Doctoral Thesis

The role of cognitive appraisals in the disruption of anxiety-buffer functioning among trauma survivors experiencing posttraumatic distress

Candidate: André Bolster

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Abstract

Background

According to anxiety-buffer disruption theory (ABDT, Pyszczynski & Kesebir, 2011), posttraumatic stress disorder (PTSD) results, in part, from a breakdown in a person's cultural worldview, which subsequently leaves them vulnerable to experiencing death anxiety (Yalom, 1980, 2008). The cognitive model (Ehlers & Clark, 2000), in turn, proposes that negative appraisals relating to a trauma and its sequelae maintain the symptoms of PTSD. The purpose of the current study was to examine a possible theoretical link between ABDT and the cognitive model. Specifically, it aimed to investigate whether negative trauma-related appraisals play a role in undermining traumatised individuals' cultural worldviews, thereby leaving them more vulnerable to experiencing death anxiety.

Method

A two-way between-groups experimental design was employed to examine this. Participants with high and low PTSD symptom severity were randomly assigned to either a mortality salience or control condition. Participants were then instructed to complete measures of their cultural worldview and negative trauma-related appraisals.

Results

No relationship was found between participants' cultural worldviews and their negative trauma-related appraisals.

Discussion

Due to methodological limitations in the study's design, it was not possible to draw any firm conclusions concerning the relationship between cultural worldviews and negative trauma-related appraisals. Nevertheless, it seems that no relationship exists between both variables. This is because cultural worldviews and negative trauma-related appraisals appear to operate according to different levels of logic. While cultural worldviews function on a pre-logical level, negative trauma-related appraisals are more conscious and rational in their orientation. The theoretical and clinical implications of this are discussed and areas for future research recommended.

Table of Contents

List of Tables and Figures

Tables

Figures

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1 Introduction

1.1 Overview

Human beings are the only creature to be aware of the inevitability of death (Yalom, 1980, 2008). As this insight conflicts with the species' biologically programmed desire for survival, it has the potential to provoke paralysing terror (Becker, 1973). To manage this fear, terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986) proposes that humans rely on an anxiety buffer comprised of three interrelated psychological structures: (1) a *cultural worldview* that imbues life with meaning, order, and purpose, (2) a sense of *self-esteem* that bestows a feeling of literal or symbolic immortality, and (3) *relationships* that are associated with protection from harm. When this anxiety buffer is functioning effectively, it enables individuals to maintain a state of psychological equanimity in the face of their mortality concerns.

As a derivative of TMT, anxiety buffer disruption theory (ABDT; Pyszczynski & Kesebir, 2011) proposes that trauma has the potential to compromise healthy anxiety-buffer functioning because traumatic experiences, by their very nature, involve a direct or indirect confrontation with death. ABDT therefore suggests that, when a person's anxiety buffer has been undermined by the experience of trauma, posttraumatic stress disorder (PTSD) results from overwhelming experiences of death anxiety (Yalom, 1980, 2008).

A central tenet of the most prominent theories of PTSD currently informing clinical practice is that the condition derives from difficulties integrating a traumatic experience into pretrauma meaning structures (Brewin, Dalgleish, & Joseph, 1996; Brewin et al., 2010; Conway, 2005; Dalgleish, 2004;

Ehlers & Clark, 2000; Horowitz, 1976, 1986, 1997; Janoff-Bulmann, 1989, 1992). While each theory postulates different psychological mechanisms to explain these difficulties, all agree that one of the reasons why individuals with PTSD may struggle to assimilate or accommodate their trauma into their pretrauma meaning structures is because traumatic experiences generally involve a threat to one's personal survival. Given this point of overlap between ABDT and these other models of PTSD, the purpose of this chapter will be to consider possible theoretical links between ABDT and these other theories, in particular Ehlers and Clark's (2000) cognitive model.

According to Ehlers and Clark (2000), PTSD arises from a current sense of threat that results from excessively negative appraisals of a trauma and its sequelae, as well as a disturbance in autobiographical memory. Ehlers and Clark (2000) further suggest that maladaptive coping strategies that are aimed at alleviating distress have the paradoxical effect of exacerbating a person's symptoms. Cognitive therapy for PTSD therefore focuses on elaborating and integrating a traumatic experience into autobiographical memory, modifying negative appraisals relating to it, and replacing dysfunctional coping strategies with more functional ones.

As Ehlers and Clark's (2000) cognitive model remains the most comprehensive in terms of its implications for treating PTSD (Brewin & Holmes, 2003), this chapter will consider the possible role that negative appraisals may play in undermining a traumatised individual's cultural worldview (i.e. one of the key components of the anxiety buffer; Pyszczynski & Kesebir, 2011). This is of relevance to clinical practice because it may suggest that recovery from trauma

could be greatly facilitated by the restoration of effective anxiety-buffer functioning, namely through the rebuilding of a cultural worldview, which could be achieved, in part, by targeting negative appraisals.

Before considering this potential relationship between ABDT and Ehlers and Clark's (2000) cognitive model, this chapter will begin with a detailed outline of the diagnostic and clinical characteristics of PTSD. Following a review of empirically supported treatments for the condition, the chapter will discuss the most prominent theories of PTSD currently informing clinical practice. Having summarised and critiqued the theoretical and empirical literature relating to ABDT, the chapter will consider possible theoretical links between it and Ehlers and Clark's (2000) cognitive model. The chapter will then conclude with a description of the study's main research hypotheses.

1.2 Posttraumatic Stress Disorder (PTSD)

1.2.1 Diagnosis. PTSD is a debilitating psychological condition that can develop in some individuals following trauma. The American Psychiatric Association (APA) defines a traumatic experience as an event involving direct or indirect "exposure to actual or threatened death, serious injury, or sexual violence" (APA, 2013, p. 271). Examples of trauma therefore include serious accidents, natural or human-made disasters, life-threatening illnesses, or physical or sexual assaults. For a diagnosis of PTSD, an individual must show evidence of intrusion symptoms, avoidance, negative alterations in cognitions and mood, and changes in arousal and reactivity in response to a traumatic experience (APA, 2013).

While intrusion symptoms may take the form of recurring and

involuntary memories, distressing nightmares, flashbacks, or marked physiological reactions to internal or external reminders of a trauma, avoidance symptoms are indicated by persistent and effortful attempts to evade or suppress any such reminders (e.g., trauma-related thoughts, feelings, mental images, objects, places, people, etc.; Ehlers & Clark, 2000). Negative alterations in cognitions and mood further characterise the disorder. These may include an inability to recall important aspects of a traumatic experience, negative beliefs and expectations about oneself or the world, a diminished interest in activities, a sense of alienation, or feelings of fear, horror, anger, guilt, or shame. A final feature of PTSD involves changes in arousal and reactivity, which may result in irritable or aggressive behaviour, self-destructiveness, hypervigilance, problems with concentration, or sleep disturbance. Importantly, these symptoms must last for more than 1 month after a trauma and lead to clinical distress or funcitonal impairment in order for a diagnosis of PTSD to be warranted. If the symptoms persist for more than 3 months, they are considered to represent a chronic disorder. In cases where the symptoms do not emerge until 6 months after a traumatic experience, the resulting condition is referred to as delayed-onset PTSD (APA, 2013).

1.2.2 Epidemiology. Prevalence studies in North and South America, Europe, Africa, Asia, and Australia have estimated that between 60-90% of the general population experience at least one trauma within their lifetime (Atwoli et al., 2013; de Vries & Olff, 2009; Kawakami et al., 2014; Kilpatrick et al., 2013; Mills et al., 2011, Zlotnick et al., 2006). Although most individuals display some PTSD symptoms in the aftermath of a traumatic experience, the vast majority

recover spontaneously within 3 to 6 months of it (Foa & Riggs, 1995; Yehuda & LeDoux, 2007). As a consequence, 12-month prevalence rates for PTSD remain relatively low, ranging from 0.4-3.8% throughout the world (Karam et al., 2014). While this global variation in prevalence rates may be linked to ethnic differences in level of trauma exposure (Roberts, Gilman, Breslau, Breslau, & Koenen, 2011), geographical and political factors may also impact on the prevalence of PTSD. For example, individuals living in war zones (Pham, Weinstein, & Longman, 2004) or areas where natural disasters are likely to occur (Gale, Nandi, & Vlahov, 2005) are at an increased risk of developing the condition, as are internally displaced ethnic minorities (Thapa & Hauff, 2005), asylum seekers (Hinton et al., 2006), and refugees (Gerritsen et al., 2006).

A number of pre-, peri-, and post-trauma factors also need to be taken into account when predicting the onset of PTSD (Brewin, Andrews, & Valentine, 2000; DiGangi et al., 2013; Foa & Rothbaum, 1998; Ozer, Best, Lipsey, & Weiss, 2003). For instance, a substantial body of research has found that pretrauma factors such as low cognitive ability (Betts, Williams, Najman, Bor, & Alati, 2012; Breslau, Lucia, & Alvarado, 2006; Macklin et al., 1998), previous exposure to trauma (Andrews, Brewin, Rose, & Kirk, 2000; Apfel et al., 2011; van Zuiden et al., 2012), or a personal or familial history of psychopathology (Heinrichs et al., 2005; Inslicht et al., 2010; Lengua, Long, & Meltzoff, 2006; Koenen et al., 2007; Koenen, Moffitt, Poulton, Martin, & Caspi, 2008; Sandweiss et al., 2011) predict more severe posttraumatic stress respones to trauma. Peritraumatic factors such as the degree of life threat or physical injury experienced during a trauma further increase the probability of PTSD developing

(Schnurr, Lunney, & Sengupta, 2004); consequently, traumatic experiences involving bereavement, assault, or violence appear especially likely to lead to the emergence of PTSD (Breslau et al., 1998). Experiences of dissocitation (Murray, Ehlers, & Mayou, 2002), mental confusion (Dunmore, Clarke, & Ehlers, 1999), or mental defeat (Ehlers, Maercker, & Boos, 2000) at the time of a trauma are also associated with poorer prognosis. In a similar vein, posttrauma factors such as a perceived lack of social support (Dalgleish, Joseph, Thrasher, Trannah, & Yule, 1996; Ulmann & Filipas, 2001; Zoellner, Foa, & Bartholomew, 1999), unrealistically negative appraisals of self, others, or the world (Dunmore, Clark, & Ehlers, 2001; Steil & Ehlers, 2000), or excessive feelings of anger, guilt, or shame (Andrews et al., 2000) decrease the likelihood of spontaneous recovery.

1.2.3 Comorbidity. In cases where PTSD does develop, the process of readjustment is likely to be further complicated by the presence of at least one comorbid psychiatric disorder (APA, 2013; Kessler, Chiu, Demier, Merikangas, & Walters, 2005). While comorbidity between PTSD and depression is particularly high (Ducrocq, Vaiva, Cottencin, Molenda, & Bailly, 2001; Quarintini et al., 2009; Stander, Thomsen, & Highfill-McRoy, 2014), a significant proportion of individuals with PTSD may also suffer from panic disorder (Barrera, Graham, Dunn, & Teng, 2013), social phobia (Zayfert, DeViva, & Hofmann, 2005), or substance use disorder (Jacobsen, Southwick, & Kosten, 2001). A minority of individuals may also experience more severe mental health issues, such as schizophrenia or bipolar disorder (Grubaugh, Zinzow, Paul, Egede, & Frueh, 2011). While the causal relationship between PTSD and some of these comorbid psychiatric disorders is most likely

bidirectional, epidemiological research suggests that, at least in cases of comorbid depression, PTSD is likely to precede and thus instigate the latter (Kessler et al., 1995). However, the findings on this are mixed (Aderka, Gillihan, McLean, & Foa, 2013), thus suggesting that a reciprocal relationship between depressive symptoms and PTSD most likely accounts for their high comorbidity (Erickson, Wolfe, King, King, & Sharkansky, 2001).

Individuals with PTSD are also at an increased risk of suffering from a variety of physical health difficulties (Maria, Bryce, & Douglas, 2013; Quereshi, Pyne, Magruder, Schulz, & Kunik; 2009), including cardio-respiratory problems (Sawchuck et al., 2005), gastro-intestinal complications (Mayer, 2007), and chronic pain (Beckham et al., 1997). While the aetiology of these medical conditions is complex, it is likely that dysregulated immune system functioning resulting from chronic mental and physiological stress associated with PTSD contributes to their emergence (Altemus, Dhabhar, & Yang, 2006). As a consequence of such concurrent health difficulties, individuals with PTSD experience more quality of life impairments than those with anxiety disorders (Olatunji, Cisler, & Tolin, 2007). Indeed, the World Health Organisation (WHO, 2004) estimates that the condition costs approximately 3.5 million years of 'healthy life' each year.

1.2.4 Socio-economic costs. Given the wide range of mental and physical health problems associated with PTSD, it is unsurprising that it is one of the costliest mental health disorders. The estimated annual productivity losses in the United States have been found to exceed US$3 billion (Brunello et al., 2001; Kessler, 2000). Although the current financial burden of PTSD in the United

Kingdom is unknown, in 1995 the Department of Health estimated that stress-related conditions, such as PTSD, resulted in 91 million working days being lost each year at a cost to industry of £3.7 billion. Similarly, Holmes (1994) calculated that 'neurotic disorders,' such as PTSD, cost the National Health Service (NHS) up to £5.6 billion per annum. Based on these figures, the National Institute for Clinical Excellence (NICE, 2005) concludes that "PTSD presents an enormous economic burden for families, the national health services and the society as a whole" (p. 43).

1.3 Psychological Processes Implicated in PTSD

In light of the significant socio-economic costs associated with PTSD, there is a need for cost-effective treatments for the condition (NICE, 2005). Researchers have already formulated several theoretical models to inform psychological interventions for the disorder (see Brewin & Holmes, 2003; Dalgleish, 2004). According to Dalgleish (2004), one criteria by which to evaluate these theories is the extent to which they can account for the core clinical and research data of PTSD. Thus, in addition to explaining individual differences in pre-, peri-, and post-trauma factors leading to the development and maintenance of chronic or delayed-onset versions of the condition, a complete model of PTSD must be able to elucidate the exact mechanisms through which natural or targeted recovery from symptoms occurs.

To this end, researchers and clinicians have identified PTSD with disturbances in a range of psychological processes (Brewin & Holmes, 2003). For example, individuals with PTSD have been shown to demonstrate attentional biases in relation to threat (Iacoviello et al., 2014). While such attentional biases

may result in exaggerated fear responses (Fani et al., 2012), PTSD is also often associated with other strong affective reactions, such as anger, guilt, or shame (Andrews et al., 2000). In some cases, these feelings may resonate with actual emotions experienced during the most intense moments of a trauma (Grey, Holmes, & Brewin, 2001; Holmes, Grey, & Young, 2003); however, in other cases, feelings of anger, guilt, or shame may result from extremely negative post-trauma cognitions about self, others, or the world (Dunmore, Clark, & Ehlers, 1999; Dunmore, Clark, & Ehlers, 2001; Kleim, Ehlers, & Glucksman, 2007). Overwhelmed by such intense emotions, individuals with PTSD may adopt several maladaptive coping strategies to deal with their distress (Ehlers & Clark, 2000). Though some may involve excessive rumination upon the trauma, the vast majority of coping strategies tend to be directed at efforts to suppress unwanted thoughts, feelings, or memories of it (Schoenfeld, Ehlers, Boellinghaus, & Rief, 2007). In their most extreme form, attempts to avoid trauma memories may result in dissociative symptoms involving emotional numbing, derealisation, depersonalisation, or 'out-of-body' experiences (van der Kolk, Pelcovitz, Roth, & Mandel, 1996). Despite such potentially extreme responses to trauma, individuals with PTSD may nonetheless begin to construct their life narrative around their traumatic experience, thereby making it one of the most central aspects of their identity (Berntsten & Rubin, 2007; Brewin, 2011; Sutherland & Bryant, 2005). Perceived or actual problems in a person's social support network may also accompany such changes in sense of self (Dalgleish, et al., 1996; Ullman & Filipas, 2001; Zoellner, et al., 1999).

From the above, it is evident that several psychological mechanisms –

including attention, affect, cognition, coping strategies, dissociation, identity construction, and social support – are implicated in the development and maintenance of PTSD (Brewin & Holmes, 2003). While many of these processes are involved in the aetiology of a range of other psychiatric disorders, a paradoxical disturbance in autobiographical memory is considered to distinguish PTSD from other mental health conditions (Brewin, 2011). The paradox centres around the fact that, although the traumatic event is strongly connected to an individual's personal identity (Berntsen & Rubin, 2007; Sutherland & Bryant, 2005), in that it is perceived to represent a significant turning point in their life (Herman, 1992; Pillemer, 1998), the trauma memory itself is incoherent and poorly integrated into their autobiographical memory (Halligan, Michael, Clark, & Ehlers, 2003; Jones, Harvey, & Brewin, 2007); this is in spite of the trauma memory being highly emotion-laden and rich in sensory detail (Hellawell & Brewin, 2004; Whalley, Farmer, & Brewin, 2007). As a result of its lack of integration in autobiographical memory, conscious recall of the trauma memory is disorganised and fragmentary, while involuntary retrieval of it is strengthened (Buck, Kindt, van den Hout, Steens, & Linders, 2007; Ehlers & Clark, 2000; Foa, Steketee, & Rothbaum, 1989). Due to its lack of integration in autobiographical memory, when the trauma memory is involuntarily triggered, it is experienced it as if it were occuring in the present (Brewin, 2007; Ehlers, Hackmann, & Michael, 2004). This, in turn, gives rise to the intrusive memories and flashbacks symptomatic of PTSD (APA, 2013).

While the above disturbance in autobiographical memory is unique to PTSD, this does not imply that trauma memories have a special status by virtue

of the fact that they concern traumatic events, nor that the processes implicated in them are distinct from the mechanisms postulated in normal memory (Brewin, 2011). Indeed, non-traumatic memories may themselves be highly affectively charged and rich in sensory detail, yet disorganised and fragmentary in their content (Fernyhough, 2012). The distinguishing feature of trauma memories is that they involve *a sense of reliving* the actual traumatic event. Any complete theory of PTSD must therefore be able to account for this unique characteristic of trauma memories, while still explaining them in terms of the mechanisms underlying normal memory (Brewin, 2011).

Another feature of trauma memories that any comprehensive model of PTSD must be able to account for is the fact that they may change over time (Brewin, 2011). For example, a recent study has found that, in cases of delayed-onset PTSD, memories of events that are not initially perceived as traumatic may acquire traumatic characteristics through a variety of processes, including reappraisal and sensitisation (Andrews, Brewin, Stewart, Philpott, & Hejdenberg, 2009). Based on such findings, it seems likely that different mechanisms are implicated in the aetiology of immediate- and delayed-onset PTSD. It is therefore important that any complete theory of PTSD is able to explain these differing pathways to the disorder (Brewin, 2011).

1.4 Psychological Treatments for PTSD

Reflecting on the processes involved in the development and maintenance of PTSD, Brewin (2003) concludes that it is a hybrid disorder consisting of more than one psychological mechanism. Recovery from PTSD therefore depends on targeting more than one process (Brewin & Holmes, 2003). While various

psychopharmacological medications have been demonstrated to be effective at helping individuals with PTSD manage their symptoms (Albucher & Liberzon, 2002), a number of randomised controlled trials (RCTs) show that trauma-focussed psychological interventions are more efficacious than generic, non-trauma-focussed therapies in treating the condition (Ehlers et al., 2003; Foa et al., 1999; Marks, Lovell, Noshirvani, Livanou, & Thrasher, 1998; Resick, Nishith, Weaver, Astin, & Feuer, 2002). Accordingly, national guidelines recommend trauma-focussed psychological interventions as the first-line of treatment for PTSD (APA, 2013; Australian Centre for Posttraumatic Mental Health, 2007; NICE, 2005).

Broadly speaking, trauma-focussed psychological interventions consist of some variation of prolonged exposure therapy (Foa & Rothbaum, 1998), cognitive therapy (Ehlers & Clark, 2000), or some combination thereof (Foa, Sheila, & Rauch, 2004). In prolonged exposure therapy, patients are supported, within the safety of the therapeutic setting, to confront objects and places relating to their trauma and to repeatedly recount the memory of it until, through a process of habituation, they become desensitised to it and its associated stimuli. An especially important aspect of the therapy is for patients to develop a coherent narrative around the most emotion-laden, vivid, disorganised, and fragmentary moments of their trauma memory as processing these aspects of their trauma memory enables it to become integrated into their autobiographical memory. Through this process of integration, conscious recall of the trauma memory is enhanced and involuntary retrieval of it is diminished, thus leading to a restored sense of competence and trust in the world (Foa & Rothbaum, 1998).

Although prolonged exposure therapy may thus indirectly lead to a reduction in negative trauma-related cognitions about self, others, and the world (Foa et al., 2004), cognitive therapy is concerned with directly targeting these negative appraisals (see section 1.5.4 for further discussion of these trauma-related appraisals). Specifically, cognitive restructuring techniques challenge the patient to reconsider any extreme negative interpretations of their trauma and its effects, with a view to restoring a more balanced and realistic perspective on the latter. This may be especially important in cases where appraisal-driven anger, guilt, or shame prevents the patient from being able to engage effectively in exposure work (Ehlers & Clark, 2000).

In light of the unequivocal findings supporting prolonged exposure therapy, cognitive therapy, and variations thereof, Dalgleish (2004) concludes that there is "little evidence to support the clear clinical superiority of either form of active treatment over the other or for the superiority of combined treatments over unitary treatments" (p. 231). Although the results for trauma-focussed psychological interventions for PTSD are impressive, treatment is only usually successful in up to 70% of cases (Dalgleish, 2004). In some cases, prolonged exposure work may even provoke strong feelings of anger, guilt, or shame that are counter-productive to recovery (Pitman, et al., 1991). Given the possible ineffectiveness, even harmfulness, of trauma-focussed psychological interventions for up to 30% of cases, it is necessary that a comprehensive theory of PTSD is able to account for these treatment non-responders and to suggest alternative methods for treating them (Jaycox & Foa, 1996).

1.5 Psychological Models of PTSD

Psychological theories of PTSD differ in their explanations for the effectiveness, and indeed ineffectiveness, of prolonged exposure therapy and cognitive therapy in treating the condition. This review will be primarily concerned with the most prominent models of PTSD currently informing clinical practice. For the sake of brevity, however, Foa and Rothbaum's (1998) integrative theory of PTSD will not be included in this review as it shares a number of parallels with Ehlers and Clark's (2000) cognitive model of PTSD. While each remaining theory will be discussed in detail, most will *not* be evaluated according to Dalgleish's (2004) aforementioned criteria for judging a complete model of PTSD. Given the focus of this research, such a detailed critique will only be provided for ABDT (Pyszczynski & Kesebir, 2011; see section 1.6.7) as comprehensive reviews of the other models are already available elsewhere (see Brewin & Holmes, 2000; Conway, 2005; Dalgleish, 2004). Before discussing these contemporary theories, the review will first summarise two influential schema-based models (Horowitz, 1976, 1986, 1997; Janoff-Bulmann, 1989, 1992). Although the influence of these theories is more historical (Brewin & Holmes, 2003), briefly considering them will facilitate greater understanding of the models that follow.

1.5.1 Schema-based models. According to Fiske and Linville (1980), a schema is a mental representation of knowledge that brings order to life by coding regularities in experience at different levels of abstraction. By drawing together commonalities across a myriad of lifetime experiences, schemas come to model aspects of self, others, and the world in parsimonious ways. The purpose of a schema is therefore to circumvent the need to engage in trial-and-

error learning by providing a mental template for interpreting new situations. Though advantageous in some circumstances, by virtue of the fact that schemas filter incoming data through pre-existing knowledge structures, they are necessarily conservative, and thus relatively inflexible and resistant to change (Fiske & Taylor, 1991). Schemas therefore tend to change slowly, only following the gradual accumulation of a large amount of schema-inconsistent information (Padesky, 2004).

While such conservatism regarding schema change may be the direct result of an evoluntionary need for existential stability and coherence in higher meaning structures (Heine, Proulx, & Vohs, 2006), Horowitz's (1976, 1986, 1997) stress response theory argues that this resistance to change in schematic representations is at the heart of stressful reactions to trauma. More specifically, Horowitz (1976, 1986, 1997) proposes that postraumatic stress responses derive from problems integrating traumatic experiences into pretrauma schemas about self, others, and the world. As a result of this failure of integration, the distressing memory of the trauma remains in conscious awareness. In attempts to forget the traumatic memory, individuals may employ a variety of psychological defense mechanisms, including "denial, repression, suppression, isolation, numbing, dissociation, use of drugs, flight or suicide" (Horowitz, 1997, p. 108). These avoidant coping strategies (with the exception of suicide), however, have the paradoxical effect of causing the trauma memory to return in the form of intrusive thoughts, flashbacks, or nightmares. Accordingly, individuals oscillate between stressful periods of avoidance and intrusion symptoms until, through a

gradual process of assimilation and accommodation, successful integration of the trauma memory is achieved.

Building on the above model, Janoff-Bulman's (1989, 1992) theory of shattered assumptions proposes that individuals who have lived a relatively sheltered existence are at an increased risk of developing PTSD because they are less able to integrate traumatic experiences into their pretrauma schemas. As a result of having lived in relative security, these individuals naively assume that the world is benevolent, that life is meaningful and predictable, and that the self is in some way special and therefore immune from harm. Extreme trauma, however, shatters all three of these basic assumptions, thereby leaving effected individuals unable to integrate their traumatic experience into their pretrauma schemas. As a consequence of this failure of integration, such individuals are left vulnerable to experiencing the avoidance and intrusion symptoms cycle elucidated by Horowitz (1976, 1986, 1997). To integrate the traumatic experience into their pretrauma schemas, effected individuals must rebuild more realistic assumptions about themselves and the world that assimilate or accommodate the implications of their trauma.

Both Horowitz's (1976, 1986, 1997) and Janoff-Bulman's (1989, 1992) seminal theories centre on the idea that problems integrating schema-incongruent information about a traumatic experience into pretrauma schemas leads to the emergence of PTSD. Although each model offers useful insights into the mechanisms of change underlying treatment, a criticism of both is that neither specifies the exact nature of a schema's mental representation. It therefore remains relatively unclear how exactly schemas can be examined, manipulated,

and changed to facilitate recovery from trauma (Dalgleish, 2004). Despite this limitation, there is no doubt that Horowitz and Janoff-Bulman's ideas have had an important influence on subsequent models of PTSD.

1.5.2. Dual representation theory (DRT). DRT (Brewin, et al., 1996; Brewin, et al., 2010) extends Horowitz (1976, 1986, 1997) and Janoff-Bulman's (1989, 1992) schema-based models by elucidating the mechanisms through which trauma memories are inhibited from being integrated into pretrauma meaning structures. According to DRT, such a failure of integration is related to the aforementioned paradox of autobiographical memory disturbance observed in individuals with PTSD: that is, that despite forming a central part of an individual's personal identity, conscious recall of the trauma memory is impoverished, while involuntary retrieval of it is strengthened (Brewin, 2011). DRT resolves this paradox by positing that there are two memory systems that normally work in parallel but which, under certain circumstances, may become disjointed. In the original DRT (Brewin et al., 1996), these two memory systems were called the Verbally Accessible Memory (VAM) system and Situationally Accessible Memory (SAM) system. The recently revised version of DRT (Brewin et al., 2010) has renamed these as the *contextual memory (C-memory) system* and the *low-level sensation-based memory (S-memory) system*, respectively.

According to the most up-to-date version of the model (Brewin et al., 2010), C-memory consists of abstract, contextually bound representations, known as C-reps. C-reps capture data that is consciously perceived and attended to during a trauma. While this information is typically expressed in oral or

written narratives, C-reps are characterised by their capacity to encode details of a traumatic event in allocentric and viewpoint-independent terms. As this detailed level of encoding enables a memory to be situated in a particular spatio-temporal context, C-reps are experienced as having happened at a particular place and time in the past. Another important characteristic of C-reps is that they can be either deliberately or involuntarily accessed and revised. This intentional retrieval and editing of C-reps is possible because conscious attention is required to encode and store C-reps. Nevertheless, as high levels of stress decrease one's attentional capacity, C-reps for traumatic experiences tend to be narrow in scope and poorly contextualised. Despite this impoverished level of encoding, C-reps still register conscious appraisals of a trauma both at the time of its occurrence and afterwards. C-reps therefore include information about primary emotions experienced at the time of a trauma (e.g., fear) and secondary emotions generated by retrospective evaluations of it (e.g., anger, guilt, or shame; Brewin & Holmes, 2003).

In direct contrast to C-memory, S-memory contains detailed sensory and perceptual representations, known as S-reps, that are unconsciously processed at the time of a trauma. Under conditions of stress, S-memory automatically encodes sensory information in detail, given its potential survival value. Though efficient, this crude way of recording information means that S-reps are only subject to involuntary retrieval. As a result, S-reps are very hard to exert control over, especially when a person is not consciously aware of the cues that trigger them. Another significant feature of S-memory is that it only encodes information in egocentric and viewpoint-dependent terms. As S-reps lack

contexual details to situate them in a particular place and time, S-reps are experienced as if they were occuring in the present, unless they are linked to corresponding C-reps that provide a historical context for their occurrence.

These representational differences between S-memory and C-memory are a function of the different brain areas supporting each system. S-reps are mostly stored in the amygdala, which is associatd with hard-wired fear responses to danger (LeDoux, 1996), and the insula, which is connected to strong interoceptive experiences (Craig, 2002). In contrast, C-reps are largely stored in prefrontal areas and medial temporal lobe (MTL) structures, such as the hippocampus and parahippocampus, which are largely responsible for creating coherent and integrated memories (Brewin, 2001). In healthy individuals, S-reps for a traumatic event are associated with corresponding C-reps via the precuneus, where egocentric visual imagery of the incident is normally represented by both memory systems. These connections between S-reps and corresponding C-reps allow the memory of the event to be accurately integrated with its historical context and thus not be experienced as though it were occuring in the present. In cases of PTSD, however, strong associations between S-reps and corresponding C-reps are prevented from forming at the time of the trauma because extreme stress decreases hippocampal functioning while simultaneously increasing amygdala functioning (Elzinga & Bremner, 2002; Payne et al., 2006; Vyas, Mitra, Rao, & Chattarji, 2002). As a consequence, strong S-reps but only weak corresponding C-reps form. This lack of integration between strong S-reps and corresponding C-reps results in the trauma memory being subject to only strong involuntary retrieval, while conscious recall of it becomes impoverished. When

these S-reps are subsequently triggered by internal or external cues relating to the trauma, they are experienced as if occuring in the present because they lack strong corresponding C-reps to provide a historical context for their occurence. This, in turn, gives rise to the intrusive memories and flashbacks symptomatic of PTSD (Brewin, 2011; Brewin et al., 2010; Jones, et al., 2007). Given the distress associated with the latter symptoms, individuals subsequently attempt to avoid internal or external reminders of their trauma (i.e., the avoidance symptoms of PTSD), thus preventing the opportunity to elaborate corresponding C-reps that would contextualise the distressing S-reps in their past (Brewin et al, 2010).

While the original DRT model (Brewin et al., 1996) assumed that the disturbance in memory observed in individuals with PTSD could only be explained in terms of special mechanisms unique to trauma memories, the most up-to-date version of the theory (Brewin et al., 2010) acknowledges that C-reps and S-reps are also implicated in the formation of non-traumatic memories. A benefit of this is that the DRT model is now aligned with a substantial body of research relating to cognitive psychology and neuroscience (Brewin, et al., 2010). Consequently, one of the most impressive aspects of the theory is the specificity with which it explains the cognitive and neuroanatomical processes involved in the formation of trauma memories. The main psychological mechanisms postulated by the model are also supported by several experimental studies using the trauma film paradigm (see Brewin, 2014; Holmes & Bourne, 2008).

Despite DRT's numerous strengths and the strong body of empirical research supporting the theory (Brewin, 2014), a limitation of the model is that it

has not yet developed a comprehensive therapeutic programme for the treatment of PTSD (Brewin & Holmes, 2003). This criticism aside, there is no doubt that DRT can account for a significant amount of the core clinical and research data relating to PTSD. It therefore remains a highly influential theoretical tool both for the generation of research ideas and the refinement of clinical techniques (Dalgleish, 2004).

1.5.3 Self-memory system (SMS). The SMS (Conway, 2005; Conway, 2009; Conway & Pleydell-Pearce, 2000) offers an alternative framework for understanding the memory disturbance observed in individuals with PTSD. Conway (2005) defines the SMS as a superordinate system consisting of two core components: the *working self* (a motivational hierarchy of goals) and the *autobiographical knowledge base* (a hierarchical database of memories). When these components interact, they form specific autobiographical memories that result in feelings of remembering (Gardiner & Richardson-Klavehn, 1999).

Recollection, however, does not map perfectly onto past events as memory is the product of a tradeoff between the demands of coherence and correspondence (Conway, Singer, & Tagini, 2004). On the one hand, as a major component of the self (Conway, 2005), memory is motivated to remain coherent with a person's current self-images and goals (Greenwald, 1980). This is important as the resulting sense of coherence enables the individual to operate effectively within their environment (Bluck, 2003). To this end, memory may be "altered, distorted, even fabricated, to support current aspects of the self" (Conway, 2005, p. 595). On the other hand, if memory does not maintain some sort of accurate record of events, then a person will be unable to adapt to the

demands of reality and survive (Conway, Meares, Standart, & 2004). Thus, there is a very real need for information that is stored in memory to correspond with the fundamental facts of the individual's existence. As a compromise between these two competing positions, Conway (2005) proposes that memory strives for "some optimum level of retention for any given experience that maximizes fitness and survival" (p. 596). In most cases, this simply involves a person being able to recall the 'gist' of an event (Brainerd & Reyna, 2004). This general information is stored conceptually in the long-term autobiographical knowledge base. In contrast, sensory-perceptual records of more concrete and specific aspects of an event are encoded in episodic memory. Given how rich in detail these latter representations tend to be, they are generally quickly forgotten, due to the limited storage capacity of memory. Episodic memories may nonetheless be retained in long-term memory by becoming conceptually linked to autobiographical knowledge.

By integrating episodic memories with autobiographical knowledge, a person is able to achieve a state of autonoetic consciousness – the sense of having a continuous self throughout their lifetime (Wheeler, Stuss, & Tulving, 1997). In order to maintain this feeling of unity, which is essential for optimal functioning (Conway et al., 2004), the individual must have some way of maintaining consistency between potentially competing goals, both historic and present. This task is achieved by the working self, which comprises a person's currently active goal hierarchy (Carver & Scheier, 1998). Through interlocking positive and negative feedback loops, this goal hiearchy functions to reduce discrepancies between current and desired end states, to guide the individual

towards achieving their goals. In order to facilitate smooth progression towards these ends, the working self strives to maintain a coherent sense of self by only consciously processing information that is consistent with the individual's current self-images and goals (Conway & Pleydell-Pearce, 2000). Importantly, through its connection with the autobiographical knowledge base, the working self is the gatekeeper through which knowledge gets encoded into and retrieved from long-term memory. As a consequence, knowledge of events become encoded into and retrieved from long-term autobiographical memory in ways that support a coherent self-image, but also necessarily alter or distort the facts (Conway, 2005).

In addition to comprising a goal hierarchy, the working self also contains a self-conceptual knowledge structure, known as the *conceptual self*. The conceptual self also influences the encoding and retrieval of information in long-term autobiographical memory. The conceptual self consists of non-temporally specified conceptual self-structures, such as attitudes, values, and beliefs. While these self-structures are abstract and thus independent of episodic memories and autobiographical knowledge, they are nonetheless linked to both in order to activate the construction of memories and experiences that illustrate and substantiate their underlying concepts (Conway & Jobson, 2012). A key feature of the conceptual self is that its structures are socially constructed, originating and evolving from social interactions with family and peers, as well as educational, religious and media institutions that create and perpetuate the dominant narratives and mythologies of a culture (Bruner, 1990). Through shaping the conceptual self in this way, socio-historical forces thus influence

how personal memories are accessed and constructed (Jobson, 2009; Jobson, Moradi, Rahimi-Movaghar, Conway, & Dalgleish, 2014).

The autobiographical knowledge base is itself composed of four levels of knowledge specificity: the life story, lifetime periods, general events, and specific episodic memories. At the most abstract level, there is the life story (Pillemer, 2001), which is part of the conceptual self (Conway, Singer, et al., 2004). Given that it is embedded in the conceptual self, the life story contains culturally influenced life scripts (Bluck, 2003) that consist of socially accepted norms about the typical path of a person's life (e.g., getting a job, marrying, having children, etc.; Berntsen & Rubin, 2004). The life story also consists of several different self-images or goals that can be cued to differentially access information about particular lifetime periods, general events, and specific episodic memories stored in the autobiographical knowledge base. For instance, a self-image or goal (e.g., a parent wanting their adolescent child to study) may cue information about a particular life time period (e.g., one's own secondary school years), which may in turn cue knowledge of general events (e.g., sitting one's own final exams), which may in turn trigger a specific episodic memory (e.g., not remembering the answer to a specific question because one had forgotten to study that section of the topic). In this way, the self-concept's abstract goals or self-images may become illustrated and substantiated by more concrete and specific events relating to the individual's actual life experiences (Conway & Jobson, 2012). In the SMS, this linking of autobiographical knowledge with episodic memories is what constitutes "specific autobiographical memory" (Conway, 2005, p.608).

According to Conway (2005), specific autobiographical memories may be accessed either generatively or directly. While generative retrieval involves a conscious search through the levels of the autobiographical knowledge base for information consistent with the working self's goals or self-images, direct retrieval occurs when an episodic memory is involuntarily triggered by an associated cue. Typically, non-traumatic episodic memories are integrated into the autobiographical knowledge base, thus becoming consciously linked to particular lifetime periods and general events in a person's history. As a result of this level of integration with the autobiographical knowledge base, non-traumatic memories are generally amenable to voluntary access, which in turn serves to inhibit their involuntary retrieval (Conway, 2005).

In cases of PTSD, however, the SMS proposes that highly traumatic memories are not sufficiently integrated into a person's autobiographical knowledge base. This is because they violate the working self's current self-images or goals – which at their core are almost always in the interest of survival (Conway, 2005). As a consequence of its failure to integrate the trauma memory into the autobiographical knowledge base, the trauma memory remains associated with the working self and becomes automatically triggered whenever the individual's self-images or goals are activated (McNally, Lasko, Macklin, & Pitman, 1995; Sutherand & Bryant 2005; 2008). Lacking a context in the individual's autobiographical knowledge base, the trauma memory is subject to involuntary retrieval and is experienced as if it were occurring in the present. This, in turn, gives rise to the intrusive memories and flashbacks consistent with a diagnosis of PTSD.

Another feature of trauma memories, according to the SMS, is that a person may distort or even falsify certain details of their traumatic experience in order to maintain a coherent sense of self (Conway, et al., 2004, 2006). For instance, if the individual believes that they are always in control of their fate, they may remember their trauma in such a way as to suggest that it was preventable, even if objectively speaking this was not the case. Conway (2005), however, acknowledges that memory distortions or falsifications of this kind do not necessarily feature in all cases of PTSD; rather he wishes to emphasise that they can and, on occasion, do happen.

In accordance with the SMS, research has shown that individuals' personal memories do tend to agree with their reported goals (Demiray & Bluck, 2011) and that individuals with PTSD have significantly more self-goals and self-cognitions involving trauma-focussed themes than those without PTSD (Jobson & O'Kearney, 2008; Sutherland & Bryant, 2000). These individuals have also been found to selectively retrieve memories related to their trauma (Jobson & O'Kearney, 2008; McNally, et al., 1995; Sutherland & Bryant 2005; 2008). Based on these findings, the SMS offers a suggestion why individuals with PTSD may develop a trauma-centred identity (Berntsen & Rubin, 2007; Sutherland & Bryant, 2005), even though their memory for the traumatic event is itself disorganised and fragmentary (Halligan et al., 2003; Jones et al., 2007). In assuming that the need for self-consistency may necessitate alteration in a person's self-images or goals, Conway (2005) proposes that, in cases of PTSD, where the trauma memory is too intrusive for the individual to be able to maintain their pretrauma identity, the individual may feel it necessary to begin to

develop their identity around the trauma for the sake of maintaining some form of self-consistency. While the trauma may henceforth form an important part of the individual's working self, this does not in itself result in the episodic memory of the trauma being adequately integrated into their autobiographical knowledge base; consequently, the individual continues to experience intrusion symptoms consistent with a diagnosis of PTSD.

Based on the above observations, the SMS suggests that recovery from the condition necessitates integrating a person's traumatic episodic memory into their autobiographical knowledge base. Through this process of integration, the trauma memory becomes subject to intentional retrieval and, consequently, involuntary access to it is weakened. Having gained control over the trauma memory in this way, the individual is then free to pursue other self-images or goals that are unrelated to the trauma. Conway (2005) also recommends that, in cases where a person distorts or falsifies certain details of a traumatic memory in an effort to maintain a coherent sense of self, such distortions and falsifications are necessary targets for intervention if treatment is to be successful.

Despite offering the above therapeutic suggestions, and thus indirectly alluding to possible mechanisms of change underlying effective exposure-based and cognitive treatments for PTSD, the SMS remains relatively silent on clinical matters. This is largely because the SMS is first and foremost a general cognitive theory of memory and not a specific model of PTSD (Conway, 2005). While this level of generality links it to a substantial body of research relating to experimental and neuroanatomical studies of memory (see Addis, 2005; Conway, Pleydell-Pearce, Whitecross, & Sharpe, 2002; Conway, 2005), a significant

weakness of the model is its limited clinical applicability. That said, the SMS nevertheless offers a coherent theoretical framework in which to explain certain aspects of PTSD not accounted for by other theories of the disorder.

1.5.4 Cognitive model of PTSD. Similar to DRT (Brewin et al., 1996; Brewin et al., 2010) and the SMS (Conway, 2005), Ehlers and Clark's (2000) cognitive model of PTSD acknowledges that a disturbance in autobiographical memory is fundamental to the aetiology of the disorder. The theory additionally posits that negative appraisals of a trauma and its sequelae play an important role in the maintenance of the condition. These negative appraisals combine with the disturbance in autobiographical memory to create *a sense of current threat* that underlies the symptoms of PTSD. In an effort to manage the latter, individuals may engage in a range of maladaptive coping strategies that are linked to their negative appraisals and thereby inadvertently perpetuate their distress (see Figure 1).

To explain the role of *negative appraisals* in maintaining the disorder, Ehlers and Clark (2000) propose that individuals with PTSD interpret their trauma and its effects in ways that create a sense of current threat. These negative appraisals may relate to external phenomena (e.g., "The world is a dangerous place" / "Others can't be trusted") or internal self-referential cognitions ("It's my fault that this happened" / "I will never be the same again"). When trying to make sense of their trauma and its sequelae, individuals' appraisals may be prone to a number of cognitive biases, including overgeneralisation (e.g., "Nowhere is safe" / "Nobody can be trusted"), catastrophisation (e.g., "It is inevitable that something bad will happen"/ "Others will eventually let me down"), or

personalisation (e.g., "This wouldn't happen to someone else/ "It's all my fault"). Whatever their form, negative appraisals give rise to a sense of current threat by directly producing negative feelings (e.g., fear, anger, guilt, or shame) that undermine a person's basic sense of competence and trust in the world.

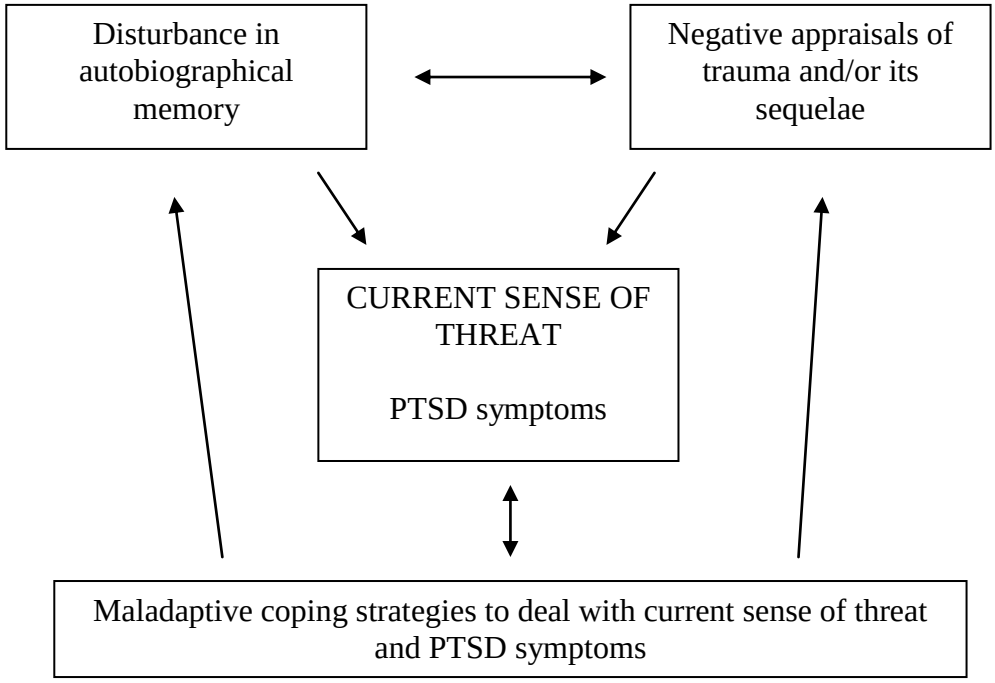

Figure 1. The cognitive model of PTSD. Adapted from "A Cognitive Model of Posttraumatic Stress Disorder," by A. Ehlers and D. M. Clark, 2000, *Behaviour Research and Therapy, 38,* p. 321.

Negative appraisals at the time of a trauma may also contribute to the development of PTSD. For instance, individuals who assume an attitude of *mental defeat* during their trauma are at an increased risk of developing PTSD (Dunmore, Clark, & Ehlers, 1997, 1998, 1999; Ehlers et al., 1998; Ehlers, Maercker, & Boos, 2000). Mental defeat is characterised by a perceived loss of psychological autonomy and sense of not being human anymore (Ehlers & Clark, 2000). One possible reason why mental defeat leads to more severe posttraumatic stress reactions is because individuals who experience it

commonly interpret their traumatic response as evidence of some personal weakness, which in turn gives rise to further negative appraisals.

While negative appraisals play an important part in the aetiology and maintenance of PTSD, the cognitive model assumes that *a disturbance in autobiographical memory* is central to the development of the condition. Similar to the authors of DRT (Brewin et al., 1996; Brewin et al., 2010) and the SMS (Conway, 2005), Ehlers and Clark (2000) observe that, although a trauma is central to the personal identity of individuals with PTSD, the trauma memory itself is incoherent and poorly integrated and contextualised into their autobiographical knowledge base. Consequently, conscious recall of it is impoverished, while involuntary retrieval of it is strengthened. To explain this apparent paradox, Ehlers and Clark (2000) propose that voluntary retrieval of the trauma memory is weak because poor conceptual processing at the time of the trauma prevents it from being adequately integrated into autobiographical memory (Conway & Plydell-Pearce, 2000). As a result of its lack of integration, the trauma memory remains vulnerable to being automatically triggered by internal or external cues that have become associated with the trauma. Furthermore, because the trauma memory is poorly elaborated and contextualised in autobiographical memory, whenever it is triggered, it is experienced as if it were occurring in the present, and hence as the intrusive memories and flashbacks symptomatic of PTSD.

These disturbances in autobiographical memory may also be influenced by individuals' aforementioned negative appraisals. For example, individuals may only selectively retrieve information from their trauma memory that is

consistent with their negative view of self. Similarly, individuals may interpret their disturbance in autobiographical memory in such a way as to confirm a negative view of self. It is thus that a disturbance in autobiographical memory and negative appraisals may reciprocally interact with one another to create the sense of current threat that is fundamental to PTSD.

Individuals with the disorder may also adopt a number of *maladaptive coping strategies* to try to deal with this sense of current threat. Although these coping strategies may alleviate immediate distress, in the long-term they only serve to perpetuate individuals' symptoms because the coping strategies themselves are meaningfully linked to their negative appraisals. For example, individuals who interpret their intrusion symptoms as a sign that they are losing their mind (e.g., "There is something wrong with me"/ "I'm going mad") may believe that actively suppressing them is the most effective way for them to manage their distress. These attempts at suppression may nevertheless have the paradoxical effect of causing the intrusion symptoms of PTSD to return more strongly (Wegner, 1989, 1994). In this way, negative appraisals and maladaptive coping strategies, as well as the disturbance in autobiographical memory, interact with one another to perpetuate the symptoms of PTSD.

Given how clearly the cognitive model elucidates the psychological mechanisms involved in the development and maintenance of the disorder, it is fitting that Ehlers and Clark (2000) have put forward a comprehensive treatment programme for PTSD. In brief, the authors suggest that psychological interventions for the condition should focus on elaborating and integrating the trauma memory into autobiographical memory, while simultaneously modifying

any negative appraisals or maladaptive coping strategies that maintain the disorder. A number of treatment-based studies provide strong evidence for the effectiveness of the treatment programme (e.g., Ehlers, Clark, Hackmann, McManus, & Fennell, 2005; Karl, Rabe, Zollner, Maercker, & Stopa, 2009; Kleim, et al., 2013). The cognitive model's assertion that negative appraisals play a significant role in the development and maintenance of PTSD has also been supported by a substantial body of research (Beck et al., 2004; Daie-Gabai, Aderka, Allon-Schindel, Foa, & Gilboa-Schechtman, 2010; Dunmore et al., 1997, 1998, 1999, 2001; Ehlers & Steil, 1995; Ehlers, Mayou, & Bryant, 1998; Emmerik, Schoorl, Emmelkamp, & Kamphuis, 2006; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999; Guelec, Kalafat, Boysan, & Barut, 2012; Mueller et al., 2010; Su & Chen, 2008). Despite the breadth of findings supporting it, a criticism of the cognitive model is that most of its concepts lack sufficient specificity with which to be able to make unique, testable, and empirical predictions (Dagleish, 2004). This criticism aside, there is no doubt that the cognitive model has been a highly productive tool informing research and practice.

1.5.5 The schematic, propositional, analogue, and associative representational systems (SPAARS) model. As in the case of Horowitz's (1976,1986, 1997) stress response theory and Janoff-Bulman's (1989, 1992) theoy of shattered assumptions, the SPAARS model (Dalgleish, 1999, 2004) proposes that PTSD results from difficulties assimilating or accommodating a traumatic experience into pretrauma schemas. The model also integrates all of the aforementioned theories of PTSD by positing four types of mental representation in the formation of trauma memories. Similar to schema-based

theories (Horowitz, 1976, 1986, 1997; Janoff-Bulman, 1989, 1992), the SPAARS model proposes that abstract and generic knowledge of self, others, and the world is stored at the *schematic* level. As in the case of DRT (Brewin et al., 1996; Brewin et al., 2010), the SMS (Conway, 2005), and the cognitive model (Ehlers & Clark, 2000), the theory also supposes that specific information about a trauma can be encoded on either a conceptual or experiential level. Very much like C-memory, the *propositional* level represents referential meaning in a verbally accessible format (i.e., conceptually), while akin to S-memory, the *analogical* level stores non-verbal information in terms of sensory-perceptual detail (i.e., experientially). Finally, the *associative* level – which is similar to the fear network theory of PTSD (Foa et al., 1989) – links these other three levels of mental representation by encoding associations between them (see Figure 2).

In addition to storing different types of knowledge, the schematic, propositional, and analogical levels represent working memory spaces where active information can be examined, manipulated, or changed. While changes to knowledge on the propositional or analogical level may lead to alterations at the schematic level, in general, due to the latter's dominant position within the system, information at the schematic level tends to organise, activate, and inhibit knowledge represented at the propositional and analogical level. Emotions play an additionally important role in organising knowledge across the different levels of the system. Similar to the cognitive model (Ehlers & Clark, 2000) and the DRT (Brewin et al., 1996; Brewin et al., 2010), the SPAARS model proposes two routes to the generation of emotion. The first route is appraisal driven, whereby events are appraised at the schematic level relative to one's goals

(Scherer, 1999). In contrast, the second route operates automatically via associative representations (Foa et al., 1989). Whether appraisal-driven or automatically triggered, emotions rapidly reconfigure information within the system to address the events that provoked their arousal in the first place.

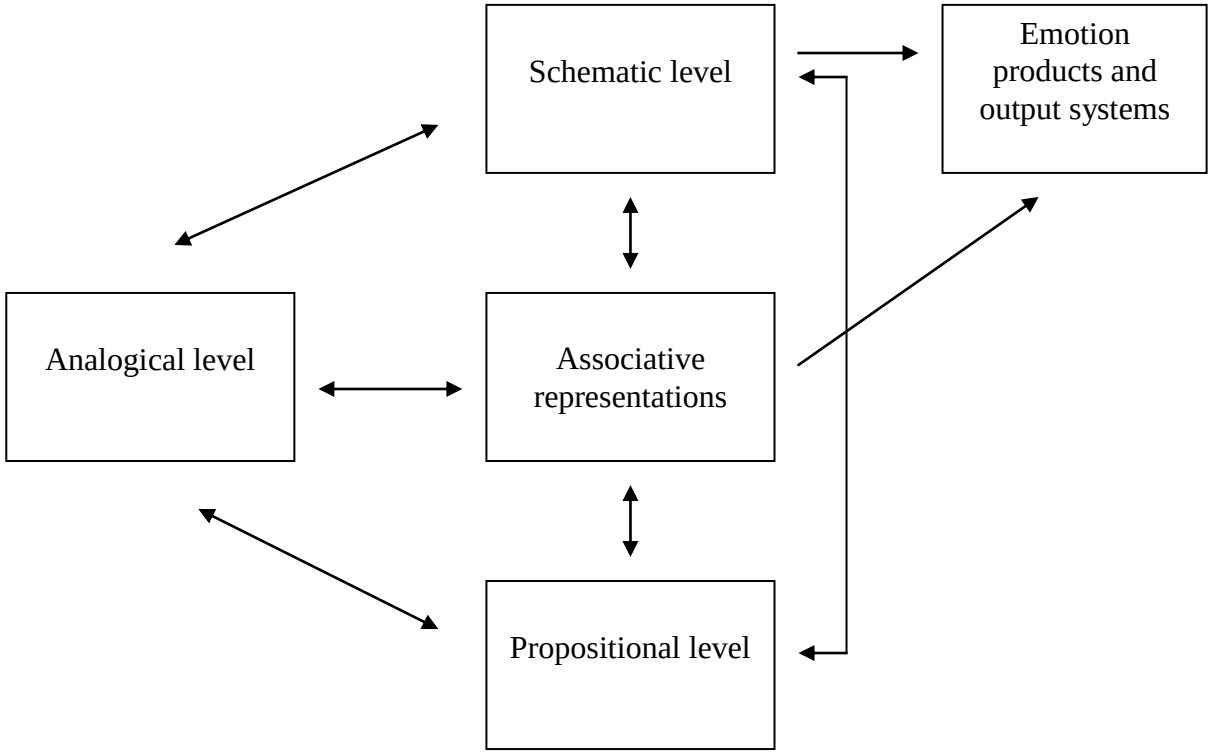

Figure 2. The schematic, propositional, analogue, and associative representational systems (SPAARS) model. Reprinted from "Cognitive Approaches to Posttraumatic Stress Disorder: The Evolution of Multirepresentational Theorizing," by T. Dalgleish, 2004, *Psychological Bulletin, 130,* p. 248.

The SPAARS model proposes that traumatic events lead to appraisals that generate fear because goals at the schematic level, such as those concerning personal survival, are threatened. Additional feelings, like anger, guilt, or shame, may also arise from other goal-related appraisals. Importantly, a person's experience of trauma is encoded and distributed across the analogical, propositional, and schematic levels, while associative representations between

them are formed. When knowledge across these different levels is incompatible with supraordinate schematic representations, the individual attempts to assimilate schema-discrepant information about the trauma by continuously reappraising it. At first, this results in a chronic low-level activation of fear, which leads to general changes in arousal and reactivity. Over time, however, this repeated appraisal of trauma-related information gives rise to intrusive memories and flashbacks consistent with a diagnosis of PTSD. To cope with the latter, a person may "intentionally interrogate their representations of the trauma, predominantly through the editing and reediting of a propositional-level account of the event or by reviewing analogical representations of their experience" (Dalgleish, 2004, p. 249). This, nevertheless, only serves to exacerbate the individual's intrusion symptoms, thus further perpetuating their distress.

According to the SPAARS model, differences in the way individuals respond to trauma can be accounted for by discrepancies in the content and configurations of their pretrauma schemas, as well as the extent to which these schematic representations strive to integrate or inhibit schema-inconsistent information. While some individuals may hold *balanced* schematic representations that acknowledge that the self is reasonably competent, others are fairly trustworthy, and the world is relatively safe, others may hold *overvalued* schemas that are naively optimistic (e.g., "I am invincible"/ "Everyone can be trusted"/ "Everywhere is safe"). In a similar vein, some individuals may hold *negative* schemas that are unrealistically pessimistic (e.g., "I am totally vulnerable"/ "Nobody can be trusted"/ "Nowhere is safe"). Generally, individuals who hold overvalued schemas about self, others, or the world are at

an increased risk of developing PTSD in response to trauma because of their inability to assimilate or accommodate the threatening details of their traumatic experience. While individuals with negative schemas may have less difficulty integrating such details, these individuals are also at risk of developing PTSD because their trauma is likely to be taken as confirmation for their pessimistic outlook, thus preventing them from being able to develop secure models of self, others, and the world that are conducive to psychological health. In contrast, individuals with balanced schemas are relatively immune to developing PTSD in response to trauma because of their ability to make sense of their traumatic experience in more realistic, and therefore adaptive, ways.

The SPAARS model proposes that individual differences in schema representation predict how individuals are likely to respond to trauma. While the theory's ability to account for these individual differences in trauma response is one of its greatest strengths, a limitation of the model is that its theoretical complexity makes it difficult for clinicians to apply in their clinical practice. Despite this criticism, the SPAARS model remains a useful theoretical and empirical tool for integrating all of the aforementioned theories of PTSD (Dalgleish, 2004).

1.5.6 Summary of PTSD models. A core principle of all the models discussed so far is that PTSD arises from difficulties integrating traumatic experiences into pretrauma meaning structures. The theories nevertheless differ in terms of their conceptualisation of the matter. On the one hand, the SPAARS model (Dalgleish, 2004) builds on Horowitz's (1976, 1986, 1997) and Janoff-Bulman's (1989, 1992) seminal theories by proposing that PTSD results from a

person's struggle to assimilate or accommodate their traumatic experience into their pretrauma *schemas* of self, others, and the world. On the other, DRT (Brewin et al., 1996; Brewin et al., 2010), the SMS (Conway, 2005), and the cognitive model (Ehlers and Clark, 2000) propose that PTSD develops from the individual's difficulties integrating their traumatic experience into their *autobiographical memory*. While a discussion of the conceptual differences between schemas and autobiographical memories is beyond the scope of this review, this review will now consider one possible reason why individuals with PTSD struggle to assimilate or accommodate their traumatic experiences into their pretrauma meaning structures.

1.6 Anxiety buffer disruption theory (ABDT): PTSD from the Perspective of Terror Management Theory (TMT)

Despite their conceptual differences, all of the aforementioned theories of PTSD agree that one of the reasons why trauma survivors find it so challenging to integrate their traumatic experience into their pretrauma meaning structures is because their trauma directly or indirectly threatens their personal survival. As Janoff-Bulman (1992) observes:

> Traumatic events involve perhaps the most basic of threats, that to our very survival […] our fragility as physical beings becomes painfully obvious through traumatic events. These are occasions when we are forced to recognize the real possibility of annihilation, of serious injury, and our own mortality (p.56).

In a related vein, Brewin et al. (1996) remark that "trauma generally involves a basic violation of assumptions connected with survival […] about personal invulnerability from death" (p. 675). Similarly, Conway (2005) and Dalgleish (2004) note that trauma usually arises when "goals such as personal survival are threatened" (Dalgleish, 2004, p.249). Although Ehlers and Clark (2000) make no explicit reference to threats to personal survival, it is nevertheless interesting that they refer to two cases in which the patients' PTSD symptoms appeared to be related to the death of another individual (p. 339, 341). ABDT (Pyszczynski & Kesebir, 2011) builds on these observations by proposing that a direct or indirect confrontation with one's own mortality lies at the heart of posttraumatic stress responses.

1.6.1 Terror management theory (TMT). As ABDT is a derivative of TMT (Greenberg, Pyzczynski, & Solomon, 1986), the theoretical and empirical literature relating to TMT will first be reviewed before considering its relevance to PTSD. TMT is based on the work of an anthropologist named Ernest Becker (1973). Becker (1973) observed that, as a result of our capacity for self-reflection and temporarily extended thought (i.e., our ability to dwell on the past and project ourselves into the future), our species confronts a unique existential dilemma. On the one hand, we are biological creatures with a deeply rooted instinct for self-preservation that operates in the service of our genes (Hamilton, 1964). On the other, we are intelligent beings with sophisticated cognitive abilities that are immensely adaptive, yet also render us aware of the inevitability of death (Rank, 1930/2003). Not only is death one of the few certainties in life, it can come at any time and occur in a number of highly unpleasant ways. Indeed,

without warning, an individual may fall victim to a deadly accident, suffer a fatal attack, or be diagnosed with an incurable disease. Human beings are therefore unique in their realisation that their biologically programmed desire for continued existence will eventually be thwarted.

According to the authors of TMT, humans would be "twitching blobs of protoplasm completely perfused with anxiety and unable to respond to the demands of their immediate surrounding" (Solomon, Greenberg, & Pyszczynski, 1998, p. 12) unless they had some means of overcoming the potentially paralysing dread that accompanies an awareness of their own mortality. To manage this fear, TMT posits that humans rely on an anxiety buffer that shields them from thoughts of death by denying its inevitability. This anxiety buffer consists of (1) a cultural worldview, (2) self-esteem, and (3) relationships, all of which interact with one another to enable individuals to maintain a state of psychological equanimity in the face of their mortality concerns (see Figure 3).

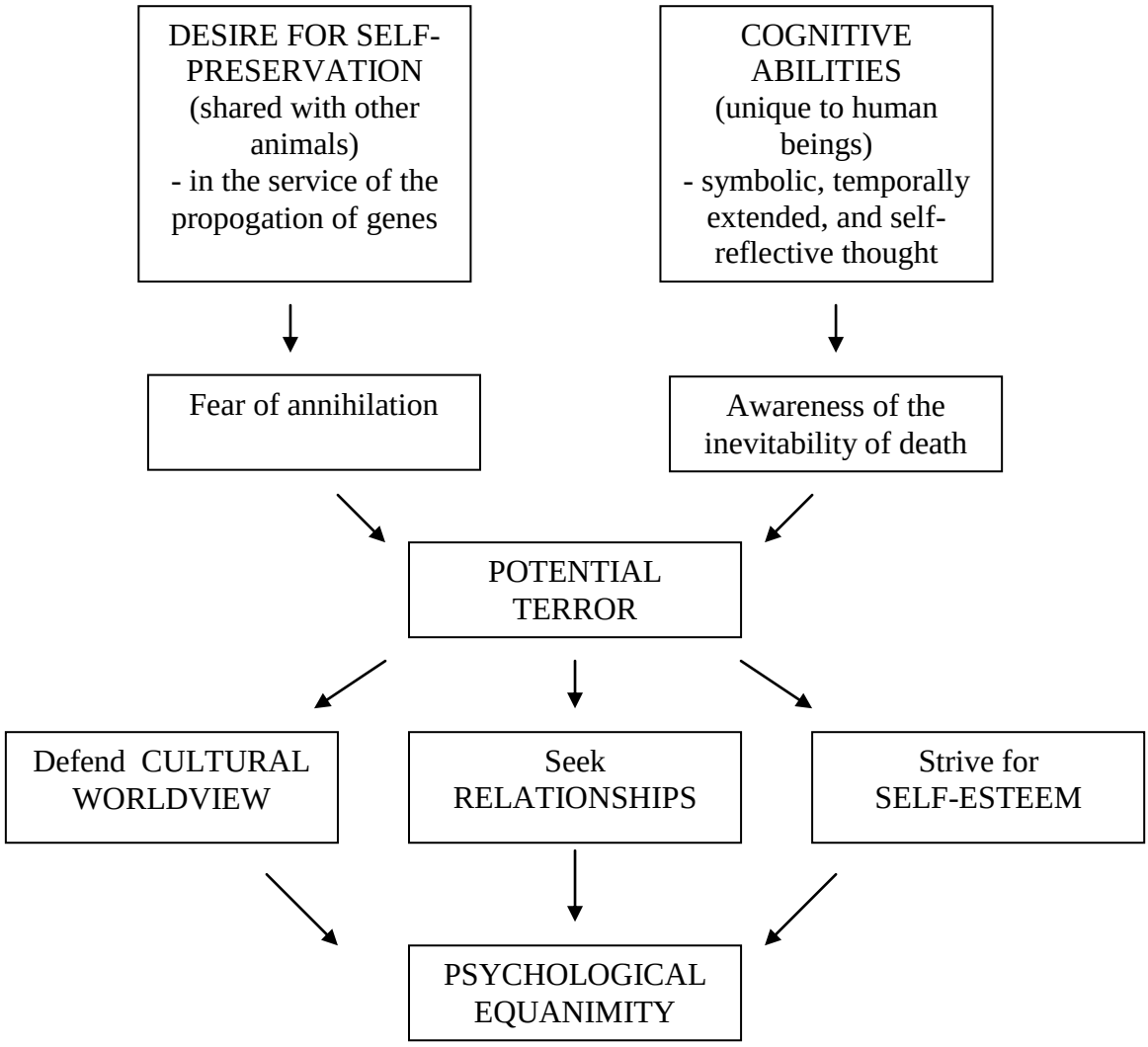

Figure 3. Terror management theory (TMT). Adapted from "Terror Management Theory of Self-Esteem and Cultural Worldviews: Empirical Assessment and Conceptual Refinements," by J. Greenberg, S. Solomon, and T. Pyszczynski, 1997, *Advances in Experimental Social Psychology, 29*, p. 71.

TMT proposes that *cultural worldviews* assuage the fear of death by providing answers to fundamental cosmological questions, which first arise in childhood (e.g., Where do I come from? Why do I exist? What happens when I die?). In addition to imbuing life with meaning, order, and purpose, cultural worldviews provide norms, standards, and values by which individuals can judge themselves and their behaviour as significant and worthy. By living up to these

standards, individuals feel connected to something greater and longer lasting than their transient selves (e.g., God, the State, the 'Greater Good,' etc.). Through this feeling of connection, individuals experience an increase in *self-esteem* that confers a sense of literal or symbolic immortality upon them. In cases of literal immortality, religious worldviews promise individuals some form of an afterlife for their valued contributions in life (e.g., heaven, reincarnation, nirvana, etc.). By contrast, in cases of symbolic immortality, secular worldviews afford individuals the opportunity to, at least metaphorically speaking, live on through the biological and cultural legacy they have invested in during their lifetime (e.g., children, career, charitable work, etc.; see Lifton, 1979, for further discussion). Cultural worldviews and self-esteem have the ability to soothe individuals' mortality concerns because their initial conceptions of reality and feelings of self-worth are rooted in early parent-child attachments that are associated with protection from harm (Hart, Shaver, & Goldenberg, 2005). By virtue of experiential linkages established very early in life between safety and security, on the one hand, and meaning and value, on the other, early-parent child attachments, and subsequently *relationships* with romantic partners, friends, and social groups, come to work in concert with the cultural worldview and self-esteem to form an anxiety buffer that shields individuals against their mortality concerns. That cultural worldviews and self-esteem derive their anxiety-buffering properties from early parent-child attachments makes sense when one considers that human infants are born developmentally premature and are therefore entirely dependent on others for their survival (Bowlby, 1969). Indeed, were there no caregiver to feed or shelter them, most human infants would die

within a short period of having been born. In this regard, an infant's early attachments can be understood as their primary defence against death anxiety, although the infant themselves may not yet have a clear conception of what exactly it is that they fear (Yalom, 1980).

Given its roots in early experience, the above anxiety buffer is somewhat irrational, bearing no logical connection to the actual problem of death. Indeed, no matter how meaningful a person's cultural worldview, how high their self-esteem, or how secure their relationships, none of these psychological structures can indefinitely postone the inevitable. As their connection to the problem of death is somewhat removed from everyday logic, these death-denying defences are known as *distal defences* (Pyszczynski, Greenberg, & Solomon, 1999). In light of their symbolic and experiential nature, distal defences tend to operate most effectively when thoughts of death are on the periphery of conscious awareness (i.e., highly accessible, though not in current focal attention). By contrast, when death-related thoughts are in conscious awareness, logical and threat-focussed *proximal defences* operate to suppress these unwanted thoughts or to push the problem of death into the future (e.g., "Not me, not now"). In support of this dual-process model of defence (see Figure 4), researchers have shown that, in the *immediate* aftermath of a mortality reminder (i.e., when thoughts of death are still in focal attention), participants engage in proximal defences. However, *following a delay or distraction* (i.e., when death-related thoughts recede to the periphery of conscious awareness), participants resort to distal defences (Greenberg, Arndt, Simon, Pyszczynski, & Solomon, 2000).

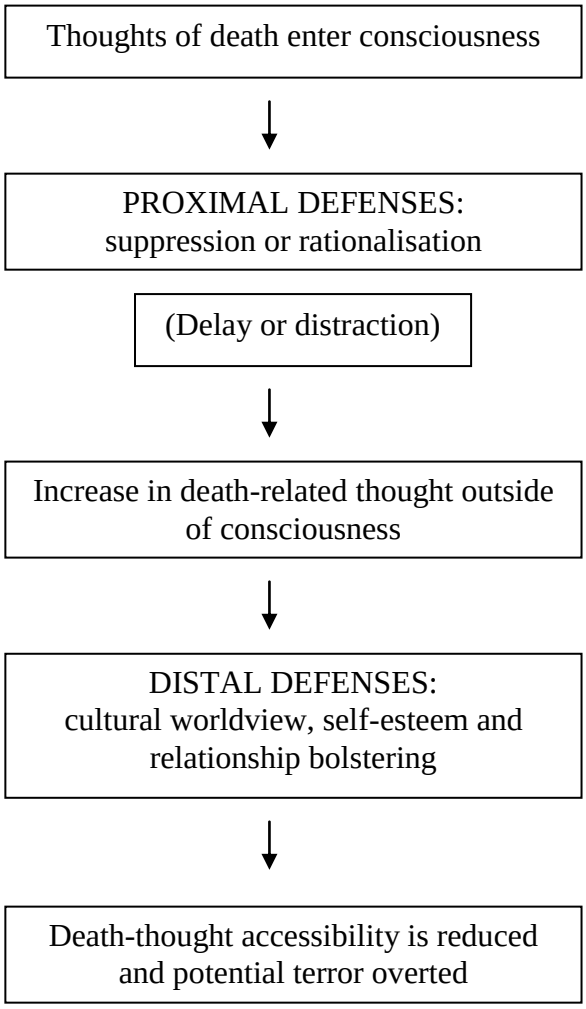

Figure 4. Dual-process model of defence. Adapted from "A Dual-Process Model of Defense Against Conscious and Unconscious Death-Related Thoughts: An Extension of Terror Management Theory," by T. Pyszczynski, J. Greenberg, and S. Solomon, 1999, *Psychological Review, 106*, p. 840.

1.6.2 Empirical support for TMT. Over 400 studies have supported the central tenets of TMT (Pyszczynski, Greenberg, Solomon, & Koole, 2010). In a typical experiment, participants are randomly assigned to either a mortality salience or control condition. While participants in the mortality salience condition are primed to think of the inevitability of death, those in the control condition are asked to reflect on a comparably aversive topic (e.g., dental pain,

social ostracism, paralysis, failing an important exam, etc.). Participants in the mortality salience condition may be primed to think about their eventual demise in a variety of ways, including by being asked to respond to open-ended questions on the matter (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989), by being instructed to complete a death anxiety scale (Dechesne et al., 2003), by being exposed to subliminal death-related stimuli (Arndt, Greenberg, Pyszczynski, & Solomon, 1997), by viewing scenes of war and destruction (Vail, Arndt, Motyl, & Pyszczynsk, 2012), or by being interviewed in morbid locations, such as in front of a funeral home or cemetery (Pyszczynski, et al., 1996). Following these experimental manipulations, participants are then instructed to complete a self-report measure or to engage in a task that is directly or indirectly related to their cultural worldview, self-esteem, or relationships. Consistently, research has shown that, relative to those in the control condition, participants in the mortality salience condition defend their cultural worldview more vigorously (Florian & Mikulincer, 1997; Greenberg et al., 1990; Greenberg, Simon, Porteus, Pyszczynski, & Chatel, 1995; McGregor et al., 1998; Rosenblatt, et al., 1989), engage in greater efforts to enhance their self-esteem (Dechesne et al., 2003; Goldenberg, McCoy, Pyszczynski, Greenberg, & Solomon, 2005; Hirschberger, Florian, Mikulincer, Goldenberg, & Pyszczynski, 2002; Mikulincer & Florian, 2002; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004), and express greater commitment to relationships that are consistent with their attachment style (Florian, Mikulincer, & Hirschberger, 2002; Mikulincer & Florian, 2000; Mikulincer, Florian, & Hirschberger, 2003; Mikulincer, Florian, Birnbaum, & Malishkevich, 2002). Such findings lend strong support to the *mortality salience*

hypothesis, which states that if cultural worldviews, self-esteem, and relationships function to provide protection against death-related thoughts, then reminding people of their own mortality will increase their commitment to, or defence of, these elements of the anxiety buffer (Greenberg, Solomon, & Pyszczynski, 1997).

Conversely, the *anxiety-buffer hypothesis* states that, if cultural worldviews, self-esteem, and relationships provide protection from mortality concerns, then bolstering one of these psychological structures will reduce or eliminate the effects of a mortality reminder on the other two aspects of the anxiety buffer (Greenberg et al., 1997). In support of this hypothesis, Dechesne et al. (2003) showed that promoting a *cultural worldview* that advocates belief in literal immortality eliminates the effects of a mortality reminder on participants' attempts to increase their *self-esteem*. Similarly, research has shown that participants with dispositionally high or experimentally enhanced *self-esteem* do not defend their *cultural worldview* more vigorously in response to a mortality reminder (Arndt & Greenberg, 1999; Harmon-Jones, Simon, Greenberg, Pyszczynski, Solomon, & McGregor, 1997). In a related vein, research has found that increasing thoughts of commitment to romantic *relationships* reduces the effects of a mortality reminder on individuals' *cultural worldview* defence (Florian et al., 2003).

As a corollary to the above hypotheses, the *death-thought accessibility hypothesis* states that, if cultural worldviews, self-esteem, and relationships play a role in protecting individuals against their mortality concerns, then threatening any of these aspects of the anxiety buffer will increase the accessibility of death-

related thoughts (Schimel, Hayes, Williams, & Jahrig, 2007; Hayes, Schimel, Arndt Faucher, & Williams, 2008). In studies testing this hypothesis, death-thought accessibility is measured using a word-completion task that requires participants to complete word fragments that are open to interpretation. For example, the fragment *SK_ _L* can be completed as either *skill* or *skull*. By counting how many fragments participants complete in a death-related manner, it is possible to infer whether thoughts of death are more or less accessible (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994). Consistent with the death-thought accessibility hypothesis, several studies have shown that experimentally undermining participants' cultural worldview (Friedman & Rholes, 2007; Gray, 2004; Hayes, Schimel, Howard, Webber, & Faucher, 2010; Hayes, Schimel, & Williams, 2008; Landau, et al., 2004; Schimel et al., 2007), self-esteem (Hayes, et al., 2008; Ogilvie, Cohen, & Solomon, 2008), and relationships (Florian et al., 2002; Taubman-Ben-Ari, 2004; Taubman-Ben-Ari & Katz-Ben-Ami, 2008) results in elevated death-thought accessibility. Similarly, research has found that experimentally promoting participants' cultural worldview (Schimel, et al., 2007), self-esteem (Hayes et al., 2008), and relationships (Yaakobi, Mikulincer, & Shaver, 2014) leads to a reduction in death-thought accessibility. These findings lend further support to TMT's assertion that cultural worldviews, self-esteem, and relationships play a fundamental role in helping individuals keep thoughts of death at bay (Hayes, Schimel, Arndt, & Faucher, 2010).

Despite death-related thoughts underlying the activation of cultural worldviews, self-esteem, and relationships, a key point emphasised by TMT is

that it is the *potential* to experience anxiety, rather than the actual experience of anxiety itself, that is triggered by heightened death-thought accessibility (Greenberg et al., 1997; Pyszczynski, et al., 1999). To explore this, most TMT studies (Burke, Martens, & Faucher, 2010) normally require participants to complete a mood scale of some sort, most notably the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). In the majority of these studies, participants in the mortality salience and control condition do not differ significantly from one another in terms of their reported mood (Arndt, Allen, & Greenberg, 2001). Similarly, although participants with high neurotic symptoms tend to report higher levels of negative affect relative to those with low neurotic symptoms, this difference in reported mood tends to be a function of participants' neurotic symptomatology rather than the experimental condition to which they are assigned (Goldenberg, Pyszczynski, McCoy, Greenberg, & Sheldon, 1999; Arndt & Sheldon, 2003). This suggests that, in general, participants are not aversely affected by the mortality salience induction methods employed in TMT studies (Burke et al., 2010).

In sum, the TMT literature suggests that healthy individuals manage their mortality concerns through an anxiety buffer consisting of proximal and distal defences. When thoughts of death are in conscious awareness, individuals resort to proximal defences that are logical and threat-focussed (e.g., a smoker may realise that giving up their habit will, at least statistically, extend their life expectancy). Following a delay or distraction, however, as death-related thoughts recede to the periphery of conscious awareness, healthy individuals rely on distal defences based on cultural worldviews, self-esteem, and relationships (e.g., a

smoker who views smoking as an integral part of their cultural identity, and consequently gains self-esteem and a sense of belonging from it, may continue their habit in a paradoxical attempt to manage their fear of death; Hansen, Winzeler, & Topolinski, 2010). By proximal and distal defences working in concert with one another, healthy individuals are able to maintain a state of psychological equanimity in the face of their mortality concerns.

1.6.3 ABDT.

Given that proximal and distal defences are implicated in healthy adaptation, it is unsurprising that a substantial body of research has found a relationship between disrupted anxiety-buffer functioning and numerous forms of psychopathology (for a review see Arndt, Routldge, Cox, & Goldenberg, 2005). For example, Strachan et al. (2007) demonstrated that reminding individuals with spider phobias, social anxiety, or obsessive-compulsive tendencies of the inevitability of death lead to an increase in their symptoms. In trying to make sense of similar observations within his therapeutic work, May (1983) suggested that neurotic individuals displace their mortality concerns onto concrete entities or events (e.g. spiders, social situations, germs, etc.) in a vain effort to render the problem of death into something that can be managed and thus indefinitely overcome.

In a related vein to such existential accounts of psychopathology (e.g., May, 1983; Yalom, 1980, 2008), ABDT proposes that PTSD results from disrupted anxiety-buffer functioning because traumatic experiences, by their very nature, involve a direct or indirect confrontation with death (Pyszczynski & Kesebir, 2011). Indeed, according to the APA (2013), a traumatic event must, by

definition, involve "exposure to actual or threatened *death*, serious *injury*, or sexual *violence* [italics added]" (p. 271). As words such as 'death,' 'injury,' and 'violence' imply a real or imagined threat to one's personal surival, this suggests that one's own mortality is implied in a traumatic experience. ABDT therefore proposes that a person's anxiety buffer may be undermined by the experience of trauma because it confronts them directly or indirectly with the reality of death. As Greening (1997) notes:

> "What happens when we are traumatized? In addition to the physical, neurological, and emotional trauma, we experience a fundamental assault on our right to live, on our personal sense of self worth, and further, on our sense that the world (including people) basically supports human life. Our relationship with existence itself is shattered"(p. 125).

As traumatic experiences involve "a fundamental assault on our right to live" (Greening, 1997, p. 125), ABDT proposes that posttraumatic stress reactions derive, in part, from overwhelming experiences of death anxiety that subsequently manifest themselves in the symptoms of PTSD. Intrusion symptoms, for example, exacerbate individuals' distress by regularly reminding them of their close encounter with death. Similarly, avoidance symptoms represent individuals' vain attempts to manage death-related thoughts in the absence of a functioning anxiety buffer. Overwhelmed by their mortality concerns, individuals may also experience negative alterations in cognitions and

mood, and changes in arousal and reactivity, that are especially attuned to thoughts of death (see Figure 5).

[Arguably, one exception to this purported relationship between trauma and death may include less direct forms of sexual violence, such as inappropriate exposure to explicit sexual material in childhood (Sanders, 2006). There are, however, theoretical reasons for believing that even such indirect forms of sexual abuse may have unconscious associations with death. As existential theorists have long noted, because the biological function of sex is to propagate the species, humankind's mortal nature is inevitably implied in the sexual act (see Clack, 2002). Indeed, as one of the most creaturely acts that humans engage in, sex acts as a constant reminder that, despite all of our cultural trappings, we are still biological animals destined to die. Given these subtle connotations between sex and death, it is conceivable that exposure to inappropriate sexual material in childhood may prove overwhelming, and thus traumatising, for some children, especially if they have not yet been given a cultural worldview through which to make sense of the sexual act (e.g. romance; Goldenberg, et al., 1999).]

In support of ABDT's assertion that PTSD emerges, in part, from a disruption in a person's anxiety buffer (i.e. their cultural worldview, self-esteem, and relationships), a substantial body of research shows that PTSD is associated with decreased perceptions of meaning, order, and purpose in life (for a review, see Park, 2010), diminished feelings of self-worth (Bradley, Schwartz, & Kaglow, 2005; Dekel, Solomon, Elklit, & Ginzburg, 2004; Kashdan, Uswatte, Steger, & Julian, 2006), and significant problems in intimate relationships (Dalgleish, et al., 1996; Ullman & Filipas, 2001; Zoellner, et al., 1999). Several

studies also point to a possible connection between heightened experiences of death anxiety and a perceived lack of meaning in life (Routledge & Juhl, 2010; Taubman-Ben-Ari, 2011; Vess, Routledge, Landau, & Arndt, 2009), a loss of self-esteem (Hayes, et al., 2008; Ogilvie, et al., 2008), and a breakdown in romantic relationships (Florian et al., 2002; Taubman-Ben-Ari, 2004; Taubman-Ben-Ari & Katz-Ben-Ami, 2008). In light of these findings, this review will now examine the empirical evidence directly relating to ABDT.

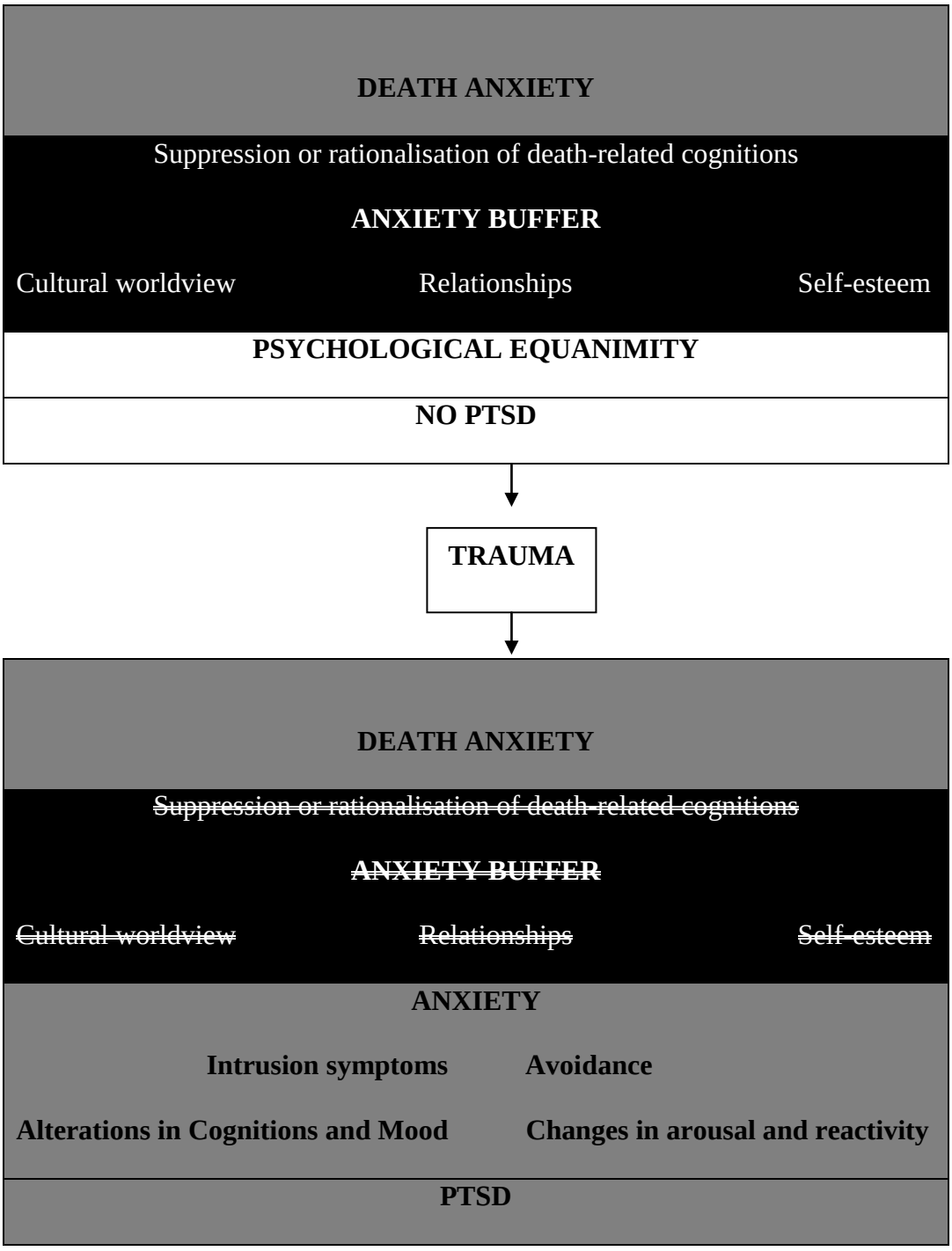

Figure 5. Anxiety buffer disruption theory (ABDT). Adapted from "Anxiety Buffer Disruption Theory: A Terror Management Account of Posttraumatic Stress Disorder," by T. Pyszczynski and P. Kesebir, 2011, *Anxiety, Stress, & Coping, 24*, p. 8.

1.6.4 Empirical support for ABDT. Only four studies to date have examined the central tenets of ABDT (Pyszczynski & Kesebir, 2011). This was confirmed by a search (on 30th November 2014) through four computerised journal databases: Psychinfo, Medline, Science Direct, and Web of Science. Four PTSD-related, three ABDT-related, two TMT-related, and two death-related search terms were used, in truncated form where appropriate: trauma*; 'post-traumatic stress disorder;' 'posttraumatic stress disorder;' PTSD; anxiety-buffer*; 'anxiety buffer'*;'ABDT; 'terror management'; TMT; death; and mortality. The PTSD-related terms were cross-referenced with the ABDT-related, TMT-related, and death-related terms, and then searched for within the title, abstract, keywords, and entire text of articles. Given the paucity of research on the subject matter, each of the four ABDT studies will be reviewed in relative detail, with a view to highlighting the role of disrupted anxiety-buffer functioning in the development and maintenance of PTSD.

In their two-part study with survivors of the 2005 Zarand Earthquake in southeast Iran, Abdollahi, Pyszczynski, Maxfield, and Luszczynska (2011) explored the possible role of disrupted distal defences in the aetiology of PTSD. For their study, Abdollahi et al. (2011) predicted that if PTSD derives from a disruption in cultural worldviews, then individuals with PTSD would *not* defend their cultural worldview in response to a mortality reminder *or* an earthquake reminder. Consistent with their prediction, Abdollahi et al. (2011) demonstrated that, in the mortality salience and earthquake salience condition, university students with high dissociation levels at 1 month after the earthquake and high PTSD symptomatology at 2 years follow-up did *not* defend their cultural

worldview relative to those with lower symptoms. [Abdollahi et al. (2011) explained the similar impact that the mortality and earthquake reminder had on participants by suggesting that it was their common link to death that made them equal in their effects. If correct, this would imply that trauma memories are equivalent to mortality reminders because they remind individuals of their close encounter with death.] Contrary to expectations, however, Abdollahi et al. (2011) found that, in the control condition, university students with high PTSD symptom severity *did* defend their cultural worldview more vigorously than those with lower symptoms. In trying to make sense of this unexpected finding, Abdollahi et al. (2011) suggested that participants with high PTSD symptomatology demonstrated a heightened state of psychological defensiveness *when thoughts of death were absent*.

Kesebir, Luszczynska, Pyszczynski, and Benight (2011) found similar results among Polish female survivors of domestic abuse. More specifically, Kesebir et al. (2011) showed that, in the mortality salience condition, female survivors with high PTSD symptom severity, high peritraumatic dissociation, and low coping self-efficacy did *not* defend their cultural worldview relative to those with lower symptoms. As in the case of Abdollahi et al. (2011), however, Kesebir et al. (2011) also unexpectedly found that, in the control condition, female survivors with high PTSD symptom severity *did* defend their cultural worldview more vigorously than those with lower symptoms. Once again, the authors suggested that this unexpected finding could be accounted for by female survivors with high PTSD symptomatology displaying a heightened state of psychological defensiveness in the absence of death-related thoughts.

In their two-part study with survivors of the Ivory Coast civil war (2002-2007), Chatard et al. (2012) explored the possible role of proximal defences in contributing to the development and maintenance of PTSD. For the first part of their study, Chatard et al. (2012) reasoned that if PTSD results from a breakdown in the capacity to suppress conscious thoughts of death, then reminding individuals of their own mortality would lead them to experience an immediate increase in death-thought accessibility. Consistent with their hypothesis, Chatard et al. (2012) found that, in the mortality salience condition, university students with high PTSD symptomatology demonstrated an immediate elevation in death-thought accessibility relative to those with lower symptoms. For the second part of their study, Chatard et al. (2012) hypothesised that if there is a connection between death-related thoughts and PTSD symptomatology, then inducing individuals to think about their own mortality would lead to an increase in reported PTSD symptomatology among those at risk of developing the disorder. In line with this prediction, Chatard et al. (2012) demonstrated that only participants who resided in a high war-exposure part of the Ivory Coast, and who were consequently more at risk of developing PTSD, reported an elevation in PTSD symptom severity after being asked multiple questions about the possibility of being killed during the civil war.

Building on the above research, Edmondson et al. (2011) examined whether a mortality reminder would lead to an immediate increase in death-thought accessibility among American university students exposed to various types of trauma. Consistent with the findings of Chatard et al. (2012), Edmondson et al. (2011) found that only students with moderate to severe PTSD

symptomatology exhibited an immediate elevation in death-thought accessibility following a mortality reminder. Further analysis also highlighted a dose-effect relationship, with students in the severe-PTSD-symptom group demonstrating greater death-thought accessibility than those in the moderate-symptom group. In a second study, Edmondson et al. (2011) showed that, despite experiencing an elevation in death-thought accessibility, students with moderate-to-severe PTSD symptoms did *not* defend their cultural worldview in response to a mortality reminder relative to those with lower symptoms. Interestingly, Edmondson et al. (2011) also demonstrated that an artificially induced self-esteem boost only decreased death-thought accessibility among students with low PTSD symptom severity but not those with higher PTSD symptomatology.

1.6.5 Methodological critique of the research on ABDT. The pioneering research by Abdollahi et al. (2011) and Chatard et al. (2012) is impressive in several ways. For example, both studies took advantage of the occurrence of a large-scale traumatic event that affected a large proportion of the populations under investigation. While each participant in Iran and the Ivory Coast no doubt experienced their respective trauma in their own unique manner (and also had differing trauma histories prior to and after its occurrence), the fact that all participants responded to questions relating to the same traumatic event increased the internal validity of both studies. The experimental rigour of both studies was further increased by the recruitment of a relatively homogenous sample of university students in each country. Despite their relative strengths, the conclusions that can be drawn from both studies' findings are limited by their use of a self-report measure to assess PTSD symptom severity. Although the

measures that were used were psychometrically sound, it is not possible to infer that all participants who scored highly on them definitely met the diagnostic criteria for PTSD; for such an inference to be confidently made, it would have been necessary to subject every participant to an extensive clinical interview as guided by the Clinician-Administered PTSD scale (CAPS; Blake et al., 1995). As both studies only focussed on one specific type of trauma, as experienced by a relatively homogenous sample of university students, it also remains unclear whether their results are generalisable to other populations and different types of trauma. Nevertheless, by focussing on traumas other than a natural disaster and civil war, the research by Kesebir et al. (2011) and Edmondon et al. (2011) demonstrated that the findings by Abdollahi et al. (2011) and Chatard et al. (2012) are likely generalisable to other types of trauma.

1.6.6 Summary and conclusion about the research on ABDT. The above findings lend strong support to ABDT's assertion that PTSD results from disrupted anxiety-buffer functioning. While Abdollahi et al. (2011) and Kesebir et al. (2011) showed that individuals with high PTSD symptom severity do *not* defend their cultural worldview in the presence of death-related thoughts, Chatard et al. (2012) and Edmondson et al. (2011) demonstrated that such disruptions in distal and proximal defences lead to heightened death-thought accessibility. Taken together, these findings suggest that individuals with PTSD are more vulnerable to experiencing death anxiety because their anxiety buffer has been undermined by the experience of trauma.

1.6.7 Critique of ABDT as a theory of PTSD. Although ABDT has started to receive some recognition in terms of its potential applicability to the

treatment of PTSD (e.g., Benight, 2012; Iverach, Mezies, & Mezies 2014; Maxfield, Samantha & Pyszczynski, 2014), it has not yet been thoroughly critiqued as a model of the disorder. Dalgleish (2004) proposes that any comprehensive theory of PTSD must be able to account for all of the core clinical and research data relating to the condition (see section 1.2, 1.3, and 1.4). Broadly speaking, this means that a complete theory must be able to do at least two things. First, it must be able to explain individual differences in pre-, peri-, and post-trauma factors contributing to the aetiology of chronic or delayed-onset versions of the condition. Second, it must be able to clarify the exact pathways through which natural or targeted recovery from symptoms occurs. This review will now consider ABDT's capacity to do each of these in turn.

As already discussed (see section 1.2.2), a number of pre-, peri-, and post-trauma factors have been found to increase the probability of individuals developing PTSD in response to trauma (Brewin, et al., 2000; DiGangi et al., 2013; Foa & Rothbaum, 1998; Ozer, et al., 2003). While ABDT is unable to account for all of these factors, it does offer some suggestions why certain factors predict more severe posttraumatic responses. For example, ABDT proposes that a previous history of trauma (Andrews, et al., 2000; Apfel et al., 2011; van Zuiden et al., 2012) and a personal or familial history of psychopathology (Heinrichs et al., 2005; Inslicht et al., 2010; Lengua, et al., 2006; Koenen et al., 2007; Koenen, et al., 2008; Sandweiss et al., 2011) are significant risk factors for PTSD because both are associated with weakened anxiety-buffer functioning (see Arndt, Routldge, Cox, & Goldenberg, 2005; Iverach, et al., 2014; Maxfield, et al., 2014; Pyszczynski & Kesebir, 2011). In a

similar vein, ABDT suggests that the degree of life threat and physical injury experienced during a trauma increases the probability of PTSD developing (Schnurr, et al., 2004) because both heighten an individual's awareness of their own mortality (Pyszczynski & Kesebir, 2011). Finally, ABDT proposes that a perceived lack of social support (Dalgleish, et al., 1996; Ulmann & Filipas, 2001; Zoellner, et al., 1999) decreases the likelihood of spontaneous recovery from trauma because, without the anxiety-buffering function afforded by relationships, individuals are more vulnerable to experiencing death anxiety (Pyszczysnki & Kesebir, 2011).

Although a strength of ABDT is that it is able to explain how individual differences in the above pre-, peri-, and post-trauma factors influence the development and maintenance of PTSD, a significant limitation of the model is that it only does so for chronic, though not delayed-onset, versions of the condition. This is not to say that ABDT could not put forward a convincing account of the processes that underlie the emergence of delayed-onset PTSD; it is just that no attempt at this has yet been made. Another limitation of the theory is that, to date, ABDT has not yet offered a clear indication of the exact mechanisms through which natural or targeted recovery from symptoms occurs. The theory therefore offers no clinical guidelines for the treatment of PTSD.

1.7 Rationale for Current Study

As Ehlers and Clark's (2000) cognitive model remains the most comprehensive in terms of its implications for treating PTSD (Brewin & Holmes, 2003), it seems fruitful to investigate possible theoretical links between ABDT and the cognitive model. By exploring one such link, the current study aims to

clarify one potential mechanism of change through which natural or targeted recovery from PTSD may occur from the perspective of ABDT.

As already discussed (see section 1.5.4), the cognitive model (Ehlers & Clark, 2000) proposes that negative appraisals of a trauma and its sequelae maintain the symptoms of PTSD by creating a current sense of threat. As ABDT proposes that PTSD is associated with a disruption in anxiety-buffer functioning, it is conceivable that negative trauma-related appraisals relating to the symptoms of PTSD may maintain disrupted anxiety-buffer functioning by directly undermining a person's cultural worldview (see Figure 6). While it is also conceivable that a disruption in cultural worldview may lead to negative trauma-related appraisals, which in turn may lead to the emergence of PTSD (i.e., the reverse of Figure 6), this seems unlikely on the grounds that a paradoxical disturbance in autobiographical memory is central to the disorder (Brewin, 2011). Given the latter fact, it seems more likely that the symptoms of PTSD result from an autobiographical memory disturbance, which in turn leads to negative trauma-related appraisals that then result in a disruption in cultural worldview.

If negative trauma-related appraisals about self, others, and the world thus induce or maintain disrupted anxiety-buffer functioning among individuals with PTSD, this would imply that the current sense of threat that is proposed by Ehlers and Clark (2000) to maintain the symptoms of the condition may in fact be sustained by an underlying death anxiety (Yalom, 1980, 2008). If correct, this would suggest that cognitive therapy is effective at treating PTSD because

targeting negative appraisals helps traumatised inidividuals to rebuild cultural worldviews that lead to restored anxiety-buffer functioning.

1.8 Research Hypotheses

With these aims in mind, the current study hypothesised that:

1. PTSD symptom severity would be positively correlated with negative trauma-related appraisals.

2. There would be an interaction between PTSD symptom severity and experimental condition such that in the mortality salience condition high PTSD symptom severity would decrease cultural worldview defence, while in the control condition it would increase it.

3. Within each experimental condition the relationship between PTSD symptom severity and cultural worldview defence would be mediated by negative trauma-related appraisals (see Figure 6).

4. Levels of negative affect would differ as a function of PTSD symptomatology, and not experimental condition, with participants with high PTSD symptom severity reporting higher levels of negative affect than those with lower symptoms.

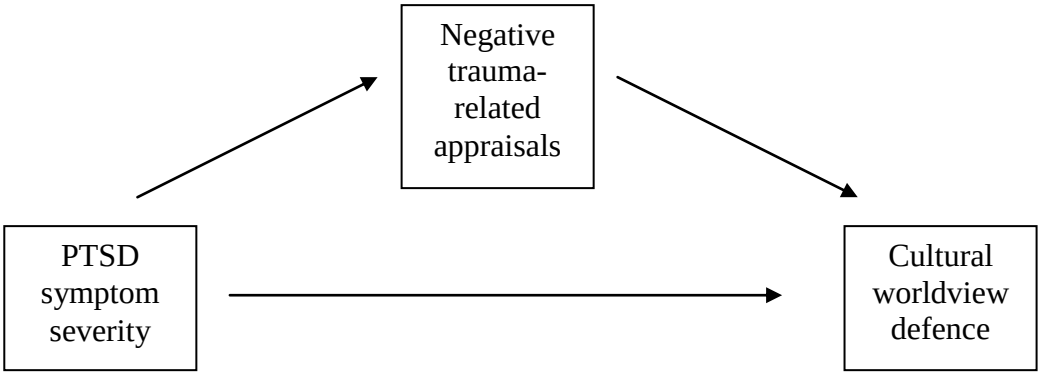

Figure 6. Hypothesised mediating effect of negative trauma-related appraisals on the relationship between PTSD symptom severity and cultural worldview defence.

2 Method

2.1 Overview

This chapter outlines the methodology adopted to test the aforementioned hypotheses. After describing the study's design, the chapter will explain how participants were recruited and what measures and materials were used to test the study's hypotheses. Following this, the chapter will give a detailed account of the procedure that was followed and the ethical issues that were taken into consideration when collecting the study's data. The chapter will then conclude with a description of the statistical analyses conducted to test the study's hypotheses.

2.2 Design

The study employed a two-way between-groups experimental design. For this, participants were first randomly assigned to either a mortality salience or control condition. Participants were then divided into a high or low PTSD symptom severity group according to their scores on the Posttraumatic Stress Diagnostic Scale (PDS; Foa, 1995). In line with Foa's (1995) scoring criteria, participants who scored 20 or less on the PDS were assigned to the low PTSD symptom severity group, while those scoring 21 and above were assigned to the high PTSD symptom severity group.

2.3 Participants

Participants were male and females, aged between 18 and 60. Individuals above the age of 60 were not eligible to participate in the study as research has shown that older adults do not respond to mortality reminders in the same way as those younger than them (Maxfield et al., 2007). In order to be included in the

study, participants had to have experienced at least one trauma within their lifetime, as defined by the APA (2013).

Participants were primarily recruited through advertisements (see Appendix B1) posted on online forums (e.g., Gumtree) and social networking websites (e.g., Facebook), as well as through links posted on the University of East Anglia's Psychology Recruitment Panel and the Norwich Medical School Bulletin. Participants were also recruited through posters (see Appendix B2) and flyers (see Appendix B3) left in community gathering places (e.g., public notice boards). As an incentive for participation, the advertisements informed individuals of the opportunity to be entered into a prize draw for the chance to win one of five £20 Amazon vouchers.

According to G Power (Faul, Erdfelder, Lang, & Bunchner, 2007), for a two-way between-groups analysis of variance (ANOVA), with power set at .80 and α at .05, it was estimated that a minimum of 94 participants would be required to detect an effect size of .35 (see Appendix A). This calculation was based on a meta-analysis of mortality salience effect sizes found within the TMT literature (Burke et al., 2010). This sample size estimate was also deemed adequate for the study's planned mediation analysis. Specifically, it was estimated that a minimum of 71 participants would be required to detect medium effect sizes between the predictor and the mediator and the mediator and the outcome variable (Fritz & MacKinnon, 2007).

2.4 Measures and Materials

2.4.1 Demographic information sheet. Participants were asked to report their age, gender, ethnicity, religion, highest level of education, employment

status, and marital status on a demographic information sheet (see Appendix E). On the same sheet, participants were also asked to state whether they were currently diagnosed with a mental health issue (e.g., major depressive disorder, anxiety disorder, PTSD) and whether they were receiving treatment for it.

2.4.2 Mortality reminder. Participants in the mortality salience condition were primed to think about their own mortality using two open-ended questions from the Mortality Attitudes Personality Survey (Rosenblatt, et al., 1989): "Please briefly describe the emotions that the thought of your own death arouses in you" and "Jot down, as specifically as you can, what you think will happen to you as you physically die" (see Appendix F1). In contrast, participants in the control condition were asked to answer the above questions in relation to dental pain (see Appendix F2). According to a meta-analysis by Burke et al. (2010), the vast majority of TMT research has used this method for inducing a mortality salience effect.

2.4.3 Negative Affect. Participants' level of negative affect following the mortality or dental pain reminder was measured using the Positive and Negative Affect Schedule – Expanded Version (PANAS-X; Watson & Clark, 1999). The PANAS-X is a 60-item scale that consists of a list of words that describe positive and negative affective states (see Appendix G). Participants are asked to rate the extent to which their current mood reflects each item on a 5-point Likert scale. The PANAS-X has been shown to have good internal consistency ($\alpha = .89$) and satisfactory test-retest reliability ($\alpha = .71$), as well as acceptable convergent validity (.65) with other measures of mood (Watson & Clark, 1999).

As previous research indicates that cultural worldview defences are only activated in response to a mortality reminder when death-related thoughts are in the periphery of conscious awareness, and not at the focal point of attention (Pyszczynski, et al., 1999), the PANAS-X was also used to provide a delay and distraction between the mortality reminder and the presentation of the cultural worldview defence measure.

2.4.4 Cultural worldview defence. A shortened version of the Multidimensional Social Transgression Scale (MSTS; Florian & Mikulincer, 1997) was used to measure participants' cultural worldview defence. This scale consists of 10 short vignettes that depict social transgressions based on newspaper articles reporting real life crimes, such as a negligent surgeon accidentally amputating a patient's wrong leg (see Appendix H). After reading these vignettes, participants are asked to rate on a 7-point Likert scale how severe they think the wrongdoing in the situation is and how severe the punishment should be. The MSTS therefore consists of two subscales: a Severity Rating subscale and a Punishment Rating subscale. The MSTS has been shown to have good inter-item reliability (α = .82 to .91; Florian & Mikulincer, 1997). Although test-retest reliability data for the MSTS is lacking, previous TMT and ABDT studies using the measure have successfully found the hypothesised effects that they were looking for (e.g., Florian & Mikulincer, 2001; Kesebir, et al., 2011). This suggests that the MSTS has some degree of test-retest reliability across different groups and settings. As its vignettes are based on real life crimes reported in newspapers, this implies that the MSTS also has relatively good face and content validity (Florian & Mikulincer, 1997).

The MSTS was used as a measure of cultural worldview defence as it concerns itself with social transgressions that almost anyone, regardless of their political or religious affiliation, should perceive to be an affront to their beliefs and values (Florian & Mikulincer, 1997). Indeed, as Kesebir et al. (2011) note: "For any society to be able to continue functioning effectively, such transgressions [as depicted in the MSTS] probably should be punished to a certain degree" (p.83). It was therefore assumed that the MSTS would be able to tap into the general beliefs and values of any cultural worldview, regardless of whether it was liberal or conservative, or secular or religious, in its orientation.

2.4.5 PTSD symptoms. Participants' PTSD symptom severity was measured using the PDS (Foa, 1995). The PDS is a 49-item self-report questionnaire that assesses the DSM-IV criteria for a diagnosis of PTSD (APA, 1994; see Appendix I). The PDS requires individuals to indicate what traumatic events they have experienced in their lifetime and which one of these distresses them the most. Individuals are then asked to rate on a 4-point Likert scale how frequently they have experienced a list of PTSD symptoms in relation to that specific traumatic event over the previous month. Scores can range from 0 to 51, with higher scores indicating greater symptom severity. Although PDS scores are not necessarily indicative of a diagnosis of PTSD, they do provide a good measure of the severity of PTSD-related symptoms an individual is experiencing (Foa, 1995). The PDS has been shown to have excellent internal consistency (α = .92) and good test-retest reliability (α = .83), as well as good sensitivity (.89) and specificity (.75) in terms of differentiating individuals with and without PTSD (Foa, Cashman, Jaycox, & Perry, 1997).

2.4.6 Trauma-related appraisals. Participants' trauma-related appraisals were assessed using the Posttraumatic Cognitions Inventory (PTCI; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999). The PTCI is a 33-item self-report questionnaire that measures negative appraisals relating to a trauma and its sequelae (see Appendix J). Individuals are required to rate their level of agreement with various statements on a 7-point Likert scale. The PTCI consists of three subscales: Negative Cognitions about Self, Negative Cognitions about the World, and Self-Blame. The PTCI has been demonstrated to have excellent inter-item (α = .97) and good test-retest (α = .85) reliability, as well as acceptable sensitivity (.86) and specificity (.62; Foa et al., 1999).

2.4.7 Positive mood induction. Although most participants do not typically report an increase in negative affect in response to a mortality reminder (Burke et al., 2010), it was possible that some might have found the experiment temporarily distressing. To counteract this possibility, at the very end of the study, participants were asked to engage in a positive mood induction task (see Appendix K). The task required participants to write down a happy memory from their childhood as research has found that nostalgia is effective at assuaging people's mortality concerns (Routledge, Arndt, Sedikides, & Wildschut, 2008).

2.5 Procedure

In line with a new emerging trend in TMT research (e.g., Kesebir, 2014), the study was conducted online, using Survey Monkey. As outlined above, participants were recruited through online advertisements, posters, and flyers. A link to the online study was provided at the end of these advertisements (see Appendix B1-3). Before commencing the study, participants were asked to read a

Participant Information Sheet (see Appendix C), followed by a Consent Form (see Appendix D). Participants were explicitly informed that by ticking the boxes on the consent form and by clicking on the 'proceed to study' button, they were giving their informed consent to take part in the research. Following this, participants were asked to complete a demographic information sheet (see Appendix E). Participants were then randomly assigned to the mortality salience or control condition. Randomisation was achieved using a Survey Monkey algorithm that ensured that participants had a '50/50' chance of being assigned to either condition.

Aside from the two open-ended questions on death or dental pain, participants were presented with the exact same measures and materials. In accordance with the procedures of other TMT and ABDT studies, participants were instructed to complete these in the order in which they were presented. After writing their responses to the open-ended questions on death or dental pain (see Appendix F1 and F2), participants were asked to complete the PANAS-X (see Appendix G). Following the delay and distraction that completing the PANAS-X afforded, participants were asked to complete the MSTS (see Appendix H). Participants were then instructed to complete the PDS (see Appendix I) and the PTCI (see Appendix J). Finally, participants ended the study by writing down a happy memory from their childhood (see Appendix K).

Upon finishing the study, participants were shown an online Debriefing Sheet (see Appendix L) and an Important Information Sheet (see Appendix M) with contact details of support services they could get in touch with if participating in the study had caused them distress. Before being thanked for

their participation (see Appendix O), participants were offered the opportunity to submit their contact details in order to enter the study's prize draw or to receive a summary of the research findings upon the study's completion (see Appendix N).

2.6 Ethical Considerations

Prior to recruiting participants, ethical approval for the study was obtained from the University of East Anglia Faculty of Medicine and Health Sciences Research Ethics Committee (see Appendix P).

2.6.1 Consent. Participants were required to read an online Participant Information Sheet before giving their informed consent to take part in the study (see Appendix C). Given the sensitive nature of the subject under investigation, the information sheet forewarned participants that certain questions might prove distressing. In addition to containing details of the study, the information sheet informed participants of their right to withdraw from the study at any time. The information sheet also explained issues around confidentiality and data protection.

2.6.2 Coercion. Participants were reminded about the voluntary nature of participation prior to the study commencing. As participants were completing the study online, they were able to discontinue participation with ease. Coercion was therefore not an issue.

2.6.3 Confidentiality. To maintain confidentiality, participants' contact details (to enter the prize draw or to receive a copy of the research findings) were stored separately from the data. To allow the researcher to still identify what measures corresponded to what person, each participant's data set was allocated a unique identification number.

2.6.4 Deception. According to the British Psychological Society's (BPS) Code of Human Research Ethics (2010), there is a difference between withholding detailed information about the hypotheses being investigated and deliberately misinforming participants regarding the purpose of a study. While previous ABDT research has deceived participants by informing them that they were engaging in a personality assessment (e.g., Abdollahi et al., 2011), no such strategy was adopted in this study. Instead, participants were informed of the vague aims of the research so as to prevent them from consciously changing their responses to suit the study's goals. Accordingly, participants were only forewarned that the questions would inquire into trauma and other related matters and might therefore prove distressing; however, they were not given advanced warning about the questions concerning death. There were two main reasons for this. First, by mentioning the topic in the Participant Information Sheet (see Appendix C), participants in the control condition might have been inadvertently primed to think of their own mortality, thus confounding the experimental manipulation. Second, as research has found that mortality reminders are only effective in TMT studies when responded to in an experiential and gut-level manner (Simon et al., 1997), it was important that potential participants were not given the opportunity to reflect on the subject of death in a premeditated and rational manner before taking part in the research.

2.6.5 Debriefing. At the end of the study, participants were presented a Debriefing Sheet (see Appendix M) informing them about the aims of the study. In the event that participating in the study had caused an individual considerable distress, the debriefing sheet advised such individuals to contact one of the

support services on the Important Information Sheet (see Appendix O) for further support.

2.6.6 Distress. In their study with survivors of the 2005 Zarand Earthquake in southeast Iran, Abdollahi et al. (2011) found that asking participants to think about the earthquake produced the same experimental effects as asking them to reflect on death (see section 1.6.4). This suggests that participating in an ABDT study carries the same risks as participating in a memory-based study of trauma. Cromer, Freyd, Binder, DePrince, and Becker-Blease (2006) highlight research that suggest that such memory-based studies do not re-traumatise participants and therefore do not place them at greater risk than other psychological research. Despite this, care was still taken to make sure that participants did not finish the study in a state of distress. First, to counteract any potential distress caused by the mortality reminder, participants were asked to report a happy memory from their childhood at the end of the study as nostalgia has been shown to ease death anxiety (Routledge et al., 2008). Second, upon finishing the study, participants were presented with an online Debriefing Sheet (see Appendix L) advising them to contact one of the organisations listed on the Important Information Sheet (see Appendix M) for further support if participating in the study had caused them significant distress.

2.7 Plan of Analysis

The Statistics Package for Social Sciences (SPSS) Version 21 was used to analyse all data. The following statistical analyses were used to test each of the study's hypotheses:

2.7.1 Hypothesis 1. To examine whether PTSD symptom severity (as measured by the PDS Total scale) and negative trauma-related appraisals (as measured by the PTCI Total scale) were positively correlated, a correlation analysis was conducted.

2.7.2 Hypothesis 2. To determine whether there was a significant interaction between experimental condition and PTSD symptom severity in relation to cultural worldview defence (as measured by the MSTS Severity Rating subscale and the MSTS Punishment Rating subscale), two-way between-groups ANOVAs were conducted with cultural worldview defence as the dependent variable. For planned pairwise comparisons, independent samples t-tests were then used to compare differences in cultural worldview defence between the high and low PTSD symptom severity group in each experimental condition.

2.7.3 Hypothesis 3. To explore whether the hypothesised relationship between PTSD symptom severity and cultural worldview defence was mediated by negative trauma-related appraisals, separate mediation analyses were conducted with data from the mortality salience and control condition. Separate mediation analyses were proposed because the relationship between PTSD symptom severity and cultural worldview defence was hypothesised to vary according to condition (i.e., in the mortality salience condition high PTSD symptom severity was predicted to decrease cultural worldview defence, while in the control condition it was predicted to increase it).

The purpose of a mediation analysis is to explore whether the relationship between a predictor variable (i.e., PTSD symptom severity) and an outcome

variable (i.e., cultural worldview defence) is partially explained by a third variable, known as a mediator (i.e., negative trauma-related appraisals). Mediation is said to have occurred if the indirect effect (i.e., the relationship of the predictor with the outcome variable through the effect of the mediating variable) is statistically significant. To help understand this, it is useful to consider Baron and Kenny's (1986) original criteria for determining whether mediation has occurred:

a) There must be a significant correlation between the predictor variable and the outcome variable (path *c'*).
b) There must be a significant correlation between the predictor variable and the mediator (path *a*).
c) There must be a significant correlation between the mediator and the outcome variable (path *b*).
d) The correlation between the predictor variable and the outcome variable (path *c'*) must be significantly reduced when paths *a* and *b* are controlled for.

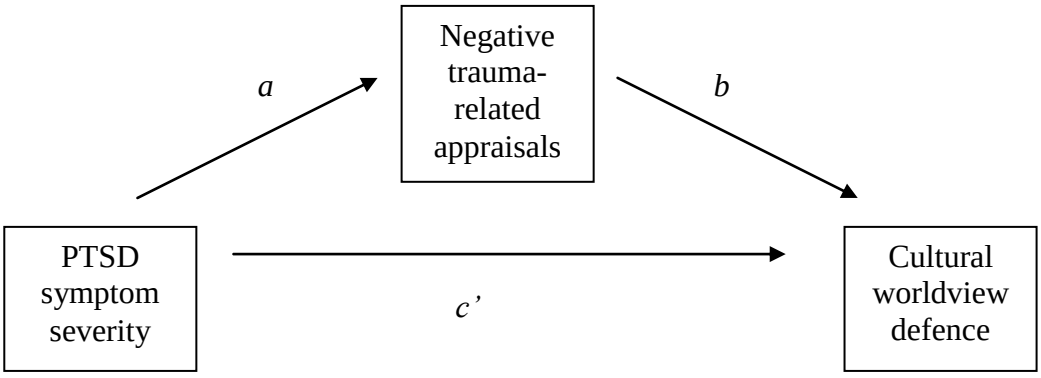

Figure 9. Hypothesised indirect effect of trauma-related negative appraisals on the relationship between PTSD symptom severity and cultural worldview defence.

One variable not depicted in the diagram is *c*. This is because *c* represents the *total effect* of the predictor on the outcome. *c* may be calculated by adding *c'* (which is known as the *direct effect*) to *ab* (which is known as the *indirect effect*). This is most easily understood when expressed in the following equation:

$$c = c' + ab \text{ (total effect = direct effect + indirect effect)}$$

From the above, it is evident that the indirect effect of a mediator can be calculated by rearranging the elements of the equation as follows:

$$ab = c - c' \text{ (indirect effect = total effect – direct effect)}$$

These are helpful equations to bear in mind when interpreting the results of the mediation analyses.

2.7.4 Hypothesis 4. To examine whether negative affect (as measured by the PANAS-X Negative Affect subscale) would differ as a function of PTSD symptomatology, and not experimental condition, a two-way between-groups ANOVA was conducted with the negative affect as the dependent variable. For planned pairwise comparisons, independent samples t-tests were then used to compare the difference in negative affect between the high and low PTSD symptom severity group, independent of experimental condition.

3 Results

3.1 Overview

This chapter will outline the main findings of the study. Before reporting these, the chapter will first provide a detailed overview of the participant characteristics and types of trauma experienced across each of the study's groups. Following this, the chapter will describe how the study's data were screened and how parametric assumptions were tested. After discussing the procedures that were used to manage non-parametric data, the chapter will briefly consider the internal reliability of the measures used. The chapter will then summarise the findings regarding the study's main hypotheses and some exploratory analyses relating to these.

3.2 Participant Characteristics

3.2.1 Demographics. Of the 248 participants who began filling in the online survey, only 162 (65.32%) completed it to a satisfactory standard (i.e., with less than 5% of missing data; Tabechnick & Fidell, 2013). As four of these participants reported experiencing a trauma that did not meet the APA's (2013, p. 271) definition of the term (i.e., marital divorce, parental separation, workplace bullying), their data were excluded from the analysis. Data from 158 participants were therefore retained for analysis.

Table 1 shows a breakdown of the participant characteristics for each of the study's groups. Chi-square tests highlighted no significant group differences in terms of ethnicity, $\chi^2(9, 158) = 10.13$, $p = .34$, religion, $\chi^2(18, 158) = 16.77$, $p = .54$, education, $\chi^2(15, 158) = 22.11$, $p = .11$, and marital status, $\chi^2(18, 158) = 23.23$, $p = .18$. Chi-square tests did nevertheless demonstrate significant group

differences in terms of gender, $\chi^2(3, 158) = 13.78$, $p < .001$. Unsurprisingly, chi-square tests also showed significant groups differences in terms of employment status, $\chi^2(9, 158) = 35.23$, $p < .01$, mental health, $\chi^2(12, 158) = 54.27$, $p < .001$, and treatment engagement, $\chi^2(6, 158) = 50.29$, $p < .001$. A two-way between-groups ANOVA conducted on age also yielded a main effect of PTSD symptom severity, $F(3,154) = 22.69$, $p < .001$, $\eta^2 = 0.13$. Follow-up pairwise comparisons demonstrated that participants with high PTSD symptom severity ($M = 41.65$, $SD = 9.38$) were significantly older than those with lower symptoms ($M = 34.44$, $SD = 9.76$), $t(156) = 4.69$, $p < .001$, $d = 0.76$.

Table 1

Participant Demographics According to Group

	Mortality Salience		Control Condition	
	Low PTSD (n = 50)	High PTSD (n = 35)	Low PTSD (n = 39)	High PTSD (n = 34)
Gender*				
Male	36.0%	5.7%	20.5%	11.8%
Female	64.0%	94.3%	79.5%	88.2%
Ethnicity				
White British	74.0%	88.6%	66.7%	82.4%
Black British	0.0%	0.0%	2.6%	0.0%
Asian British	2.0%	0.0%	0.0%	0.0%
Other	24.0%	11.4%	30.7%	17.6%

Note. * Statistically significant difference on this variable across groups.

Table 1 Continued

	Mortality Salience		Control Condition	
	Low PTSD (n = 50)	High PTSD (n = 35)	Low PTSD (n = 39)	High PTSD (n = 34)
Religion				
Christianity	38.0%	45.7%	33.3%	38.2%
Islam	0.0%	2.9%	0.0%	2.9%
Sikhism	0.0%	0.0%	0.0%	2.9%
Buddhism	2.0%	2.9%	2.6%	0.0%
Agnosticism	20.0%	11.4%	28.2%	11.8%
Atheism	24.0%	8.6%	20.5%	20.6%
Other	16.0%	28.6%	15.4%	23.5%
Education				
Secondary School	6.0%	5.7%	7.7%	11.8%
Vocational	10.0%	37.2%	23.1%	41.2%
College	34.0%	25.7%	20.5%	20.6%
Undergraduate	38.0%	31.4%	33.3%	20.6%
Masters	12.0%	0.0%	15.4%	5.9%
Doctoral				
Employment*				
Employed	74.0%	43.3%	68.5%	55.1%
Unemployed	12.0%	56.7%	13.6%	40.0%
Education/Training	14.0%	0.0%	17.9%	5.9%
Marital Status				
Single	44.0%	40.0%	43.6%	35.3%
Married	32.0%	31.4%	20.5%	17.6%
Co-habiting	12.0%	8.6%	28.2%	26.5%
Separated	4.0%	2.9%	0.0%	2.9%
Divorced	4.0%	11.4%	7.7%	5.9%
Widowed	2.0%	5.7%	0.0%	11.8%
Mental Health*				
Major Depression	4.0%	5.7%	2.6%	5.9%
Anxiety Disorder	0.0%	11.4%	2.6%	5.9%
PTSD	2.0%	34.3%	5.1%	26.5%
Other	6.0%	25.7%	5.1%	17.6%
N/A	88.0%	22.9%	84.6%	44.1%
Treatment*				
Yes	18.0%	54.3%	7.7%	35.3%
No	12.0%	31.4%	15.4%	41.2%
N/A	70.0%	14.3%	76.9%	23.5%

Note. ∗ Statistically significant difference on this variable across groups.

3.2.2 Trauma experiences. All participants included in the analysis reported experiencing at least one trauma that met the APA's (2013, p. 271) definition of the term. Table 2 shows the percentage of participants in each group who reported experiencing at least one of the traumas listed on the PDS (Foa, 1995). Chi-square tests did not highlight significant group differences in terms of the number of participants who reported experiencing a serious accident, $\chi^2(3, 158) = 1.85$, $p = .61$, a natural disaster, $\chi^2(3, 158) = 1.4$, $p = .71$, a life-threatening illness, $\chi^2(3, 158) = 2.81$, $p > .05$, a physical assault by a stranger, $\chi^2(3, 158) = 0.63$, $p = .89$, military combat, $\chi^2(3, 158) = 2.86$, $p = .41$, imprisonment, $\chi^2(3, 158) = 1.21$, $p = .64$, and torture, $\chi^2(3, 158) = 1.06$, $p = .73$. Chi-square tests did nevertheless demonstrate significant group differences in terms of the number of participants who reported experiencing a physical assault by a known person, $\chi^2(3, 158) = 14.90$, $p < .001$, a sexual assault by a known person, $\chi^2(3, 158) = 27.57$, $p < .01$, a sexual assault by a stranger, $\chi^2(3, 158) = 12.82$, $p = .01$, and childhood sexual abuse, $\chi^2(3, 158) = 9.43$, $p = .02$.

3.3 Preliminary Data Screening and Assumption Testing

3.3.1 Missing data. All participant responses were screened for missing data. In a small number of cases (4.38%), data were missing for one or two items on the PANAS-X, the MSTS, the PDS, and the PTCI. If data were missing at random and the amount of missing data was less than 5% per participant, then the missing item was imputed by mean substitution (Tabachnick & Fidell, 2013).

Table 2

Participant Trauma Experiences According to Group

	Mortality Salience		Control Condition	
	Low PTSD (n = 50)	High PTSD (n = 35)	Low PTSD (n = 39)	High PTSD (n = 34)
Accident	38.0%	28.6%	38.5%	44.1%
Natural disaster	12.0%	11.4%	5.1%	8.8%
Physical assault by known person∗	28.0%	48.6%	28.0%	64.7%
Physical assault by stranger	36.0%	40.0%	33.3%	41.2%
Sexual assault by known person∗	12.0%	65.7%	33.3%	47.1%
Sexual assault by stranger∗	10.0%	40.0%	15.4%	29.4%
Military combat	0.0%	2.9%	2.6%	5.9%
Childhood sexual abuse∗	30.0%	62.9%	38.5%	41.2%
Imprisonment	0.0%	2.9%	0.0%	0.0%
Torture	2.0%	0.0%	0.0%	0.0%
Life-threatening illness	20.0%	34.3%	33.3%	29.4%

Note. ∗ Statistically significant difference across groups in terms of the number of participants who reported experiencing this type of trauma.

3.3.2 Outliers. One or two outliers were also identified on most variables. As outliers might have represented natural diversity within the population under investigation, analyses were conducted with and without outliers. As excluding outliers did not affect the outcome of analyses, they were included in all subsequent calculations.

3.3.3 Normality tests. The study's main variables of interest were measured by the PDS Total scale, the PTCI Total scale, the MSTS Severity Rating subscale, the MSTS Punishment Rating subscale, and the PANAS-X Negative Affect subscale. Data normality for each of these variables was determined by visually inspecting histograms and by examining z-scores calculated from skewness and kurtosis statistics. This method was used instead of the Kolmogorov-Smirnov and Shapiro-Wilks tests because the latter tests tend to be overly conservative when estimating the normality of a distribution (Field, 2009). For this alternative normality test, skewness and kurtosis z-scores for each of the study's main variables were calculated using the following equations (where S = skewness, K = kurtosis, and SE = standard error):

$$\text{Z skewness} = \frac{S - 0}{\text{SE skewness}} \qquad \text{Z kurtosis} = \frac{K - 0}{\text{SE kurtosis}}$$

The results of these calculations are reported in Table 3. As the sample had less than 200 participants, z-scores greater than 1.96 (i.e., $p < .05$) were interpreted as being indicative of a non-normal distribution (Field, 2009).

As can be seen from Table 3, in the mortality salience x low PTSD symptom severity group, data from the PDS Total scale and PTCI Total scale

were significantly positively skewed at $p < .05$. Data from the PANAS-X Negative Affect subscale were also positively skewed at $p < .001$ in both the mortality salience x low PTSD symptom severity group and the control x low PTSD symptom severity group. For both of these groups, z-scores also indicated that data from the PANAS-X Negative Affect subscale were significantly leptokurtic at $p < .01$ and $p < .001$, respectively.

In accordance with Tabachnick and Fidell's (2013) guidelines for dealing with non-normally distributed variables, data from the PDS Total scale, the PTCI Total scale, and the PANAS-X Negative Affect subscale were statistically transformed. As all three data sets were positively skewed, each was transformed using a square root transformation. As can be seen in Table 4, square root transformations resulted in data from the PDS Total scale and PTCI Total scale assuming a more normal distribution in all groups; however, this was not the case with data from the PANAS-X Negative Affect subscale. While square root transformations corrected the positive skewness of the PDS Total scale data and the PTCI Total scale data, these transformations did not affect the outcome of subsequent analyses. As conducting non-parametric tests on the original data produced the same results as conducting parametric tests on the transformed data, it was decided to retain the original results over the transformed ones; this is because transforming data may change the construct under investigation (Grayson, 2004).

Table 3 *Normality Data for Study Variables According to Group*

	Mortality Salience								Control							
	Low PTSD (n = 50)				High PTSD (n = 35)				Low PTSD (n = 39)				High PTSD (n = 34)			
	M	SD	Skew. z-score	Kurt. z-score	M	SD	Skew. z-score	Kurt. z-score	M	SD	Skew. z-score	Kurt. z-score	M	SD	Skew. z-score	Kurt. z-score
PDS Total	7.08	6.83	1.96 ∗	-1.42	35.03	9.04	0.49	-1.60	7.18	5.73	0.85	-1.57	32.50	8.60	1.85	-0.09
PTCI Total	2.32	1.17	2.42 ∗	-0.26	4.73	1.28	-0.43	-0.99	2.41	1.12	1.77	-0.73	4.47	1.21	0.10	-0.81
MSTS Severity	5.91	0.57	0.51	-0.86	5.87	0.75	-0.70	-1.23	5.84	0.55	0.41	-1.45	6.34	0.55	-1.88	-0.43
MSTS Punishment	5.51	0.67	-0.91	-0.61	5.52	0.72	0.20	-1.34	5.47	0.64	0.32	0.25	5.95	0.61	-0.21	-1.13
PANAS-X Negative	15.94	4.50	4.53 ∗	2.21 ∗	25.51	10.91	0.57	-1.67	15.18	6.63	4.56 ∗∗∗	3.10 ∗∗	23.85	10.11	1.05	0.83

Note. Skew. = Skewness; Kurt = Kurtosis; PDS= Posttraumatic Diagnostic Scale; PTCI = Posttraumatic Cognitions Inventory; MSTS = Multidimensional Social Transgression Scale; PANAS-X = Positive and Negative Affect Schedule – Expanded Version.
∗ significant at $p < .05$; ∗∗ significant at $p < .01$; ∗∗∗ significant at $p. < .001$.

3.3.4 Internal consistency. Cronbach's alphas were calculated for the PDS Total scale, the PTCI Total scale, the MSTS Severity Rating subscale, the MSTS Punishment Rating subscale, and the PANAS-X Negative Affect subscale. As can be seen in Table 5, all measures ranged from good (i.e., $\alpha = 0.7 - 0.9$) to excellent (i.e., $\alpha > 0.9$) in terms of their internal reliability.

Table 4

Normality Distribution Data Following Square Root Transformations According to Group

	Mortality Salience				Control Condition			
	Low PTSD (n = 50)		High PTSD (n = 35)		Low PTSD (n = 39)		High PTSD (n = 34)	
	Skew. z-score	Kurt. z-score	Skew. z-score	Kurt. z-score	Skew. z-score	Kurt. z-score	Skew. z-score	Kurt. z-score
PDS Total	-0.25	-1.89	0.11	-1.58	-0.94	-1.38	1.25	-0.41
PTCI Total	1.42	-1.30	-1.11	-0.66	1.03	-1.33	-0.63	-0.57
PANAS-X Negative	3.73 ***	0.92	-0.03	-1.68	3.78 ***	1.73	0.21	-1.22

Note. Skew. = Skewness; Kurt = Kurtosis; PDS= Posttraumatic Diagnostic Scale; PTCI = Posttraumatic Cognitions Inventory; PANAS-X = Positive and Negative Affect Schedule – Expanded Version.
*** significant at p. < .001.

Table 5

Cronbach's Alphas for Study's Scales and Subscales

Scale/Subscale	α
PDS Total	0.96
PTCI Total	0.98
MSTS Severity Rating	0.86
MSTS Punishment Rating	0.86
PANAS-X Negative	0.93

Note. PDS= Posttraumatic Diagnostic Scale; PTCI = Posttraumatic Cognitions Inventory; MSTS Severity = Multidimensional Social Transgression Scale; PANAS-X = Positive and Negative Affect Schedule – Expanded Version.

3.4 Research Hypotheses

3.4.1 Hypothesis 1: Relationship between negative trauma-related appraisals and PTSD symptom severity.

The first research hypothesis predicted that negative trauma-related appraisals would be positively correlated with PTSD symptom severity. As the original data for the PDS Total scale and PTCI Total scale were not found to be normally distributed (see Table 3), a one-tailed Spearman's rank-order correlation was used to test this prediction. In accordance with expectations, negative trauma-related appraisals and PTSD symptom severity were found to be significantly positively correlated, $r_S(158) = .79$, $p < .01$.

3.4.2 Hypothesis 2: Interaction between experimental condition and PTSD symptom severity in determining cultural worldview defence.

The

second research hypothesis predicted that there would be an interaction between experimental condition and PTSD symptom severity such that in the mortality salience condition participants with high PTSD symptom severity would defend their cultural worldview less than those with lower symptoms, while in the control condition the opposite would be the case. To test this hypothesis, two separate two-way between-groups ANOVAs were conducted with data from the MSTS Severity Rating subscale and the MSTS Punishment Rating subscale.

A 2 (mortality salience vs control) x 2 (high PTSD vs low PTSD) ANOVA was conducted with the MSTS Severity Rating subscale as the dependent variable. As a Levene's Test of Equality of Error Variance highlighted that the homogeneity of variance assumption had been violated, $F(1, 151) = 2.92$, $p = 0.04$, it was necessary to set a more stringent significance level (i.e. $p < .01$) for evaluating the results of the ANOVA (Pallant, 2007). The experimental condition x PTSD symptom severity interaction was significant, $F(1, 154) = 7.45$, $p < .001$, $\eta^2 = 0.05$ (see Figure 7). Planned pairwise comparisons demonstrated that, contrary to expectations, in the mortality salience condition participants with high PTSD symptom severity ($M = 5.87$, $SD = 0.75$) did not defend their cultural worldview significantly less than those with lower symptoms ($M = 5.91$, $SD = 0.57$), $t(80) = 0.25$, $p = .80$, $d = 0.06$. Nevertheless, in line with expectations, in the control condition, participants with high PTSD symptom severity ($M = 6.34$, $SD = 0.55$) did defend their cultural worldview significantly more than those with lower symptoms ($M = 5.84$, $SD = 0.55$), $t(71) = 3.87$, $p < .001$, $d = 0.90$.

Figure 7. Interaction between experimental condition and PTSD symptom severity in determining severity ratings for social transgressions.

A 2 (mortality salience vs control) x 2 (high PTSD vs low PTSD) ANOVA was also conducted with the MSTS Punishment Rating subscale as the dependent variable. The experimental condition x PTSD symptom severity interaction was significant, $F(1, 154) = 4.57$, $p = .03$, $\eta^2 = 0.03$ (see Figure 8). Contrary to expectations, planned pairwise comparisons demonstrated that in the mortality salience condition participants with high PTSD symptom severity ($M = 5.51$, $SD = 0.67$) did not defend their cultural worldview significantly less than those with lower symptoms ($M = 5.52$, $SD = 0.72$), $t(80) = 0.62$, $p = .95$, d = 0.01. As predicted, however, in the control condition participants with high PTSD symptom severity ($M = 5.95$, $SD = 0.61$) did defend their cultural worldview significantly more than those with lower symptoms ($M = 5.47$, $SD = 0.64$), $t(70) = 3.20$, $p < .001$, d = 0.78.

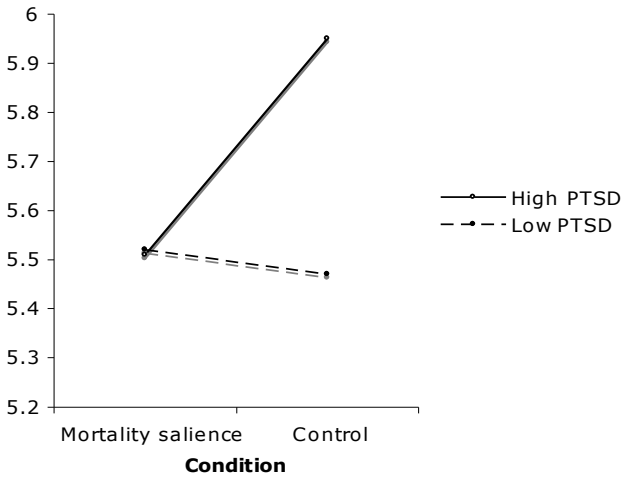

Figure 8. Interaction between experimental condition and PTSD symptom severity in determining punishment ratings for social transgressions.

3.4.3 Hypothesis 3: Role of negative trauma-related appraisals in mediating the relationship between PTSD symptom severity and cultural worldview defence.

The third research hypothesis predicted that within each experimental condition the hypothesised relationship between participants' PTSD symptom severity and cultural worldview defence would be mediated by negative trauma-related appraisals (see Figure 9). In order to test both parts of this hypothesis, it would have been necessary to have found the interaction effect predicted by the study's second research hypothesis. Contrary to expectations, however, cultural worldview defence was only found to differ between participants with high and low PTSD symptom severity in the control condition, and not in the mortality salience condition (see section 3.4.2). As there was insufficient variance in cultural worldview defence between participants with high and low PTSD symptom severity in the mortality salience condition, this variation (or more accurately, lack of variation) could not be accounted for by differences in negative trauma-related appraisals. A mediation analysis was

therefore not conducted on data relating to the mortality salience condition. It was nevertheless still possible to conduct a mediation analysis on data relating to the control condition. Before considering the results of this, however, it useful to examine how the different variables involved in the planned mediation analysis correlated with one another (see Table 6).

Table 6

Means, Standard Deviations, and Spearman's Rank-Order Correlations for PTSD Symptoms, Negative Trauma-Related Appraisals, and Cultural Worldview Defence within the Control Condition

		N	*M*	*SD*	1	2	3	4
1.	PDS Total	73	18.97	14.45	–			
2.	PTCI Total	73	3.37	1.55	.75***	–		
3.	MSTS Severity	73	6.07	0.6	.39***	.19	–	
4.	MSTS Punishment	73	5.69	0.67	.29**	.13	.81***	–

Note. PDS = Posttraumatic Diagnostic Scale; PTCI = Posttraumatic Cognitions Inventory; MSTS = Multidimensional Social Transgression Scale.
** significant at $p < .01$; *** significant at $p < .001$

As can be seen from Table 6, in the control condition there was a significant positive correlation between PTSD symptom severity and negative trauma-related appraisals, $r_S(73) = .75$, $p < .001$. This is what was expected, given the findings relating to the study's first hypothesis (see section 3.4.1). While there was a significant positive correlation between PTSD symptom

severity and cultural worldview defence [$r_S(73) = .39$, $p < .001$; $r_S(73) = .29$, $p = .01$], the relationship between negative trauma-related appraisals and cultural worldview defence was insignificant [$r_S(73) = .19$, $p = .12$; $r_S(73) = .13$, $p = .27$]. Although this implied that it was unlikely that negative trauma-related appraisals would mediate the relationship between PTSD symptom severity and cultural worldview defence, it was still decided to conduct the mediation analysis to explore what the outcome of this would be.

Traditionally, the Sobel test was used to examine the significance of an indirect effect (Baron & Kenny, 1986). A criticism of this approach, however, is that it assumes that the sampling distribution of the indirect effect is normal (Hayes, 2013). As this is not always the case, especially when a sample has less than two hundred participants, it was decided to use Fritz and MacKinnon's (2007) non-parametric bias-corrected bootstrapping method instead. Two bias-corrected bootstrapping mediation analyses (Fritz & MacKinnon, 2007) were therefore conducted using the PROCESS add-on for SPSS (Hayes, 2014). By resampling observations from the data set ten thousand times, this bootstrapping method created an empirically derived sampling distribution of the indirect effect for each mediation model (see Figure 10 and 11). From this distribution, 95% confidence intervals were calculated to determine if the effect was different from zero. If zero did not fall between either end of the confidence intervals, the mediation was considered significant (Fritz & Mackinnon, 2007; Preacher & Hayes, 2004). The results of the mediation analysis are displayed in Table 7.

Table 7

Unstandardised and Standardised Coefficients for Mediation Analyses with Posttraumatic Symptom Severity as the Predictor, Negative Trauma-Related Appraisals as the Mediator, and Cultural Worldview Defence as the Outcome Variable

	B	*SE*	β	*T*	*P*	LLCI	ULCI
MSTS Severity Rating as Outcome Variable							
Path *a*	.167	.017	.753	9.639	> .001	.132	.202
Path *b*	-.333	.228	.180	-1.460	.148	-.788	.121
Path *c*	.116	.031	.514	3.437	> .001	.049	.183
Path *c'*	-.171	.051	.378	3.380	> .001	.070	.273
MSTS Punishment Rating as Outcome Variable							
Path *a*	.166	.017	.753	9.54	> .001	.132	.201
Path *b*	-.340	.264	.112	-1.283	.204	-.868	.188
Path *c*	.094	.039	.362	2.419	.018	.017	.171
Path *c'*	.150	.059	.278	2.567	.0124	.034	.267

Note. LLCI = Lower Limit Confidence Interval; ULCI = Upper Limit Confidence Interval.

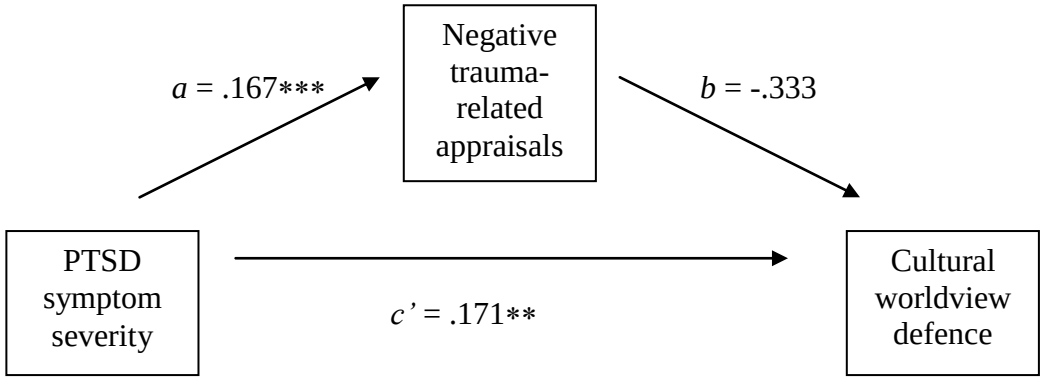

Figure 10. Indirect effect of trauma-related negative appraisals on the relationship between PTSD symptom severity and cultural worldview defence, as measured by the Multidimensional Social Transgression Severity Rating subscale.
** significant at $p < .01$; *** significant at $p < .001$

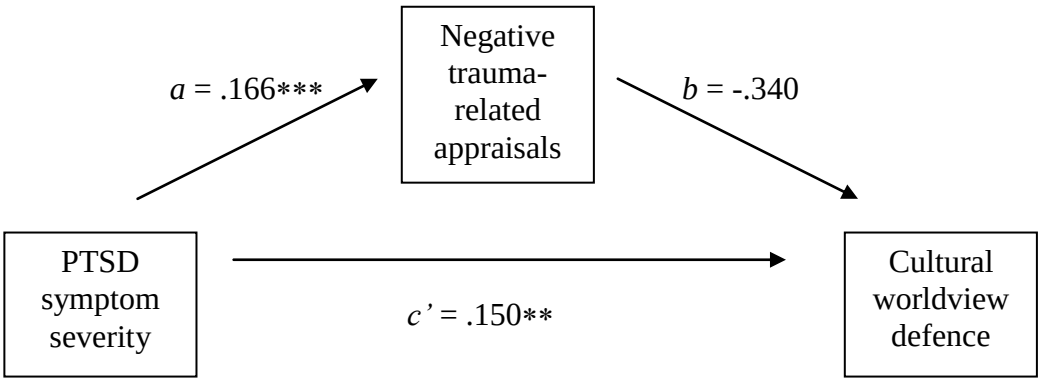

Figure 11. Indirect effect of trauma-related negative appraisals on the relationship between PTSD symptom severity and cultural worldview defence, as measured by the Multidimensional Social Transgression Punishment Rating subscale.
** significant at $p < .01$; *** significant at $p < .001$

Although both the standardised (β) and unstandardised (B) coefficients of the mediation models are reported in Table 7, Hayes (2013) recommends focussing on the unstandardised coefficients when the data are derived from arbitrary Likert scales, as was the case with the measures used in this study. From the unstandardised coefficients listed in Table 7, it is possible to calculate the indirect effects of negative trauma-related appraisals on the relationship between posttraumatic symptom severity and cultural worldview defence (i.e., ab = c - c'). The indirect of effect of negative trauma-related appraisals when cultural worldview defence was measured by the MSTS Severity Rating subscale was -.056, while the 95% bias-corrected confidence intervals around the bootstrapped mean for this indirect effect were LLCI = -.124 and ULCI = 0.015. Similarly, the indirect effect of negative trauma-related appraisals when cultural worldview defence was measured by the MSTS Punishment Rating subscale was

-.057, while the 95% bias-corrected confidence intervals around the bootstrapped mean for this indirect effect were LLCI = -0.142 and ULCI = .013. As zero lies within both of these confidence intervals, the indirect effect of negative trauma-related appraisals was not significant in either mediation model (see Figure 10 and 11).

3.4.4 Hypothesis 4: Negative affect as a function of PTSD symptom severity, and not experimental condition. The fourth research hypothesis predicted that, although participants with high PTSD symptom severity would report higher negative affect relative to those with lower symptoms, this difference in negative affect would be attributable to differences in PTSD symptomatology, and not experimental condition. To test this hypothesis, a two-way between-groups ANOVA was conducted on data relating to the PANAS-X Negative Affect subscale.

As already mentioned, data for the PANAS-X Negative Affect subscale were not normally distributed (see Table 3), including following a square root transformation (see Table 4). As there is no non-parametric alternative for a two-way between-groups ANOVA (Pallant, 2007), it was necessary to proceed with the latter statistical test, despite parametric assumptions having been violated. While the F-statistic is usually robust to violations of normality when group sizes are equal (Wilcox, 2005), group sizes were not equal in this study. It was therefore necessary to set a more stringent significance level (i.e. $p < .01$) for evaluating the results of the ANOVA. Consistent with the study's predictions, a 2 (mortality salience vs control) x 2 (high PTSD vs low PTSD) ANOVA conducted on data from the PANAS-X Negative Affect subscale revealed only a

main effect for PTSD symptom severity, $F(1, 154) = 42.79$, $p = .001$, $\eta^2 = 0.22$, and not for experimental condition, $F(1, 154) = 0.75$, $p = .39$, $\eta^2 = 0.005$. Given the magnitude of the effect size for PTSD symptom severity ($\eta^2 > 0.14$ is considered a large effect size; Cohen, 1988), this suggests that the results of the ANOVA are relatively reliable, despite parametric assumptions having been violated. A planned pairwise comparison also demonstrated that, in line with expectations, participants with high PTSD symptom severity (M = 24.70, SD = 10.48) reported significantly higher negative affect than those with lower symptoms (M = 15.61, SD = 6.87), $t(156) = 6.24$, $p < .001$, d = 1.06.

3.5 Exploratory Analyses

3.5.1 Gender as a potential counfounding variable. As already noted (see section 1.4.2), in the mortality salience condition participants with high PTSD symptom severity did not defend their cultural worldview significantly less than those with lower symptoms. As this result is inconsistent with previous ABDT findings (Abdollahi et al., 2011; Kesebir, et al., 2011; Edmondson, et al., 2011), it is possible that the study's experimental manipulation might have been confounded by certain factors. For example, when describing the participant characteristics of the sample (see section 3.2.1), it was noted that there were statistically significant differences between the study's groups in terms of age, gender, employment status, mental health, and treatment engagement. While participants with high PTSD symptom severity were expected to differ from those with lower symptoms in terms of their employment status, mental health, and treatment engagement (because higher PTSD symptomatology is associated with more functional impairments; see section 1.2.3 and 1.2.4), the variation in

age and gender between groups was unexpected. When unanticipated differences in participant characteristics are found between groups, it suggests that the assignment of participants to different experimental conditions may not have been completely random (Fields, 2009). Although it is not clear why participants with high PTSD symptom severity were older than those with lower symptoms, the higher proportion of males in the mortality salience condition x low PTSD symptom severity group relative to the other groups implies that a self-selection bias relating to gender might have been interfering with the study's randomisation process (see section 4.2.2 for further discussion).

As gender appears to have been related to the study's experimental manipulation, it is not valid to use an analysis of covariance (ANCOVA) to try to control for its possible confounding effects (Miller and Chapman, 2011). This is because the observed relation between gender and experimental manipulation suggests some shared variance between both variables that cannot be controlled for (Fields, 2009). In order to explore whether gender confounded the experimental manipulation in some way, it was therefore decided to remove all males from the entire sample and to reconduct the two-way between-groups ANOVAs relating to the second hypothesis to see what impact this had on the study's findings (see section 3.4.2). If removing males changed the results of the analyses, this would suggest that gender was a confounding variable within the study.

Another 2 (mortality salience vs control) x 2 (high PTSD vs low PTSD) ANOVA was therefore conducted with scores from the MSTS Severity Rating subscale as the dependent variable, but this time with males removed from the

entire sample. As before (see 3.4.2), a Levene's Test of Equality of Error Variance highlighted that the homogeneity of variance assumption had been violated, $F(1, 119) = 3.47$, $p = 0.02$. It was therefore necessary to set a more stringent significance level (i.e. $p < .01$) for evaluating the results of the ANOVA (Pallant, 2007). The experimental condition x PTSD symptom severity interaction was significant, $F(1, 119) = 9.41$, $p < .001$, $\eta^2 = 0.07$ (see Figure 12). Planned pairwise comparisons demonstrated that although participants with high PTSD symptom severity ($M = 5.84$, $SD = 0.76$) in the mortality salience condition defended their cultural worldview less than those with lower symptoms ($M = 6.04$, $SD = 0.53$), this difference was not statistically significant $t(60) = 1.20$, $p = .24$, $d = 0.34$. Nevertheless, in line with expectations, in the control condition participants with high PTSD symptom severity ($M = 6.35$, $SD = 0.53$) did defend their cultural worldview significantly more than those with lower symptoms ($M = 5.88$, $SD = 0.56$), $t(59) = 3.36$, $p < .001$, $d = 0.88$.

Figure 12. Interaction between experimental condition and PTSD symptom severity in determining severity ratings for social transgressions, with males removed from sample.

Another 2 (mortality salience vs control) x 2 (high PTSD vs low PTSD) ANOVA was conducted with scores from the MSTS Punishment Rating subscale as the dependent variable, but this time with males removed from the entire sample. The experimental condition x PTSD symptom severity interaction was significant, $F(1, 119) = 6.82$, $p = .01$, $\eta^2 = 0.06$ (see Figure 13). Once again, planned pairwise comparisons demonstrated that although participants with high PTSD symptom severity ($M = 5.48$, $SD = 0.73$) in the mortality salience condition defended their cultural worldview less than those with lower symptoms ($M = 5.70$, $SD = 0.65$), this difference was not statistically significant, $t(58) = 1.23$, $p = .23$, d = 0.32. As predicted, however, in the control condition participants with high PTSD symptom severity ($M = 5.94$, $SD = 0.62$) did defend their cultural worldview more than those with lower symptoms ($M = 5.52$, $SD = 0.68$), $t(58) = 2.51$, $p = .02$, d = 0.66.

Figure 13. Interaction between experimental condition and PTSD symptom severity in determining punishment ratings for social transgressions, with males removed from sample.

3.5.2 Potential mediating role of negative trauma-related appraisals about the world.

As already noted (see section 3.4.3), negative trauma-related appraisals did not mediate the relationship between posttraumatic symptom severity and cultural worldview defence. One possible reason for this is that the study's third hypothesis may have been stated too coarsely. Indeed, rather than assuming that all negative trauma-related appraisals are related to cultural worldview defence, it is possible that only negative trauma-related appraisals about the *world* play a role in undermining a cultural *worldview*, while negative trauma-related appraisals about *self* play a role in undermining *self-esteem*. To explore this possibility, the relationship between cultural worldview defence and each of the individual subscales of the PTCI was examined to see whether the PTCI Negative Cognitions About the World subscale was more positively correlated with cultural worldview defence than the PTCI Negative Cognitions About Self and PTCI Self-Blame subscales (see Table 8). As with the previous correlation matrix (see Table 6), this exploration was only conducted with data from the control condition. As can be seen from Table 8, none of the three PTCI subscales correlated significantly with the MSTS Severity and Punishment Rating subscales, thus implying that neither trauma-related appraisals about the world nor trauma-related appraisals about self shared a specific relationship with cultural worldview defence.

Table 8

Means, Standard Deviations, and Spearman's Rank-Order Correlations for PTSD Symptoms, Specific Negative Trauma-Related Appraisals, and Cultural Worldview Defence

		N	*M*	*SD*	1	2	3	4	5	6
1.	PDS Total	73	18.97	14.45	–					
2.	PTCI Wolrd	73	4.38	1.74	.68***	–				
3.	PTCI Self	73	3.09	1.70	.76***	.71***	–			
4.	PTCI Self-Blame	73	3.11	1.80	.36***	.49***	.6***	–		
5.	MSTS Severity	73	6.07	0.6	.39***	.15	.21	-.02	–	
6.	MSTS Punishment	73	5.69	0.67	.29**	.18	.13	-.07	.81***	–

Note. PDS = Posttraumatic Diagnostic Scale; PTCI = Posttraumatic Cognitions Inventory; MSTS = Multidimensional Social Transgression Scale.
** significant at $p < .01$; *** significant at $p < .001$

3.6 Summary of Findings

In accordance with the study's first hypothesis, a significant positive correlation between participants' PTSD symptom severity and their negative trauma-related appraisals was found. The study's second hypothesis, however, was only partly supported. Although participants with high PTSD symptom severity in the control condition did defend their cultural worldview significantly more than those with lower symptoms, the opposite was not found in the mortality salience condition, even after controlling for the possible confounding effects of gender. The study's third hypotheses was therefore only tested with

data from the control condition. While PTSD symptom severity was found to be positively correlated with cultural worldview defence, the same was not true for negative trauma-related cognitions. Accordingly, negative trauma-related appraisals were not found to mediate the relationship between PTSD symptom severity and cultural worldview defence. Further exploratory analyses suggested that this would remain the case, regardless of the type of cognition under investigation. Finally, the study's fourth hypothesis was supported by the finding that participants' reported negative affect varied as a function of PTSD symptomatology rather than experimental condition.

4 Discussion

4.1 Overview

This chapter will consider the implications of the study's results in greater detail. After restating the aims of the research, it will discuss the findings relating to the each of the four hypotheses. Following a critical evaluation of the study's methodological strengths and limitations, the chapter will then discuss the theoretical and clinical implications of its findings. The chapter will then conclude with some suggestions for future research relating to ABDT (Pyszczynski & Kesebir, 2011) and other theories of PTSD.

4.2 Aims of the Research

The purpose of the study was to explore a possible theoretical link between ABDT and Ehlers and Clark's (2000) cognitive model of PTSD. As a derivative of TMT (Greenberg, Pyszczynski, & Solomon, 1986), ABDT proposes that PTSD results, in part, from a breakdown in an individual's cultural worldview (see section 1.6.3 and 1.6.4). By imbuing life with meaning, order, and purpose, cultural worldviews typically afford individuals the opportunity to attain a sense of personal significance and worth that functions to assuage their mortality concerns. Trauma, however, has the potential to compromise this death-denying aspect of a cultural worldview because traumatic experiences, by their very nature, involve a direct or indirect confrontation with death (APA, 2013). ABDT therefore proposes that, when an individual's cultural worldview is undermined by the experience of trauma, PTSD arises from overwhelming experiences of death anxiety (Yalom, 1980, 2008). Consistent with this view, several studies have found that following a mortality reminder individuals with

high PTSD symptom severity do not defend their cultural worldview in the same way as those with lower symptoms (Abdollahi et al., 2011; Edmondson et al., 2011; Kesebir, et al., 2011), thus implying that this death-denying aspect of their cultural worldview has been undermined by the experience of trauma (Pyszczynski & Kesebir, 2011).

In contrast to ABDT, Ehlers and Clark (2000) propose that negative appraisals of a trauma and its sequelae contribute to the development of PTSD by producing a current sense of threat that perpetuates the symptoms of the disorder (see section 1.5.4). As negative trauma-related appraisals are considered fundamental to maintaining the condition, Ehlers and Clark (2000) recommend that cognitive therapy for PTSD should focus on targeting these negative appraisals. A number of treatment-based studies have already provided strong evidence for the effectiveness of this intervention (Ehlers, et al., 2005; Karl, et al., 2009; Kleim, et al., 2013).

As Ehlers and Clark's (2000) cognitive model remains the most comprehensive in terms of its implications for treating PTSD (Brewin & Holmes, 2003), the aim of this study was to investigate whether negative trauma-related appraisals play a role in undermining traumatised individuals' cultural worldviews. If negative trauma-related appraisals about self, others, and the world induce or maintain disrupted anxiety-buffer functioning among individuals with PTSD, this would imply that targeting negative trauma-related appraisals in therapy is effective in the treatment of PTSD because it helps traumatised inidividuals to rebuild cultural worldviews that lead to restored anxiety-buffer

functioning. With these aims in mind, the next section will consider the findings relating to each of the study's four hypotheses.

4.3 Research Findings

4.3.1 Hypothesis 1. The study's first hypothesis predicted that PTSD symptom severity would be positively correlated with negative trauma-related appraisals. Consistent with this prediction, a significant positive correlation was found between participants' PTSD symptomatology and their negative appraisals. This finding fits with a substantial body of research on the role of negative appraisals in the development and maintenance of PTSD (Beck et al., 2004; Daie-Gabai, Aderka, Allon-Schindel, Foa, & Gilboa-Schechtman, 2010; Dunmore et al., 1997, 1998, 1999, 2001; Ehlers & Steil, 1995; Ehlers, Mayou, & Bryant, 1998; Emmerik, Schoorl, Emmelkamp, & Kamphuis, 2006; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999; Guelec, Kalafat, Boysan, & Barut, 2012; Mueller et al., 2010; Su & Chen, 2008). Given the strength of the correlation between PTSD symptom severity and negative trauma-related appraisals, this finding also seems to support the cognitive model's emphasis on targeting traumatised individuals' negative appraisals when treating PTSD (Ehlers, et al., 2005; Karl, et al., 2009; Kleim et al., 2013).

What is less immediately clear from the finding is why prolonged exposure therapy, which does not include any cognitive component, is just as effective as cognitive therapy in treating PTSD (Dalgleish, 2004). One possible reason why both therapies are unequivocally effective is because, through increasing a patient's feelings of mastery over their trauma, exposure work may indirectly lead to a reduction in negative trauma-related appraisals about self,

others, and the world (Foa et al., 2004). Thus, although negative appraisals share a strong relationship with PTSD symptom severity, this does not necessarily imply that negative appraisals must be direct targets for intervention in order for treatment to be successful (Dalgleish, 2004).

4.3.2 Hypothesis 2. The study's second hypothesis predicted that there would be an interaction between PTSD symptom severity and experimental condition such that in the mortality salience condition high PTSD symptom severity would decrease cultural worldview defence, while in the control condition it would increase it. Contrary to expectations, this hypothesis was only partly supported. Although participants with high PTSD symptomatology in the control condition defended their cultural worldview significantly more than those with lower symptoms, the converse was not true in the mortality salience condition. That is, participants with high PTSD symptom severity in the mortality salience condition did not defend their cultural worldview significantly less than those with lower symptoms. This latter finding was unexpected as it does not fit the results of previous ABDT studies (Abdollahi et al., 2011; Edmondson et al., 2011; Kesebir, et al., 2011).

As this result contradicts previous findings, it is important to consider possible confounding factors that might have interfered with the study's experimental manipulation. Despite attempts to randomly assign participants to either the mortality salience or control condition (see section 2.5), the study's groups were found to differ in terms of age and gender (see section 3.2.1). More specifically, a significantly higher proportion of males were found to be in the mortality salience x low PTSD symptom severity group relative to other groups.

Furthermore, participants with high PTSD symptom severity were found to be significantly older than those with lower symptoms, independent of experimental condition. As the latter finding was not specific to experimental condition, it does not appear to have arisen from some intrinsic aspect of the design of the study. Indeed, it is possible that more older individuals with high PTSD symptom severity were drawn to the study simply because prevalence rates for PTSD tend to be highest in middle age (Ditlevsen & Elkit, 2010). Nevertheless, as gender appears to have been linked to experimental condition, specifically among individuals with low PTSD symptom severity, this suggests that gender, or some variable relating to gender, may have interfered with the study's randomisation process.

To examine this possibility, an exploratory analysis was conducted in which all males were removed from the entire sample to see whether or not that had an impact on the study's findings relating to the second hypothesis. Although removing males from the entire sample resulted in a trend in which individuals with high PTSD symptom severity in the mortality salience condition defended their cultural worldview less than those with lower symptoms, this difference remained statistically insignificant. Thus, while the emergence of a trend suggests that gender might have been a factor confounding the study's experimental manipulation, it is not clear whether or not this was the only confound. Most TMT and ABDT studies tend to involve testing homogenous samples of university students under highly controlled experimental conditions (Burke et al., 2010). Given that the current study relied on a heterogeneous community sample of trauma survivors who participated in the study online, it is

possible that other confounding factors might have interfered with the experimental manipulation (see section 4.4.2 for further discussion).

Although the first half of the hypothesis was not supported by the study's findings, the second half was. That is, participants with higher PTSD symptom severity in the control condition defended their cultural worldview significantly more than those with lower symptoms. This fits with the results Abdollahi et al. (2011) and Kesebir et al. (2011) who were both initially surprised by their findings. Abdollahi et al. (2011) and Kesebir et al. (2011) nevertheless explained their seemingly anomalous results by suggesting that participants with high PTSD symptom severity had demonstrated a heightened state of psychological defensiveness in the absence of death-related thoughts. As participants with high PTSD symptom severity in the control condition were more judgemental of social transgressors than those with lower symptoms, the current study's results seem to support this conclusion.

Another implication of this finding is that cultural worldviews do not seem to be *totally* shattered by the experience of trauma, as originally suggested by Janoff-Bulman (1989, 1992; see section 1.5.1). Instead, it seems possible that traumatic experiences may only compromise the *death-denying* function of cultural worldviews; that is, the existentially meaningful aspect that enables individuals to feel connected to something greater and longer lasting than their transient selves (Greenberg, Pyszczynski, & Solomon, 1986). Nevertheless, as the current study did not find any significant difference in cultural worldview defence between participants with high and low PTSD symptom severity in the mortality salience condition, this suggestion rests on the results of other ABDT

studies (Abdollahi et al., 2011; Kesebir et al., 2011), and not the current study's findings.

4.3.3 Hypothesis 3. The study's third hypothesis predicted that within each experimental condition the relationship between PTSD symptom severity and cultural worldview defence would be mediated by negative trauma-related appraisals. As there was insufficient variation in cultural worldview defence between participants with high and low PTSD symptom severity in the mortality salience condition, it was only possible to test this third hypothesis with data from the control condition. In this regard, the current study's mediation analyses did not represent a true test of ABDT as the theory is most concerned with data relating to the mortality salience condition. As with most experimental designs, the purpose of the control condition was simply to enable causal inferences to be drawn about findings relating to the experimental condition. Caution must therefore be exercised when interpreting the results relating to the control condition.

Although PTSD symptom severity was found to positively correlate with negative trauma-related appraisals and cultural worldview defence, negative trauma-related appraisals were not found to correlate with the latter. Unsurprisingly, therefore, negative trauma-related appraisals were not found to mediate the relationship between PTSD symptom severity and cultural worldview defence. Further exploratory correlations suggested that this finding would also most likely hold for specific negative trauma-related cognitions about self and the world. Thus, contrary to expectations, negative trauma-related

appraisals did not mediate the relationship between PTSD symptom severity and cultural worldview defence in the control condition.

There are several possible reasons for this finding. Firstly, it may be that the study's third hypothesis was incorrect and that there really is no relationship between negative trauma-related appraisals and cultural worldview defence. Secondly, it may be that the MSTS (Florian & Mikulincer, 1997) was simply too coarse a measure of cultural worldview defence and it was therefore not a measure of cultural worldview defence at all; if this is the case, then no valid inferences can be drawn from the findings. Thirdly, it may be that there was too much statistical noise within the sample for a relationship between negative trauma-related appraisals and cultural worldview defence to be detected. Nevertheless, given that PTSD symptom severity was positively correlated with cultural worldview defence and given that the direct effect of PTSD symptom severity on cultural worldview defence remained significant within both mediation models (see Figure 10 and 11), both the second and third possibilities seem highly unlikely. It therefore seems most probable that the real reason why no relationship between negative trauma-related cognitions and cultural worldview defence was found is because none in fact exists.

It is important to state, however, that this conclusion only applies to data relating to the control condition, and not the mortality salience condition. It is therefore not possible to extrapolate with confidence that the same would necessarily have held true for the findings relating to the mortality salience condition, had the study's experimental manipulation been successful. There are nevertheless theoretical reasons for assuming that negative trauma-related

appraisals might also not have mediated the relationship between PTSD symptom severity and cultural worldview defence in the mortality salience condition.

Originally, it had been proposed that negative trauma-related appraisals may play a role in undermining cultural worldviews because it is conceivable that an individual who thinks negatively about themselves, others, and the world may find it difficult to have *faith* in a meaningful, orderly, and purposeful universe. This hypothesis, however, was based on the false assumption that a logical relationship necessarily exists between an individual's appraisals and their cultural worldview. TMT nevertheless points out that, given its origins in early parent-child relationships, the cultural worldview defence is illogical to the extent that it can only offer *symbolic* protection against death. Thus, as it involves a degree of magical thinking, the cultural worldview defence only operates effectively when thoughts of death are on the periphery of conscious awareness (Pyszczynski, et al., 1999). In contrast, negative trauma-related appraisals appear to exert their greatest influence when accessed on a conscious level. The DRT, for example, proposes that, although C-reps may be poorly elaborated for traumatic events, C-reps still register *conscious* appraisals of a trauma both at the time of its occurrence and afterwards (Brewin & Holmes, 2003). In a related vein, the SMS (Conway, 2005) and the cognitive model (Ehlers & Clark, 2000) both propose that *conscious* appraisals during and after a trauma may lead to distorted interpretations of the actual events of a trauma. Although these negative trauma-related appraisals may be 'irrational' from the point of view of not corresponding directly to objective reality, a key assumption

of cognitive therapy is that they are nevertheless still amenable to change through rational methods involving behavioural experimentation and cognitive restructuring. In direct opposition to this, TMT proposes that because the cultural worldview defence operates on a pre-logical level, it is less open to rational scrutiny. Given that the cultural worldview defence appears to operate on a different level of logic to negative trauma-related appraisals, it is therefore possible that no relationship in fact exists between both variables. However, as the current study's experimental manipulation was unsuccessful, it was not possible to explore the relationship between cultural worldview defence and negative trauma-related appraisals in the mortality salience condition. For the moment, therefore, this point remains purely speculative.

4.3.4 Hypothesis 4. The study's fourth hypothesis predicted that levels of negative affect would differ as a function of PTSD symptomatology, and not experimental condition. Consistent with this hypothesis, participants with high PTSD symptom severity reported significantly higher levels of negative affect than those with lower symptoms, independent of what experimental condition they had been assigned to. This finding fits with the results of previous TMT studies that have investigated the impact of mortality salience inductions on individuals with neurotic symptoms (Goldenberg, Pyszczynski, McCoy, Greenberg, & Sheldon, 1999; Arndt & Sheldon, 2003). This is of relevance as it suggests that participants were not aversely affected by the current study's mortality salience induction, or at least no more affected by it than the dental pain reminder. One possible reason for this is that, although participants were expected to respond to the mortality salience induction in a gut-level and

experiential manner (Simon et al., 1997), the abstract nature of the task meant that it is not as distressing as an actual confrontation with death (Burke et al., 2010).

4.4 Strengths and Limitations of the Research

In his seminal book *Madness Explained*, Richard Bentall (2004) shares with readers his "first law of research" (p.6), which he bases on years of experience conducting experimental studies with patients with schizophrenia: "By the time an experiment has been completed, the researcher will know how it should have been done properly" (p.6). While this study contained several strengths, the conclusions that can be drawn from its findings are limited by a number of methodological issues that, as Bentall's (2004) law points out, only became apparent upon the study's completion. Accordingly, the purpose of this section will be to consider the strengths and limitations of the current study, with a view to highlighting certain methodological issues that need to be taken into account when conducting future research on ABDT.

4.4.1 Design. Although the two-way between-groups design adopted by the current study was in line with most other TMT and ABDT research (Burke et al., 2010), the fact that unanticipated differences in participant characteristics were found between groups suggests that the assignment of participants to different experimental conditions might not have been completely random (Fields, 2009). As this does not generally appear to occur in other TMT and ABDT studies, it suggests a possible flaw in the design of the current study. Although attempts were made to randomly assign participants to the mortality salience and control condition, participants ultimately had a choice to discontinue

participation at any time. This choice was further facilitated by the fact that it was an internet-based study in which participants' anonymity was assured. Social desirability was therefore most likely not a factor influencing participants' decision to continue participation. Given that the questions on death or dental pain might have come as a surprise to participants, most especially as there was no mention of them in the Participant Information Sheet (see Appendix C), it is possible that some participants might have been deterred by these questions, particularly those concerning death, thereby interfering with the randomisation process.

4.4.2 Participants. As already discussed (see section 4.3.2), the study's experimental manipulation seemed to be confounded by gender, and quite possibly also age. That gender might have been a confounding factor came as a surprise as previous TMT research has found that males and females do not generally differ in their response to mortality reminders (Burke et al., 2010). Nevertheless, as a higher proportion of males with low PTSD symptom severity was found in the mortality salience condition, it is possible that some moderating variable relating to gender, such as personal hardiness, might have been responsible for this apparent self-selection bias. Indeed, as personally hardy individuals have been found to be more resilient in their responses to mortality reminders (Florian, Mikulincer, & Hirschberger, 2001), it is conceivable that a higher proportion of males with low PTSD symptom severity ended up in the mortality salience condition because they felt less deterred by the questions on death.

Another possible reason why such gender differences were found in the current study but not other TMT studies (Burke et al., 2010) is that the latter have generally been conducted with relatively homogenous samples under highly controlled experimental conditions. For instance, when Maxfield et al. (2007) found that older adults did not respond to mortality reminders in the same way as young people, they found this to be the case between 17 to 37 year olds and 61 to 84 year olds. Although the current study excluded individuals aged 61 and over from taking part, it assumed that individuals as old as 60 would respond to mortality reminders in the same way as those aged 18. However, as Maxfield et al. (2007) left a gap of 24 years between the younger and older adult groups, this assumption appears unwarranted. An apparent oversight of the current study therefore seems to have been that its inclusion and exclusion criteria were not stringent enough, thereby undermining the study's internal validity. While it was hoped that recruiting a broad sample of trauma survivors might have increased the generalisability of the study's findings, in retrospect, issues concerning internal validity should have been given precedence when deciding on the study's inclusion and exclusion criteria.

4.4.3 Measures and materials. Although the PDS (Foa, 1995) has good psychometric properties (Foa, Cashman, Jaycox, & Perry, 1997), a limitation of using it was that it was not possible to infer that participants who scored highly on it definitely met the diagnostic criteria for PTSD. However, given that a minimum of ninety-four participants was needed to meet the statistical power requirements of the current study, conducting clinical interviews as guided by the

CAPS (Blake et al., 1995) did not seem like a feasible alternative, despite the fact that this would have increased the certainty of participants' PTSD diagnoses.

While the study's design was based on a recently emerging trend to conduct TMT studies online (e.g., Kesebir, 2014), one difference between this research and the current study is that these studies used a much subtler mortality reminder than the one employed in the current study. For example, in her five-part study, Kesebir (2014) primed participants to think about their own mortality by instructing them to search for images of gravestones on the internet. Kesebir (2014) most likely chose this method for reminding individuals of their own mortality because its subtle nature meant that participants would most likely not be deterred by the task and therefore discontinue the study at the point of entry. In retrospect, therefore, it would have been advisable to use a subtler prime than asking participants to respond to questions on the Mortality Attitudes Personality Survey (Rosenblatt, et al., 1989).

4.4.4 Ethical considerations. Despite this oversight, one strength of the current study's internet-based design was that it enabled participants to exit the study at will. Although other TMT and ABDT studies inform participants that they may discontinue participation at any time, it is likely that social desirability factors generally prevent participants from doing so. In this regard, the anonymity afforded by the internet-based design was, at least ethically speaking, a strength.

4.5. Theoretical and Clinical Implications

Given the methodological limitations of the study, caution needs to be exercised when considering the theoretical and clinical implications of the

study's findings. The current study was predominantly interested in exploring whether negative trauma-related appraisals play a role in undermining traumatised individuals' cultural worldviews. Had negative trauma-related appraisals been found to mediate the relationship between participants' PTSD symptom severity and cultural worldview defence in the mortality salience condition, this would have suggested that targeting negative appraisals may be effective in treating PTSD because it facilitates individuals to rebuild cultural worldviews that lead to restored anxiety-buffer functioning. Unfortunately, as the current study's experimental manipulation was unsuccessful, it was only possible to explore the relationship between participants' cultural worldviews and their negative trauma-related appraisals in the control condition. As this does not provide a true test of ABDT (as the theory is most concerned with data relating to the mortality salience condition), caution must be exercised when extrapolating what meaning the current study's findings might have for ABDT. It is nevertheless still possible to *speculate* what their theoretical and clinical implications might be.

As already discussed (see section 4.3.3), no relationship between participants' cultural worldview defence and their negative trauma-related appraisals was found in the control condition. While it is not certain whether or not the same would have held true in the mortality salience condition, there are theoretical reasons for assuming why this might have been the case. Originally, it had been assumed that negative trauma-related appraisals most likely share a logical relationship with cultural worldviews. As already pointed out, however, TMT proposes that cultural worldview defences are irrational to the extent that

they share no logical connection to the actual problem of death. Given their illogical nature, cultural worldview defences only operate effectively when thoughts of death are on the periphery of conscious awareness (Pyszczynski, et al., 1999). Although negative trauma-related appraisals may also be 'irrational' to the extent that they do not necessarily correlate with objective reality, they are nevertheless governed by reasoning processes that are conscious and therefore open to rational scrutiny. Indeed, this appears to be one of the fundamental assumptions underlying the use of behavioural experiments and cognitive restructuring techniques in cognitive treatments for PTSD (Ehlers & Clark, 2000). As cultural worldview defences and negative trauma-related appraisals therefore appear to operate according to different levels of logic, it is possible that no relationship between participants' cultural worldview defence and negative trauma-related appraisals was found in the control condition because none in fact exists. Nevertheless, as it was not possible to conduct mediation analyses on data relating to the mortality salience, at present, this point remains purely speculative.

In assuming that this finding would have held true for data relating to the mortality salience condition (had the experimental manipulation been successful), it is possible that, theoretically speaking, negative trauma-related appraisals may be more closely related to *proximal defences*. As proximal defences operate when thoughts of death are in the focal point of attention, like negative trauma-related appraisals, they function on a more conscious and rational level. For example, after a doctor informs a patient that they risk an early death if they do not change their lifestyle, the patient may *consciously* vow to

start eating healthier and to engage in exercise more regularly. To the extent that this change in lifestyle actually increases the probability of the patient living longer, it is *logically* connected to the actual problem of death. In the same way, when an individual with PTSD starts avoiding stimuli that remind them of their trauma, the individual can be said to be acting *rationally* to the extent that they *think* it is protecting them from potential harm. Putting these examples together, it is therefore conceivable that the negative trauma-related appraisals and the maladaptive coping strategies that Ehlers and Clark (2000) propose to be maintaining PTSD may in fact represent ineffective proximal defences that have been undermined by the experience of trauma. Of course, if negative trauma-related appraisals share more in common with proximal defences than distal defences, this does not rule out the possibility of a patient's cultural worldview, self-esteem, and relationships (i.e., their distal defences) still being legitimate targets for intervention in therapy. After all, despite the impressive findings concerning prolonged exposure therapy and cognitive therapy's effectiveness in treating PTSD, the fact remains that these treatments are still ineffective in up to 30% of cases (Dalgleish, 2004). In cases where traditional techniques for treating PTSD are unsuccessful, it is possible that facilitating patients to rebuild their cultural worldviews, self-esteem, and relationships may offer an alternative means of helping patients' deal with their distress. Through what means this can be best achieved, however, remains a question for future research to explore.

4.6 Future Research

In light of the current study's methodological limitations, the conclusions that can be drawn from the study's findings remain tentative at best. To clarify

the exact relationship between negative trauma-related appraisals and cultural worldview defences, it is advisable that future studies exercise more caution in their experimental design, placing greater emphasis on issues concerning internal validity over matters relating to external validity. As in the case of Abdollahi et al. (2011) and Chatard et al. (2012), it is recommended that future studies focus on a relatively homogenous sample of trauma survivors. Ideally, this means that participants should be within a similar age group and possibly of the same gender (e.g. Kesebir, et al., 2011). If possible, it would also be preferable if participants have experienced the exact same type of trauma to reduce potential statistical noise within the sample. Future studies may also wish to consider using alternate measures of cultural worldview defence that are perhaps more specific to the culture or subculture under investigation.

It would also be interesting to investigate whether certain types of trauma are more prone to lead to anxiety-buffer disruption than others (Breslau, et al., 1998; Schnurr, et al., 2004). Based on ABDT, traumas that involve a direct confrontation with death should be more likely to lead to PTSD than those that involve an indirect threat to one's personal survival. The direct or indirect confrontation with death implied in a trauma, however, need not be the only area of interest for future ABDT studies. Indeed, as PTSD is often accompanied by strong affective reactions, such as anger, guilt, or shame (Andrews et al., 2000), it is possible that trauma may also lead to disrupted anxiety-buffer functioning by violating norms, values, or beliefs that are central to an individual's cultural worldview. As this is something that is already suggested by most other theories of PTSD (e.g. Brewin, et al., 1996; Conway, 2005; Dalgleish, 2004; Ehlers and

Clark, 2000;), it would be interesting to explore further possible theoretical links between ABDT and these other models.

As ABDT acknowledges points of overlap between itself and schema-based theories of PTSD (e.g. Horowitz, 1976, 1986, 1997; Janoff-Bulman, 1989, 1992), there are already theoretical grounds for assuming possible links between ABDT and the SPAARS model (Dalgleish, 2004). According to the SPAARS model, individuals with overvalued or negative schemas are more likely to experience severe posttraumatic stress reactions than individuals with balanced schemas (see section 1.5.5). One possible reason for this is that these differences in schematic representation may be associated with different levels of anxiety-buffer functioning. Indeed, as schemas and distal defences both originate in early-parent child attachments, it is possible that they may be intrinsically linked in some way. In what way, however, remains a matter for future research to investigate.

There may also be theoretical grounds for assuming that ABDT shares links with models such as DRT (Brewin et al., 1996; Brewin et al., 2010) and the SMS (Conway, 2005), both of which view a disturbance in autobiographical memory as central to the aetiology of PTSD (Brewin, 2011). Indeed, as the *life story* is considered to be the most abstract level of autobiographical memory (Conway, 2005; Pillemer, 2001; see section 1.5.3), it is conceivable that one reason why individuals with PTSD may struggle to integrate their traumatic experience into their autobiographical memory is because the confrontation with death implied in their trauma (Abdollahi et al., 2011; see section 1.6.4) is too

incongruent with their actual *lived* experience. At present, however, this idea remains purely speculative and is therefore in need of further investigation.

Finally, it would be interesting for future research to explore further possible theoretical links between ABDT and the cognitive model (Ehlers & Clark, 2000). Although the findings of the current study suggest that it is unlikely that negative trauma-related appraisals and cultural worldviews are related to each other, this does not rule out the possibility that negative trauma-related appraisals and their accompanying maladaptive coping strategies may be linked to proximal defences, especially since both appear to operate on a conscious and rational level. What the exact nature of this relationship might be, however, remains a matter for future research to clarify.

4.7 Conclusion

The current study aimed to investigate whether negative trauma-related appraisals play a role in undermining traumatised individuals' cultural worldviews, thereby leaving them more vulnerable to experiencing death anxiety (Yalom, 1980, 2008). Unfortunately, due to the study's experimental manipulation not being successful in the mortality salience condition, it was not possible to determine with certainty whether or not this is in fact the case. The results from the control condition nevertheless suggest that it is unlikely that negative trauma-related appraisals and cultural worldview defences are related to one another. One possible reason for this is that cultural worldview defences operate on a pre-logical level, while negative trauma-related appraisals are more conscious and rational in their orientation. If correct, this raises the intriguing possibility that negative trauma-related appraisals and their accompanying

maladaptive coping strategies may be more closely related to proximal defences.

This, however, remains a matter for future research to explore.

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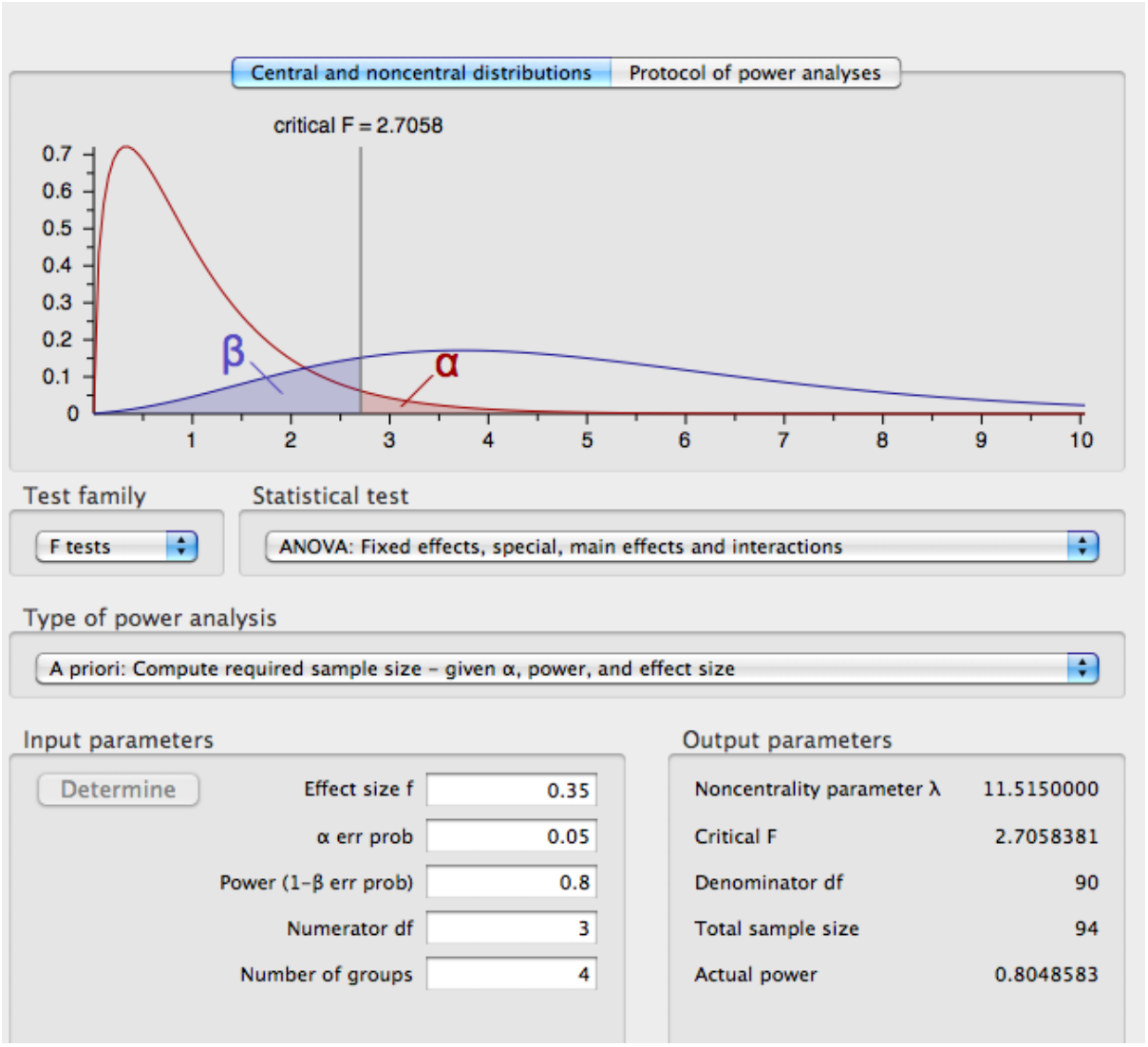
6 Appendices

Appendix A: G-Power Screen Shot for 2 x 2 ANOVA



Appendix B1: Online Advertisement to Recruit Participants

Investigating the impact of trauma on people's worldviews

Would you like to participate in research exploring how trauma influences our worldviews?

I am looking for male and female adults (aged between 18 and 60) who have experienced a trauma (e.g., road traffic accident, assault, natural disaster, life-threatening illness, etc.).

Volunteering will take between 35 to 50 minutes. It will involve reading some short stories online and answering some questions on trauma and other related topics.

Participants will be entered into a prize draw for the opportunity to win one of five £20 Amazon.co.uk vouchers!

If you are interested in participating in the study and would like some more information on it, then please follow this link: www.surveymonkey.com/XXX

Should you have any questions about any of the above, please do not hesitate to contact me at A.Bolster@uea.ac.uk

I look forward to hearing from you soon,

André Bolster
Trainee Clinical Psychologist
Doctoral Programme in Clinical Psychology
Norwich Medical School
University of East Anglia,
Norwich,
NR4 7TJ

Appendix B2: Poster to Recruit Participants

Investigating the impact of trauma on people's worldviews

Would you like to participate in research exploring how trauma influences our worldviews?

I am looking for male and female adults (aged between 18 and 60) who have experienced a trauma (e.g., road traffic accident, assault, natural disaster, life-threatening illness, etc.).

Volunteering will take between 35 to 50 minutes. It will involve reading some short stories online and answering some questions on trauma and other related topics.

Participants will be entered into a prize draw for the opportunity to win one of five £20 Amazon.co.uk vouchers!

If you are interested in participating in the study and would like some more information on it, then please follow this link: www.surveymonkey.com/XXX

Should you have any questions about any of the above, please do not hesitate to contact me at A.Bolster@uea.ac.uk

I look forward to hearing from you soon,

André Bolster
Trainee Clinical Psychologist
Doctoral Programme in Clinical Psychology, Norwich Medical School,
University of East Anglia, Norwich, NR4 7TJ

Appendix B3: Flier to Recruit Participants

Investigating the impact of trauma on people's worldviews

Would you like to participate in research exploring how trauma influences our worldviews?

I am looking for male and female adults (aged between 18 and 60) who have experienced a trauma (e.g., road traffic accident, assault, natural disaster, life-threatening illness, etc.).

Volunteering for the study will take between 35 to 50 minutes. It will involve reading some short stories online and answering some questions on trauma and other related topics.

Participants will be entered into a prize draw for the opportunity to win one of five £20 Amazon.co.uk vouchers!

If you are interested in participating in the study and would like some more information on it, then please follow this link: www.surveymonkey.com/XXX

Should you have any questions about any of the above, please do not hesitate to contact me at A.Bolster@uea.ac.uk

Appendix C: Participant Information Sheet

Research study investigating the impact of trauma on people's worldviews

My name is André Bolster. I am a Trainee Clinical Psychologist at the University of East Anglia (UEA). I would like to invite you to take part in a study, which is part of my Doctorate in Clinical Psychology. Before you decide whether or not you would like to participate in the research, I would like to explain why it is being carried out and what participation in it would involve. Please read the following information carefully before deciding whether or not you would like to take part in the study.

1. What is the purpose of the research?

The purpose of the study is to investigate the influence of trauma on people's worldviews. Broadly speaking, a worldview refers to a set of norms, values, and beliefs that a person relies on to help them make sense of the world. The study will thus aim to explore how these aspects of a person's outlook may change in response to a traumatic experience.

2. Who is being invited to take part?

I am looking for male and female adults, aged between 18 and 60 years, who have experienced a trauma (e.g., assault, life-threatening illness, road traffic accident, natural disaster etc.). *This means that if you are either under 18 or over 60 years of age and you have not experienced a trauma, then you are not eligible to participate in the research.*

3. Do I have to take part?

No, your participation is completely voluntary. After you have read this information sheet, you will be asked whether or not you give your consent to participate in the research.

4. What will happen if I take part?

If you agree to take part in the study, you will be asked to press the 'proceed to study' button to show that you consent to take part in the research. Following this, you will be taken to an online survey that should take between 35 and 50 minutes to complete. Please note that some questions may be distressing to answer as they ask you to think about trauma and other related topics. Please also note that halfway through the study, you will be offered the opportunity to save your data and take a break, should you wish to do so. It will then be possible for you to complete the remainder of the study within 24 hours of saving your data.

5. Can I stop taking part if I change my mind?

Should you decide to take part in the study and you become too distressed to answer any of the questions, you have the right to end your participation at any time. If you choose to withdraw from the research, you do not have to provide a reason why and there will be no consequence to you taking this action. Any answers that you have given will also be automatically deleted from the study's final data set.

6. Will my taking part in this study be anonymous and kept confidential?
All of the collected data for the study will be treated as anonymous and confidential. This means that you will not be asked to give your name or address when completing the online survey. If you choose to submit your email address at the end of the study to enter the prize draw for one of five £20 Amazon.co.uk vouchers or to receive a copy of the research findings, this contact detail will be stored separately from your survey responses, and so there will be no way of linking the two. As soon as the winners for the prize draw have been selected and the results of the study shared, all email addresses will be deleted. Meanwhile, all data relating to the actual study itself will be saved on an encrypted memory stick, which will be stored in a locked archive room at UEA for 5 years, after which its contents will be deleted.

7. What will happen to the results?
The information collected will be reported in a doctoral thesis, which will possibly be edited for publication in an academic journal. You will not be identified in any of these writings.

8. What are the possible disadvantages or risks of taking part?
The research does include some questions about trauma and other related topics. It is therefore possible that you may feel some distress while completing the survey. If you do feel distressed during the study, you can withdraw from it at any time without having to give a reason why. Should you continue to feel distressed after participating in the research, you may wish to consider contacting one of the organisations listed on the Important Information Sheet for further support.

9. What are the possible benefits of taking part?
Although there are no direct benefits for you taking part in the study, its results will hopefully add to our understanding of trauma and thus be used to inform treatments that aim to help people recover from traumatic experiences.

10. Complaints
If you have any complaints about the study, you should contact Prof Ken Laidlaw, Programme Director of ClinPsyD Doctoral Programme in Clinical Psychology. Email: K.Laidlaw@uea.ac.uk

11. Who has reviewed the study?
The UEA Faculty of Medicine and Health Sciences Research Ethics Committee have reviewed and approved the study.

12. Further information and contact details
If you have any other queries about the study, then please contact me or my supervisor using the contact details below:

André Bolster (Trainee Clinical Psychologist), Norwich Medical School, University of East Anglia, Norwich, NR4 7TJ. E-mail: A.Bolster@uea.ac.uk

Dr. Laura Jobson (Research Supervisor and Clinical Lecturer in Clinical Psychology), Norwich, Medical School, University of East Anglia, Norwich, NR4 7TJ. E-mail: L.Jobson@uea.ac.uk

Appendix D: Consent Form

Please tick as appropriate if you agree with each of the following statements:

- I confirm that I have read and understood the information on the Participant Information Sheet.
- I understand who will have access to my results.
- I understand that I do not have to take part in the study and that I can change my mind at any time.
- I agree to take part in the study.

By clicking on the 'proceed to study' button, you are showing that you give your consent to participate in the research.

PROCEED TO STUDY

Appendix E: Demographic Information Sheet

Age: _____ years

Gender: Male Female

Ethnicity: White British Asian British Black British

Other

If other, please specify: _____

Religion: Christianity Islam Hinduism

Sikhism Judaism Buddhism

Agnosticism Atheism Other

If other, please specify: _____

Highest level of education:

Primary School Secondary School College/Vocational College

Undergraduate Degree Masters Degree PhD/Doctoral Degree

Other

If other, please specify: _____

Employment status: Employed Unemployed

In Education/Training Other

If other, please specify:_____

Marital Status: Single Married Co-habiting Separated

Divorced Widowed Other

If other, please specify: _____

Are you <u>currently</u> experiencing any of the following?

Major Depressive Disorder Anxiety Disorder

Posttraumatic Stress Disorder Other Mental Heath Issue

If other, please specify: _____

If you are currently experiencing a mental health issue, are you receiving any treatment for it?

Yes No

Appendix F1: Mortality Prime

1. Please give your gut-level responses to the following:

a) Briefly describe the emotions that the thought of your own death arouses in you.

_____

_____

_____

_____

_____

_____

_____

_____

b) Jot down, as specifically as you can, what you think will happen to <u>you</u> as you physically die and once you are physically dead.

_____

_____

_____

_____

_____

_____

_____

_____

Appendix F2: Dental Pain Prime

1. Please give your gut-level responses to the following:

a) Briefly describe the emotions that the thought of dental pain arouses in you.

_____

_____

_____

_____

_____

_____

_____

_____

b) Jot down, as specifically as you can, what you think would happen to <u>you</u> if you were experiencing dental pain.

_____

_____

_____

_____

_____

_____

_____

_____

Appendix G: Positive and Negative Affect Schedule – Expanded Version (PANAS-X)

2. Below are a number of words that describe different feelings. On a scale from 1 to 5, indicate to what extent you feel each emotion right <u>now</u>.

1	Very slightly or not at all
2	A little
3	Moderately
4	Quite a bit
5	Extremely

(1)	Cheerful	1	2	3	4	5
(2)	Disgusted	1	2	3	4	5
(3)	Attentive	1	2	3	4	5
(4)	Bashful	1	2	3	4	5
(5)	Sluggish	1	2	3	4	5
(6)	Daring	1	2	3	4	5
(7)	Surprised	1	2	3	4	5
(8)	Strong	1	2	3	4	5
(9)	Scornful	1	2	3	4	5
(10)	Relaxed	1	2	3	4	5
(11)	Irritable	1	2	3	4	5
(12)	Delighted	1	2	3	4	5
(13)	Inspired	1	2	3	4	5
(14)	Fearless	1	2	3	4	5
(15)	Disgusted with Self	1	2	3	4	5
(16)	Sad	1	2	3	4	5
(17)	Calm	1	2	3	4	5
(18)	Afraid	1	2	3	4	5

(19)	Tired	1	2	3	4	5
(20)	Amazed	1	2	3	4	5
(21)	Shaky	1	2	3	4	5
(22)	Happy	1	2	3	4	5
(23)	Timid	1	2	3	4	5
(24)	Alone	1	2	3	4	5
(25)	Alert	1	2	3	4	5
(26)	Upset	1	2	3	4	5
(27)	Angry	1	2	3	4	5
(28)	Bold	1	2	3	4	5
(29)	Blue	1	2	3	4	5
(30)	Shy	1	2	3	4	5
(31)	Active	1	2	3	4	5
(32)	Guilty	1	2	3	4	5
(33)	Joyful	1	2	3	4	5
(34)	Nervous	1	2	3	4	5
(35)	Lonely	1	2	3	4	5
(36)	Sleepy	1	2	3	4	5
(37)	Excited	1	2	3	4	5
(38)	Hostile	1	2	3	4	5
(39)	Proud	1	2	3	4	5
(40)	Jittery	1	2	3	4	5
(41)	Lively	1	2	3	4	5
(42)	Ashamed	1	2	3	4	5

(43)	At Ease	1	2	3	4	5
(44)	Scared	1	2	3	4	5
(45)	Drowsy	1	2	3	4	5
(46)	Angry at Self	1	2	3	4	5
(47)	Enthusiastic	1	2	3	4	5
(48)	Downhearted	1	2	3	4	5
(49)	Sheepish	1	2	3	4	5
(50)	Distressed	1	2	3	4	5
(51)	Blameworthy	1	2	3	4	5
(52)	Determined	1	2	3	4	5
(53)	Frightened	1	2	3	4	5
(54)	Astonished	1	2	3	4	5
(55)	Interested	1	2	3	4	5
(56)	Loathing	1	2	3	4	5
(57)	Confident	1	2	3	4	5
(58)	Energetic	1	2	3	4	5
(59)	Concentrating	1	2	3	4	5
(60)	Dissatisfied with Self	1	2	3	4	5

Appendix H: Multidimensional Social Transgression Scale – Shortened Version (MSTS)

4. Read each vignette and give your response to the questions that follow:

a) The head executive of a scholarship fund for low-income students fled overseas with the grant money. “He ran away with our future,” said a representative of the students. “We have nothing. How are we supposed to stay in school? Our education was supposed to get us out of our situations but now our dreams are pushed far away, maybe forever.”

i) How severe was this wrongdoing?

1	2	3	4	5	6	7
Not at all severe						Very severe

ii) How heavily should this person be punished?

1	2	3	4	5	6	7
Very light punishment						Very heavy punishment

b) A doctor mixed up the records of two patients with the same last name and amputated the leg of the wrong patient. "It's impossible to believe," said the patient as she stared in disbelief at the empty space on her bed where her left leg was supposed to be. "I came in for a simple knee operation and woke up without a leg."

i) How severe was this wrongdoing?

1	2	3	4	5	6	7
Not at all severe						Very severe

ii) How heavily should this person be punished?

1	2	3	4	5	6	7
Very light punishment						Very heavy punishment

c) A frustrated burglar destroyed the life masterpiece of a renowned sculptor, one week before the sculpture's completion and public unveiling. The burglar, who was disappointed by the small amount of money he was able to find during the robbery, tied up the sculptor and forced him to watch as he smashed the ceramic sculpture with a sledge hammer. The stunned sculptor could not believe what had happened: "Nineteen years of work, the best of my talent, turned into a pile of rubble."

i) How severe was this wrongdoing?

1	2	3	4	5	6	7
Not at all severe						Very severe

ii) How heavily should this person be punished?

1	2	3	4	5	6	7
Very light punishment						Very heavy punishment

d) "The senior doctor's decision to cut the young woman's womb unnecessarily was based on his arrogance and use of only partial information." Such was the judge's conclusion at the end of the doctor's trial. Leaving the courtroom, the young woman said, "I'll never be a complete person again. I have three children and did not intend to have more, but sitll a major part of my identity is lost forever. Is there anything that can compensate for this?"

i) How severe was this wrongdoing?

1	2	3	4	5	6	7
Not at all severe						Very severe

ii) How heavily should this person be punished?

1	2	3	4	5	6	7
Very light punishment						Very heavy punishment

e) The owner of a cement factory was sued for the youth's loss of sight. His promise made 15 years ago to install new filters on his smokestacks wasn't fulfilled because of economic reasons. The youth, who lived his whole life neighboring the factory, said: “Their greed cost me my health; any financial compensation, no matter how large – I will never recover from this loss.”

i) How severe was this wrongdoing?

1	2	3	4	5	6	7
Not at all severe						Very severe

ii) How heavily should this person be punished?

1	2	3	4	5	6	7
Very light punishment						Very heavy punishment

f) The vehicle hit me, but my son is the victim,” said the teacher who was hit in front of his son’s eyes while a young driver drove through the residential area at a speed of 100 mph. “Half a year after the accident, I have totally recovered, yet he is still afraid of the sound of a car. He can’t travel in a moving vehicle. He walks to and from school, which is two miles from our house, trying to avoid all roads. The boy who was happy and carefree has turned anxious and paranoid.”

i) How severe was this wrongdoing?

1	2	3	4	5	6	7
Not at all severe						Very severe

ii) How heavily should this person be punished?

1	2	3	4	5	6	7
Very light punishment						Very heavy punishment

g) A false identification of the AIDS virus in the body of a young man caused him social isolation. “My girlfriend and my close friends all became afraid and left me. Even my peers in my dance club, which was the focus of my social life, rejected me from the group. I became dangerous to society. Even now, when the mistake is clear, people are still nervous, not willing to take risks, and I blame no one but the doctor who was too busy to take a second look at the test results.”

i) How severe was this wrongdoing?

1	2	3	4	5	6	7
Not at all severe						Very severe

ii) How heavily should this person be punished?

1	2	3	4	5	6	7
Very light punishment						Very heavy punishment

h) “The mother’s wounds will heal, but her daughter’s wounded soul will forever remain,” according to the psychologist who treated the girl upon hearing of the capture of the driver of the vehicle who hit the mother and escaped. The daughter, age five, who was orphaned from her father when she was one year old, was separated from her mother due to her mother’s hospitalisation for over a year.

i) How severe was this wrongdoing?

1	2	3	4	5	6	7
Not at all severe						Very severe

ii) How heavily should this person be punished?

1	2	3	4	5	6	7
Very light punishment						Very heavy punishment

i) "I've been excommunicated forever," said the youth, who was incriminated by the police investigator as an accomplice to a terror organisation. The investigator brought evidence in a systematic way, which led to the conviction of the youth as revenge after a continuous neighbours' quarrel. "Three years I sat in jail for no wrongdoing on my part, and even now that his lie has come out, I am still guilty; they still see me as a traitor, and none of my friends is willing to be seen with me… nothing can turn the clock back."

i) How severe was this wrongdoing?

1	2	3	4	5	6	7
Not at all severe						Very severe

ii) How heavily should this person be punished?

1	2	3	4	5	6	7
Very light punishment						Very heavy punishment

j) The boy's social life was destroyed by the accident caused by the drunken driver who veered toward the side-walk and hit the boy. The child said, "For a year, I had to rest in hospital and at home. My body gradually recovered, but I was forgotten by my friends, who went on with their lives. I don't have any way to go back to the way things were – they all went to a different secondary school, and I was left back a grade and have to start again. I don't belong to the old cliques or the new ones. I simply don't belong."

i) How severe was this wrongdoing?

1	2	3	4	5	6	7
Not at all severe						Very severe

ii) How heavily should this person be punished?

1	2	3	4	5	6	7
Very light punishment						Very heavy punishment

Appendix I: Posttraumatic Diagnostic Scale (PDS)

5) Follow the instructions below:

Part A

Many people have lived through or witnessed a very stressful and traumatic event at some point in their lives. Below is a list of traumatic events. Put a tick in the box next to ALL of the events that have happened to you or that you have witnessed.

(1) □ Serious accident, fire, or explosion (for example, an industrial, farm, car, plane, or boating accident)

(2) □ Natural disaster (for example, cyclone, flood, tornado, hurricane, flood, or major earthquake)

(3) □ Non-sexual assault by a family member or someone you know (for example, being mugged, physically attacked, shot, stabbed, or held at gunpoint)

(4) □ Non-sexual assault by a stranger (for example, being mugged, physically attacked, shot, stabbed, or held at gunpoint)

(5) □ Sexual assault by a family member or someone you know (for example, rape or attempted rape)

(6) □ Sexual assault by a stranger (for example, rape or attempted rape)

(7) □ Military combat or war zone

(8) □ Sexual contact when you were younger than 18 with someone who was 5 or more years older than you (for example, contact with genitals, breasts)

(9) □ Imprisonment (for example, prison inmate, prisoner of war, hostage)

(10) □ Torture

(11) □ Life threatening illness

(12) □ Other traumatic event

(13) If you marked item 12, specify the traumatic event below.

_____

_____

Part B

(14) If you marked more than one traumatic event in Part 1, put a tick in the box below next to the event *that bothers you the most*. If you only marked one traumatic event in Part 1, mark the same one below.

□ Accident

□ Disaster

□ Non-sexual assault by a family member or someone you know

□ Non-sexual assault by a stranger

□ Sexual assault by a family member or someone you know

□ Sexual assault by a stranger

□ Combat

□ Sexual contact when you were younger than 18 with someone who was 5 or more years older

□ Imprisonment

□ Torture

□ Life threatening illness

□ Other

In the lines below, briefly describe the traumatic event you marked above.

_____

_____

_____

_____

_____

_____

_____

Below are several questions about the traumatic event you just described above.

(15) How long ago did the traumatic event happen? (circle ONE)

1 Less than 1 month
2 1 to 3 months
3 3 to 6 months
4 6 months to 3 years
5 3 to 5 years
6 More than 5 years

For the following questions, circle Yes or No.

During this traumatic event:

(16) Were you physically injured?	YES	NO
(17) Was someone else physically injured?	YES	NO
(18) Did you think your life was in danger?	YES	NO
(19) Did you think someone else's life was in danger?	YES	NO
(20) Did you feel helpless?	YES	NO
(21) Did you feel terrified?	YES	NO

Part C

Below is a list of problems that people sometimes have after experiencing a traumatic event. Read each one carefully and circle the number (0-3) that best describes how often that problem has bothered you IN THE PAST MONTH. Rate each problem with respect to the traumatic event you described in Item 14.

0 Not at all or only one time
1 Once a week or less/once in a while
2 2 to 4 times a week/half the time
3 5 or more times a week/almost always

(22)	Having upsetting thoughts or images about the traumatic event that came into your head when you didn't want them to	0	1	2	3
(23)	Having bad dreams or nightmares about the traumatic event	0	1	2	3

(24)	Reliving the traumatic event, acting or feeling as if it was happening again	0	1	2	3
(25)	Feeling emotionally upset when you were reminded of the traumatic event (for example, feeling scared, angry, sad, guilty, etc.)	0	1	2	3
(26)	Experiencing physical reactions when you were reminded of the traumatic event (for example, breaking out in a sweat, heart beating fast)	0	1	2	3
(27)	Trying not to think about, talk about, or have feelings about the traumatic event	0	1	2	3
(28)	Trying to avoid activities, people, or places that remind you of the traumatic event	0	1	2	3
(29)	Not being able to remember an important part of the traumatic event	0	1	2	3
(30)	Having much less interest or participating much less often in important activities	0	1	2	3
(31)	Feeling distant or cut off from people around you	0	1	2	3
(32)	Feeling emotionally numb (for example, being unable to cry or unable to have loving feelings)	0	1	2	3
(33)	Feeling as if your future plans or hopes will not come true(for example, you will not have a career, marriage, children, or a long life)	0	1	2	3
(34)	Having trouble falling or staying asleep	0	1	2	3
(35)	Feeling irritable or having fits of anger	0	1	2	3
(36)	Having trouble concentrating (for example, drifting in and out of conversation, losing track of a story on television, forgetting what you read)	0	1	2	3
(37)	Being overly alert (for example, checking to see who is around you, being uncomfortable with your back to the door, etc.)	0	1	2	3
(38)	Being jumpy or easily startled (for example, when someone walks up behind you)	0	1	2	3

(39) How long have you been experiencing the problems that you reported above? (circle ONE)

1 Less than 1 month
2 1 to 3 months
3 More than 3 months

(40) How long after the traumatic event did these problems begin? circle ONE)

1 Less than 6 months
2 6 or more months

Part D

Indicate below if the problems you rate in Part 3 have interfered with any of the following areas in your life DURING THE PAST MONTH. Circle YES or NO.

(41) Work	YES	NO
(42) Household chores and duties	YES	NO
(43) Relationships with friends	YES	NO
(44) Fun and leisure activities	YES	NO
(45) Schoolwork	YES	NO
(46) Relationships with your family	YES	NO
(47) Sex life	YES	NO
(48) General satisfaction with life	YES	NO
(49) Overall level of functioning in all areas of your life	YES	NO

Appendix J: Posttraumatic Cognitions Inventory (PTCI)

6. Below is a list of thoughts people sometimes have after a stressful life event. Please read each item carefully and indicate how much you AGREE or DISAGREE with each statement with respect to the traumatic event you described above.

1 Totally disagree
2 Disagree very much
3 Disagree slightly
4 Neutral
5 Agree slightly
6 Agree very much
7 Totally agree

(1)	The event happened because of the way I acted.	1	2	3	4	5	6	7
(2)	I can't trust that I will do the right thing.	1	2	3	4	5	6	7
(3)	I am a weak person.	1	2	3	4	5	6	7
(4)	I will not be able to control my anger and will do something terrible.	1	2	3	4	5	6	7
(5)	I can't deal with even the slightest upset.	1	2	3	4	5	6	7
(6)	I used to be a happy person but now I am always miserable.	1	2	3	4	5	6	7
(7)	People can't be trusted.	1	2	3	4	5	6	7
(8)	I have to be on guard all the time.	1	2	3	4	5	6	7
(9)	I feel dead inside.	1	2	3	4	5	6	7
(10)	You can never know who will harm you.	1	2	3	4	5	6	7
(11)	I have to be especially careful because you never know what can happen next.	1	2	3	4	5	6	7
(12)	I am inadequate.	1	2	3	4	5	6	7
(13)	If I think about the event, I will not be able to handle it.	1	2	3	4	5	6	7
(14)	The event happened to me because of the sort of person that I am.	1	2	3	4	5	6	7
(15)	My reactions since the event mean that I am going	1	2	3	4	5	6	7

crazy.

(16)	I will never be able to feel normal emotions again.	1	2	3	4	5	6	7
(17)	The world is a dangerous place.	1	2	3	4	5	6	7
(18)	Somebody else would have stopped the event from happening.	1	2	3	4	5	6	7
(19)	I have permanently changed for the worse.	1	2	3	4	5	6	7
(20)	I feel like an object, not like a person.	1	2	3	4	5	6	7
(21)	Somebody else would not have gotten into this situation.	1	2	3	4	5	6	7
(22)	I can't rely on other people.	1	2	3	4	5	6	7
(23)	I feel isolated and set apart from others.	1	2	3	4	5	6	7
(24)	I have no future.	1	2	3	4	5	6	7
(25)	I can't stop bad things from happening to me.	1	2	3	4	5	6	7
(26)	People are not what they seem.	1	2	3	4	5	6	7
(27)	My life has been destroyed by the trauma.	1	2	3	4	5	6	7
(28)	There is something wrong with me as a person.	1	2	3	4	5	6	7
(29)	My reactions since the event show that I am a lousy coper.	1	2	3	4	5	6	7
(30)	There is something about me that made the event happen.	1	2	3	4	5	6	7
(31)	I feel like I don't know myself.	1	2	3	4	5	6	7
(32)	I can't rely on myself.	1	2	3	4	5	6	7
(33)	Nothing good can happen to me anymore.	1	2	3	4	5	6	7

Appendix K: Positive Mood Induction Task

7. Please write down a happy memory from your childhood:

_____

_____

_____

_____

_____

_____

_____

Appendix L: Debriefing Sheet

Thank you for participating in the study.

The purpose of the research was to investigate the influence of trauma on a person's worldview. Broadly speaking, a worldview refers to a set of beliefs and values that an individual relies on to help them make sense of the world. The study thus aimed to explore how these aspects of a person's outlook may change in response to a traumatic event.

At the start of the survey, some of you were asked to reflect on your own death, while others of you were asked to think about dental pain. The reason for this is that previous research has found that asking people to reflect on their own mortality tends to cause them to become more extreme in their moral judgements, while asking people to think about other unpleasant topics, like dental pain, does not. One explanation for this finding is that human beings tend to defend the beliefs and values of their worldview more strongly after being reminded of their own mortality as it is through holding onto these beliefs and values that they are able to come to feel that life is relatively predictable safe and that death will not befall them so long as they take due care.

Although the above finding has been replicated in over 400 studies across 17 countries, it has recently been shown that trauma survivors with posttraumatic stress disorder (PTSD) *do not* become more extreme in their moral judgements after being reminded of their own mortality. One possible reason for this is that individuals with PTSD have experienced traumas that have lead them to lose faith in the beliefs and values that they previously relied on to help them keep thoughts of death at bay.

Another common feature of PTSD is that people with the condition often tend to think about themselves and the world in excessively negative ways. For example, it is not uncommon for a person with PTSD to blame themselves for their trauma or to find it difficult to trust others following it. This research study was specifically interested in exploring whether such negative ways of thinking play a role in undermining trauma survivors' beliefs and values. If this is found to be the case, it may suggest that helping a person to change their negative ways of thinking about themselves and the world may constitute an important part of therapy as it could help them rebuild a worldview that not only restores a sense of meaning and purpose in their life but also adequately addresses their concerns about death.

If participating in the study has caused you any distress, then please contact one of the organisations listed on the Important Information Sheet for further support.

If you are interested in entering the prize draw for the opportunity to win one of five £20 Amazon.co.uk vouchers or you would like to receive a copy of the study's findings, please continue on to the following link to submit your email address: www.surveymonkey.com/XXX (Please note that your email address will be stored separately from your survey responses, so there will be no way of linking the two.)

Should you have any questions or concerns about the study, please do not hesitate to contact me or my supervisor:

André Bolster (Trainee Clinical Psychologist), Norwich Medical School, University of East Anglia, Norwich, NR4 7TJ. E-mail: A.Bolster@uea.ac.uk.

Dr. Laura Jobson (Research Supervisor and Clinical Lecturer in Clinical Psychology), Norwich, Medical School, University of East Anglia, Norwich, NR4 7TJ. E-mail: L.Jobson@uea.ac.uk

Appendix M: Important Information Sheet

For support and advice in the UK, please contact one of the following organisations:

ASSIST (Assistance, Support and Self-Help in Surviving Trauma), 24hr PTSD Helpline: 01788 560 800

The Samaritans
24hr helpline: 08457 909 090

British Association for Counseling and Psychotherapy (BACP): 0870 443 5252

Appendix N: Contact Detail Sheet

If you would like to enter the prize draw for the opportunity to win one of five £20 Amazon.co.uk vouchers or you would like to receive a copy of the study's findings, please provide your email address in the space provided below and tick as appropriate:

- I would like to be entered in the prize draw
- I would like to receive a copy of the study's results upon its completion

Email address: _____

Please note that this information will be kept separate from your survey responses, so it will not be possible to link the two.

Appendix O: Thank You Note to Participants

Thank you for taking the time to participate in this research. Your input is greatly appreciated!

Appendix P: Letter from the University of East Anglia Faculty of Medicine and Health Sciences Research Ethics Committee

Faculty of Medicine and Health Sciences Research Ethics Committee

University of East Anglia

Andre Bolster
Doctoral Programme in Clinical Psychology
Norwich Medical School
University of East Anglia
Norwich
NR4 7TJ

Research & Enterprise Services
West Office (Science Building)
University of East Anglia
Norwich Research Park
Norwich, NR4 7TJ

Telephone: +44 (0) 1603 591720
Email: fmh.ethics@uea.ac.uk

Web: www.uea.ac.uk/researchandenterprise

13th June 2014

Dear Andre,

Project Title: The role of cognitive appraisals in the disruption of anxiety-buffer functioning among trauma survivors experiencing posttraumatic distress. Reference: 2013/2014 - 45

The amendments to your above proposal have been considered by the Chair of the Faculty Research Ethics Committee and we can confirm that your proposal has been approved.

Please could you ensure that any further amendments to either the protocol or documents submitted are notified to us in advance and also that any adverse events which occur during your project are reported to the Committee. Please could you also arrange to send us a report once your project is completed.

The Committee would like to wish you good luck with your project.

Yours sincerely,

Yvonne Kirkham
Project Officer

cc Laura Jobson