Jones & Barlow 1990). It is limited however, in that it was specifically developed to understand combat-related trauma. To what extent the model can be applied to other forms of trauma, such as distress following violent assault or severe accidents, is therefore unclear. It also fails to explain why some individuals remain in a survival mode, whilst others do not (Brewin et al 1996). A further criticism of the model is that it does not discuss the role of other (potentially) significant variables such as social support, familial factors and/or cultural issues.

3.5. Cognitive processing theory

The cognitive-processing theory of PTSD proposed by Creamer, Burgess & Pattison (1992, p.453) is presented as a 'synthesis and reconceptualisation of existing formulations'. The model combines the key ideas of Horowitz, with the fear network architecture outlined by Foa and colleagues. Creamer et al. propose that the fear network must be activated for recovery to occur. This mechanism of activation is referred to as 'network resolution processing' (Creamer et al 1992, p.453). Creamer et al suggest that levels of initial intrusion act as an index of the degree of 'network resolution processing'.

Based on longitudinal data, they propose that high levels of initial intrusion are a predictor of successful recovery (allowing full activation of the fear network), whilst low levels are a predictor of poor outcome with chronic symptoms (Creamer et al.1992). The individual copes with periods of intrusion by employing a range of defensive and avoidant strategies.

One strength of cognitive processing theory is that it is based on findings from longitudinal data, and makes clear predictions about expected outcome (Brewin et al. 1996). However, a drawback is that the theory does not adequately account for the effects of social support or the individual's attributions and interpretations of the event (Brewin et al. 1996). In addition, research by McFarlane (1989) suggests that prior levels of high intrusion may actually be predictive of a poorer outcome. This finding does appear to suggest that the theory needs to be extended to include the role of factors that potentially mediate the link between level of initial intrusions and clinical outcome, such as specific trauma characteristics or pre-existing beliefs.

3.6. Dual representation theory

In dual representation theory (Brewin 2001, Brewin, et al. 1996), PTSD is viewed as a particular type of unsuccessful adaptation to trauma. Brewin et al. (1996) suggest that traumas (experienced after early childhood) give rise to two sorts of memory. The first set of representations are the individual's conscious experience of trauma referred to as 'verbally accessible knowledge'. This can be deliberately retrieved from the store of autobiographical experiences. In contrast, a second set of representations is not verbally accessible but refers to the output of extensive unconscious processing which may be

accessed automatically through appropriate situational cues. Brewin et al. (1996, p.676) refer to this second set of representations as 'situationally accessible knowledge' . Brewin et al. propose that the sensory, physiological, and motor aspects of traumatic experience are represented in situationally accessible knowledge, triggered by trauma-related cues. Individuals may only become aware that representations of the original experience have been accessed when they experience emotional arousal, flashbacks and dissociative states. Recently, Brewin (2001) has reviewed research in the areas of animal conditioning, neuroanatomy and cognitive science in attempts to provide preliminary support for the operation of these two independent types of memory that appear to be differentially affected by extreme stress levels.

Brewin et al.'s theory deserves recognition because it provides a detailed cognitive-neuroscientific account of trauma processing, with direct clinical implications. It also makes a significant contribution because it acknowledges the role of both conscious and unconscious processes in PTSD. On a less positive note, Brewin (2001) acknowledges that although dual representation theory is consistent with clinical observations, it has only received limited empirical evaluation. Brewin argues that neuroimaging techniques will help to provide more direct information about the structure and functioning of the traumatised brain. However, these techniques would clearly need to be supported by controlled clinical studies, to avoid an overly reductionistic perspective.

3.7. A new cognitive model of PTSD

Ehlers & Clark (2000) have recently proposed a new cognitive model of PTSD, which draws on several features of existing models such as Foa's fear network. Their model is

designed to explain the persistence of PTSD, and to provide a framework for cognitive-behavioural treatment. Ehlers & Clark suggest that PTSD becomes persistent when traumatic material is processed in a way that promotes a sense of serious, ongoing current threat. This sense of threat arises as a result of excessively negative appraisals of the trauma and/or its sequelae, and a disturbance of autobiographical memory. This memory disturbance is characterised by poor elaboration, strong associative memory, and perceptual priming (a form of implicit memory) for stimuli that were temporally associated with the traumatic event. The authors propose that positive changes in negative appraisals of the trauma memory are prevented by several problematic behavioural and cognitive strategies. These problematic strategies include factors such as thought suppression, selective attention to threat cues, safety behaviours, avoidance of reminders of the trauma, rumination and dissociation. The treatment focus includes elaboration and integration of the traumatic memories into the individual's autobiographical memory store, through techniques such as imaginal re-living. Treatment goals also include modification of problematic appraisals of the trauma that maintain a sense of current threat, and change in dysfunctional behavioural and cognitive strategies that prevent memory elaboration.

This new model provides a direct framework for clinical treatment by identifying key targets for change. Clinical techniques are related to the theoretical perspective, and are described in a clear and accessible way. Recent studies have provided some support for several central features of the model - including the role of thought suppression, rumination, and avoidance in predicting persistence of symptoms (e.g. Dunmore, Clark &

Ehlers 1997, 1999). Nonetheless, the authors note that many features of the model including its clinical implications remain to be tested.

4. Summary of cognitive models of PTSD

A range of cognitive theories of PTSD have been developed to account for the aetiology and maintenance of the disorder. However, with the exception of the most recent theories (Brewin 2001, Ehlers & Clark 2000) a distinct weakness of these models is that they fail to clearly distinguish between the specific role of conscious and unconscious processes in their understanding of the disorder. Perhaps most importantly, current theorists also fail to consider how metacognitions, such as thoughts about distressing thoughts themsevles, might influence the course of symptoms.

Aside from these limitations, it is relevant to note that contemporary theorists have focused on subjective appraisals of the trauma itself, and of its immediate sequelae. This includes a focus on how maladaptive control strategies such as safety behaviours, rumination, and suppression of intrusive thoughts prevents positive reappraisals of the traumatic memory (e.g. Ehlers & Clark 2000, Dunmore et al. 1999). Reflecting recent empirical interest (Harvey & McGuire 2000), the review will now focus directly on the maintenance role of one particular maladaptive control strategy - thought suppression (Wegner 1994). This will include a review of the research that has sought to explain the persistent recurrence of unwanted traumatic thoughts, which typically cause individuals so much distress within PTSD.

5. Thought suppression: a general discussion

In a classic study, Wegner, Schneider, Carter & White (1987) reported that deliberate thought suppression can result in a subsequent increase in the frequency of the very thoughts that are being suppressed. In Wegner et al.'s study, 34 participants (psychology undergraduates) were randomly assigned to one of two experimental conditions: an initial suppression condition, or an initial expression condition, where participants actively generated a thought. Within the initial suppression group, subjects were first instructed to suppress thoughts about a white bear, and then to actively express them. For the initial expression group, these instructions were reversed. During two, five minute periods, participants were left alone and instructed to report their 'stream of consciousness' (Pope 1978 cited by Wegner et al. 1987) by continuously describing what they were thinking into a tape recorder. In the suppression condition, each time they thought of the white bear, they were told to ring a bell. Wegner et al. found that participants who had suppressed during the first interval reported significantly more thoughts about the white bear during the expression interval compared with those who merely expressed their thoughts initially. In this early study, Wegner et al. warn that further research should seek to ascertain whether the suppression effect generalises to items other than white bears, and to items beyond the laboratory setting. Accordingly, a range of research studies have since examined how the effects of suppressing negative, emotionally relevant thoughts might offer an understanding in the development and maintenance of emotional disorders (Purden 1999).

5.1. Ironic effects of suppression: a theoretical perspective

Wegner (1994) and Wegner & Erber (1992) labelled the increased accessibility (or 'hyperaccessibility') of suppressed thoughts as the 'rebound effect'. A theory of 'ironic processes of mental control' was proposed to account for this effect (Wegner 1994, p.34). This theory postulates that attempts to suppress thoughts introduces an interplay between two cognitive processes referred to as the operating process and monitoring process.

The operating process involves a controlled, non-automatic and deliberate search for thoughts that are *not* the target thought. The chosen replacement non-target thought/s are then held in active consciousness and act as distractors. Importantly, each occurrence of the target thought will prompt the search for a new distractor. These distractors can be internal stimuli such as mood-congruent thoughts (Wenzlaff, Wegner & Klein 1991) or external stimuli (Wegner, Schneider, Knutson & McMahon 1991). The controlled distractor search requires attentional resources, and may be disrupted by cognitive demands (Wegner 1994).

The operating process is activated by the monitoring process. As a general rule, Wegner (1994) proposes that the initial intention to engage in mental control (suppression) is the starting point for both the monitoring and the operating process. The monitoring process searches continuously for thoughts that are inconsistent with the achievement of successful suppression. This process is termed the 'automatic target search'. This search is not conscious, requires relatively little cognitive effort, and continues until attempted suppression is terminated by conscious choice. When suppression efforts have commenced, the automatic target search begins searching

consciousness for thought traces. As the controlled distractor search progresses, increasingly more stimuli become relevant to the target thought, and act as corresponding cues for it. These cues are quickly detected by the automatic target search and through their subsequent association with the target thought, actually evoke it. To this end, the very cognitive processes used in the act of suppression actually serve to elicit the thought itself (Wegner 1994).

As a result of the interplay between these 2 processes, it appears that thoughts that reflect a particular mood state will be particularly difficult to suppress and more vulnerable to the rebound effect', due to the accessibility of other mood-congruent thoughts as distracters (Purden 1999). In a series of three related studies, Wenzlaff Wegner & Roper (1988) found that depressed mood in students triggered an enhanced accessibility of interconnected negative thoughts that undermined efforts at mental control through thought suppression. It appeared that thoughts chosen as initial distractors (associated with inappropriately negative levels of affect) eventually served as reminders of the unwanted item itself. A key limitation of this study is that participants were only asked to record their thoughts through a writing task. It is possible that participants may have censored the content of this material. Providing more than one measure to index the level of target thoughts would help to eliminate this methodological weakness.

From a critical perspective, Purdon (1999) has recently noted that although some studies report the paradoxical rebound effect of suppression on the frequency of target thoughts (e.g. Trinder & Salkovskis 1994, Davies & Clark 1998a, Clark, Ball & Pape 1991) this effect has not been consistently detected (e.g. Mathews & Milroy 1994,

Roemer & Borkovek 1994, Harvey & McGuire 2000). In part, these inconsistencies may be the result of methodological research differences. Design issues clearly have important implications for the reliability of findings across studies. In addition, Wells (2000) has suggested that individual differences in willingness to report thought occurrences, the availability of distracters in experimental settings, and/or individual differences in motivation to suppress might all affect results.

Muris, Merckelbach, van den Hout & De Jong (1992) further warn that if the thought suppression paradigm is to be successfully applied to the maintenance of unwanted thoughts in emotional disorders, research has to focus on whether the rebound effect is generalizable to the occurrence of thoughts that have intense personal meaning. Related to this, Salkovskis & Campbell (1994) argue that the emotional impact of personally relevant thoughts may influence the manner in which they are processed. For example, thoughts that are associated with intense, personal trauma will be more emotionally significant, and therefore potentially harder to suppress than thoughts with no personal significance. Furthermore, it is likely that thought-induced emotion may influence levels of motivation to engage in thought suppression strategies (Salkovskis & Campbell 1994). For example, thoughts that trigger strong levels of distressing emotional arousal are likely to enhance active suppression efforts.

Overall, it is clear that Wegner's model fails to wholly account for the various inconsistencies within the research literature. However, a strength of Wegner's theory is that it provides an information processing model of thought suppression, encompassing

both automatic and more strategic levels of cognitive processing. A distinct weakness is that the model fails to consider the potential impact of repeated traumatic material in terms of its specific 'meaning', and how this might influence subsequent motivation to suppress. This limitation may further account for some of the research inconsistencies. Notwithstanding these limitations, the thought suppression paradigm has still become a fertile research area. Most recently, the paradigm has been directly linked with the maintenance of intrusive and unwanted thoughts in posttraumatic stress disorder and acute stress disorder (Guthrie & Bryant 2000). This research is now reviewed.

5.2. Research on thought suppression and posttraumatic stress disorder

Ehlers, Mayou & Bryant (1998) conducted a prospective longitudinal study to assess 967 consecutive patients who attended an emergency clinic after a motor vehicle accident at 3 time points: shortly after the accident whilst victims were still in hospital, and at 3-month and 1-year follow-ups. The prevalence of PTSD was 23.1% at 3 months, and 16.5% at 1 year. Chronic PTSD was related to objective measures of trauma severity, perceived threat, to female gender, previous emotional problems, dissociation during the accident and litigation. Most importantly, negative interpretations of intrusions and tendency to suppress recollections of the accident at three months and at 1 year after the traumatic event, correlated with PTSD diagnosis and severity at both time points. Regression analyses highlighted the role of thought suppression and negative interpretations of intrusions as two of several major predictors of PTSD at 1 year. The authors propose that cognitive interventions targeting these maintenance factors may be effective in treating chronic PTSD, although as of yet, this proposition is not based on any

controlled clinical trials. Despite the research strengths of a prospective design, it is important to stress that no cause and effect relationships can be inferred from a correlational study. A further major problem with this study is the potential ethical complications of recruiting hospital victims for research so quickly after their motor vehicle accidents when victims could still be in shock, and less able to make informed choices about their right to withdraw from research.

Davies & Clark (1998b) designed a study to investigate the predictors of analogue posttraumatic intrusive cognitions using a prospective design. The authors were interested in the predictive role of pre-existing psychological factors, in addition to specific responses to an unpleasant event. Ninety non-clinical participants completed a range of predictor measures before being exposed to a 3-minute extract from a real fire safety film in which several people were seen to die. Participants were then asked to record their intrusions during a 4-minute computer task. In addition, they were instructed to record on-going intrusions about the film for a 7-day period using a diary measure. Notably, pre-existing tendency to suppress unwanted thoughts in conjunction with more negative affective state after viewing the film predicted more frequent intrusions immediately after the film. However, in contrast to findings by Ehlers et al. (1998), pre-existing tendency to suppress thoughts did not predict intrusions during the following week, and this was not related to diary compliance. Davies & Clark suggest that the discrepancy between immediate and longer-term suppression effects may be due to the relative simplicity of the single item measure of suppression used in the study. Alternatively, they suggest that persistent intrusions may be better predicted by measures of thought suppression immediately after a traumatic experience, influenced by negative

beliefs about the event (as outlined by Ehlers & Steil 1995). The most surprising aspect of the study was the failure of measures of emotional vulnerability (such as neuroticism, trait anxiety and depression) to predict intrusive thoughts. It may be that the global, standardised measures used failed to capture the idiosyncratic features of these factors in a non-clinical sample. There are several further limitations of this study. As above, findings were based on a correlational methodology, so no causal relationships can be inferred. The study also uses an undergraduate population, and therefore potentially lacks ecological validity because the film does not hold any personal relevance (Muris et al. 1992).

In a further study, Davies & Clark (1998a) examined the impact of suppressing thoughts about the same fire film extract in a sample of 32 undergraduate participants. Participants were shown the fire and a polar bear film in counterbalanced order. During a 2-minute period after each film, participants were instructed to record thoughts about the film by a thinking aloud task, a target thought recording exercise (involving buzzer pressing), and a retrospective visual analogue scale. Whilst recording thoughts, participants were told to either suppress thoughts about the film, or to 'think anything'. In a subsequent 2-minute interval, all participants were instructed to 'think anything'. The results indicated that participants who saw the disaster film and were initially instructed to suppress, reported fewer thoughts during the first interval than the control group. They also reported a higher frequency of thoughts in the second interval compared with the control. The rebound effect of suppression on thought frequency was thus observed, although this effect was only apparent within the thinking aloud task. Davies & Clark propose that the retrospective measure may have been a less sensitive estimate of

intrusions. Moreover, they suggest that the attentional demands required in the thinking aloud procedure may have diverted attention away from pressing the buzzer. Accuracy of buzzer pressing appears to be greater in studies that have not combined it with a competing task (Salkovskis & Campbell 1994). A clear strength of this research is that it uses a factorial design which allows cause and effect relationships to be explored. It also used real video footage which would increase the emotional impact of the stimulus material. A weakness of the study is that it failed to clarify whether all participants rated the film as distressing. Clearly, the mean values alone do not convey this information. It would make sense to eliminate participants who rated the film's level of unpleasantness as less than 50% on the visual analogue scale. In addition, the study's findings were based on a relatively small, non-clinical sample of only 35 undergraduates.

Harvey & Bryant (1998a) investigated the effects of thought suppression in 72 undergraduate participants who were shown either a violent, humorous or neutral film. Participants were instructed to monitor their thoughts for two 3-minute intervals using a response button after presentation of the 3-minute film stimulus. During the first interval, participants were given either suppression or non-suppression instructions relating to thoughts about the film. In the second interval, participants were instructed to 'think about anything'. The results indicated that participants who had viewed the distressing film reported more frequent film-related thoughts overall. A rebound effect of suppression was also evident, whereby participants who had suppressed thoughts in all three film conditions reported more frequent film-related thoughts during the second interval than did controls. There was no interaction of film type with suppression group which was very surprising. The authors propose that the use of individuals with varying levels of

anxiety may have confounded group results. Whilst this is plausible, it is also possible that the unpleasant stimulus was not experienced as distressing, because it was not taken from real film/video footage, and was not personally relevant. This is likely to have diminished the potential impact of film type on suppression attempts. On a more positive note, the use of an analogue study does help to eliminate many of the ethical and practical complications associated with the use of a clinical sample.

In a subsequent study, Harvey & Bryant (1998b) investigated the effects of attempted suppression of traumatic memories in 24 survivors of motor vehicle accidents with acute stress disorder (ASD) and in 24 participants without ASD who acted as a control group. Participants monitored their trauma-related thoughts for three 5-minute periods using a response button. In period one, participants were instructed 'to think about anything'. During the second period, participants were administered suppression or non-suppression instructions relating to thoughts about the trauma. In the final period, participants were again instructed 'to think about anything'. The results indicated that acute stress disorder participants reported higher ratings of anxiety, and greater frequency of trauma-related thoughts. Related to this, they also attempted greater levels of suppression of trauma-related thoughts than non-ASD participants. Moreover, participants who were given suppression instructions demonstrated a delayed increase in trauma-related thoughts in the period subsequent to the suppression period. Despite the strengths of this study which uses a clinical sample, the statistical methodology is limited. Purdon (1999) notes that comparisons were made across each interval only. The within subjects factor of interval was not included as a factor in the analyses. Thus changes across intervals were not tested, nor were the interactions of interval with the other factors. Moreover, differences

in suppression efforts within each group were not tested statistically. This raises concerns about whether the suppression group were suppressing more than the control group. If there were no statistical differences, the conclusions and implications of the study are somewhat undermined. The ethical complications of asking a clinical population to suppress trauma-related thoughts is also problematic in terms of potentially intensifying intrusions, and levels of distress.

This ethical complication is highlighted in a more recent study by Shipherd & Beck (1999). These researchers investigated the effects of suppression of rape-related thoughts on female sexual assault survivors. Seventeen women with chronic PTSD were contrasted with 19 survivors without PTSD using the thought suppression paradigm for a 9-minute interval using a writing task. The results indicated that PTSD participants experienced a rebound in the frequency of rape-related thoughts following suppression. In contrast, non-PTSD participants did not experience this effect. PTSD participants were also significantly more anxious, depressed, and distressed throughout the procedure compared with the non-PTSD participants.

Shipherd & Beck's (1999) study is worthy of recognition because it employs both a clinical sample and experimental design. Nonetheless, the conclusions that can be drawn from the study are limited due to several procedural issues. Perhaps most importantly, baseline ratings of target thoughts and associated emotions may have been inflated by a diagnostic interview, immediately preceding the experiment (Shipherd & Beck 1999). This effect could be diminished within a future study by conducting the diagnostic interview and experiment on different days.

Guthrie & Bryant (2000) investigated the influence of attempted suppression on traumatic memories in 20 survivors of civilian trauma with acute stress disorder, and 20 survivors without ASD. Participants were instructed to monitor their trauma-related thoughts for three 24-hour periods using a post card. To enhance task compliance, a pencil was attached to the post card and participants were instructed to carry the card with them at all times. In the first period, participants were instructed 'to think about anything'. During the second period, participants were administered the suppression or non-suppression instructions relating to trauma thoughts. In the final period, participants were again instructed 'to think about anything'. Interestingly, the results indicated no evidence for an increase in trauma-related thoughts following suppression instructions, although frequency of intrusions were positively associated with levels of distraction as predicted by Wegner's (1994) model. A key limitation of the study is that the participants in the suppression condition failed to comply with suppression instructions. This probably explains why there were no thought suppression effects in the experimental group. As noted by Guthrie & Bryant (2000), failure to comply with suppression instructions also highlights the difficulties in modifying thought control strategies in traumatised individuals, who may choose their own methods of dealing with intrusive thoughts despite experimental instructions. A further significant problem with this study is that it assumes participants will be able to record their thoughts accurately during daily activities over an extended time period. For most individuals, this task expectation may be unrealistic. Participants could easily forget to record their intrusions or simply not be motivated to do so. The use of a more convenient device such as a click counter, could help to eliminate this problem.

5.3. Summary of thought suppression literature and PTSD

Several studies have supported the link between thought suppression and the maintenance of traumatic thoughts (Ehlers et al. 1998, Davies & Clark 1998a, Davies & Clark 1998b, Shipherd & Beck 1999), although not consistently (Guthrie & Bryant 2000). Overall however, the results of the research within PTSD do suggest that suppression of thoughts about a distressing event frequently leads to a subsequent increase in these traumatic thoughts.

An overall limitation of the current research base is that studies failed to examine the possibility that participants may be employing alternative thinking styles to manage intrusions, such as attempting to distance themselves from their thoughts by taking a mental step back from them. To meet this limitation, the review will now consider a detailed information processing model of affective disorders including PTSD, called the Self-Regulatory Executive Function (S-REF) model (Wells & Matthews 1994, 1996). This model explicitly considers the role of processing strategies in the maintenance of emotional disorders. The S-REF also sharply contrasts traditional information processing models of PTSD (e.g. Horowitz 1975, Foa & Kozak 1986) because it clearly distinguishes between symptoms that are associated with involuntary, 'automatic' processing (such as intrusions), and those derived from more strategic or 'controlled' processing (such as catastrophic appraisals and dysfunctional safety behaviours) (Morgan, Matthews & Winton 1995). Perhaps most importantly, it further expands existing models of PTSD and also the theoretical model of thought suppression, by considering the role of metacognitive knowledge. Metacognitive knowledge includes the knowledge that individuals have about their own thinking styles (Wells & Purdon 1999). Although the

model was originally designed as an explanation for affective disorders in more general terms, it has recently been extended to include an account of trauma (Wells 2000). Following an exploratory study, Sembi & Wells (2000) are also seeking to expand the S-REF model in relation to PTSD more explicitly.

6. The Self-regulatory Executive Function (S-REF) Model

Wells & Matthews (1994, 1996) developed the S-REF model of emotional disorder to describe a cognitive architecture for information processing in states of anxiety and distress. This model is based on three interacting levels of cognition: a *lower- level* network of automatic processing of external and internal stimuli, an *upper-* level network of controlled processing involved in the regulation of behaviour and thought (the S-REF), and a *metacognitive* store of beliefs that guide the content of the controlled processing system (Wells 1997).

Low-level processing is predominantly automatic, in that attentional demands are minimal and processing occurs predominantly outside conscious awareness. The model proposes that low-level processing networks generate intrusive thoughts, which then activate the *second* level called the executive system or S-REF (Matthews, Hillyard & Campbell 1999).

In contrast to the low-level networks, the S-REF level comprises a level of on-line, controlled processing which is involved in the conscious appraisal of thoughts and events, and the control of action and thought (Wells 2000). It also monitors internal state, and attempts to intensify or suppress significant thoughts. Notably, S-REF functioning cannot function independently and relies on self-referent knowledge from the *third* level: a

metacognitive store of beliefs that guide processing styles, determine the personal significance of stimuli, and provide a blueprint for coping responses (Wells 1997).

One key manifestation of metacognitive knowledge, is the knowledge and beliefs that individuals hold about their own thinking styles (Wells & Purdon 1999). This includes beliefs such as: 'thinking bad thoughts can make bad things happen', and 'some thoughts always need to be controlled' (Wells 1997). These explicit metacognitions are linked to plans for processing such as the control of attention and information searches. They also act as data that will influence interpretations of cognitions. (Wells 2000). Metacognitive knowledge thus impacts on both behaviour and appraisals (Wells & Purdon 1999), two key variables implicated in the maintenance of PTSD.

Wells (2000) has developed the concept of a 'mode' to refer to the perspective individuals hold in relation to their thoughts and beliefs. Wells has distinguished between two distinct modes: the object mode and the metacognitive mode. When the cognitive system is in 'object mode', thoughts are unevaluated and are taken as accurate representations of events. When in 'metacognitive mode', thoughts and perceptions are evaluated and not necessarily accepted as direct representations of reality. Wells (2000) has also developed the concept of a 'configuration' to reflect the pattern of cognitive processes that are activated at any specific time.

The configuration most relevant to emotional disorder is the S-REF configuration, which is closely linked to self-relevant processing. The S-REF configuration serves a goal-directed, executive function of attempting to reduce self-discrepancies between a representation of the *current* status of the self in distress, and a desired or 'normative' representation of the self (Wells, 2000, p.18). The S-REF configuration is characterised

by a 'cognitive attentional syndrome' (Sembi & Wells 2000). This cognitive attentional syndrome manifests as perseverative self-focused attention, on-line processing of negative self-beliefs, rumination, hypervigilence for threat, and the implementation of coping strategies (such as attempted suppression of distressing thoughts) that interfere with the development of more adaptive self-knowledge. Symptoms such as flashbacks, re-experiencing, and dwelling on negative aspects of trauma can be viewed as indicators of an on-going discrepancy in self-regulation. Nonetheless, Wells suggests that since these are normal symptoms following stress, they are likely to represent cognitive responses that have functional significance in terms of emotional processing. In their 'normal form', they are likely to be adaptive because they stimulate selection and modification of upper-level beliefs and plans for dealing with threat. However, a continuation of these symptoms may indicate that the S-REF configuration has become perseverative, and that individuals have been unable to achieve self-regulatory goals through coping strategies or modification of beliefs.

6.1. A step forward from fear network approaches

As previously noted, traditional fear network approaches to PTSD (e.g. Foa & Kozak 1986) have exerted a huge influence on both early and contemporary models of the disorder (e.g. Ehlers & Clark 2000). Network approaches represent fear and emotion structurally as discrete networks. Therapeutic techniques related to this approach are based predominantly on the decay of arousal in fear networks produced through exposure and habituation, and an automatic encoding of this new response information within the fear network (Wells 2000, p.58). Wells & Matthews (1994) argue that network models do

not distinguish between the role of automatic processing in the network, and the role of strategy-driven-processing to achieve cognitive emotional change. Wells & Matthews assert that it is unlikely that emotional processing can be fully explained in terms of changes in representations that are automatically produced as a consequence of exposure and habituation. It is likely that metacognitions influence the choice of coping and processing strategies that will either impede or promote the acquisition of information subsequently incorporated into the fear structure following stress. Moreover, fear network models do not explicitly link emotional processing to the nature of the individual's knowledge that guides the selection and execution of particular coping strategies. In contrast to this, the S-REF model embraces a metacognitive approach that links knowledge stored in long term memory, with lower-level processing activities.

Compared to classical network approaches, Wells & Matthews (1994, 1996) and Wells (1997, 2000) appear to offer a more explicit understanding of emotional disorder including PTSD, by proposing a complex cognitive architecture for information processing in states of distress. Within a review of recent studies, Wells (2000) has concluded that overall findings generally support S-REF predictions concerning relationships between metacognition, coping style, and emotional disorder. Nonetheless, it is clear that many of the findings are correlational in nature and drawing causal inferences about the effects of metacognitions and perseverative coping are therefore unwarranted at this stage (Wells 2000).

6.2. Post-traumatic stress disorder and the S-REF architecture

As outlined above, the S-REF model is based on three interacting levels of cognitive processing: a lower-level network of automatic processing, an upper- level network of controlled processing, and a metacognitive store of beliefs (Wells 1997). Failures of emotional processing within PTSD can therefore emerge from maladaption at any one, or a combination of the three levels (Wells 2000, p.62). Firstly, there may be maladaption in lower-level processing networks that support automatic processing. For example, repeated exposure to specific traumatic experiences may produce a fast stimulus-response connection leading to arousal responses (that are largely independent from any upper-level input). Maladaption may also occur at the on-line level. Maladaptive attentional and coping strategies may disrupt the restructuring of traumatic material in memory. For example, after being attacked, individuals may be hypervigilant for people who appear suspicious in their environment. This strategy will maintain a trauma-related processing mode that selectively attends to danger. Finally, there may be maladaption at the upper belief level. This is linked to coping strategies, and may lead to exaggerated threat appraisals. Certain types of knowledge such as negative beliefs about one's vulnerability are likely to underlie exaggerated fear and arousal responses. For example, individuals may negatively interpret bodily symptoms following a stressful meeting (Wells 2000, p.62).

6.3. The S-REF model and thought suppression

According to the S-REF model, thought suppression represents a specific type of avoidant coping, that interferes with more adaptive self-knowledge (Wells 1997).

That is, the act of suppression reduces available attention that can be directed towards the processing of new information, and active cognitive restructuring. More specifically, from a metacognitive perspective, the model also predicts that beliefs about thought recurrences could enhance distress, and therefore motivation to suppress. For example, persistent intrusions about an attack may prompt concerns that the thoughts mean that the event was actually wanted at some level Each thought might then result in more negative appraisal, which in turn would evoke the thought (Purden 1999, Wells & Matthews 1994).

6.4. Research support for metacognitive thought control strategies and PTSD

Wells & Davies (1994) developed the Thought Control Questionnaire (TCQ) to measure individual differences in the use of a range of thought control strategies, and the relationship between these strategies and emotional vulnerability. This scale was originally validated on a non-clinical sample and comprises 5 subscales that measure the thought control strategies of distraction, social control, worry, punishment and reappraisal. In a follow-up study, Reynolds & Wells (1999) explored the relationships between thought control strategies and clinical symptoms in clients with major depression, and/or PTSD. The authors note that PTSD is associated with high levels of cognitive avoidance and may involve strategies that are tapped by the distraction sub-scale of the TCQ. The sample consisted of 124 inpatients and outpatients who met DSM-IV criteria (APA, 1994) for major depression and/or PTSD. Criteria for recovery were based on DSM-IV. A comparison of groups based on primary diagnosis (PTSD versus depression) revealed that the PTSD sub-group scored significantly higher on distraction than the depressed group. Moreover, the use of distraction emerged as a negative

predictor of depression scores for both the PTSD and depressed groups. Related to this study, Wells (2000) has recently asserted that distraction may divert attention away from the processing of threat and emotion - and thus reduce emotional distress temporarily. It may also prevent activation of fear networks. However, longer-term effects of distraction may be disadvantageous if they block the encoding of new information that can modify maladaptive knowledge.

6.5. Implications for therapy

The S-REF model provides an account of attentional and coping responses in the aetiology and maintenance of emotional disorder that offers specific implications for the application of cognitive therapy (Matthews & Wells 2000, Wells 1997, 2000). Firstly, the model highlights the importance of examining the individual's self-knowledge that potentially drives maladaptive coping strategies in PTSD. The model proposes that metacognitive beliefs concerning the influence of thought, are important determinants of dysfunctional processing strategies that in turn maintain the symptoms of PTSD.

Related to this, the model suggests that it is necessary to influence the individual's maladaptive online processing operations. Self-focused processing reduces attention available for processing new information that may help to disconfirm maladaptive beliefs, and also leads to the generation of familiar patterns of information that maintain dysfunctional beliefs. (Wells 1997, Wells 2000). This suggests that perseverative thinking styles should be reduced early in treatment. Attention should be manipulated so that the client's self-focus is reduced, and selective attention to disconfirmatory information is enhanced (Wells 2000, Matthews & Wells 2000).

Thus the model highlights the need to examine cognitive processes in more detail, rather than merely modifying the content of belief systems in PTSD.

In contrast to classic models of cognitive therapy designed to treat PTSD, exposure or imaginal reliving is not the principal technique used to affect emotional processing in the S-REF model (Wells 2000, Sembi & Wells 2000). The model proposes that prolonged imaginal reliving of trauma may not be necessary for resolving abnormal trauma reactions. Indeed, where imaginal exposure fails to establish new adaptive plans for coping and positive self-beliefs, it may actually strengthen the processing of danger signals (Wells 2000). Imaginal exposure is also poorly tolerated by some clients (Sembi & Wells 2000).

The S-REF model implies that abnormal post-trauma reactions are linked to a failure to revise one's self-beliefs, and to develop a satisfactory coping plan. Maladaptive processes such as the use of threat monitoring, hypervigilance, rumination, and avoidance of trauma-related situations and trauma related thoughts, will all 'lock' the individual into a preoccupation with threat (Wells 2000). From a therapeutic perspective, it is therefore important to modify these self-defeating processes and coping strategies (Sembi & Wells 2000, Wells 2000). Wells proposes that once ruminatory strategies are stopped, this should 'free up' attentional processes for cognitive restructuring.

6.6. Summary of the S-REF model

The S-REF model of emotional disorder describes a detailed cognitive architecture for information processing in states of distress and worry (Matthews et al. 1999). It also potentially extends Wegner's thought suppression paradigm by embracing a metacognitive

perspective. Although there are some interesting preliminary findings, the model requires further empirical validation. The S-REF model also has direct implications for clinical practice. This includes a focus on the way individuals process information during cognitive therapy. To highlight this point more explicitly, the review will now focus on a specific metacognitive processing style advocated by Wells & Matthews (1994, 1996) called detached mindfulness. The review will commence with a brief introduction to the area of mindfulness in order to provide a general framework for the discussion.

7. Detached processing and mindfulness

The S-REF offers a working framework for understanding how cognitive processes and structures interact in the maintenance of a disorder (Wells 1997, Matthews et al 2000). Wells (1997) suggests that an exciting possibility is the development of cognitive processing strategies that aim to manipulate the attentional and metacognitive dimensions that maintain dysfunctional processing and beliefs. A specific processing strategy proposed by Wells is detached mindfulness. This is described as the 'antithesis of thought suppression attempts' (Wells 1997, p.272). It is not an attempt 'not to think' a thought, but rather an attempt to disengage the analytic processing from intrusive thoughts which maintains them.

7.1. Mindfulness-based cognitive therapy

Training individuals to relate to thoughts as events in the mind using mindfulness has been used as a way of reducing psychological stress for thousands of years (Goldstein & Kornfield 1987 cited by Teasdale 1999a). Mindfulness has been defined as 'paying

attention in a particular way: on purpose, in the present moment, and non-judgementally' (Kabat-Zinn 1994, p.69). Using this criteria, Teasdale (1999b, p.71) notes that mindfulness of thoughts and feelings as objects of *awareness*, involves a shift from relating to them as a 'reality', to relating them as events that come and go through the mind.

Mindfulness techniques also form a central component of Linehan's (1993) cognitive behavioural treatment of borderline personality disorder (Dialectical Behaviour Therapy, DBT), constituting 'core skills' within the treatment protocol. To date, research examining the effectiveness of mindfulness-based interventions within the treatment of personality disorder, depression, stress management, chronic pain, binge-eating, and group therapy for women with posttraumatic stress disorder following histories of childhood sexual abuse, has yielded encouraging preliminary findings (Linehan 1993, Teasdale 1999b, Shairo, Schwartz & Bonner 1998, Kabat-Zinn, Lipworth, & Burney 1985, Wiser & Telch 1999, Wolfsdorf & Zlotnick 2001). From a critical perspective however, the specific efficacy of mindfulness techniques within these interventions is unclear, because the treatment programmes generally include a package of therapeutic techniques.

7.2. Detached processing

Beck (1976) has highlighted the importance of 'distancing' and detaching from thoughts in the practice of cognitive therapy. Ehlers & Clark (2000 p.337) have recently proposed that it is 'the way' people think about their traumatic experience that is important. Rather than trying to push intrusions out of mind, they suggest that they should just be allowed to 'come and go' and 'watched as though they are a train passing through

a station'. Related to this, Wells (1997, Wells 2000) proposes that a detached processing style should prevent full activation of the S-REF dysfunctional processing mode, potentially facilitating a greater sense of cognitive control. By reducing self-focused attention, this processing strategy should then facilitate a disengagement from negative thoughts. For example, the distressed individual experiencing traumatic flashbacks shifts from the object mode: 'I am going crazy', to the metacognitive mode: 'my problem is that I think these experiences mean I am going crazy, I must examine my thinking in a detached, objective way' (Wells 1997). Detached mindfulness thus allows subjects to objectively examine their attentional processes in response to stimuli in a more intellectual and detached way, potentially promoting more adaptive self-appraisals and coping choices.

During the clinical use of detached mindfulness, Wells (1997, p.250) stresses that the client is encouraged not to engage with intrusions by ruminating on them, or by using neutralising strategies. In contrast, they are prompted to 'passively let go of intrusions, allowing them to occupy their own space without engaging with them'. Wells suggests that the process may be assisted through self-instruction such as: 'this is only a thought it isn't a reality; and 'I don't need to give my time to this thought'. Intrusions should then be allowed to decay in their own right. Associated reductions in distress can then be used as evidence that responses to intrusions (rather than intrusions themselves), are the key problem. S. Sembi (personal communication, August 2000) proposes that detached processing involves a feeling of detachment from stressful events, and is not a form of denial, distraction or avoidance. It is important to note however, that Sembi's conceptual

definition, as well as the practical application of the technique, is yet to be investigated within a controlled clinical setting.

Wells (2000) proposes that detached mindfulness is a distinctive, metacognitive processing strategy which can be differentiated from mindfulness in the historical, meditation sense. Therefore, it contrasts mindfulness strategies currently used in other clinical approaches (e.g. Linehan 1993, Teasdale 1999b). Wells has argued that whilst mindfulness meditation may alter the content of self-attention, it is unclear how it might influence the intensity of self-focus, or increase the metacognitive control of attention as in detached mindfulness. However, it is debatable whether Well's (2000) differentiation between detached mindfulness and mindfulness is really warranted. The dividing line between the application of the two approaches is very blurred. Moreover, Well's argument about the relationship between self-attention and self-focus is perhaps rather circular: reducing self-attention in mindfulness (as well as in detached mindfulness) could readily affect self-focus, by shifting overall levels of awareness directed towards the self.

7.3. A Study examining the impact of a metacognitive focused therapy for PTSD using detached mindfulness

Sembi & Wells (2000) have recently reported a preliminary evaluation of a metacognitive focused therapy for PTSD. This study reports a case series of six consecutive patients referred for treatment of PTSD following a violent assault. The treatment protocol included a consideration of the advantages and disadvantages of rumination and thought suppression, use of controlled worry periods, and training in

detached mindfulness. The treatment package did not involve imaginal exposure or active restructuring of negative thoughts and beliefs.

In the detached mindfulness component of the intervention, clients were trained to relate to their intrusive and traumatic thoughts in a detached way, as if they were observing their thoughts like clouds in the sky. All clients commenced a 4-week baseline period before treatment started, although treatment length was not set. Clients were then followed up at three and six months. Results indicated that the treatment helped to produce positive clinical shifts in symptoms for each client as assessed by a range of standardised measures of psychopathology including the Impact of Event Scale (Horowitz, Wilner, & Alvarez 1979). Notwithstanding these findings, it is important to stress that this study was exploratory. It employed a case-study methodology, an unstandardised treatment protocol, and lengths of treatment varied across clients. These factors clearly limit the study's reliability and validity. However, the study does represent an exciting preliminary examination of a metacognitively focused treatment for PTSD, including the use of detached mindfulness. Further research should clearly endeavour to tease out the role of detached mindfulness more explicitly, ideally within an experimental design.

7.4. Summary of mindfulness and detached processing

Mindfulness-based cognitive therapy is a component of several contemporary treatment protocols. Detached mindfulness is a thinking style proposed by Wells & Matthews (1994, 1996) and Wells (1997, 2000) that involves individuals taking a mental step back from their traumatic thoughts, rather than trying to fight or suppress them.

However, it is unclear how this technique really differs from the historical use of mindfulness.

8. Overall Conclusion

A range of cognitive factors have been linked to the maintenance of PTSD symptoms, including thought suppression. From a metacognitive perspective, the S-REF model potentially suggests that a detached thinking style might offer a more adaptive way of processing traumatic material by reducing self-focused attention, and promoting access to more adaptive self-appraisals and coping choices. Exploratory research is now required to directly examine the potential impact of this detached processing style on distressing thought recurrences.

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Empirical Paper

Comparing The Impact of Thought Suppression with Detached Mindfulness on The Rebound Effect in Analogue Posttraumatic Intrusions

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Comparing the Impact of Thought Suppression with Detached Mindfulness on the Rebound Effect in Analogue Posttraumatic Intrusions

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Abstract

The aim of this exploratory study was to compare the impact of a 'detached' thinking style called detached mindfulness (Wells & Matthews 1994, 1996) with thought suppression on the rebound effect (the delayed resurgence of intrusions) (Wegner 1994) using analogue posttraumatic thoughts. Pre-training was provided for the detached mindfulness group. Analogue intrusions were then induced in a student population using video footage of a real fire. The film was followed by two consecutive time periods during which the frequency of participants' thoughts were recorded. During the first period, experimental groups were given suppression, detached mindfulness or control instructions. During the second period, all three groups merely recorded their thoughts. The results indicated that suppression of intrusions did not produce an immediate decrease in their frequency, followed by a delayed increase as expected in a 'rebound effect'. However, using the retrospective analogue measure, the suppression group reported more time thinking about the film during both periods compared with the detached mindfulness group but not with the control group. The percentage of time spent thinking about target thoughts recorded by a 5-hour diary measure did not reveal significant group differences. Methodological issues relating to the findings are highlighted, and suggestions for further research discussed.

Comparing the impact of thought suppression with detached mindfulness on the rebound effect in analogue posttraumatic intrusions

1. Introduction

Posttraumatic stress disorder (PTSD) is a common and often debilitating reaction to distressing events (Foa & Meadows 1997). The disorder is characterised by persistent reexperiencing of the trauma in the form of recurrent and intrusive recollections of the event such as flashbacks, and avoidance of stimuli associated with the trauma (Dunmore, Clark & Ehlers 1999). Thought suppression, the conscious attempt to suppress intrusive cognitions, is one form of cognitive avoidance that has recently been linked with the persistence of PTSD (Ehlers & Steil 1995, Davies & Clark 1998a, Davies & Clark 1998b Reynolds & Brewin 1998). Suppression of distressing thoughts has also been associated with an increased suicide risk in this client group (Amir, Kaplan, Efroni, & Kotler 1999).

Thought suppression has been defined as 'an effort not to think about' a specific thought (Wegner 1994). Experimental studies show that thought suppression typically leads to an immediate decrease of the suppressed thought, followed by a paradoxical increase (Wegner, Schneider, Carter & White 1987, Trinder & Salkovskis 1994, Davies & Clark 1998a, Clark, Ball & Pape 1991)). This paradoxical finding has been termed 'the rebound effect'. However, this effect has not been detected consistently within the literature (e.g.: Matthews & Milroy 1994, Roemer & Borkovek 1994, Harvey & McGuire 2000). Some studies for example, have reported an immediate increase in thought frequency following suppression (Salkovskis & Campbell 1994, Salkovskis & Reynolds, 1994, Lavy & van den Hout 1990). Discrepancies in findings are thought to relate to the

plethora of experimental methodologies (Purden 1999), and practical issues such as individual differences in willingness to report thought occurrences (Wells 2000).

Wegner (1994, p.34) proposed a theory of 'ironic processes of mental control' to account for the rebound effect. This theory proposes that as soon as suppression efforts are activated, there is an immediate hypervigilance to cues associated with the suppressed (target) thought. Through their subsequent association with the target thought, these cues subsequently serve to evoke the very target thoughts that are actively avoided (Wegner 1994). Notably, the small body of research examining the specific role of thought suppression within PTSD suggests that suppression of thoughts about *distressing* events, often leads to a subsequent increase in thought frequency (Harvey & Bryant 1998a, Harvey & Bryant 1998b, Shipherd & Beck 1999), although this is not always the case (Guthrie & Bryant 2000). The studies which found evidence for a rebound effect suggest that thought suppression in PTSD is a counterproductive coping strategy that maintains traumatic intrusions, thus preventing resolution of traumatic memories. An overall weakness of studies thus far, is that they fail to examine whether participants are using other thinking styles or thought processing strategies to manage their distressing thoughts (such as detaching or 'distancing' themselves from thoughts).

Only one study to date has investigated the rebound effect with analogue post-traumatic intrusions using real video footage (Davies & Clark 1998a). In this study, thought suppression produced a rebound effect with analogue posttraumatic intrusions during a thinking aloud task, but not with a buzzer pressing or retrospective measure. The authors suggest that the accuracy of button pressing may be greater in studies that do not combine it with a competing, thinking aloud task (e.g. Salkovskis & Campbell 1994). It is

also important to use film footage from a *real* event, as this makes the analogue more convincing (M. Davies, personal communication, February 2000).

Notably, traditional information processing and network models of PTSD (e.g. Horowitz 1975, Foa & Kozak 1986) suggest that intrusive thoughts which are the focus of thought suppression attempts, arise when individuals attempt to incorporate traumatic experiences into their pre-existing cognitive networks (Morgan, Matthews & Winton 1995). Morgan et al argue that network models are theoretically weak because they fail to clearly distinguish between symptoms that are associated with involuntary, 'automatic' processing, and those which are derived from strategic, or 'controlled' processing. Morgan et al. (1995) note that the activation of the network and elicitation of intrusive thoughts may proceed automatically, but it cannot be assumed that the individual has no voluntary control over the course of information processing.

A further, important criticism of both contemporary models of PTSD and Wegner's theory of thought suppression, is that these approaches fail to acknowledge the impact of metacognitive factors on intrusions. Metacognitive factors include the way individuals perceive their own thinking styles (Wells & Purden 1999). In attempts to address these various deficits, Wells & Matthews (1994, 1996) and Wells (1997, 2000) have developed a cognitive model for affective disorders including PTSD, which clearly distinguishes between a lower-level network operating through automatic processing, and an upper-level executive system which controls more strategic efforts to cope - such as thought suppression. Within their model, affective disorders are characterised by a cognitive-attentional syndrome called the Self-Regulatory Executive Function (S-REF). The S-REF is characterised by a self-focus and biasing of selective attention towards threat stimuli,

such as intrusive traumatic thoughts. Wells (1997) proposes that thought suppression represents a dysfunctional coping strategy that can lead to a delayed resurgence of intrusions related to the suppressed thought, by increasing attentional strategies that monitor for the presence of target thoughts.

The S-REF model also highlights the role of a specific type of self-knowledge in emotional disorders called metacognitive knowledge (Matthews & Wells 2000). Metacognitive knowledge guides cognitive processing styles and interpretations of cognitions. The S-REF model predicts that metacognitive beliefs about thought recurrences could potentially enhance distress, and therefore motivation to suppress. For example, persistent intrusions about a sexual assault may evoke concerns that the event was actually desired or enjoyed at some level. Each occurrence of the intrusive thought might then result in more negative appraisal, which in turn would evoke the thought (Purdon 1999, Wells & Matthews 1994).

The S-REF model suggests that PTSD treatment programmes should modify not only cognitive content, but also cognitive processes. (Sembi & Wells 2000). Wells (1997) proposes that the development of cognitive processing strategies aimed at manipulating attention and metacognition, represent an exciting possibility for improving current treatment plans. A specific processing style for use in treatment advocated by Wells & Matthews (1994, 1996) and Wells (1997, 2000), is detached mindfulness. Detached mindfulness has been defined as the 'antithesis of thought suppression attempts' (Wells 1997, p.272). This processing style endeavours to 'disengage' the analytic processing from intrusive thoughts, by reducing self-focused attention directed towards the intrusions. The resulting 'disengagement' from negative thoughts is thought to allow clients access to

more functional levels of metacognitive self-knowledge, and adaptive plans for processing. This process should also permit intrusions to decay in their own right (Wells 2000) through habituation, although as of yet, these theoretical assertions are largely untested.

S. Sembi (personal communication August 2000) proposes that detached mindfulness is not a form of avoidance or distraction. Wells (2000, p.84) further argues that detached mindfulness is a metacognitive processing strategy that is different from mindfulness in the meditation sense, because it does not borrow from the Buddhist tradition or use breath control. However, there is no evidence to support this contention. One recent study has provided some interesting preliminary findings to support the use of detached mindfulness in the treatment of PTSD. Sembi & Wells (2000) reported a case series of six patients following a violent assault who were treated using a metacognitive focused therapy package The treatment plan included consideration of the pros and cons of thought suppression, controlled worry periods and training in detached mindfulness, but did not involve imaginal exposure or cognitive restructuring. Wells (2000) proposes that emotional processing cannot be achieved simply by the decay of arousal in fear networks through exposure, because this process fails to account for the development of new processing strategies. Notably, the therapeutic package produced a sharp reduction in symptoms for each client at 3 and 6-month follow-up, as assessed by a range of standardised measures including the Impact of Event Scale (Horowitz, Wilner & Alvarez 1979). The study is limited however, because it employed a case-study methodology and a non-standardised treatment protocol. The specific role of detached mindfulness is unclear, because it was not examined in isolation or in direct comparison with thought suppression within a controlled setting.

The aim of the current study is to explore the impact of different thought processing strategies on analogue posttraumatic intrusions, by directly comparing the use of thought suppression with detached mindfulness on the 'rebound effect' and during a subsequent 5-hour period. The study was exploratory as detached mindfulness is a new and relatively untested technique. Two specific research questions were investigated to determine the influence of thought suppression and detached mindfulness on traumatic material. Firstly, would suppression of analogue posttraumatic intrusions produce an immediate decrease in their frequency compared with detached mindfulness and a control group, and would this be followed by a delayed increase of suppressed thoughts ('the 'rebound effect')? Secondly, would the use of detached mindfulness produce a lower resurgence of target thoughts during a 5-hour 'diary' period compared with thought suppression and a control group?

2. Method

2.1. Experimental Design

A 3 X 2 mixed model factorial design was employed in partial replication of Davies & Clark's study (1998a). The between group factor was thinking style: thought suppression, detached mindfulness, or 'thinking anything' (control). Experimental period (post-video period 1, and post-video period 2) served as the within-group factor. Participants were allocated to either the suppression, detached mindfulness or control group and shown the fire disaster video. After the video, participants reported their thoughts during the first 5-

minute period following instructions to adopt the respective thinking style. This was followed by the second 5-minute period, where all three groups received identical instructions to merely record their thoughts. After the experiment, participants recorded any further thoughts about the fire film using a 5-hour diary measure.

2.2. Participants

Eighty-six undergraduate psychology students were recruited from the Research Participation Scheme at the University of Southampton. Appropriate university ethical approval was granted (Appendix 2). The sample was predominantly female (89.78%) and ranged in age from 18 to 46 years (M= 19.99, S.D. = 3.73). Participants were excluded if they had received or were about to receive any form of psychological or psychiatric treatment. They were also excluded if they had any form of heart condition, serious disease, or if they, or anyone close to them, had ever been involved in a major fire (Appendix 3). Participants were informed that the experiment would involve watching a 6-minute film about a real fire hazard, and performing some straightforward tasks (Appendix 4), including a short training exercise in the detached mindfulness condition. Students received research credits and a chocolate bar for their participation.

2.3. Materials

Film stimulus. A fire video showing footage from a real fire in which attempts are made to resuscitate 2 children was obtained from the Staffordshire Fire & Rescue Service. This video is produced as training material for fire officers. Express permission was obtained

from the Chief Fire Officer to use the video within the research study. The video lasted for 6-minutes and was shown on a 40cm colour television screen.

2.4. Measures

2.4.1. Fire thoughts. Two key measures of fire thoughts were used. A retrospective visual analogue scale provided an estimate of the amount of time participants had spent thinking about the film on a 0 (none of the time) to 100% (all of the time) rating scale (Appendix 5a). The number of 'on-line' fire thoughts was recorded during each 5-minute interval using a computer key press system which was attached to a hidden computer programme that calculated the total number of key presses. Another visual analogue scale was used to measure how unpleasant participants found their thoughts about the fire film on a 0 (not at all) to 100% (extremely) point scale (Appendix 5b).

2.4.2. Thinking styles. Three retrospective visual analogue scales were used to measure the degree of effort made by participants to suppress their thoughts, employ detached mindfulness, or to distract themselves from their thoughts. All scales were measured on a 0 (none at all) to 100% (full effort) point scale. To avoid semantic confusion, the terms suppression and detached mindfulness were not used directly. Suppression efforts were measured by asking participants to rate 'how much effort they put into deliberately trying to push away their thoughts about the fire film'. Efforts to use detached mindfulness were measured by asking participants to rate 'how much effort they put into detaching themselves from their thoughts about the fire film by simply letting them go, without deliberately trying to push them away'. Efforts to use distraction were measured by asking

participants to rate 'how much effort they put into trying to deliberately distract themselves from their thoughts about the fire film' (Appendix 5c).

2.4.3. Mood measures. Happiness, anxiety, depression and anger were rated on visual analogue scales ranging from 0 (not at all x) to 100% (extremely x). The prompt for each mood state was the phrase: "at this moment", followed by the analogue measure for each mood (Appendix 6).

2.4.4. Training measures in detached mindfulness. A short training period in detached mindfulness was provided prior to the experiment: this is described below. Following this period, participants were asked to rate how well they "understood the concept of detached mindfulness" on a 0 (not at all) to 100% (extremely well) point scale. Participants were then asked to rate how much effort they put into detaching themselves from thoughts about two polar bears in a practical exercise "by simply letting them go, without deliberately trying to push the thought away" on a 0 (none at all) to 100% (full effort) point scale (Appendix 7).

2.4.5. Diary Measure. A diary was used to measure the amount of time participants spent thinking about the fire film within a 5-hour period after the experiment (Appendix 8). Time spent thinking about the film was measured on an hourly basis, and using an overall 5-hour 'summary' measure on a 0 (none of the time) to 100% (all of the time) point scale. A further visual analogue scale was used to measure how well participants kept to the

time scale outlined on the diary table on a 0 (not at all well) to 100% (extremely well) point scale.

2.5. Procedure

Participants were seen individually, and were initially asked to complete an information sheet to ensure that they could proceed with the study on ethical and health grounds. None of the participants met the exclusion criteria. Participants were then asked to complete consent forms and the first set of mood rating scales. Participants in the detached mindfulness condition were given time to read an information sheet on detached mindfulness, and were then provided with a short training period lasting approximately 10 minutes. The information sheet was produced to explain the concept and technique of detached mindfulness (based on S.Sembi, personal communication August 2000) and read as follows:

"This is a short information sheet which describes a thinking style called 'detached mindfulness'. After you have read this, we will carry out a practical exercise together based on this technique. You are not expected to remember all the details and facts about detached mindfulness, and will not be tested on these facts. It is hoped that the information will give you some insight into the key concepts and ideas which form the basis of this approach.

Detached mindfulness is a thinking style in which you acknowledge that a certain thought is present, but then you just let it be. You simply let it go. You don't have to give any time to the thought, or engage with it. If you try and push the thought away or 'fight it', it will come back. The following examples can be used to illustrate this point. Imagine

paying attention to a naughty child. The more attention you give the child, the worse its behaviour is likely to become. As an adult, you will be aware of the child's behaviour, but the less attention you give it the more likely it is to stop misbehaving. Alternatively, imagine trying to sleep in a room with a clock, which ticks loudly. The more attention you give to the ticking, the worse it will become. If you acknowledge the ticking, but then just let it be, it is likely to become less intrusive and you will get to sleep. In detached mindfulness, you acknowledge that a thought is present, but then you take a mental step back from it and leave it alone. You don't fight the thought or try to suppress it. You don't engage with it or elaborate on it. You just let the thought go".

This information sheet was followed by a short, practical exercise in which participants were first requested to look at an image of two polar bears. They were then given the following instructions:

"Now imagine you are lying in a field looking up at the sky. Your thoughts and images about the bears are just like clouds in the sky. You see the clouds, you know they are there, but then you just leave them alone. You don't have to give any time to the clouds. You don't try to force them out of sight or keep checking that they are there. You simply take a mental step back from them and then just let them be".

Participants were excluded from the study if they rated their understanding of detached mindfulness and effort to use the approach as less than 50% on the rating scales.

All participants were then shown the fire film individually and instructed to imagine that they were 'bystanders at the scene of the fire rescue'. The researcher left the room whilst each participant watched the video. After the film, participants were given the

suppression, detached mindfulness or control instructions, and the researcher then left the room again.

The suppression group was instructed:

"During the next 5 minutes it is essential that you try as hard as possible not to think about the fire film. It is however essential that you record any thoughts or images about the film, however vague or fleeting, by pressing the touch key. I will tell you when the time is up".

For the detached mindfulness group, the suppression instructions were replaced with:

"During the next 5 minutes, if you have any thoughts or images about the fire film, simple detach yourself from them and let the thoughts go. You don't have to give any time to the thoughts. It's as if your thoughts and images about the fire film are just like clouds. You see the clouds, you know they are there, but then you take a mental step back from them. You don't fight them, you simply let them be. It is however essential that you record any thoughts or images about the film, however vague or fleeting, by pressing the touch key. I will tell you when the time is up".

For the control group, the instructions were replaced with:

"During the next 5 minutes, if you have any thoughts or images about the fire film, please press the computer touch key. It is essential that you record any thoughts or images about the film, however vague or fleeting, by pressing the touch key. I will tell you when the time is up".

After the first 5-minute period, participants were instructed to complete the entire visual analogue rating scales, including the mood measures. This was followed by a second 5-minute period, in which all groups received identical instructions:

"During the next 5 minutes you can think about anything with no restrictions. This includes any thoughts or images about the fire film. It is essential that you record any thoughts or images about the film, however vague or fleeting, by pressing the touch key. I will tell you when the time is up".

Participants were then asked to complete the entire visual analogue rating scales again, including the mood measures. Participants were then handed the diary measure which provided them with the following instructions:

'From the end of this lab session, during the next five hour period, please record any thoughts and/or images you have about the fire film by completing the following diary table'.

Participants were told to return the diary measure in a sealed envelope (provided by the researcher). It was explained that their research credits would be allocated on direct receipt of this. Participants were also handed a sealed envelope containing a full debriefing letter. This included the information and practical exercise on detached mindfulness for participants in the suppression and control conditions (Appendix 9). Participants were encouraged to contact the researcher if they felt concerned by any aspect of the experiment. No participants pursued this offer.

3. Data Analysis

Data was entered into SPSS Version 10. To justify the use of parametric tests, skewed distributions that were not reasonably well distributed were transformed using a log transformation. For clarity, all reported means and standard deviations are actual scores.

Mixed model Anovas were the primary statistical methods used in the analysis of data to address the central aims of the study. Post hoc tests were performed using the Scheffe test, in order to detect the source of significant differences. One-way Anovas were used to examine the single item diary measures. Finally, Pearson's correlation coefficient was used to determine relationships between scores on the measures of distraction, suppression and detached mindfulness. Due to the exploratory nature of the study, two-tailed levels of significance were used throughout. An alpha level of 0.05 was employed for all statistical tests.

4. Results

A number of participants were excluded from the final data analysis. Nine participants were excluded because they rated the video's level of unpleasantness as less than 50%. Two further participants were excluded because they misunderstood the computer key press instructions. One participant was excluded following the pre-training in detached mindfulness, because of a failure to understand the procedure. In order to refine the experimental manipulation, 7 participants in the detached mindfulness group were excluded after rating their efforts to suppress as more than 70%. Similarly, 2 participants in the suppression group were excluded after rating their efforts to use detached mindfulness as more than 70%. These exclusion criteria resulted in a sample size of 65 participants with the following group sizes: suppression group $n = 25$, detached mindfulness group $n = 17$, control group $n = 23$. Sixty-two of these participants returned the 5-hour diary measure as follows: suppression group $n = 23$, detached mindfulness group $n = 16$, control group $n = 23$.

4.1. The video's unpleasantness ratings

Table 1. shows the mean unpleasantness ratings of the video across each Period. A 3 (Group) x 2 (Period) Anova on the unpleasantness ratings of the video revealed a main effect of Period, indicating an overall drop in the perceived level of unpleasantness of the video between Periods 1 and 2 ($F(1,62) = 38.09$, $P < 0.001$). There was no main effect of Group ($F(2,62) = 0.49$, NS) and no Group x Period interaction ($F(2,62) = 0.73$, NS). These findings indicated that the experimental manipulations did not influence the film's perceived level of unpleasantness.

Insert table 1 about here

4.2. Manipulation checks

Table 2. shows the mean ratings of efforts made by participants in each group to use suppression and/or detached mindfulness during each Period. In order to investigate whether the suppression manipulation had been successful, a 3 (Group) x 2 (Period) Anova was conducted on the suppression measure. There was a main effect of Period, indicating an overall decrease in the amount of effort put into suppression between Periods 1 and 2 ($F(1,62) = 54.64$, $P < 0.001$). There was also a main effect of Group ($F(2,62) = 5.01$, $P = 0.01$), and a Group x Period interaction ($F(2,62) = 15.10$, $P < 0.001$). Post hoc tests indicated that the suppression group made significantly more effort to suppress their thoughts at Period 1 compared with the detached mindfulness group ($P < 0.001$) and control group ($P = 0.001$). There were no differences in efforts to suppress at

Period 1 between the detached mindfulness and control group ($P > 0.05$). During Period 2, there were no differences between the three groups in their efforts to suppress ($F(2,62) = 2.36$, NS).

In order to investigate whether the detached mindfulness manipulation had been successful, a 3 (Group) x 2 (Period) ANOVA was conducted on efforts to use detached mindfulness. There was a main effect of Period, indicating an overall drop in the amount of effort put into the use of detached mindfulness between periods 1 and 2 ($F1,62) = 4.56$, $P < 0.05$). There was no main effect of group ($F(2,62) = 0.89$, NS), but there was a Group x Period interaction ($F(2,62) = 3.84$, $P < 0.05$). Post-hoc tests indicated that the detached mindfulness group made significantly more effort to use detached mindfulness at Period 1 than the suppression group ($P = 0.01$), but not more effort than the control group ($P > 0.05$). There were no differences in efforts to use detached mindfulness at Period 1 between the suppression and control group ($P > 0.05$). During Period 2, there were no differences between the three groups in their efforts to use detached mindfulness (F (2,62) = 0.28, NS).

Insert table 2 about here

4.3. Measures of fire thoughts

Table 3. shows the two measures of thoughts about the fire film during both periods: the retrospective visual analogue ratings recording the percentage of time spent thinking about the fire film, and the number of 'on-line' fire thoughts recorded by computer

presses. The immediate decrease effect was explored by examining group differences in the number of thoughts during the first Period. The delayed increase effect was explored by examining group differences in the number of thoughts during the second Period. Each of the 2 measures of thoughts about the fire film were initially subjected to a 3 (Group) x 2 (Period) mixed model Anova.

4.3.1 The effect of thought suppression on the immediate decrease and delayed increase effect using visual analogue ratings

For the percentage of time spent thinking about the fire film, there was a main effect of Period, indicating that the overall percentage of time spent thinking about the fire film differed significantly between Periods 1 and 2 ($F(1,62) = 21.36$, $P < 0.001$). There was a main effect of Group ($F(2,62) = 4.85$, $P = 0.01$) but no Group x Period interaction ($F(2,62) = 2.53$, NS). Post hoc tests indicated that the suppression group recorded significantly more time thinking about the fire film at Period 1 compared with the detached mindfulness group ($P < 0.05$), but not with the control group ($P > 0.05$). There were no differences in the amount of time spent thinking about the film at Period 1 between the detached mindfulness and control group ($P > 0.05$). During Period 2, the suppression group again recorded significantly more time thinking about the fire film compared with the detached mindfulness group ($P < 0.05$), but not with the control group ($P > 0.05$). There were no differences in the time spent thinking about the film at Period 2 between the detached mindfulness and control group ($P > 0.05$).

The first research question examined whether suppression of posttraumatic intrusions would produce an immediate decrease in their frequency, followed by a delayed increase.

Neither of these effects were directly observed in the thought suppression Group. That is, the suppression group did not report an immediate decrease in the percentage of time spent thinking about the film during Period 1 compared with the detached mindfulness and control group. In contrast, the suppression group reported an immediate increase in the amount of time spent thinking about the film compared with the detached mindfulness group only. During the second period, this result was repeated, in that the suppression group again reported a larger percentage of time thinking about the film compared with the detached mindfulness group, but not with the control group.

4.3.2. The effect of thought suppression on the immediate decrease and delayed increase effect using the number of 'on-line' fire thoughts

For the number of (transformed) 'on-line' fire thoughts recorded by the computer key-press system there was a main effect of Period, indicating an overall decline in the amount of fire thoughts between Periods 1 and 2 ($F(1,62) = 13.44$, $P = 0.001$). There was no main effect of group ($F(2,62) = 1.87$, NS) and no Group x Period interaction ($F(2, 62) = 2.23$, NS). Results with the 'on-line' measure of fire thoughts thus showed no evidence for either an immediate decrease, or delayed increase effect.

Inset table 3 about here

4.4. Thoughts about the fire film recorded by 5- hour diary post-experiment

Table 4. shows the mean percentage of time spent thinking about the fire film recorded by the itemised 5-hour diary scale across each hour, and the mean *summary* rating of the percentage of time spent thinking about the film during the entire 5-hour period. It also reports mean levels of accuracy in diary time keeping. A one-way ANOVA revealed no group differences on the perceived levels of accuracy of diary time keeping, indicating that this variable did not act as a group confound ($F(2,59) = 0.57$, NS).

A 3 (Group) x 5 (Hour) mixed model Anova was conducted on (transformed) scores on the itemised 5-hour diary scale. There was a main effect of Hour, indicating an overall decline in the amount of time spent thinking about the fire film over the 5 hours ($F(4,236) = 38.73$, $P < 0.001$). There was no main effect of Group ($F(2,59) = 0.68$, NS), but there was a Group x Hour interaction ($F(8,236) = 3.23$, $P < 0.05$). Post-hoc tests did not reveal further significant differences (all P's > 0.05). A one-way Anova on the 5-hour diary *summary* measure did not reveal group differences in the overall percentage of time spent thinking about the fire film ($F(2,59) = 1.15$, NS).

In answer to the second research question, these findings thus indicate that the use of detached mindfulness did not produce a lower resurgence of target thoughts during a 5-hour 'diary' period compared with the suppression and control group.

Insert Table 4 about here

4.5 Additional analyses

4.5.1. Correlational relationships

The literature suggests that there is a direct relationship between suppression and distraction. In contrast, detached mindfulness and distraction are not thought to be related. Relationships between distraction, suppression and detached mindfulness were explored using correlational analyses. These analyses were based on efforts to use distraction, suppression and detached mindfulness during Period 1. Notably, there was a strong, significantly positive correlation between efforts to use suppression and distraction (r = 0.69, $P < 0.001$) during the first period, indicating that higher levels of suppression were associated with higher levels of distraction. In contrast, the relationship between detached mindfulness and distraction did not reach significance (r = -0.17, NS).

4.5.2. Mood measures

Table 5 shows mean mood ratings which were measured at 3 time points: pre-video Period, post-video Period 1, post-video Period 2. Visual inspection of these ratings reveals that the suppression group reported very low anxiety scores within the pre-video period. A 3 (Group) x 3 (Time) ANOVA was conducted for each of the 4 mood states to assess mood change across the 3 time points, and possible group differences. For (transformed) anxiety ratings, there was no main effect of Time ($F(2,124)$ =1.76, NS) or of group ($F(2,62)$ = 0.21, NS). However, there was a Group x Time interaction ($F(4,124)$ =3.40, $P < 0.05$). Post-hoc tests did not reveal further significant differences (all P's > 0.05). For (transformed) anger ratings, there was a main effect of Time, indicating an overall rise in levels of anger between Times 1 and 2, followed by a drop between Times 2 and 3 ($F(2,124)$ = 28.98, $P < 0.001$). There was no main effect of Group ($F(2,62)$ = 1.63, NS) but there was a Group x Time interaction ($F(4,124)$ = 3.52, $P < 0.05$).

Post-hoc tests indicated that the suppression group reported significantly higher levels of anger at Time 2 compared with the control group ($P = 0.05$). There was also a non-significant trend for the suppression group to report higher levels of anger at Time 2 compared with the detached mindfulness group ($P = 0.06$). There were no differences in anger levels at Time 2 between the detached mindfulness and control group ($P > 0.05$). For happiness ratings, there was a main effect of Time, reflecting an overall drop in levels of happiness between Times 1 and 2, followed by a subsequent rise between Times 2 and 3 ($F(2,124) = 73.04$, $P < 0.001$). There was no main effect of Group ($F(2,62) = 0.66$, NS), but there was a Group x Time interaction ($F(4,124) = 0.85$, $P < 0.05$). Post- hoc tests did not reveal further significant differences (all $P's > 0.05$). For (transformed) depression ratings, there was a main effect of Time, indicating an overall rise in levels of depression between Times 1 and 2, followed by a drop between Times 2 and 3 ($F(2,124) = 33.43$, $P < 0.001$). There was no main effect of Group ($F(2,62) = 0.66$, NS) and no Group x Time interaction ($F(4,124) = 0.24$, NS).

Insert Table 5 about here

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5. Discussion

The main aim of this exploratory study was to investigate the impact of different thought processing strategies on the rebound effect with analogue posttraumatic intrusions. For clarity, the findings will initially be discussed in relation to the two key research questions raised in the introduction. Firstly, would suppression of analogue post-traumatic intrusions produce an immediate decrease in their frequency compared with the detached mindfulness group and the control group, and would this be followed by a delayed increase in suppressed thoughts in the form of a 'rebound effect'? Secondly,

would the use of detached mindfulness produce a lower resurgence of target thoughts during a 5-hour 'diary' period compared with thought suppression and a control group?

Traumatic thoughts were measured using both an 'on-line' computer press key system, and a retrospective visual analogue measure which recorded how much time the participant had spent thinking about the film. During the first period, with the retrospective visual analogue measure, there was no evidence for an immediate decrease in thought frequency in the suppression group compared with either the detached mindfulness or control condition. In contrast, there was *some* evidence for an immediate enhancement effect, in that the suppression group reported more time thinking about the film on the visual analogue measure compared with the detached mindfulness group, but not with the control group. During the second Period this result was repeated: the suppression group again reported a larger percentage of time thinking about the film compared with the detached mindfulness group - but not with the control group. By comparison, using the number of 'on-line' target thoughts recorded by the computer press key system did not reveal any evidence for either an immediate decrease, or delayed enhancement effect at any level.

Overall, the pattern of these results thus fails to demonstrate the delayed enhancement or rebound effect that has been reported after suppression of posttraumatic intrusions (Harvey & Bryant 1998a, Harvey & Bryant 1988b, Shipherd & Beck 1999). More specifically, it also fails to replicate findings by Davies & Clark (1998a) who reported the rebound effect in an analogue study with verbalised thoughts that were measured during a

thinking aloud exercise. In contrast, the percentage of fire thoughts in the suppression condition increased immediately from the first Period compared with the detached mindfulness group, as measured by the retrospective measure. This finding is consistent with several studies that have reported an immediate enhancement effect following suppression efforts (Lavy & van den Hout 1990, Salkovskis & Campbell 1994, Salkovksis & Reynolds, 1994). Notably, the 'on-line' recording of fire thoughts showed no evidence for either an immediate enhancement or delayed rebound effect, which matches the results of further studies (e.g. Matthews & Milroy 1994, Roemer & Borkovek 1994, Harvey & McGuire 2000).

Failure to replicate the rebound effect in the current study may have been a function of the measures used. A thinking aloud task was not included in the present study because of the practical difficulties in asking participants to combine three competing and attentionally demanding tasks concurrently (detached mindfulness, thinking aloud, and key pressing). Pre-training participants in both detached mindfulness and the thinking aloud task before the experiment, may also have increased performance anxiety. Failure to find evidence for the rebound effect could also reflect individual differences in willingness to report thought occurrences, the availability of different distractors, and/or individual differences in motivation to suppress thoughts (Wells 2000).

The discrepancy in the level of thoughts recorded by the retrospective and on-line measure between the suppression and detached mindfulness group could be related to several factors. One possibility is that the visual analogue scale may have provided a less

sensitive measure of intrusions due to its retrospective nature (Davies & Clark 1998a). Alternatively, it is possible that the suppression processing strategy may be responsible for this discrepancy. That is, suppression efforts may make the thought more salient, and thus increase the subjective *perception* of the presence of the thought. In contrast, the use of a more detached processing style, could diminish cognitive and attentional biases directed towards intrusions. By implication, thought recurrences could then be perceived as less intrusive and dominating retrospectively. However, the lack of any effect with the 'on-line' key press measure suggests that there may be no difference in the actual quantity of thoughts generated in 'real' terms.

Differences between the retrospective and the 'on-line' measure could also reflect the attentional demands required in the application of a novel thinking style. That is, information processing resources tapped whilst employing detached mindfulness, may have subsequently diminished the participants ability to accurately attend to the amount of time spent thinking about the film.

In the present study, the immediate enhancement effect following suppression efforts using the analogue measure, highlights the potential difficulties in motivating participants to suppress their thoughts following experimental instructions (Salkovskis & Campbell 1994). Failure of participants to comply with suppression instructions has been noted more recently in a study by Guthrie & Bryant (2000). In the current study, participants in all three conditions sometimes indicated that they were employing both experimental thinking styles simultaneously. This may have masked potential suppression effects in the

suppression group. Although several participants were excluded from the manipulation check based on this criteria, the fact that the dividing line between group thinking styles was somewhat blurred despite experimental instructions, may partly explain the absence of a complete rebound effect.

Related to the manipulation check, it is also possible that using the term 'effort' with the detached mindfulness measure may have been counter-intuitive because the technique could be perceived as involving a sense of 'effortless' application. This semantic confusion could account for why the control condition indicated that they were using detached mindfulness. Alternatively, although it is unlikely that participants in the control condition were using a detached thinking style as advocated by Wells (1997, 2000), it is still feasible that they were trying to 'distance' themselves from their thoughts by taking a mental step back from them. Complications relating to the manipulation check do make it difficult to draw firm conclusions about differences that may or may not have existed between the control condition and the other groups. Future research should endeavour to tease out potential group differences after a more sophisticated manipulation check, such as using explicit multi-item measures to assess different thinking styles.

The 5-hour diary measure does not indicate that the use of detached mindfulness produces a lower resurgence of target thoughts during a 5-hour 'diary' period compared with the suppression group and the control group. There were no group differences in the hourly, or 5-hour summary measure. This finding matches an earlier study by Davies &

Clark (1998b), who also failed to find evidence for suppression effects recorded by a seven-day diary of intrusions. It could be that any potential suppression effects diminish very rapidly within an analogue study employing a film stimulus, because the material holds no personal relevance for participants (Purden 1999).

Additional analyses yielded several important findings. The pattern of relationships between distraction, suppression, and detached mindfulness were particularly striking. That is, whilst higher levels of suppression were associated with higher levels of distraction during the first period (as noted by Davies & Clark 1998a), there was no relationship between distraction and detached mindfulness at this time. As outlined below, these findings potentially carry important theoretical implications.

With respect to the mood measures, current findings tentatively indicate that suppression of distressing thoughts could heighten levels of anger. Although this effect was not maintained across time, it suggests that suppression of thoughts increases adverse emotional reactions, so prolonging distress (Horowitz 1986). This finding is not consistent with Davies & Clark's (1998a) results, where the suppression manipulation failed to influence mood. However, indirectly, the findings are consistent with Shipherd & Beck's study (1999), where suppression of rape-related thoughts influenced levels of both depression and anxiety.

In summary, this exploratory study potentially suggests that in comparison to thought suppression, detached mindfulness is a distinct thinking style that may carry important implications for the way in which traumatic thoughts are 'perceived' retrospectively (in terms of time spent thinking about them). However, it is unclear from the present study to what extent employing a detached thinking style directly differs from a control condition,

where participants also perceived themselves as employing some kind of 'detached' thinking style. Nonetheless, the study does indicate that participants are able to use detached mindfulness at a very elementary level - with only a limited amount of training. Perhaps most importantly, the study raises important theoretical questions about the ways in which detached mindfulness differs from forms of avoidant coping, and distraction.

Wegner (1989, 1994) has highlighted the role of self-distraction in the suppression process. In the present study, this appeared to be indirectly supported by the positive relationship between suppression and distraction in the first post-video period, even though attempts at self-distraction did not lead to the full rebound effect. Wegner (1994) has proposed that attempts to suppress unwanted thoughts prompt the individual to use a range of distracters in an effort to avoid them. However, these distracters subsequently become associated with the avoided thoughts, and later serve as cues for them. Thus, the very cognitive processes used in the act of suppression may actually work to elicit the thought itself (Gold & Wegner 1995). In contrast to this, S. Sembi (personal communication August 2000) proposes that detached mindfulness is not a form of distraction or avoidance. It is not an attempt 'not to think a thought' using self-distraction, but rather an attempt to take a mental step back from the thought, in a 'neutral' way (Wells 1997, 2000). In contrast to thought suppression, Wells proposes that detached mindfulness reduces self-focused attentional strategies which monitor for the presence of 'target thoughts', so diminishing the number of cognitive cues that become associated with the intrusion. This process potentially allows distressing thoughts to decay in their own right. Importantly, Wells (2000) has recently asserted that in the short term distraction may divert attention away from the processing of threat, and thus reduce emotional distress

temporarily. In the longer term however, distraction may block the encoding of new information that can modify maladaptive knowledge.

In contrast to thought suppression and attempts at self-distraction, a detached processing style is thought to allow access to more adaptive forms of self-knowledge which help to disconfirm negative appraisals and reduce negative affect linked with traumatic thought recurrences. For example, repeated intrusions following suppression efforts may be perceived as a sign of inadequacy or impending madness (Dunmore et al 1999), so fuelling further catastrophic appraisals and negative emotions. In contrast, a *'detached'* processing style, may help to diminish rather than promote negative emotional components commonly associated with the traumatic intrusion, by changing the way the traumatic material is processed and thus perceived. Again, the current study provides some tentative evidence for this proposal because neither detached mindfulness nor the control condition were linked with negative mood fluctuations. Suppression of thoughts however, appeared to fuel at least some level of negative affect.

As noted, various methodological issues were raised by the present study. It is possible that the pre-training period in detached mindfulness was too brief. A longer period of pre-training may have heightened the potential risk for an experimental confound resulting from the increased experimenter-participant interaction (in the detached mindfulness group *only*) prior to the experiment. However, if the other experimental groups were given some form of pre-experimental training tasks, this could help to diminish such effects whilst allowing for more extensive training periods. A clear limitation of the current study was that all three groups were not provided with a standardised pre-training period.

There is also a possibility that the content of the information sheet on detached mindfulness, may have inadvertently provided participants with some indication of the objectives of the study. The use of an attractive image of a polar bear as the pre-training stimulus rather than a neutral image, may also have produced pleasant intrusions which subsequently enhanced compliance with detached mindfulness instructions in the screening period. If this was the case, it could have masked real levels of motivation to use the technique with more distressing intrusions during the actual experiment.

In addition to the above limitations, it is also apparent that there were no measures to assess whether the participants avoided watching the more unpleasant images on the video, or whether they read the debriefing letter before they completed the diary. Both these factors could have confounded the findings. Moreover, the detached mindfulness instructions which are not yet based on a standardised protocol, used the 'target' term: 'fire thought' more frequently than within the other conditions in attempts to explain the procedure explicitly. Priming effects were thus not well controlled, in that the number of times the 'target' term was mentioned in each instructional set was not constant across experimental conditions (Harvey & McGuire 2000). In addition, for reasons of length, the current study did not include a neutral (control) film stimulus. Including a neutral stimulus would have helped to clarify differential effects on the basis of film type (Harvey & Bryant 1998a). Finally, the sample was predominantly female. This may have introduced the possibility of a gender bias.

The clinical implications drawn from an analogue study must be stated cautiously. Nevertheless, the current research suggests that the *way* individuals process intrusive

cognitions, may have important treatment implications for PTSD. Guthrie & Bryant (2000) note that thought suppression is an avoidant coping strategy for dealing with intrusive thoughts, which impairs engagement with, and thus resolution of aversive memories. In contrast, taking an emotional step back from unpleasant intrusions rather than actively 'fighting' them or trying to avoid them, could allow for a form of detached and less emotionally charged 'exposure' and 'reliving' of the event, thus facilitating more adaptive emotional processing. This more detached, 'neutral' thinking style could also facilitate access to higher order beliefs and metacognitions, such as beliefs about the meaning of distressing thought recurrences.

Future research should start by developing a standardised protocol for detached mindfulness. This would also help to clarify more explicitly the way in which detached mindfulness differs from traditional forms of mindfulness meditation, because in practical terms the dividing line between the two techniques is unclear. Employing a standardised protocol would also help to clarify how a detached thinking style explicitly differs from just 'thinking anything', as this is not evident from the current study. Further studies could also help to explore the way in which a detached processing style might influence emotional affect associated with distressing thoughts. Perhaps most importantly, investigations with clinical populations would help to measure more directly the impact of this detached thinking style on traumatic intrusions, especially in terms of how it potentially influences the 'perceived' amount of time spent dwelling on persistent thoughts, and the metacognitive meaning of these thought recurrences. Inevitably, further research within this new area could potentially help to inform the treatment literature, so enabling clinicians to better understand the mechanisms of change with clients with PTSD.

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Table 1.

Means (and S.D.s) of unpleasantness ratings of the fire video

Table 1

Means (and S.D.s) of unpleasantness ratings of fire video

Period	Suppression Group (n = 25)	Detached mindfulness Group (n =17)	Control Group (n = 23)
Period 1	71.2% (13.94)	70.59% (16.00)	69.13% (14.11)
Period 2	58.40% (23.40)	49.94% (24.08)	53.91% (19.71)

Table 2.

Means (and S.D.s) of efforts to use suppression and detached mindfulness at Periods 1 and 2

Table 2

Means (and S.D.s) of efforts to use suppression and detached mindfulness at Periods 1 and 2

Efforts to use Suppression and Detached mindfulness at Periods 1& 2	Suppression Group (n = 25)	Detached mindfulness Group (n = 17)	Control Group (n = 23)
Suppression			
Period 1	77.60% (16.15)	43.53% (16.18)	55.22% (25.38)
Period 2	31.20% (22.79)	31.76% (21.57)	43.91% (21.90)
Detached mindfulness			
Period 1	46.40% (17.77)	65.88% (19.06)	54.78% (22.74)
Period 2	50.80% (27.22)	45.29% (25.52)	47.83% (17.83)

Table 3.

Means (and S.D.s) of thoughts about the fire film at Periods 1 and 2

Table 3

Means (and S.D.s) of thoughts about the fire film at Periods 1 and 2.

Measures of thoughts at Periods 1 & 2	Suppression Group (n = 25)	Detached mindfulness Group (n = 17)	Control Group (n = 23)
Period 1			
Percentage of time Thinking about film	60.80%* (26.44)	42.35% (17.51)	58.70% (22.22)
Number of on-line Fire thoughts	23.08 (17.44)	15.82 (15.69)	27.91 (27.80)
Period 2			
Percentage of time Thinking about film	52.40%* (26.03)	32.35% (20.78)	36.96% (20.10)
Number of on-line Fire thoughts	22.40 (17.76)	11.29 (9.16)	23.52 (31.88)

*$p < .05$ compared to the detached mindfulness group, post hoc Scheffe test, two-tailed

Table 4.

Means (and S.D.s) of percentage of time spent thinking about the fire film recorded by the 5-hour diary measure, including accuracy of diary time keeping

Table 4
Means (and S.D.s) of percentage of time spent thinking about the fire film recorded by 5 hour diary measure, including accuracy of diary time keeping.

Percentage of time thinking about film during each hourly period	Suppression Group (n = 23)	Detached mindfulness Group (n = 16)	Control Group (n = 23)
Hour 1	33.91% (20.39)	23.75% (17.08)	31.74% (23.48)
Hour 2	21.74% (12.67)	14.38% (16.72)	20.00% (21.11)
Hour 3	10.00% (13.48)	12.50% (14.38)	15.65% (19.96)
Hour 4	6.09% (8.39)	8.13% (13.28)	13.48% (16.41)
Hour 5	3.91% (6.56)	6.88% (11.95)	7.83% (9.98)
Overall summary measure of time spent thinking about film	21.74% (15.57)	16.25% (8.85)	22.61% (14.21)
Accuracy in diary time keeping	71.30% (18.90)	68.75% (17.84)	65.65% (17.01)

Table 5.

Means (and S.D.s) of mood ratings at the 3 experimental periods

Table 5
Mean (and S.D.s) of mood ratings at the 3 experimental periods

Mood levels at each Experimental period	Suppression Group (n = 25)	Detached mindfulness Group (n = 17)	Control Group (n = 23)
Anxiety			
Time 1 (pre-video)	16.40% (18.00)	32.94% (20.85)	31.30% (26.00)
Time 2 (post video, Period 1)	37.60% (27.28)	34.12 %(21.52)	33.04% (26.87)
Time 3 (post video Period 2)	29.20% (23.97)	25.29% (19.72)	29.57% (24.77)
Anger			
Time 1 (pre video)	8.40% (15.46)	12.94% (16.87)	6.09% (8.91)
Time 2 (post video Period 1)	39.20% (23.26)	21.18% (20.58)	21.30% (23.02)
Time 3 (post video Period 2)	23.60% (21.58)	18.24% (17.04)	13.91% (16.72)
Happiness			
Time 1 (pre video)	68.00% (17.08)	65.29% (17.00)	70.43% (13.31)
Time 2 (post video Period 1)	40.80% (13.82)	51.76% (17.04)	47.83% (17.04)
Time 3 (post video Period 2)	52.80% (15.95)	55.29% (20.35)	56.52% (14.65)
Depression			
Time 1 (pre video)	20.40% (22.26)	17.06% (18.63)	16.96% (21.19)
Time 2 (post video Period 1)	50.40% (24.75)	37.06% (21.73)	41.74% (30.40)
Time 3 (post video Period 2)	38.00% (21.41)	28.24% (20.99)	37.39% (27.83)

List of Appendices

APPENDIX 1

Instructions to authors: Behaviour Research and Therapy

BEHAVIOUR RESEARCH AND THERAPY
incorporating BEHAVIORAL ASSESSMENT

Information for Contributors

Submission of Papers

Authors are requested to submit their original manuscript and figures with two copies. Manuscripts for the regular section should be sent to Dr S. Rachman, Department of Psychology, University of British Columbia, Vancouver, British Columbia, Canada, V6T 1Z4. Manuscripts for the *Behavioral Assessment* Section should be sent to Dr S. Taylor, Department of Psychiatry, 2255 Wesbrook mall, Vancouver, British Columbia, Canada, V6T 2A1.

Submission of a paper implies that it has not been published previously, that it is not under consideration for publication elsewhere, and that if accepted it will not be published elsewhere in the same form, in English or in any other language, without the written consent of the publisher.

Manuscript Preparation

General: Manuscripts must be typewritten, double-spaced with wide margins on one side of white paper. Good quality printouts with a font size of 12 or 10 pt are required. The corresponding author should be identified (include a Fax number and E-mail address). Full postal addresses must be given for all co-authors. Authors should consult a recent issue of the journal for style if possible. An electronic copy of the paper should accompany the final version. The Editors reserve the right to adjust style to certain standards of uniformity. Authors should retain a copy of their manuscript since we cannot accept responsibility for damage or loss of papers. Original manuscripts are discarded one month after publication unless the Publisher is asked to return original material after use.

Abstracts: A summary, not exceeding 200 words, should be submitted on a separate sheet in duplicate. The summary will appear at the beginning of the article.

Keywords: Authors should include up to six keywords with their article. Keywords should be selected from the APA list of index descriptors, unless otherwise agreed with the Editor.

Text: Follow this order when typing manuscripts: Title, Authors, Affiliations, Abstract, Keywords, Main text, Acknowledgements, Appendix, References, Vitae, Figure Captions and then Tables. Do not import the Figures or Tables into your text. The corresponding author should be identified with an asterisk and footnote. All other footnotes (except for table footnotes) should be identified with superscript Arabic numbers.

References: All publications cited in the text should be present in a list of references following the text of the manuscript. In the text refer to the author's name (without initials) and year of publication, e.g. "Since Peterson (1993) has shown that . . ." or "This is in agreement with results obtained later (Kramer, 1994)". For 2–6 authors, all authors are to be listed at first citation, with "&" separating the last two authors. For more than six authors, use the first six authors followed by et al. In subsequent citations for three or more authors use author et al. in the text. The list of references should be arranged alphabetically by authors' names. The manuscript should be carefully checked to ensure that the spelling of authors names and dates are exactly the same in the text as in the reference list.

References should be prepared carefully using the *Publication Manual of the American Psychological Association* for style as follows:

Birbaumer, N., Gerber, D., Miltner, W., Lutzenberger, W., & Kluck, M. (1984). Start with biofeedback and continue with behavior therapy in migraine. *Proceedings of the 15th Annual Meeting of Biofeedback Society of America* (pp. 33–36) Albuquerque.

Gray, J.A. (1976). The behavioral inhibition system: a possible substratum for anxiety. In M. P. Feldman & A. Broadhurst. *Theoretical and experimental bases of the behaviour therapies* (pp. 3–41). London: Wiley.

Taber, I.I., McCormick, R.A., Russo, A.M., Adkins, B.J., & Ramirez, L.F. (1987). Follow-up of pathological gamblers after treatment. *American Journal of Psychiatry, 144*, 757–761.

Illustrations: All illustrations should be provided in camera-ready form, suitable for reproduction (which may include reduction) without retouching. Photographs, charts and diagrams are all to be referred to as "Figure(s)" and should be numbered consecutively in the order to which they are referred. They should accompany the manuscript, but should not be included within the text. All illustrations should be clearly marked on the back with the figure number and the author's name. All figures are to have a caption. Captions should be supplied on a separate sheet.

Line drawings: Good quality printouts on white paper produced in black ink are required. All lettering, graph lines and points on graphs should be sufficiently large and bold to permit reproduction when the diagram has been reduced to a size suitable for inclusion in the journal. Dye-line prints or photocopies are not suitable for reproduction. Do not use any type of shading on computer-generated illustrations.

[continued opposite

Information for Contributors—continued

Photographs: Original photographs must be supplied as they are to be reproduced (e.g. black and white or colour). If necessary, a scale should be marked on the photograph. Please note that photocopies of photographs are not acceptable.

Colour: Authors will be charged for colour at current printing costs.

Tables: Tables should be numbered consecutively and given a suitable caption and each table typed on a separate sheet. Footnotes to tables should be typed below the table and should be referred to by superscript lowercase letters. No vertical rules should be used. Tables should not duplicate results presented elsewhere in the manuscript (e.g. in graphs).

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APPENDIX 2

Southampton University Ethical Approval

University of Southampton

Department of Psychology

University of Southampton
Highfield
Southampton
SO17 1BJ
United Kingdom

Telephone +44 (0)23 8059 5000
Fax +44 (0)23 8059 4597
Email

27th July 2000

FAO Shara Drysdale
Clinical Psychology Department
University of Southampton
Highfield, Southampton
SO17 1BJ

Dear Shara,

Re: Application for Ethical Approval

I am writing to confirm you that your ethical application titled "Comparing the impact of thought suppression and detached mindfulness on the rebound effect in analogue post-traumatic intrusions" has been given approval by the department.

Should you require any further information, please do not hesitate in contacting me on (023) 80 593995.

Yours sincerely,

KMSM

Kathryn Smith
Ethical Secretary

DEPARTMENT OF PSYCHOLOGY

OUTLINE OF PROPOSED RESEARCH TO BE SUBMITTED FOR ETHICAL APPROVAL

PLEASE NOTE: You will need to discuss this form with your Supervisor. In particular, you should ask him/her for any departmental guidelines relating to this area of research which you must read and understand. You should also read and understand the Ethical Principles for Conducting Research with Human Participants published by the British Psychological Society. ***You must not begin your study until ethical approval has been obtained. Failure to comply with this policy will affect the viability of your research***

To obtain ethical approval it may take up to one week for undergraduates and up to two weeks for staff and postgraduates.

1. Name(s): SHARA DRYSDALE

   Supervisor: DR LUSIA STOPA

2. How may you be contacted? 01983- 855520 (a-phone).

3. Into which category does your research fall?

Year 1 Practical	
Year 2 Practical	
Year 3 Project	
Intercalated Medical	
MSc Ed Psy	
MSc/Diploma Health	
DClin Psy	✓
PhD Research	
Intercalated Medical Student	
Staff Research	

4. Provisional Title of Project:

Comparing The Impact of Thought Suppression and detached Mindfulness on the Rebound Effect in analogue Post-traumatic Intrusions.

5. ANSWER THE FOLLOWING QUESTIONS.
Give full details where necessary.

a) What are the aims, hypothesis or research questions of this project?

The aim of the research is to explore the impact of thought/processing strategies on analogue post-traumatic intrusions, by comparing the use of detached mindfulness with thought suppression on the 'rebound effect'. (Full hypotheses outlined in attached proposal).

b) What measurement procedures will be employed? Rating scales, a diary & 'thinking aloud' task
(If a questionnaire/test protocol/structured interview is to be used, a copy should be attached). All measures to be used are attached. The stimulus material is a 6-minute film depicting five hazards in a local community (as attached)
If a standard questionnaire is to be used, have you obtained permission to duplicate this questionnaire or purchased sufficient copies?" Yes/No
N/A

c) Who are the participants?
Psychology undergraduates as part of research participation scheme.

d) How will they be recruited? Through research scheme

e) If participants are under the responsibility of others (such as teachers, nurses or medical staff) have you obtained permission for the participants to take part in the study? YES/NO N/A

f) Is there reason to believe participants will experience discomfort during your study?
Yes, there is reason to think that participants may experience some discomfort. Please see overleaf for full details.

g) How will you obtain the consent of participants?
Written & verbal consent will be obtained as attached.

h) How will it be made clear to participants that they may withdraw consent to participate at any time?
This will be clearly stated in the 'informed consent' document issued to all participants prior to their participation.

i) Will the procedure involve deception of any sort? YES/NO

If YES, what is your justification? N/A

J) Do you propose to debrief participants and/or provide them with information about the findings of your study?

YES/~~NO~~

If YES, how will this be done? In a 'debriefing document' as attached.

If NO, why is there no debriefing? N/A

k) How will information obtained from or about participants be protected?

It will be strictly confidential, & kept in a secure place within the university.

l) Experimental apparatus employed must be approved for safety by Martin Hall or Bryan Newman. Has this approval been given? N/A.

m) Do you intend to make a submission to the medical ethical committee?
(Certain projects may need medical ethical approval, please check with your supervisor)

Yes/(No)

6. Outline any other information you feel relevant to this submission.

Please see attached.

I endorse the following statement: "I confirm that I have a copy of, have read and understand the Ethical Principles for Conducting Research with Human Participants published by the British Psychological Society".

Signature(s) S Ryedale .....

If you have received additional written guidelines from your supervisor please endorse the statement; "I have received, read and understood departmental ethical guidelines issued to me by my Supervisor relating to this work"

Signature(s) ..... Date .....

7. To be completed by the Supervisor

Do you foresee any ethical problems with this research? YES/NO – Great care has been

If YES, please detail. taken by the student to respond to potential ethical problems + she has done so successfully in my opinion.

Signature of Supervisor ...Lucia Skypa... Date 24/7/00

8. Ethical Authorisation given by

Name(s) ...SANDRA HORN...

Signature(s) ...SA Horn...

Date 26/7/00

9. If not Authorised, give reason for transmission to Full Ethics Committee

10. Decision of Full Ethics Committee

11. Points to be noted at the end of year meeting of the Ethics Committee

When full approval has been given, please pass this form to the Ethics Committee Secretary in the Psychology Department General Office (room 4041).

Discomfort associated with research

The aim of the research is to compare different thought strategies in response to an unpleasant event. The 6-minute video has been developed for fire officers and care staff in the first instance, and contains unpleasant scenes. Express permission has been obtained by the Manager and chief fire officer responsible for distribution of the video, to use it as part of my own research study. During parts of the video, attempts are made to resuscitate 2 young children. Although these are very unpleasant, these scenes are similar to some of the more distressing news footage we are exposed to on occasions within the media.

The following steps will be taken to ensure ethical criteria are met. Participants will be excluded from the study based on the following factors: individuals who are about to receive (are receiving, or have previously received) any form of psychological or psychiatric counselling. Any participants who have a heart condition, other serious health problem or if they (or anyone close to them) has ever been involved in a major fire. Information about the study will be provided and informed consent obtained. Mood measures will be obtained at 3 time points. All subjects will be fully debriefed, and those subjects who did not obtain a copy of the detached mindfulness exercise will be provided with this to help them manage any difficult thoughts/images after the research. If participants have any further queries or are in any way distressed by the nature of their thoughts, they will be encouraged to contact the researcher. The researcher will be available to 'normalise' these intrusions. Should they persist beyond reasonable expectations, they will be asked to contact their GP. Previous researchers in the same field reported that their video (in which several people are seen to die) did not prompt any participants to contact them after the study (Davies & Clark 1998).

APPENDIX 3

Personal information sheet, including screen for exclusion criteria from study

Title: A study to investigate thought strategies after an unpleasant event.

Researcher: Shara Drysdale

Contact details: e.mail - dryspa@aol.com
Telephone – 01983 521427 (day)

We would be grateful if you could provide us with some information about yourself. We need this information to compare the different groups that we are studying in this experiment. We also need to ensure that you are excluded from the study, if certain criteria are met.

Any information that you provide is **strictly confidential** and will not be used outside this experiment.

Thank you very much for your help.

Name: _____ (optional)

* Research participation scheme number: _____

Sex: M / F

Age: _____

Are you receiving, (about to receive, or have you previously received) any form of psychiatric or psychological treatment?: Y / N

Do you have any form of heart condition or other serious health problem?: Y / N

Have you (or has anyone close to you) ever been involved in a major fire?: Y / N

APPENDIX 4

Information sheet about the experiment and consent form

Information

Title: A study to investigate thought strategies after an unpleasant event

Researcher: Shara Drysdale

Contact details: e.mail – dryspa@aol.com
Telephone – 01983 521427 (day)

The aim of this study is to compare different thought strategies after an unpleasant event. The study involves watching a 6-minute film about fire hazards in a local community. In the film, real attempts are made to resuscitate two young children. Before and after watching the video, you will be asked to perform some straightforward tasks. You will also be asked to fill in some questionnaires.

Consent Form

Title: A study to investigate thought strategies after an unpleasant event

Researcher: Shara Drysdale

Contact details: e.mail – dryspa@aol.com
Telephone – 01983 521427 (day)

Please complete the following:

Have you read the information sheet?	yes / no
Have you had the opportunity to ask questions and discuss the study?	yes / no
Have you received satisfactory answers to all your questions?	yes / no
Have you received enough information about the study?	yes / no

Do you understand that you are free to withdraw from the study:

- At any time?
- Without having to give reason for withdrawing? yes / no

Do you agree to take part in this study? yes / no

Signed ..... Date: .....

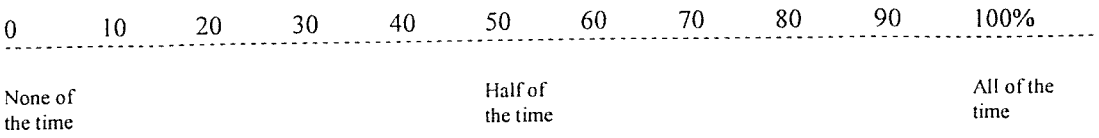
APPENDICES 5(a-c)

Measure of estimate of time spent thinking about the fire film (5a)

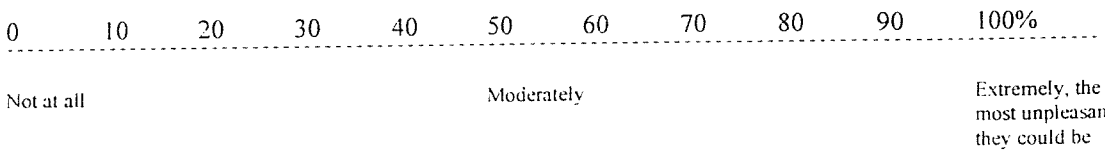
Film's level of unpleasantness (5b)

Measures of efforts to use distraction, suppression and detached mindfulness (5c)

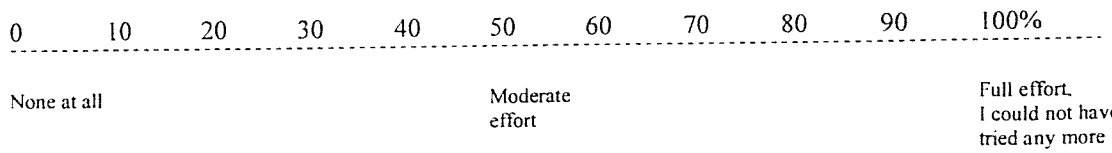
How much time would you estimate that you have spent thinking about the fire film?



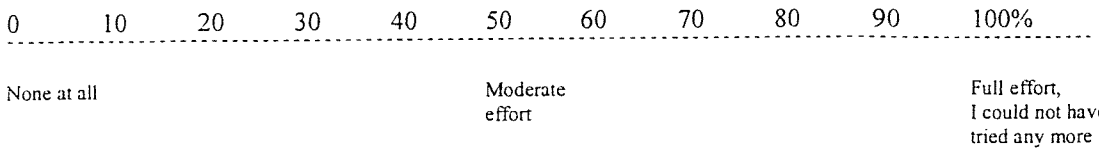
How unpleasant were your thoughts about the fire film?



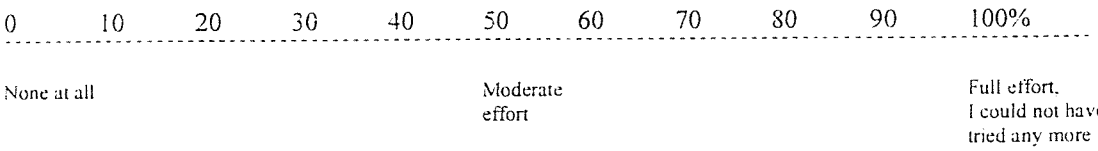
How much effort did you put into trying to deliberately distract yourself from your thoughts about the fire film?



How much effort did you put into deliberately trying to push away your thoughts about the fire film?



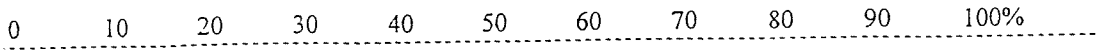
How much effort did you put into detaching yourself from your thoughts about the fire film by simply letting them go, without deliberately trying to push them away?



APPENDIX 6

Mood Measures

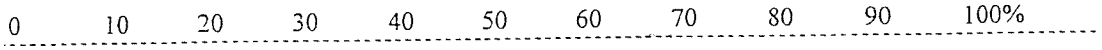
AT THIS MOMENT



I do not feel at all happy

I feel extremely happy

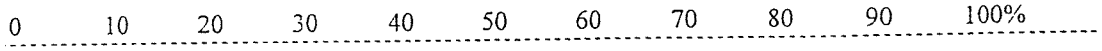
AT THIS MOMENT



I do not feel at all angry

I feel extremely angry

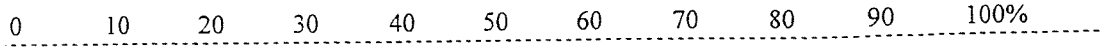
AT THIS MOMENT



I do not feel anxious

I feel extremely anxious

AT THIS MOMENT



I do not feel at all depressed

I feel extremely depressed

APPENDIX 7

Measures and training material for detached mindfulness

Detached Mindfulness

This is a short information sheet which describes a thinking style called 'detached mindfulness'. After you have read this, we will carry out a practical exercise together based on this technique. You are not expected to remember all the details and facts about detached mindfulness, and will not be tested on these facts. It is hoped that the information will give you some insight into the key concepts and ideas which form the basis of this approach.

Detached mindfulness is a thinking style in which you acknowledge that a certain thought is present, but then you just let it be. You simply let it go. You don't have to give any time to the thought, or engage with it. If you try and push the thought away or 'fight it', it will come back. The following examples can be used to illustrate this point. Imagine paying attention to a naughty child. The more attention you give the child, the worse its behaviour is likely to become. As an adult, you will be aware of the child's behaviour, but the less attention you give it the more likely it is to stop misbehaving. Alternatively, imagine trying to sleep in a room with a clock which ticks loudly. The more attention you give to the ticking, the worse it will become. If you acknowledge the ticking, but then just let it be, it is likely to become less intrusive and you will get to sleep.

In detached mindfulness, you acknowledge a thought is present, but then you take a mental step back from it and leave it alone. You don't fight the thought or try to suppress it. You don't engage with it or elaborate on it. You just let the thought go.

How well do you understand the concept of detached mindfulness?

0 10 20 30 40 50 60 70 80 90 100%

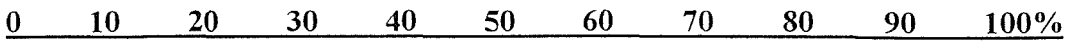
Not at All | Moderately well | Extremely well, I understand it completely

Exercise in detached mindfulness:

Take a minute to look at the photo of these white fluffy polar bears.

Now imagine you are lying in a field looking up at the sky. Your thoughts and images about the bears are just like clouds in the sky. You see the clouds, you know they are there, but then you just leave them alone. You don't have to give any time to the clouds. You don't try to force them out of sight or keep checking that they are there. You simply take a mental step back from them, and then just let them be.

How much effort did you put into detaching yourself from your thoughts about the polar bears by simply letting them go, without deliberately trying to push them away?



None at all

Moderate effort

Full effort, I could not have tried any more

APPENDIX 8

5-Hour Diary Measure

From the end of this lab session, during the next five hour period, please record any thoughts and/or images you have about the fire film by completing the following table.

TIME		During the last hour, how much time have you spent thinking about the fire film?
TO:	*FROM:*	0 10 20 30 40 50 60 70 80 90 100% None of the time — Half of the time — All of the time
TO:	*FROM:*	0 10 20 30 40 50 60 70 80 90 100% None of the time — Half of the time — All of the time
TO:	*FROM:*	0 10 20 30 40 50 60 70 80 90 100% None of the time — Half of the time — All of the time
TO:	*FROM:*	0 10 20 30 40 50 60 70 80 90 100% None of the time — Half of the time — All of the time
TO:	*FROM:*	0 10 20 30 40 50 60 70 80 90 100% None of the time — Half of the time — All of the time

During the last five hours, how much time would you estimate that you have spent thinking about the fire film?

0 10 20 30 40 50 60 70 80 90 100%

None of the time — Half of the time — All of the time

How well did you keep to the time scale outlined on the diary table?

0	10	20	30	40	50	60	70	80	90	100%
Not at all well					Moderately well					Extremely well, the exact time scale

Please return these forms to Shara Drysdale, c/o the Clinical Psychology Department Office in the envelope attached. There is a post box outside the clinical psychology office which you should use. On receipt of this, your research scheme credits can be allocated to you.

Please read the debriefing sheet *after* you have completed the diary table and rating scales.

Thank you for your participation in this study.

APPENDIX 9

Debriefing sheet with information about detached mindfulness

Debriefing

Title: Comparing the impact of thought suppression with detached mindfulness on analogue post-traumatic intrusions

Researcher: Shara Drysdale

Contact details: e.mail – dryspa@aol.com
Telephone – 01983 521427 (day)

The aim of this study is to examine the effect of different thought strategies on distressing thoughts and images that are often experienced after an unpleasant or distressing event. It is quite natural to experience these intrusive thoughts and images. For example, after a near collision with another car whilst driving, it is common for the incident to be 'replayed' in our minds as unwanted thoughts and images. The intensity of these thoughts and images naturally diminishes and ceases over time, depending on the specific circumstances.

The fire video you saw during the experiment is unpleasant and likely to produce intrusive thoughts and/or images. These are quite normal and should fade gradually, and then disappear. Research indicates that thought suppression (attempts to not think about the event/experience) can actually exacerbate the thoughts. In theoretical terms, it appears that the very cognitive processes used in the act of suppression may actually work to elicit the thought itself (see Purdon 1999 for a review). In contrast, theory suggests that a technique called detached mindfulness may help to reduce them. Detached mindfulness is a technique in which you try to notice the thoughts in a detached, neutral way. This thinking style may help to disengage the *analytic processing* and *attentional bias* away from intrusive thoughts which maintains them, as explained within a model for emotional disorders (including Post-Traumatic Stress Disorder), called the Self-Regulatory Executive Function (S-REF) (see Wells & Matthews 1996).

For those participants who were not given the training in detached mindfulness, examples of how to use this technique with a practical exercise is enclosed herewith.

Features of PTSD include the re-experiencing of a traumatic event as intrusive thoughts and images. The clinical implications of the study are that detached mindfulness could potentially be used with individuals to help them manage and process distressing thoughts and images following a trauma. This could potentially enhance therapeutic outcome.

If you require any further information, or if you are in any way disturbed by the nature of your thoughts following the video, please contact me (Shara Drysdale) on the contact details outlined above.

Thank you very much for your participation in this study.

References

Purdon, C. (1999). Thought suppression and psychopathology. *Behaviour Research and Therapy*, 37, 1029-1054.

Wells, A. & Matthews, G. (1996). Modelling Cognition in Emotional Disorder: The S-REF Model. *Behaviour Research and Therapy*, 11, 881-888

Detached Mindfulness

Detached mindfulness is a thinking style in which you acknowledge that a certain thought is present, but then you just let it be. You simply let it go. You don't have to give any time to the thought, or engage with it. If you try and push the thought away or 'fight it', it will come back. The following examples can be used to illustrate this point. Imagine paying attention to a naughty child. The more attention you give the child, the worse its behaviour is likely to become. As an adult, you will be aware of the child's behaviour, but the less attention you give it the more likely it is to stop misbehaving. Alternatively, imagine trying to sleep in a room with a clock which ticks loudly. The more attention you give to the ticking, the worse it will become. If you acknowledge the ticking, but then just let it be, it is likely to become less intrusive and you will get to sleep.

In detached mindfulness, you acknowledge a thought is present, but then you take a mental step back from it and leave it alone. You don't fight the thought or try to suppress it. You don't engage with it or elaborate on it. You just let the thought go.

Try the following exercise:

Imagine you are lying in a field looking up at the sky. Your thoughts are just like clouds in the sky. You see the clouds, you know they are there, but then you just leave them alone. You don't have to give any time to the clouds. You don't try to force them out of sight or keep checking that they are there. You simply take a mental step back from them, and then just let them be.