SUICIDAL BEHAVIOUR IN POSTTRAUMATIC STRESS DISORDER

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Doctor of Philosophy

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ABSTRACT

A thesis submitted to the University of Manchester for the degree of Doctor of Philosophy
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A growing body of research has indicated that the levels of suicidal behaviour are particularly heightened among individuals with Posttraumatic Stress Disorder (PTSD). Two theoretical models of suicide, the Cry of Pain Model of suicide (CoP; Williams, 1997) and the Schematic Appraisals Model of Suicide (SAMS; Johnson, Gooding & Tarrier, 2008) have proposed that perceptions of defeat and entrapment are key components of the psychological mechanisms which drive suicidal behaviour. The SAMS has also emphasized the importance of psychological resilience factors for preventing suicide risk. Resilience to suicide has been recently defined as a set of appraisals which buffer the impact of risk factors on suicidal behaviour. The first aim of this thesis was to investigate the role of perceptions of defeat and entrapment in suicidal behaviour in those with full or subthreshold PTSD. The second aim of this thesis was to obtain empirical evidence for the presence of resilience factors to suicidal behaviour in PTSD.

Initially, a comprehensive narrative review and a meta-analysis were conducted to examine the magnitude of the association between various forms of suicidal behaviour and a PTSD diagnosis and the role of comorbid depression in this association. Both, the narrative review and the meta-analysis demonstrated a strong positive association between suicidal behaviour and PTSD, and supported the mediating impact of comorbid depression in this association. A re-analysis of a previous dataset of individuals with PTSD was also pursued to establish the relevance of negative perceptions/appraisals to suicidal behaviour in those with PTSD.

Next, three empirical studies were designed to investigate the utility of perceptions of defeat and entrapment in explaining suicidal behaviour in those with full or subthreshold PTSD. The outcomes across the three studies supported the hypothesis that defeat and entrapment represent the proximal psychological drivers of suicidal behaviour in PTSD and fully account for the suicidogenic effects of negative self-appraisals and PTSD symptoms.

Two additional empirical studies were conducted to examine resilience factors to suicidal behaviour among individuals with full or subthreshold PTSD. The first of these studies provided evidence that high levels of perceived social support buffered the impact of PTSD symptoms on suicidal behaviour. The last study supported the efficacy of a resilience-boosting technique, the Broad-Minded Affective Coping procedure (BMAC), to enhance the experience of positive emotions and improve mood amongst individuals diagnosed with PTSD.

Together, the current results support the SAMS’ postulation concerning the role of perceptions of defeat and entrapment in the emergence of suicidal behaviour in PTSD and highlight the importance of boosting resilience as a means of targeting suicidal behaviour in those with PTSD. Clinical implications of these findings are outlined throughout the thesis.
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DEDICATION

To my mum and dad, Matina and Philippos who have taught me to follow my dreams.
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LIST OF COMMON ABBREVIATIONS

APA = American Psychological Association

BDI = Beck Depression Inventory

BHS = Beck Hopelessness Scale

CBT = Cognitive Behavioural Therapy

CAPS = Clinician Administered PTSD Scale

COP = Cry of Pain

DSM-IV = Diagnostic and Statistical Manual of mental disorder version IV

PDS = Posttraumatic Stress Diagnostic Scale

PTSD = Post Traumatic Stress Disorder

RAS = Resilience Appraisals Scale

SAMS = Schematic Appraisals Model of Suicide

SEM = Structural Equation Modelling
CHAPTER 1

1. Introduction

This introductory section aims to provide an overview of the phenomena of suicide and suicidal behaviour in general and the relevance of suicidal behaviour in those diagnosed with Posttraumatic Stress Disorder (PTSD). Two contemporary theoretical models of suicide, the Cry of Pain model of suicide (CoP) and the Schematic Appraisals Model of Suicide (SAMS) are emphasized in relation to suicidal behaviour in those with PTSD and a number of research hypotheses/questions are formulated on the grounds of the key premises of these theoretical perspectives (particularly based on the premises of the SAMS). This section ends by providing an outline of the content of the subsequent chapters of this thesis.

1.1. The Impact and Complexity of Suicide

1.1.1. The burden of suicide.

Suicide represents a considerable socioeconomic burden for societies (Sesok, Roskar, & Marusic, 2004; Yip, Liu, Law, & Law, 2005) and an enormous emotional and psychological burden for the friends and relatives of the deceased individuals (Begley & Quayle, 2007; De Groot, Keijser, & Neeleman, 2006). Studies have shown that deaths due to self-inflicted injuries (ICD-10 codes: X60-84) account for 1.5% of total deaths for both sexes, globally. Estimates indicate that suicide is included in the leading two causes of death among people aged between 15-34 years in a number of European countries and is one of the leading causes of death in Europe (Murrey & Lopez, 1996). Recently, the World Health Organization announced that in Europe, in 2002 alone, more than 160,000 people died as a result of self-inflicted injuries (WHO, 2004). It has been suggested that the above rates may be underestimated mainly because suicide is considered taboo in many societies and it is underreported (Sesok et al., 2004). A wide range of factors have been associated...
with increased suicide rates including male gender, older age, unemployment status, low socio-economic status, concurrent psychiatric disorders, previous suicide attempts, alcohol abuse or dependence and low social support (Bernal et al., 2007; Plutchik, Vanpraag, Conte, & Picard, 1989; Westefeld et al., 2000). It has been suggested that these factors predict suicide across Western and Asian countries (e.g., Tran Thi Thanh, Tran, Jiang, Leenaars, & Wasserman, 2006).

Suicidal behaviour (e.g., suicidal thoughts, plans or attempts) is considered to be the most robust predictor of subsequent successful suicide (Niméus, Alsén, & Träskman-Bendz, 2002; Reinherz, Tanner, Berger, Beardslee, & Fitzmaurice, 2006). The prevalence rates of suicidal behaviour have been estimated to be significantly higher than the rates of completed suicides. For example, the rates of lifetime suicidal ideation and lifetime suicide attempts fluctuate from 4.8% to 19.8% (Casey et al., 2008; Paykel, Myers, Lindenth, & Tanner, 1974; Weissman et al., 1999) and 1.1% to 5.9% (Paykel et al., 1974; Weissman et al., 1999), respectively. In Europe, a recent epidemiological research reported a 7.8% lifetime prevalence of suicidal ideation and a 1.3% lifetime prevalence of suicide attempts (Bernal et al., 2007). Suicidal behaviour has been associated with the concurrent presence of a psychiatric illness (Bernal et al., 2007; Weissman et al., 1999) and increased levels of psychological distress (Reinherz et al., 2006). Furthermore, there is evidence that the family members of suicide attempters are adversely emotionally affected by the unsuccessful suicide attempt (Kjellin & Ostman, 2005). Thus, in addition to completed suicide, suicidal behaviour also represents a substantial clinical and social burden which extends beyond the suicidal individual (Haukka, Suominen, Partonen, & Lonqvist, 2008).

1.1.2. The continuum of suicide.

A considerable portion of the suicide literature conceptualizes suicidal behaviour as lying on a continuum from fleeting suicidal thoughts to deliberate suicidal ideation/plans and suicide attempts (Casey et al., 2008; Claes et al., 2010; Johnson, Gooding, & Tarrier,
This conceptualization of suicidal behaviour contrasts with the assertion that completed suicides and non-completed suicides represent two distinct phenomena (Beautrais, 2001). The suicide continuum view has received strong empirical support. In particular, the finding that suicidal behaviour is the strongest indicator of subsequent completed suicides favours the continuum model (Nimeus et al., 2002). Consistent with this, it has been found that present suicidal behaviour is strongly associated with previous suicidal behaviour (Corcoran, Keeley, O'Sullivan, & Perry, 2004; Joiner et al., 2005; Sidley, Calam, Wells, Hughes, & Whitaker, 1999).

The continuum conceptualization of suicide may lead to a number of important advantages. First, due to the rarity of completed suicides and serious suicide attempts, the investigation of the psychological factors which make some individuals more susceptible to suicide can be inherently problematic. This difficulty could be overcome if research focuses on investigating the psychological processes which underlie the suicide risk among populations experiencing mild but more frequent forms of suicidality such as suicidal thoughts or plans. Following the assumption of the suicide continuum that lower levels of suicidality exist on the same dimension as higher levels of suicidality, it is expected that both, mild and serious suicidal behaviours emerge as a consequence of the enactment of the same psychological mechanisms. Indeed, studies investigating risk factors for suicide among populations with different severity levels of suicidal behaviours have yielded similar outcomes. For example, increased frequency of affective disorders and family history of affective disorders, suicide and antisocial disorder have been found to be common features among adolescent suicide victims and seriously suicidal psychiatric inpatients (Brent et al., 1988). Thus, the factors which have been found to give rise to mild suicidal thoughts also appear to lead to serious suicidal behaviours and completed suicides. Second, this approach of focusing on less severe forms of suicidality may facilitate the
prompt identification of individuals, who might be at heightened risk for developing severe
suicidal behaviours in the future. In fact, it has been suggested that the initial suicide
attempts arise rapidly and erratically and suicide prevention programmes need to target
ey early stages of suicidality such as suicidal ideation and planning (Kessler, Borges, &
Walters, 1999). A third advantage of the suicide continuum is that it is theoretically
supported by contemporary theoretical accounts of suicidal behaviour (Johnson et al.,
2008a; Lau, Segal, & Williams, 2004) and thus it can be readily translated into empirical
research. These theories postulate that suicidal behaviour is driven by a cognitive structure
or “schema” and serious suicidal behaviours develop gradually as a consequence of
experiencing recurrent suicidal thoughts and negative emotions. A number of studies
provide support for this postulation by demonstrating that suicidal behaviour re-emerges at
periods of low mood and high stress (Shneidman, 1996; Williams, Crane, Barnhofer, Van
der Does, & Segal, 2006).

Despite its advantages, the suicide continuum formulation also has important
limitations. A core limitation is that the direct relationship between ideation and successful
suicide is not definite, that is, the presence of suicidal ideation might not predict accurately
the risk for suicide (Beck, Kovacs, & Weissman, 1979; McAuliffe, 2002; O’Carroll et al.,
1996). Indeed, only a minority of those who experience suicidal thoughts go on to make
plans or intend to kill themselves (McAuliffe, Borges et al., 2006; Kukoyi, Shuaib,
Campbell-Forrester, Crossman, & Jolly, 2010; 2002). The broadness of the suicidal
ideation concept is one factor which possibly reduces its predictive value (McAuliffe,
2002). For example, suicidal ideation might incorporate suicidal thoughts which range
from occasional thoughts that are fleeting, transitory and easily dismissed to persistent
thoughts that are very powerful and impossible to dismiss (Diekstra, 1996; McAuliffe,
2002). Furthermore, suicidal ideation may overlap with deliberate self-harm which have
other functions rather than a desire to end one’s life (Bebbington et al., 2010; Brown,
Another central limitation of the continuum view of suicide is that it cannot explain adequately the case of impulsive suicides. In other words, the presence of impulsive suicides is not consistent with the view of suicide as a continuum since in this case suicide appears to emerge as an in-the-moment reaction (Wojnar et al., 2009; Wyder & De Leo, 2007). However, it has been argued that engaging in suicidal behaviour is a gradual process and impulsivity is a personality trait which increases suicidal risk because it reduces the possibility of engaging in alternative more adaptive behaviours (Joiner et al., 2005; Witte et al., 2008). An additional argument which supports the continuum view is that impulsive suicides are the result of an extended suicide schema whereby seemingly trivial triggers result in suicidal thoughts and behaviours (Tarrier, Gooding, Gregg, Johnson, & Drake, 2007a). Nevertheless, it is as yet unclear whether impulsivity as a route to suicidality, occurs because an extended suicide schema allows seemingly innocuous triggers to be associated with entrenched suicidal thoughts and plans, or whether this route is in fact unrelated to the mechanisms described by the suicide continuum view and current theories of suicide (Johnson et al., 2008a; Joiner, 2005; Williams, 1997). There is a dearth of research on the psychological mechanisms underlying impulsive suicides and contemporary perspectives of suicide need to incorporate impulsivity into the putative underlying mechanisms of suicide.

Overall, the continuum perspective of suicide (Casey et al., 2008; Claes et al., 2010; Kessler et al., 1999) together with contemporary theoretical accounts of suicide (Johnson et al., 2008a; Williams, 1997) offer a useful framework for investigating both, the development of suicidal behaviour over time and different levels of severity of suicidal behaviour (i.e., ideation, plans, attempts, completed suicides). Nevertheless, in order to understand and potentially reduce suicidal behaviour, the investigation of the psychological factors which lead some people to engage in suicidal behaviours, and then to
maintain and reinforce these maladaptive behaviours, is needed. The overarching aim of this thesis was the investigation of the psychological drivers of suicidal behaviour in the context of contemporary theoretical models of suicidality.

1.2. Suicide in Posttraumatic Stress Disorder


PTSD was first incorporated as a psychiatric disorder in the Diagnostic Statistical Manual (DSM-III) in 1980 (APA, 1980). Before its incorporation in DSM-III, the psychological implications of PTSD were not fully understood and a series of different terms had been used to describe the condition. “Shell shock” or “combat fatigue”, are just two examples of terms that had been used in the past to describe PTSD (Baldwin, Williams, & Houts; Barlow & Durand, 2000).

PTSD has been classified as an anxiety disorder in the Diagnostic Statistical Manual (DSM-IV-TR; APA, 2000) which develops after experiencing or witnessing a life-threatening traumatic event (APA, 2000). According to DSM-IV criteria, PTSD may occur soon after the traumatic experience or it might have a delayed onset (more than 6 months following the trauma). The first necessary condition to diagnose PTSD is exposure to (or witnessing) an event which is life-threatening for the self or others and the subsequent experience of intense fear, helplessness or horror. PTSD comprises three distinct symptom clusters, the re-experiencing symptom cluster, the avoidance/numbing symptom cluster, and the hyperarousal symptom cluster. The experience of at least one re-experiencing symptom, three avoidance/numbing symptoms and two hyperarousal symptoms are also necessary for the assignment of a PTSD diagnosis. Furthermore, in order for a PTSD diagnosis to be given, the duration of the above symptoms needs to be at least one month and considerable distress or impairment in the person’s social, occupational and other areas of functioning should to be evident (APA, 2000).
Recently, mental health professionals have proposed a series of revisions to the PTSD diagnostic criteria for the next version of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5). These changes are described and justified in a recent review of the literature (Friedman, Resick, Bryant, & Brewin, 2010) and thus only the most important proposed changes (i.e., mainly three changes) will be discussed briefly in this section. The first major revision is that the reactions of fear, helplessness or horror are not necessary for the fulfilment of Criterion A for a PTSD diagnosis. The second major revision is the differentiation of avoidance symptoms from numbing symptoms which are proposed to be included in DSM-5 in two separate symptom clusters. This implies that DSM-5 will potentially require the experience of symptoms across four PTSD symptom clusters in order to assign a PTSD diagnosis. Furthermore, the experience of at least one avoidance symptom becomes a necessary criterion for a PTSD diagnosis in DSM-5. The third, and related, major change is that the newly proposed separate numbing symptom cluster is planned to incorporate symptoms which assess the presence of negative expectations of the self, others, the world and the future, persistent blame of the self or others, and negative emotional states such as fear, horror, guilt or shame. Overall, particularly these three revisions are expected to alter significantly the way that PTSD is conceptualized if they are finally incorporated into DSM-5 (Friedman et al., 2010). It should be noted that since the changes in DSM-5 have not yet been finalized, a PTSD diagnosis was made using the DSM-IV criteria in the current thesis.

A core debate in the field of psychiatry is the ability of the categorical diagnostic systems to offer a clear distinction between normal and pathogenic behaviours (Helmchen & Linden, 2000; Widiger & Clark, 2000). Additionally, an increasing body of literature suggests that psychopathology exists on a continuum from normal human behaviour (McGovern & Turkington, 2001; Rössler et al., 2011; van Os, Hanssen, Bijl, & Ravelli, 2000; van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). Some authors
have suggested that levels of impairment or distress might comprise more useful indicators for distinguishing normal from abnormal behaviours (Widiger & Clark, 2000). In the PTSD literature, it has been questioned whether a categorical diagnostic system is sufficient for identifying those who suffer from PTSD and whether those who do not meet the diagnostic threshold of PTSD differ significantly from those who fulfil the full criteria for a PTSD diagnosis (Broman-Fulks et al., 2006; Gudmundsdottir & Beck, 2004; Palm, Strong, & MacPherson, 2009; Ruscio, Ruscio, & Keane, 2002). Consistent with this, a considerable number of studies have shown that “subthreshold” PTSD is associated with an equivalent degree of occupational, social and emotional impairment as compared with a full diagnosis of PTSD (Marshall et al., 2001; Stein, Walker, Hazen, & Forde, 1997; Weiss et al., 1992; Zlotnick, Franklin, & Zimmerman, 2002).

Based on the previous literature which suggests that subthreshold PTSD has comparable substantial clinical relevance with full PTSD, the psychological mechanisms of suicidal behaviour were examined not only among individuals who met the full diagnostic criteria for a current PTSD diagnosis but also among individuals with subthreshold PTSD in this thesis. Furthermore, based on the continuum hypothesis, individuals with subthreshold and full PTSD were hypothesised to form a sole group with various levels of the PTSD symptom severity (Chapter 7 to Chapter 10). Individuals with subthreshold PTSD in the current thesis include those who have partially recovered from a previous diagnosis of PTSD (thus, they meet the criteria for a lifetime diagnosis of PTSD) and those who developed PTSD symptoms after the trauma but their symptoms were not numerous or severe enough to warrant a PTSD diagnosis.

1.2.2. The link between suicidal behaviour and PTSD.

The literature suggests that the majority of the individuals who successfully kill themselves suffer from a psychiatric illness. For example, a review of the psychological autopsy studies demonstrated that as many as 90% of the people who did kill themselves
suffered from a psychiatric disorder (Cavanagh, Carson, Sharpe, & Lawrie, 2003). Similarly, the prevalence of suicidal thoughts and behaviours has been found to be particularly heightened among individuals diagnosed with psychiatric disorders compared to healthy individuals. For example, heightened rates of suicidal ideation and suicide attempts have been found among individuals diagnosed with depressive disorders, psychoses and anxiety disorders (Bernal et al., 2007; Fenton, 2000; Harkavy-Friedman et al., 2003; Hawton, Sutton, Haw, Sinclair, & Deeks, 2005; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Weissman et al., 1999).

There is an extensive literature which indicates that prevalence rates of suicidal behaviours and completed suicides are also heightened among individuals who have experienced negative life events (Thoresen, Mehlum, Roysamb, & Tonnessen, Cooper, Appleby, & Amos, 2002; Crane et al., 2007; 2006; Yen et al., 2005). For example, a psychological autopsy research paper demonstrated that suicide was predicted by the experience of negative life events in the preceding three months (Cooper et al., 2002). Consistent with this, a recent review of psychological autopsy studies (including more than 75 suicides) revealed that the vast majority of people who committed suicides have experienced at least a negative life event in the year prior to death (Foster, 2011). King and colleges (2001) have found that adolescents who had experienced more than five negative life-events in the previous year or previous six months had a substantially increased frequency of suicidal thoughts or suicide attempts. Consistent with this, a study among individuals who were admitted to a psychiatric unit after a suicide attempt found that first suicide attempts were significantly predicted by the experience of negative life events in the past six months (Pompili et al., 2011). Furthermore, it has been suggested that some specific negative life events such as those pertaining to interpersonal conflict are strongly associated with a subsequent completed suicide or unsuccessful suicide attempts, and this association pertains even after controlling for the presence of mental disorders (Foster,
Similarly to the adverse effect of negative life events on suicide risk, there is ample evidence in the literature which has shown that exposure to a range of traumatic events such as criminal assault (Kilpatrick et al., 1985; Simon, Anderson, Thompson, Crosby, & Sacks, 2002), partner physical violence (Ragin et al., 2002; Seedat, Stein, & Forde, 2005; Thompson et al., 1999), sexual abuse (Cloitre, Scarvalone, & Difede, 1997; Ullman, 2004; Ullman & Brecklin, 2002), childhood abuse or neglect (Gladstone et al., 2004; Kaplan, Asnis, Lipschitz, & Chorney, 1995; Santa Mina & Gallop, 1998), natural disasters (Chou et al., 2007; Yang, Xirasagar, Chung, Huang, & Lin, 2005), and war related traumas (Bullman & Kang, 1996; Drescher, Rosen, Burling, & Foy, 2003; Farberow, Kang, & Bullman, 1990; Ferrada-Noli, Asberg, Ormstad, Lundin, & Sundbom, 1998b) are associated with increased risk for suicidal behaviours including suicide attempts and suicidal thoughts. Across a considerable number of studies a diagnosis of PTSD or depression (Kaslow et al., 2000; Martin, Bergen, Richardson, Roeger, & Alison, 2004; Mazza & Reynolds, 1999; Thompson et al., 1999) have been suggested to be the mediational mechanisms through which traumatic events lead to suicidal behaviours.

Based on the presence of a robust association between suicidal behaviour and negative or traumatic life events, it would not be surprising if the prevalence rates of suicidal behaviours are heightened in those with PTSD. Indeed, a considerable number of studies have shown that suicidal thoughts and behaviours are frequently reported by individuals suffering from PTSD (e.g., Ferrada-Noli et al., 1998b; Sareen et al., 2007; Tarrier & Gregg, 2004). However, until recently the association between a PTSD diagnosis and suicidal behaviour has been overlooked in the literature. To compensate for this omission, a comprehensive narrative review was conducted to summarise the available research findings on suicidal behaviour and PTSD (see Chapter 3; Panagioti, Gooding, & Tarrier, 2009). A meta-analysis was also conducted to quantify the results of the previous narrative review regarding the PTSD and suicidal behaviour association (Chapter 4). The
results of the narrative review and the meta-analysis were totally consistent. Both reviews demonstrated that PTSD was strongly associated with various forms of suicidality (i.e., suicidal ideation, suicide attempts and suicidal behaviours) across a large number of studies (over 60).

Following the conduction of the narrative review and the meta-analysis (June 2010) seven new studies were identified which investigated the association between suicidal behaviour and PTSD. The outcomes across these seven studies further confirmed the presence of a robust link between suicidal behaviour and a PTSD diagnosis (Guerra & Calhoun, 2011; Harned, Rizvi, & Linehan, 2010; Jakupcak et al., 2011a; Jakupcak et al., 2010; Jakupcak & Varra, 2011b; Panagioti, Gooding, Dunn, & Tarrier, 2011). Jakupcak and his research team advanced the previous literature by demonstrating that PTSD severity moderates the link between lack of social support and suicidal risk (Jakupcak & Varra, 2011b) and provided further evidence that subthreshold PTSD is associated with comparable levels of distress and suicidal behaviour as compared with full PTSD (Jakupcak et al., 2011a). Furthermore, Guerra and Calhoun (2011) found that suicidal behaviour in veterans with PTSD is uniquely and positively associated with the PTSD numbing symptoms (i.e., feelings of detachment; restricted affect) and the cognitive-affective cluster of depressive symptoms (i.e., depressed mood, guilt). Interestingly, the avoidance symptoms of PTSD had the weakest association with suicidal behaviour compared to the other PTSD symptom clusters. This finding is important since it suggests that future studies should examine the impact of numbing symptoms on suicidality separately from the impact of the avoidance symptoms. In other psychiatric groups (e.g., psychotic individuals) there is evidence that emotional withdrawal, but not blunted affect is inversely associated with suicide behaviour. These results beg the question of what is different between emotional withdrawal (protects against suicidality), numbing (increases the risk for suicidality) and blunted affect (has no effect on suicidality) (Tarrier et al.,
One explanation would be that numbing may indicate a response which is triggered by extreme distress. Nevertheless, it could be argued that emotional withdrawal represents a response to extreme distress also. These inconsistent results are potentially justified on the basis of the different measures and clinical populations utilized across the studies. Thus, there does seem to be a need to systematically investigate numbing, withdrawal, blunted affect in relation to suicidal behaviour in a transdiagnostic framework. Moreover, Panagioti et al. (2011) investigated paths to suicidal behaviour among individuals with PTSD and showed that negative subjective appraisals of the current levels of functioning and comorbid depression lead to suicidal behaviour by two independent pathways (see Chapter 5). Consequently, this last study provided evidence that negative appraisals might have a central role in the emergence of suicidal behaviours in those with PTSD.

Overall, the majority of the investigations in the PTSD and suicide research area suggest that individuals with a diagnosis of PTSD are at heightened risk for suicide. However, a limited number of studies have investigated the mechanisms which underlie the emergence of suicidal thoughts and behaviours in those with PTSD. One possibility is that suicidal behaviour in those with PTSD might emerge as a consequence of the function of generic transdiagnostic factors which drive suicidal behaviour in a wide range of disorders. A second possibility is that suicidal behaviour in PTSD is caused by comorbid disorders (i.e., comorbid depression). A third possibility is that PTSD-specific factors drive suicidal behaviour in those with PTSD and these specific factors do not play a role in suicidal thoughts and behaviours in people with other mental illness diagnoses. Finally, a fourth possibility is that an amalgam of the above alternatives might underlie suicidal behaviour in those with PTSD (Bolton, Gooding, Kapur, Barrowclough, & Tarrier, 2007; Panagioti et al., 2009).
The current thesis explores, primarily, the impact of general psychological factors such as perceptions of defeat and entrapment, subjective self-appraisals (positive and negative) and feelings of hopelessness on suicidal behaviour in those with PTSD. Furthermore, this thesis examines how these general psychological factors interact with comorbid factors (e.g., depression) and PTSD-specific factors (i.e., PTSD symptom severity) to lead to suicidal behaviour in PTSD. Thus, the work of this thesis is designed to indicate which of the four transdiagnostic, symptom-specific, co-morbid and amalgamation mechanisms described above best explains suicidality in PTSD.

1.3. Theoretical Perspectives of Suicide

Individuals with a diagnosis of PTSD are at heightened risk for suicide but only limited progress has been made in understanding the psychological mechanisms underlying suicide in this population (Panagioti et al., 2009). A number of theoretical models of suicide have been proposed in the literature, which aim to explain the mechanisms behind the emergence of suicidal behaviours (Westefeld et al., 2000). Some of these models include the Overlap Model (Blumenthal & Kupfer, 1986), the Three Element Model (Jacobs, Brewer, & Klein-Benham, 1999), the Suicide Trajectory Model (Stillion, McDowell, & May, 1989) and the Cubic Model (Shneidman, 1987).

The Overlap Model emphasizes the role of five core domains in the development of suicidal risk. The five domains comprise: i. the psychosocial milieu (mostly social support), ii. the biological vulnerability, iii. the presence of psychiatric disorders, iv. personality factors such as impulsivity, hostility or depression and v. family history and genetic factors. These five domains are schematically illustrated as five overlapping circles. The interception of these five circles implies a heightened risk for suicide (Blumenthal & Kupfer, 1986; Westefeld et al., 2000).

The Three Element Model focus on three areas including the predisposing factors (e.g., mood disorders, substance use, schizophrenia), the potentiating factors (e.g., family
and social support, personality disorders, stressful life events) and the suicide threshold. The main assumption of the Three Element Model is that predisposing and potentiating risk factors interact with idiosyncratic factors to give rise to suicidal behaviours (Jacobs et al., 1999).

The Suicide Trajectory Model postulates that suicidal thoughts and behaviours arise as a consequence of the interaction between biological (e.g., genetic predisposition to depression, male gender), psychological (e.g., depression, hopelessness, helplessness, low self-esteem), cognitive (e.g., cognitive inflexibility, cognitive distortions) and environmental risk factors (e.g., adverse family experiences, negative life events, availability of methods for suicide such as firearms). The combination of these risk factors together with the view of suicide as a viable option and the presence of a triggering event (i.e., negative life event) are believed to trigger suicide acts (Stillion et al., 1989).

The Cubic Model of Suicide considers the importance of three elements, the negative presses (e.g., events which contain rejection, loss, humiliations and mostly the negative subjective evaluation of these events), psychological pain and perturbation (e.g., a state of being upset mostly due to negative self-evaluations and cognitive distortions) in the emergence of suicidal thoughts and acts. The severity of each of the three components is assessed in a 1 to 5 scale. Individuals who score 5 at each of these components are considered to be at high risk for suicide (Shneidman, 1987).

All aforementioned theoretical models of suicide have been criticized as being derived from post-hoc correlates of suicides and suicidal behaviour. Thus, their main limitation is that they lack a strong theoretical basis to guide the research on the area of suicide and suicidal behaviour. Furthermore, the formulation of clear hypotheses/predictions based on these models is difficult (Bolton et al., 2007; Westefeld et al., 2000).
1.3.1. Suicide as an escape.

A number of theorists in the suicide literature emphasize the role of the need to escape from current adverse emotional states as a key element of suicide (Baumeister, 1990; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996; Shneidman, 1996). Baumeister (1990) proposed a theoretical model of suicide, defined as suicide as escape from the self theory which postulates that the desire to escape is the core urge for suicide. According to this model suicide is the final consequence of a series of causal steps. The initial step is the exposure to an adverse life event which triggers feelings of not being able to meet important expectations. Next, these feelings of not being able to meet important expectations lead to the experience of negative emotions and a state of aversive self-awareness. The model further suggests that individuals move to a state of reduced awareness, termed cognitive deconstruction in order to escape from the aversive self-awareness state. Another important state of the model is the limited future thinking (which is similar to the concept of hopelessness) which is accompanied by the removal of the person’s inhibitions regarding suicide. Suicidal thoughts and behaviours arise as a means of escaping the negative affect and the aversive awareness. Consistent with this view of suicide as an escape, empirical studies have shown that suicidal individuals report escape-related images (Holmes, Crane, Fennell, & Williams, 2007) and desires to escape (Bancroft, Skrimshire, & Simkin, 1976). Nonetheless, some core concepts of the Baumeister’s theoretical perspective including cognitive deconstruction and aversive self-awareness are best described as generic states rather than psychological processes while the psychological factors which drive suicidality are not clearly defined. It has been suggested that perceptions of being trapped, having no alternative solutions other than suicide, and negative future perceptions, are central precursors to the emergence of suicidal thoughts as a means of escape (Baumeister, 1990; Shneidman, 1996; Williams et al., 2006). Two influential contemporary theoretical perspectives of suicide, namely the Cry of
Pain model of suicide (CoP; Williams, 1997; Williams, Crane, Barnhofer, & Duggan, 2005) and the Schematic Appraisal Model of Suicide (SAMS; Johnson et al., 2008a) have utilized the concepts of defeat, entrapment, negative subjective appraisals, and the perception that suicide is an escape to describe the generic psychological routes that lead to suicide.

1.3.2. The Cry of Pain model of suicide.

The Cry of Pain Model (CoP; Williams, 1997; Williams et al., 2005) is a transdiagnostic bio-psychological model of suicide which describes the psychological conditions under which suicide is likely to occur. The CoP builds on previous theories which view suicide as an escape (Baumeister, 1990) in the context of the social rank theory of depression (Gilbert & Allan, 1998). The CoP postulates that a prerequisite for the emergence of suicidal behaviours is the presence of stressors which might be external (e.g., marriage problems, loss of job) or internal (e.g., symptoms of psychiatric illness) (Bolton et al., 2007). The model further suggests that if these stressors are appraised in terms of defeat (e.g., low self-worth, rejection or subordination) they are particularly likely to give rise to suicidal thoughts and behaviours (Bolton et al., 2007). Whether or not individuals perceive themselves as being able to overcome the defeated situation further determines the risk for suicide. Those individuals, who view themselves as being unable to escape from the defeated situation, experience overwhelming feelings of entrapment which in turn leads to suicidal behaviours. In addition to the presence of stressors and feelings of defeat and entrapment, the CoP proposes three other psychological processes which are also important for the emergence of suicidal behaviours: i. the escape potential (Taylor, 2010) which includes negative subjective appraisals of personal abilities such as problem solving skills (Williams et al., 2005) and self-efficacy ii., the presence of feelings of hopelessness and iii., the perceived absence of rescue factors which mostly include the accessibility to social networks and the availability of social support (O'Connor, 2003). According to the
CoP, each of these three processes, impact on the suicide risk because they increase feelings of entrapment. A final aspect which determines whether or not the desire for suicide will result in a suicide attempt is the availability of means and knowledge of the methods for suicide. Overall, in the context of CoP model feelings of hopelessness, defeat and entrapment are key psychological mechanisms which underlie the development of suicidal thoughts and behaviours.

1.3.3. Empirical support for the Cry of Pain model: Evidence from PTSD populations.

The components of the CoP have received varied attention in the literature. A strong association has been found between negative appraisals of problem solving skills (which is part of the escape potential component) and suicidal behaviour in a range of research populations including students (Chang, 2002; Clum & Febbraro, 1994; Johnson, Gooding, Wood, & Tarrier, 2010a; Taylor, Wood, Gooding, & Tarrier, 2010b), suicidal ideators and attempters (Dixon, Heppner, & Anderson, 1991; Pollock & Williams, 2004; Rudd, Rajab, & Dahm, 1994), imprisoned adolescents (Esposito & Clum, 2002), older adults (Gibbs et al., 2009) and individuals with psychiatric diagnoses (Johnson et al., 2010b; Maurex et al., 2010; Roskar, Zorko, Bucik, & Marusic, 2007). Similarly, self-efficacy was found to drive suicidality among suicide attempters (Dieserud, Roysamb, Braverman, Dalgard, & Ekeberg, 2003; Dieserud, Roysamb, Ekeberg, & Kraft, 2001). There is also evidence that individuals with PTSD report problem-solving difficulties (particularly those of an interpersonal nature) and reduced self-efficacy, but these have not yet linked with the presence of suicidal behaviour. For instance, Vietnam veterans have been found to report poorer social problem-solving abilities compared with veterans with no PTSD diagnosis (Nezu & Carnevale, 1987). Similarly, Sutherland and Bryant (2008) showed that PTSD patients produced fewer solutions to inter-personal problems, and the generated solutions were less effective compared with trauma-only participants. Perceived
self-efficacy has been found to predict the development of PTSD among trauma victims (Flatten, Walte, & Perlitz, 2008) and to mediate the effect of negative cognitions on posttraumatic distress (Cieslak, Benight, & Lehman, 2008). Furthermore, perceived coping self-efficacy was positively associated with recovery from PTSD (Benight & Bandura, 2004) and greater positive changes following the traumatic experience (Cieslak et al., 2009). More importantly, among abused African-American women, self-efficacy predicted whether or not the participants had previously attempted suicide (Meadows, Kaslow, Thompson, & Jurkovic, 2005; Thompson, Kaslow, Short, & Wyckoff, 2002).

The association between rescue factors (i.e., social support) and suicidal behaviour is well established in the literature. A large number of studies have shown that perceived social support buffered the risk for suicide among clinical and non-clinical populations (Borowsky, Ireland, & Resnick, 2001; Clum & Febbraro, 1994; Esposito & Clum, 2002; Meadows et al., 2005). Perceived social support has been found to be inversely associated with the presence of suicidal behaviours in those with PTSD (Freeman, Roca, & Moore, 2000; Jakupcak et al., 2010; Kotler, Iancu, Efroni, & Amir, 2001) and trauma victims (Kaslow et al., 2005). More recently a study showed that perceived social support moderated the effect of number and severity of PTSD symptoms on suicidal behaviour (Panagioti, Gooding, Taylor, & Tarrier, in submission-b).

Numerous studies have shown that hopelessness is a strong predictor of various forms of suicidal behaviour (Elliott & Frude, 2001; Kuo, Gallo, & Eaton, 2004; O’Connor, Armitage, & Gray, 2006) and completed suicides (Keith Hawton & van Heeringen, 2009). Additionally, hopelessness has been identified as a strong predictor of suicidal behaviour in a wide range of clinical and non-clinical populations (Beautrais, 2001; Johnson et al., 2010b; O’Connor, Connery, & Cheyne, 2000; Rutter, Freedenthal, & Osman, 2008; Tarrier, Barowclough, Andrews, & Gregg, 2004). Hopelessness has been found to be a strong predictor of suicidal ideation suicide attempts among abused African-American
women (Kaslow et al., 2000) and childhood abuse victims (Spokas, Wenzel, Stirman, Brown, & Beck, 2009). In those with PTSD, the association between feelings of hopelessness and suicidal behaviour has not been investigated in the previous literature. Two studies which examined the role of hopelessness in the development of suicidal behaviour are described in the current thesis (Panagioti, Gooding, & Tarrier, in press; Panagioti, Gooding, Taylor, & Tarrier, in submission-a).

It is worth of mentioning that although the research evidence suggests that escape potential, rescue factors and hopelessness are significant predictors of suicidal behaviour, this does not necessarily mean that they support the CoP model. For example, other theoretical perspectives of suicide suggest that hopelessness (Baumeister, 1990; Clum & Febbraro, 1994), social support and problem-solving difficulties (Clum & Febbraro, 1994) have a central role in the development of suicidal behaviours. In contrast, perceptions of defeat and entrapment are more directly linked with the CoP perspective which is in turn based on the social rank theory (Gilbert & Allan, 1998). The particular focus of this thesis is the examination of the effect of perceptions of defeat and entrapment on suicidal behaviour.

Contrary to problem solving capacity, hopelessness and rescue factors, the role of perceptions of defeat and entrapment on suicide has not received the appropriate attention in the literature. Nevertheless, recently, there has been an increasing research interest in investigating the effect of defeat and entrapment on suicidal behaviour. Currently, there is evidence that perceptions of defeat and entrapment are the most proximal factors of suicidal behaviour among students (Taylor, Gooding, Wood, Johnson, & Tarrier, 2011b; Taylor et al., 2010b), adolescents (Park et al., 2010) parasuicidal samples (O'Connor, 2003; Rasmussen et al., 2010) and individuals with psychosis (Taylor et al., 2010a). Furthermore, Taylor and his colleagues suggested that perceptions of defeat and entrapment should be best defined as a single construct. A number of studies have supported this unidimensional
view of defeat and entrapment (Taylor et al., 2010a; Taylor, Wood, Gooding, Johnson, & Tarrier, 2009; Taylor et al., 2010b). Defeat and entrapment have been suggested to have a central role among individuals with PTSD (Taylor, Gooding, Wood, & Tarrier, 2011a). Consistent with this, increased levels mental defeat have been strongly associated with the onset and chronicity of PTSD (Dunmore, Clark, & Ehlers, 2001; Kleim, Ehlers, & Glucksman, 2007) and low response to exposure therapy (Ehlers et al., 1998). However, there is no evidence in the existing literature that perceptions of defeat and entrapment are relevant to suicidal behaviour in those with PTSD. Based on this lack of research, we conducted three studies which investigated defeat and entrapment in relation to suicidal behaviour among trauma victims with full PTSD or subthreshold symptoms. These studies are presented in Chapters 6, 7 and 8 of this thesis (Panagioti et al., in press; Panagioti, Gooding, Taylor, & Tarrier, in re-submission; Panagioti et al., in submission-a).

### 1.3.4. The Schematic Appraisals Model of Suicide (SAMS)

Despite its numerous strengths (Bolton et al., 2007; Johnson et al., 2008a), the CoP model has been criticised mainly because some of its core concepts such as defeat, absence of rescue, hopelessness, and entrapment are unclear in the way they are used, defined and measured. Furthermore, the fact that these concepts are derived from animal behaviour research reduces their utility in terms of human cognition. In fact, one study that tested the Cry of Pain Model failed to demonstrate that the concepts of defeat and entrapment were significant and independent predictors of suicidal behaviour (O'Connor, 2003). Moreover, the translation of concepts, derived from the model into treatment strategies has not been particularly fruitful (Johnson et al., 2008a).

Johnson et al. (2008a) proposed a new theoretical framework of suicide, named the Schematic Appraisal Model of Suicide (SAMS). The SAMS model is a re-conceptualization of the Cry of Pain (CoP) model and it aims to explain the psychological mechanisms behind suicide in those suffering from psychosis but it appears promising in
describing the generic psychological pathways to suicidal behaviour in a wide range of psychological disorders. The SAMS model consists of three main components: i. An extended memory schema which is primed for suicide, ii. Negatively biased information processing systems, and iii. Negative dysfunctional appraisals of the self, the past and the current situation and the future. An important advantage of the SAMS model is that the three components which comprise the model are closely related to cognitive-behavioural experimental paradigms and, thus, they are empirically testable. In addition, the concepts of defeat and entrapment and the process of their development are more clearly explained in the SAMS. A schematic illustration showing the interaction of the three components of the SAMS model is presented in Figure 1.

![Diagram of the SAMS model](image)

Figure 1. A schematic illustration of the components of the SAMS model as described in Johnson et al. (2008).

A key premise of the SAMS model is that feelings of defeat and entrapment arise as a consequence of the enactment of both negative dysfunctional appraisals of the self
(negative self-evaluations of personal abilities and access to social resources) and negative situation appraisals (past, present and the future). Although the CoP has implied to some extent that negative dysfunctional appraisals are responsible for the emergence of feelings of defeat and entrapment, this idea is elaborated and expanded upon in the context of the SAMS model (Johnson et al., 2008a). Furthermore, in the SAMS framework, defeat and entrapment are conceptualised as a singular psychological process which drives suicidality. This unidimensional view of defeat and entrapment is more parsimonious and avoids the potential overlap between the two concepts.

An additional advance of the SAMS model is that it provides a useful scaffold for the understanding of the factors which might confer resilience to suicide. According to the SAMS model, positive self-appraisals, such as, positive perceptions of social support and positive evaluations of the problem solving abilities, protect individuals against the development of perceptions of defeat and entrapment and provide a source of resilience to counter suicidal behaviours. Two recent empirical studies investigated the protective role of these positive self-appraisals and demonstrated that positive self-appraisals buffered the impact of negative life experiences and psychotic symptoms on suicidal behaviour (Johnson et al., 2010a,b). A study investigating the protective role of positive perceptions of social support against suicidal behaviours among individuals with PTSD symptoms is described in the Chapter 9 of this thesis (Panagioti et al., in submission-b). Moreover, based on previous recommendations that positive emotions boost the experience of positive self-appraisals and ameliorate the effect of negative affective states (Johnson, Gooding, Wood, Fair, & Tarrier, in submission; Johnson, Wood, Gooding, Taylor, & Tarrier, 2011b), the effectiveness of a newly developed mood induction technique to elicit positive emotions and boost current mood is described in Chapter 10 of this thesis (Panagioti, Gooding, & Tarrier, submitted-b).
1.3.5. Research hypothesis derived from the SAMS model.

1.3.5.1. Perceptions of defeat and entrapment predict suicidal behaviour in those with PTSD.

First, the SAMS model postulates that perceptions of defeat and entrapment are related to increased levels of suicidal behaviour. This hypothesis was tested using cross-sectional design in Chapter 6. Since, there is evidence that depression potentially mediates the association between suicidal behaviour and PTSD (Chapter 3 and 4), it was predicted that defeat and entrapment would be significantly associated with suicidal behaviour even after controlling for the levels of comorbid depression. Furthermore, based on previous recommendations, defeat and entrapment were conceptualized as a single variable in the majority of the following chapters (Chapters 6, 7 and 8).

1.3.5.2. Perceptions of defeat/entrapment mediate the effects of negative self-appraisals and PTSD symptoms on suicidal behaviour.

A core prediction of the SAMS is that negative life events, stressors and psychiatric symptoms impact negatively on the severity of perceptions of defeat and entrapment which in turn give rise to suicidal thoughts and behaviours. Among individuals exposed to traumas, the experience of PTSD symptoms is associated with high levels of psychological distress and functional impairment (Breslau, Lucia, & Davis, 2004; Marshall et al., 2001; Zlotnick et al., 2002) and, potentially, are related with heightened levels of defeat and entrapment. Another prediction of the SAMS is that negative self-appraisals associated with the ability to cope with negative emotions and difficult situations and access social support underlie the emergence of perceptions of defeat and entrapment.

Based on the SAMS model, it was predicted that perceptions of defeat and entrapment would not only be positively associated with the severity of PTSD symptoms and negative self-appraisals but would mediate the impact of the PTSD symptoms and
negative self-appraisals on suicidal behaviour. This hypothesis was tested in Chapter 7 and 8 of this thesis.

1.3.5.3. Positive self-appraisals confer resilience to suicidal behaviour in those with PTSD.

The SAMS postulates that the presence of positive self-appraisals, such as, positive self-appraisals of social support might undo the deleterious effects of stressors (i.e., psychiatric symptoms) on suicidal behaviour. On the grounds of the previous evidence which showed that perceived social support was negatively associated with suicidal risk in those with PTSD (Freeman et al., 2000; Kakupcak et al., 2010; Kotler et al., 2001), it was hypothesized that positive perceptions of social support would buffer the effects of PTSD symptoms on suicidal behaviour. Chapter 9 of this thesis describes a study which investigated this hypothesis.

1.4. Structure of the Thesis

The overarching aim of the current thesis was to examine the psychological processes which underlie the emergence of suicidal thoughts and behaviours among individuals with PTSD. The third chapter of the thesis contains the first narrative review which summarised the existing literature findings on suicidal behaviour and PTSD (Panagioti et al., 2009). In addition to the narrative review, a meta-analysis was conducted to systematically quantify the association between PTSD and various forms of suicidal behaviour (completed suicides, suicide attempts and suicidal ideation). This meta-analysis is presented in Chapter 4 (Panagioti, Gooding, & Tarrier, submitted-a). The subsequent chapters of the study investigated a series of research questions which were generated from the SAMS model but have not yet been resolved. First, pathways to suicidal behaviour were tested to ascertain whether negative perceptions of functioning added to the routes to suicidal behaviour in PTSD. This was a preliminary investigation which was based on re-analysing previous data of 94 individuals diagnosed with PTSD (Chapter 5; Panagioti et
Following this re-analysis, Chapter 6 presents the first empirical study which examined the levels of defeat, entrapment and hopelessness among individuals with PTSD compared to trauma victims without PTSD. The association of defeat, entrapment and hopelessness with suicidal behaviour among the two groups (PTSD, non PTSD) was also examined in the study (Panagioti et al., in press). Chapters 7 and 8 of the thesis describe two studies which aimed to test two core mediational hypotheses of the SAMS model. In particular, Chapter 7 tests the hypothesis that perceptions of defeat and entrapment would mediate the impact of PTSD symptom severity on suicidal behaviour whilst covarying for the effects of comorbid depression and hopelessness in a sample of individuals who fulfilled the criteria for a current or lifetime diagnosis of PTSD (Panagioti et al., in submission-a). Chapter 8 examines whether or not negative self-appraisals exert their effect on suicidality via increasing the severity of perceptions of defeat and entrapment among individuals experiencing PTSD symptoms or whether this occurs only in those with a full PTSD diagnosis. Thus a mediational pathway is examined whereby perceptions of defeat and entrapment mediate the impact of negative self-appraisals on suicidal behaviour. In Chapter 9, the hypothesis was tested that positive self-appraisals (e.g., positive perceptions of social support) would buffer the impact of key risk factors (PTSD symptom severity) on suicidal behaviour (Panagioti et al., in submission-b). A final study is described in Chapter 10 which focused on exploring the efficacy of a newly developed therapeutic technique, namely, the Broad-Minded Affective Coping Procedure, to elicit positive emotion and reduce the experience of negative emotions in those with full or subthreshold PTSD (Panagioti et al., submitted-b). The final chapter of this thesis (Chapter 11) offers an overview and general discussion of the preceding chapters and emphasizes the theoretical and clinical implications of the current findings. Finally, the limitations of the findings of this thesis are outlined and future research directions are proposed.
1.5. Note on Collaboration and Published Material

The alternative format option offered by the University of Manchester was used for the production of this thesis. This option allows the empirical chapters to be written and presented in a format suitable for publication in academic peer-reviewed journals. Alternative format was considered appropriate for the current thesis to enable parts of the thesis to be published during the course of the PhD. Consequently, a number of the subsequent empirical chapters have been published. Chapter 3 (Posttraumatic stress disorder and suicidal behaviour: A narrative review) has been published by Clinical Psychology Review, Chapter 5 (Pathways to suicidal behaviour in posttraumatic stress disorder) has been published by the Journal of Traumatic Stress, and Chapter 6 (Hopelessness, defeat and entrapment in posttraumatic stress disorder (PTSD): Their association with suicidal behaviour and severity of depression) has been accepted for publication in the Journal of Nervous and Mental Disease.

A number of empirical chapters in this thesis have been reviewed or are currently under review by peer-reviewed journals. Chapter 8 (Negative self-appraisals and suicidality among trauma victims experiencing PTSD symptoms: The mediating role of defeat and entrapment) has been reviewed by Depression and Anxiety and is currently being revised for resubmission to this journal. Chapter 4 (A meta-analysis of the association between posttraumatic stress disorder and suicidality: The role of comorbid depression) is under review by Journal of Psychosomatic Research, and Chapter 10 (An empirical investigation of the effectiveness of the Broad-Minded Affective Coping Procedure (BMAC) to boost mood among individuals with posttraumatic stress disorder) is under review by Behavior Research and Therapy.

The author collaborated with a number of other individuals to complete the research featured this thesis. The author’s supervisory team, Prof. Nicholas Tarrier and Dr Patricia Gooding contributed to the research design, theory and write-up, and are, therefore,
recognised as co-authors. Prof. Graham Dunn is recognised as a co-author in Chapter 5 and Dr Peter Taylor is recognised as co-authors on Chapters 7, 8 and 9 because they provided assistance and feedback on the statistical analyses of the corresponding chapters.

Recruitment was undertaken solely by the author of this thesis (Chapters 6, 7, 8, 9 and 10). The only exception was the research described in Chapter 5 which comprised a re-analysis of an existing dataset. All analyses were undertaken solely by the author of this thesis, with assistance and feedback provided by the author’s supervisory team and co-authors. All write-ups were solely the work of the author of this thesis, with the supervisors’ and co-author’s contribution being given in terms of ideas and comments on drafts.
CHAPTER 2

2. Methodological Considerations

All the empirical studies in this thesis (Chapter 5 to Chapter 10) include a methodology section which outlines the recruitment procedure, the research design, the measures and the statistical techniques employed by the individual studies. The current section aims to discuss some important methodological issues which were beyond the scope of the empirical chapters of this thesis. In particular, the aims of this chapter are the following: i. to provide a general overview of the recruitment procedure and the research designs employed across the studies, ii. to justify the choice of specific measures, and iii. to describe some sophisticated statistical techniques which have been used to test the hypotheses of this research.

2.1. Research Design

A cross-sectional design was used across all the studies of this thesis to examine the mechanisms of suicidal behaviour in those with PTSD. Since the majority of the studies in the thesis explored mediation or moderation hypotheses, an experimental design in which mood was induced or manipulated would be more appropriate for examining which psychological processes underlie suicidal behaviour in those with PTSD. Nevertheless, there are several ethical and practical issues which did not allow the use of an experiment design in this thesis. First, the current thesis examined complicated psychological and emotional processes such as perceptions of defeat and entrapment, feelings of hopelessness, and negative or positive self-appraisals in relation to suicidal behaviour. Although mood induction tasks have been found to result in considerable mood changes (Johnson, Tarrier, & Gooding, 2008b; Maner, Miller, Schmidt, & Eckel, 2008) it is unsure whether they can provoke severe and enduring feelings of hopelessness, defeat or entrapment. In fact, it has been suggested that the continuous experience of feelings of defeat and entrapment makes these feelings maladaptive for the individuals. Second, mood
induction procedures might increase the severity of suicidal behaviours and thus their use would be ethically inappropriate. Finally, this thesis aimed only to provide preliminary evidence of the psychological drivers of suicidal behaviour in individuals with PTSD. Therefore, a naturalistic cross-sectional design was considered appropriate to provide this initial knowledge.

2.2. Participants and Recruitment Strategy

All the empirical chapters of this thesis comprise a section which describes the recruitment procedure and the inclusion and exclusion criteria of the research. However, since these empirical chapters were written in the format of journal articles, the details of the recruitment procedure were sometimes necessarily short. This section aims to provide a detailed description of the recruitment procedures employed by the empirical studies of the current thesis. The inclusion criteria of the study are outlined in each empirical chapter and, thus, they are not included in this section.

The sample of the empirical chapter 5 of this thesis was not recruited by the author of the thesis but from other researchers (Tarrier et al., 1999a,c). The results presented in chapter 5 were based on re-analysing the data from this existing sample. This sample comprised 94 individuals, who fulfilled the criteria for a current diagnosis of PTSD and were originally recruited as part of a screening process to participate in a clinical trial of cognitive behavioural treatments of PTSD (Tarrier et al., 1999a,c). Five individuals were excluded from the analyses in chapter 5 because they had substantial missing data. Therefore, the results of chapter 5 were based on reanalysing data from 89 individuals with full current PTSD.

The recruitment of the individuals who comprised the sample of the following five empirical investigations (Chapter 6 to 10) of this thesis was conducted by the author of this thesis. The recruitment process of these five investigations was completed in two phases. The first phase of the recruitment lasted seven months (December 2009 to June 2010) and
a total of 95 individuals were recruited into the research. In the second phase, the recruitment lasted four months (September 2010 to December 2010) and a total of 58 participants were recruited into the research. The empirical investigations which are outlined in the chapters six and seven of this thesis were based on the first recruitment phase and the empirical studies outlined in the chapters eight, nine and ten of this thesis were based on the second recruitment phase. The participants across all the empirical chapters of this thesis were individuals who had experienced a serious traumatic event in the past. A substantial proportion of those participants fulfilled the full criteria for a current PTSD diagnosis and the remaining participants were either in the remission phase (e.g., these participants fulfilled the criteria for lifetime PTSD) or they never reached the threshold for a PTSD diagnosis. Table 1 presents the number of the individuals who were recruited into the two phases of the research (Chapters 6 to 10).

<table>
<thead>
<tr>
<th>Study</th>
<th>Overall number of participants recruited into the research (N)</th>
<th>Excluded from the study or the analyses of the study (N)</th>
<th>Overall number of those included into the analyses of the research (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1 (Chapter 6)</td>
<td>95</td>
<td>4</td>
<td>91</td>
</tr>
<tr>
<td>Study 2 (Chapter 7)</td>
<td>95</td>
<td>22</td>
<td>73</td>
</tr>
<tr>
<td>Study 3 (Chapter 8)</td>
<td>58</td>
<td>2</td>
<td>56</td>
</tr>
<tr>
<td>Study 4 (Chapter 9)</td>
<td>58</td>
<td>2</td>
<td>56</td>
</tr>
<tr>
<td>Study 5 (Chapter 10)</td>
<td>55</td>
<td>5</td>
<td>50</td>
</tr>
</tbody>
</table>

Table 1. *Number of Individuals Who Were Recruited across the Five Empirical Investigations of the Current Thesis*
As seen in Table 1, overall, 95 participants were recruited in the first phase of the research. From those, three individuals were excluded because they had substantial missing data and one participant was excluded because he reported psychotic symptoms during the research session. Thus, 91 individuals participated in the first study which is presented in Chapter 6 of this thesis. Among the 91 individuals, those who had a current or lifetime diagnosis of PTSD ($n = 73$) comprised the sample of the empirical study which is presented in Chapter 7 of this thesis.

Overall, 63.75% of the initial sample (58 out of 91 individuals) also participated in the second phase of the research (see Table 1). From those 58 individuals, two were excluded from the analyses presented in the empirical Chapters 8, 9 and 10 because they had substantial missing data. Having at least one posttraumatic symptom in the past month was an inclusion criterion across the studies described in Chapters 8, 9 and 10 of this thesis. Consequently, the empirical Chapters 8 and 9 comprised a total of 56 participants. Since the empirical Chapter 10 of this thesis was based on analysing the data from those who had current or lifetime PTSD, three individuals were further excluded because they did not fulfil the criteria for a current or lifetime PTSD. Furthermore, three individuals with current PTSD (according to PDS) refused to participate in the BMAC session. Thus, the empirical study in Chapter 10 was based on analysing the data from a total of 50 individuals with current or lifetime PTSD. Table 2 displays the diagnostic characteristics of the participants who were included into the analyses across the five studies of this thesis. As shown in Table 2, more than half of the individuals who were recruited into the first and second phase of the research fulfilled the full criteria for a current PTSD diagnosis as assessed through the Clinician Administered Posttraumatic Scale (CAPS; Blake et al., 1995) or Posttraumatic Stress Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997).
Table 2. Diagnostic Characteristics of the Individuals who Participated across the Five Empirical Investigations of this Thesis

<table>
<thead>
<tr>
<th></th>
<th>Study 1 (Chapter 6)</th>
<th>Study 2 (Chapter 7)</th>
<th>Study 3 (Chapter 8)</th>
<th>Study 4 (Chapter 9)</th>
<th>Study 5 (Chapter 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current PTSD diagnosis (N)</td>
<td>50</td>
<td>50</td>
<td>34</td>
<td>34</td>
<td>31</td>
</tr>
<tr>
<td>Current PTSD symptoms and a lifetime PTSD diagnosis (N)</td>
<td>23</td>
<td>23</td>
<td>16</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>Current PTSD symptoms without a lifetime PTSD diagnosis (N)</td>
<td>13</td>
<td>_</td>
<td>6</td>
<td>6</td>
<td>_</td>
</tr>
<tr>
<td>No current PTSD symptoms (N)</td>
<td>5</td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>_</td>
</tr>
</tbody>
</table>

2.2.1. First recruitment phase.

In the first phase, the recruitment of the potential participants was based on advertisements in local community. Adverts were placed in local newspapers (i.e., Manchester Evening News) online advertising sites (e.g., Gumtree) and various mental health services in the city of Manchester (e.g., Centre of Anxiety Disorders and Trauma, Victim Support and Rape Crisis Centre). Furthermore, the research and the contact details of the researchers were advertised in the online volunteering system of the University of Manchester. The University of Manchester operates a system whereby all the students and staff members of the University receive weekly email alters about all the new studies which request participants. The adverts were seeking volunteers who had experienced a traumatic event (i.e., crime, physical threat, serious accident, military combat, natural disaster, terrorist attack, diagnosed with a life-threatening illness) in the past, and have
been affected by it. The potential participants had the opportunity to contact the researcher by telephone or email.

Individuals who expressed their interest in participating in the study were contacted by the researcher (MP; via telephone or email) and were provided with further information about the aims and the procedure of the study. Following this initial contact, potential participants who continued to be willing to participate in the study were sent by post or email the Posttraumatic Stress Diagnostic Scale (PDS; Foa et al., 1997). Those who completed and returned the PDS scale were invited to come in the University of Manchester to participate in the study. Participants were reimbursed £10 for their participation in the research.

Adverts in the local community seeking volunteers who had experienced serious traumatic events, comprised the focal recruitment plan for the studies of this thesis for the following two practical reasons. First, many people who experience PTSD symptoms do not receive pharmaceutical or psychological therapy for their PTSD symptoms and thus they do not use the mental health services (Zimmerman & Mattia, 1999). This suggests that a significant proportion of those who suffer from PTSD remain unidentified and untreated unless they seek treatment for other psychological problems (e.g., depression, panic attacks). Second, it is well known that the vast majority of individuals (more than eighty percent) who fulfil the criteria for a PTSD diagnosis also suffer from other comorbid psychiatric diagnoses, especially depressive disorders (Kessler et al., 1995). Since PTSD is often comorbid with other psychiatric disorders, clinicians in mental health settings tend to focus mostly on the patient’s depressive or anxiety symptoms, or panic attacks, and fail to scrutinize for the presence of traumas or PTSD (Briere & Zaidi, 1989; Zimmerman & Mattia, 1999). In fact, a number studies which have investigated the rates of PTSD in mental health services or medical centres, concluded that PTSD often remains under-diagnosed (Grossman et al., 1997; Miele & O'Brien, 2010; Zimmerman & Mattia, 1999).
2.2.2. Second recruitment phase.

All the individuals who were recruited in the second research phase had previously participated in the first research phase. In particular, the individuals who completed the first research phase were asked (at the end of the research procedure) whether they would be willing to participate in future research which was planned to start six to eight months later. Those participants who were interested in participating in the second research phase and agreed to receive further information about this, were re-contacted by the researcher (MP; by telephone or email) and were invited into this second research. Participants were reimbursed with £10 for their participation in the second research.

2.3. Choice of Measures

2.3.1. PTSD diagnosis and assessment of PTSD symptoms.

The Clinician Administered PTSD Scale (CAPS; Blake et al., 1995) was utilized to screen for a current or lifetime diagnosis of PTSD and to assess the severity of PTSD symptoms in the empirical Chapters 6 and 7 of this thesis. The CAPS is a 30-item structured interview which assesses PTSD according to DSM-IV criteria and allows both a dichotomous diagnostic PTSD classification (present/absent) and a continuum assessment of PTSD severity. The CAPS instrument was employed to diagnose PTSD on the grounds of the strong research evidence which has yielded CAPS as the standard criterion measure for assessing the PTSD diagnostic status and the PTSD symptom severity (Foa & Tolin, 2000; King, Leskin, King, & Weathers, 1998; Pupo et al., 2011; Weathers, Keane, & Davidson, 2001). Consistent with this, a recent study demonstrated that the CAPS is the most common instrument which mental health professionals use to assess PTSD (Elhai, Gray, Kashdan, & Franklin, 2005). The CAPS interview has been found to have excellent psychometric properties including reliability (e.g., internal consistency, test-retest reliability and inter-rater reliability) and validity (e.g., construct validity, content validity) in a range of trauma populations (Betemps, Smith, Baker, & Rounds-Kugler, 2003; Foa &
Moreover, the CAPS measure, as a clinician administered clinical interview allows clinical judgements and interpretations and avoids the limitations of the self-report measures.

Despite the numerous strengths of the CAPS, a self-report measure rather than CAPS was used to confirm a current PTSD diagnosis and to assess the presence and severity of the PTSD symptoms across three empirical studies which are presented in Chapters 8, 9 and 10 of this thesis. The CAPS was not used to assess the PTSD diagnosis and the severity of the PTSD symptoms in the above chapters for two reasons. First, the administration of the CAPS requires a long time (approximately 45 to 50 minutes) and its simultaneous administration with the tasks presented in the three empirical studies (Chapter 8, 9 and 10) in a single session was impractical. Second, all the individuals who participated in the last three empirical studies of this thesis (Chapters 8, 9 and 10) had participated in the previous empirical studies (Chapters 6 and 7) and thus they have been already assessed using the CAPS. In the second phase of the research (Chapter 8 to 10) the main research aim was to re-assess the number and the severity of the PTSD symptoms that the participants experienced rather than to re-diagnose PTSD. Thus, the use of a self-report measure which required considerably less time to be administered was deemed suitable to achieve this aim.

The Posttraumatic Stress Diagnostic Scale (PDS; Foa et al., 1997) was used to assess the number and severity of the PTSD symptoms across three empirical studies in this thesis (Chapters 8 to 10). The PDS is a 49-item self-report measure which was developed to screen for PTSD according to the DSM-IV criteria and to assess the severity of the PTSD symptoms. This measure was chosen because it is widely used in clinical and research settings (Brewin, 2005; Duffy, Gillespie, & Clark, 2007; Martin, Fincham, & Kagee, 2009; McCarthy, 2008) and its administration requires only 15 minutes. One investigation among posttraumatic stress professionals demonstrated that the PDS was the
most widely used instrument to assess exposure to traumas and one of the most commonly
used tools for assessing PTSD symptoms (Elhai et al., 2005). Furthermore, the PDS has
been found to have high internal consistency (Cronbach’s alpha = .92) and test-retest
reliability (Kappa = .74) and an 82% agreement with the CAPS interview (Foa et al.,
1997).

2.3.2. Measuring defeat and entrapment.

As discussed in the previous chapter (Chapter 1), perceptions of defeat and
entrapment are considered the proximal psychological processes to suicidal behaviours
across two prominent theoretical models of suicide (Bolton et al., 2007; Johnson et al.,
2008a; Williams, 1997; Williams et al., 2005). Thus, the investigation of the proposed role
of defeat and entrapment in the development of suicidal thoughts and behaviours in those
with PTSD was a fundamental aim of this thesis. It should be noted that the CoP
(Williams, 1997; Williams et al., 2005) suggests that in addition to the occurrence of defeat
and entrapment, having no method of escape and no escape potential is another focal factor
which increases considerably the risk for suicide when combined with severe feelings of
defeat and entrapment. The effect of the interaction between perceptions of defeat and
entrapment and no rescue factors on suicidality was not investigated into the present thesis
because the “no rescue” factor is not conceptually clear and often overlaps with other
processes including hopelessness (Johnson et al., 2008a; Williams, 1997) and social
support (O’Connor, 2003; Weber, Metha, & Nelsen, 1997).

Two self-report measures which have been developed by Gilbert and Allan (1998)
were used to measure perceptions of defeat and entrapment throughout this thesis. These
self-reports were selected because they are the most frequently used and best validated
measures of defeat and entrapment in the literature (Taylor et al., 2011a). For example,
Gilbert and Allan (1998) have found that defeat and entrapment scales have high internal
consistency (e.g., a Cronbach’s alpha of .93 to .94 for defeat and .86 to .94 for entrapment).
Furthermore, Taylor and colleagues (2009) provided evidence that defeat and entrapment demonstrated by using exploratory factor analysis that defeat and entrapment comprise a distinct unitary factor.

One measure, the Mental Defeat during Trauma Scale (MDTS; Dunmore, Clark, & Ehlers, 1999) has been used to assess feelings of mental defeat among PTSD populations in particular. The concept of mental defeat encompasses negative self-appraisals relating to the loss of psychological autonomy and identity as a human being (Ehlers, Maercker, & Boos, 2000). The MDTS measure requires the responders to rate retrospectively their thoughts and feeling in terms of defeat at the time of the trauma. Three studies have been identified in the literature which utilized MDTS to assess defeat (Dunmore et al., 1999; Dunmore et al., 2001; Kleim et al., 2007). Despite the fact that all the empirical studies in this thesis recruited individuals exposed to traumas, the MDTS was not used. The main reasons for this were the following. First, the unidimensionality of MDTS has not yet been confirmed by employing factor analyses or other similar analyses, and further validation of the measure is needed (Taylor et al., 2011a). Second, the retrospective character of the MDTS raises concerns regarding the accuracy of the responses (Taylor et al., 2011a). Third, the MDTS has been designed to measure perceptions of defeat but not entrapment.

Dunmore and colleagues (1997) have developed a narrative-based coding system for assessing perceptions of defeat in relation to traumatic experiences among trauma victims. This method involves external raters who assess perceptions of defeat from transcribed sessions and clinical interviews. Three studies so far have used this technique to measure perceptions of defeat among trauma populations (Dunmore et al., 1997; Ehlers et al., 1998; Ehlers et al., 2000). These external ratings of perceptions of defeat have been found to have high inter-rater reliability (Kappa = .87; Ehlers et al., 2000) and avoid the limitations associated with using self-report measures. Thus, they might comprise an interesting area for further development. Nevertheless, similar to the use of MDTS these
external techniques suffer a series of limitations which made them unsuitable for the examination of the aims of this the current thesis. First, this thesis aimed at investigating the role of both defeat and entrapment in relation with suicidality but currently there are no external indices to measure perceptions of entrapment. Second, these indices might involve accuracy problems because they are based on assessing retrospective accounts. Furthermore, their effectiveness in capturing complicated subjective perceptions of defeat and entrapment has not yet empirically confirmed (Taylor et al., 2011a).

Another issue which is worthy of mention is the use of defeat and entrapment as single construct in the statistical analyses across three empirical chapters of this thesis (Chapters 6, 7 and 8). This choice was mostly based on the work of Taylor and his colleagues who demonstrated that defeat and entrapment form a single factor using exploratory factor analysis (Taylor et al., 2009). Furthermore, this choice was also informed by the premises of a recent theoretical model of suicidal behaviour which conceptualizes defeat and entrapment as a unitary psychological process which drives suicidal behaviour in a range of clinical populations (Johnson et al., 2008a; Taylor et al., 2010a,b).

2.3.3. Measuring depression.

The Beck Depression Inventory or BDI-II (Beck, Steer, Ball, & Ranieri, 1996a) was used to assess the severity of depressive symptoms in this thesis. The BDI-II is a 21-item self-report measure which assesses the presence of a series of emotional and somatic symptoms which have been observed among depressed individuals. The BDI-II is a revised version of the BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and BDI-IA (Beck & Steer, 1993) which corresponds to the diagnostic criteria of the DSM-IV for major depression. Each of the 21 items of the BDI-II is rated in a 0-3 scale with higher scores indicating more severe depression. For example, among individuals diagnosed with
depression, scores between 0-13 indicate minimal depression, 14-19 mild depression, 20-28 moderate depression and 29-63 severe depression (Beck et al., 1996a).

The use of the BDI-II as a screening tool for the severity of depressive symptoms in this thesis was based on the following advantages of the measure. First, the BDI is one of the best known and commonly used measures to assess the severity of depressive symptoms in clinical and research settings (for a review, Richter, Werner, Heerlein, Kraus, & Sauer, 1998). This suggests that the results of the current thesis can be directly compared with the results of a large number of studies which used the same tool to assess severity of depressive symptoms. Second, the BDI is an easily administered and brief instrument (i.e., requires only 5 to 10 minutes; Beck et al., 1996a) and thus can be effortlessly used together with other measures in a single research session. Third, the BDI has been found to have excellent psychometric qualities such as internal consistency (alpha coefficient of .91), one week test-retest reliability ($r = .93$), high content validity, sensitivity to change and a high agreement with other measures of depression including the Hamilton Depression Scale ($r = .71$) (Beck et al., 1996a; Beck, Steer, & Brown, 1996b; Dozois, Dobson, & Ahnberg, 1998; Richter et al., 1998). Another advantage of the BDI is that it provides a valid differentiation between depressed and non depressed individuals (Richter et al., 1998).

Nonetheless, it should be noted that the use of the BDI measure is also associated with limitations. In particular, the BDI-II has the disadvantages associated with the use of self-report measures. For instance, the total score can be higher or lower based on personal evaluations of the individuals who complete the questionnaire and the way that the BDI instrument is administered (Bowling, 2005; Kerr & Kerr, 2001; Richter et al., 1998). Another limitation of the BDI is related to the use of the BDI as a diagnostic tool. The BDI should be used cautiously since it has been developed to be used to assess the severity of depressive symptoms, not to diagnose clinical depression (Hersen, Turner, & Beidel,
Furthermore, Richter and colleagues (1998) in their review concluded that the BDI suffers shortcomings relating to high item difficulty, controversial factorial validity and instability of scores in short time-intervals. These limitations should be taken into account when BDI-II is used for examining the levels of depression for research and clinical purposes.

2.3.4. Measuring hopelessness.

Hopelessness has been conceptualized as a set of cognitive schemata which incorporate negative expectations and pessimistic thoughts about the future (Beck, Weissman, Lester, & Trexler, 1974). Since the existing theoretical and empirical evidence suggest that the value of hopelessness as a predictor of suicide risk is particularly high, the assessment of the levels of hopelessness in those with PTSD and its relationship with suicidality was a central focus of this thesis. To measure the levels of hopelessness in this thesis, a well-known self-report measure, the Beck Hopelessness Scale (BHS; Beck et al., 1974) was utilized. The development of the BHS was based on Beck’s cognitive theory of depression and research on attempted suicide (Beck et al., 1974), and represented an attempt to quantify the broad concept of hopelessness (Hanna et al., 2011; Velting, 1999). The BHS contains 20 true or false items (e.g., 11 negatively phrased items and 9 positively phrased items) which assess hopeless thoughts and beliefs in the past week. A high score on the hopelessness scale indicates the presence of high levels of hopelessness while a low score indicates absence of hopelessness (Beck et al., 1974; Glanz, Haas, & Sweeney, 1995).

One core characteristic of the BHS measure is that high levels of hopelessness, as assessed through the BHS, strongly predict both suicidal behaviour and completed suicide (Beck et al., 1988). For example, two studies have demonstrated that hopelessness predicted completed suicide. Importantly, it was found that individuals who had a cut off score of 9 on the BHS were 9 to 11 times more likely to commit suicide compared to the
individuals who had lower levels of hopelessness (Beck, Brown, Berchick, Stewart, & Steer, 1990; Beck, Steer, Kovacs, & Garrison, 1985). Furthermore, there is evidence that hopelessness predicts suicidal risk more reliably than depression (Beck, Steer, Beck, & Newman, 1993; Chochinov, Wilson, Enns, & Lander, 1998). Thus, it appears that a high score on the BHS measure is a reliable indicator of the risk for suicide. Another important advantage of the BHS is that it is the most widely used instrument for measuring hopelessness among clinical and nonclinical populations including individuals with traumas or PTSD (e.g., Clements, Sabourin, & Spiby, 2004; Machado, de Azevedo, Facuri, Vieira, & Fernandes, 2011; Scher & Resick, 2005). Other measures of hopelessness in the literature include the hope scales developed by Obayuwana and colleagues (1982) and Miller and Powers (1988), but these hope measures have not been used extensively in the literature and their characteristics have not yet been adequately examined (Glanz et al., 1995). A third advantage of the BHS is that it is the most psychometrically sound measure of hopelessness (Steed, 2001). In particular, the internal consistency of the BHS has been reported to be high among clinical populations (alpha coefficient of .83 to .93) (Beck et al., 1974; Durham, 1982; Dyce, 1996; Young, Halper, Clark, Scheftner, & Fawcett, 1992) and acceptable in non-clinical populations (alpha coefficient of .65 to .88) (Chang, Dzurilla, & Maydeu-Olivares, 1994; Durham, 1982; Steed, 2001). Beck and colleagues (1990; 1985) reported a sensitivity of 91% and 94% for the BHS measure at three and 10 year follow-up assessments, respectively. Moreover, there is evidence that the BHS has high convergent validity and is highly correlated with other measures which assess future expectations and perceptions of optimism/pessimism (Steed, 2001). Overall, research has shown that BHS is reliable and valid measure for hopelessness which has been extensively used for research proposes. Based on the above, BHS was selected to measure hopelessness in this thesis.
Nevertheless, it is worth mentioning some limitations of the BHS measure which require consideration when interpreting the findings of this thesis. One core area of criticism of the BHS measure is that it is highly susceptible to social desirability bias and thus its reliability and validity are reduced in situations where responders wish to complete the scale in a socially desirable manner (Glanz et al., 1995). In addition, more research is needed in defining the hopelessness construct and its ability to predict suicidal behaviour (Glanz et al., 1995; Hanna et al., 2011). For example, recent directions suggest that hopelessness is best conceptualized as including both, negative future expectations and lack of positive future expectations (Johnson et al., 2008a; O'Connor, 2003). Studies investigating the factor composition of the BHS through the use of factor analyses have produced inconsistent findings (Haaga, Dyck, & Ernst, 1991; Mystakidou et al., 2008; Pompili, Tatarelli, Rogers, & Lester, 2007; Rosenfeld, Gibson, Kramer, & Breitbart, 2004). These inconsistent findings provide a further area of criticism regarding the conceptual status of hopelessness and the ability of the BHS measure to capture adequately the hopelessness concept (Glanz et al., 1995; Hanna et al., 2011).

2.3.5. Measuring suicidal behaviour.

The examination of the frequency and severity of suicidal behaviours such as suicidal ideation or plans and suicide attempts among individuals with a PTSD diagnosis or PTSD symptoms was the fundamental aim of the current thesis. Across the total number of the empirical studies (except the empirical study presented in Chapter10) of this thesis, suicidal behaviour was the key variable of interest and the main outcome measure. Throughout this thesis, a self-report measure, the Suicidal Behaviors Questionnaire-Revised (SBQ-R; Osman, et al., 2001) was used to assess suicidality. The SBQ-R contains four items which assess different aspects of suicidality. In particular, item 1 evaluates the lifetime prevalence of suicidal ideation, plans and suicide attempts, item 2 evaluates the frequency of suicidal ideation in the past year, item 3 taps previous communication of
suicide intent, and item 4 assesses the self-reported likelihood of suicide. The overall score on SBQ-R can range between 3 and 18. The cut off SBQ-R score has been proposed to be ≥ 7 in non-clinical samples and ≥ 8 in psychiatric patients (Osman et al., 2001).

The SBQ-R measure was deemed appropriate for the purposes of this thesis for the following reasons. First, since suicidal thoughts and acts are an inherently private phenomenon, it has been suggested that individuals may have difficulties in disclosing suicidal thoughts or suicide attempts in the context of prolonged clinical interviews (Kaplan et al., 1994; Range & Knott, 1997; Yigletu, Tucker, Harris, & Hatlevig, 2004). Due to this limitation of the extensive interviews, brief self-report measures such as the SBQ-R potentially comprise a more acceptable means of suicidality assessment (Osman et al., 2001; Yigletu et al., 2004). Second, the SBQ-R is a straightforward measure which assesses suicidality directly and uncovers a wide range of information by asking just few questions (Osman et al., 2001; Range & Knott, 1997). Third, the reliability scores of the SBQ-R across clinical and non-clinical populations have been found to be adequate to high (alpha coefficient to range between .76 and .88). A cut off score of 8 on total SBQ-R has been found to have good sensitivity (.87), specificity (.93), and to be of predictive value (positive =.90, negative =.99) among clinical samples (Osman et al., 2001). The total SBQ-R score has also demonstrated evidence of concurrent and divergent validity (Gutierrez, Osman, Barrios, & Kopper, 2001; Osman et al., 2002). Furthermore, the SBQ-R has been used to assess the severity of suicidal behaviours among trauma populations such as childhood trauma victims (Clements-Nolle, Wolden, & Bargmann-Losche, 2009). Additional benefits of the brief SBQ-R measure is that it is easily administered and requires less than five minutes to be completed and scored (Osman et al., 2001). Finally, the focus of this study was to assess the presence and severity of a range of non fatal suicidal behaviours because these are indicative of heightened psychological distress (Reinherz et al., 2006) and substantially amplify the risk for subsequent suicide (Niméus,
et al., 2002; Reinherz et al., 2006; Sidley et al., 1999). The use of the SBQ-R fulfils this aim since its overall score provides a continuum assessment of suicidal risk.

However, the use of the SBQ-R has important limitations. For example, the SBQ-R is a brief measure which assesses an amalgam of various forms of suicidality and calculates an overall suicidal risk score but does not provide detailed information about the severity of the different modes of suicidal behaviour. Furthermore, the SBQ-R was selected as a measure of suicidal behaviours in this study based on the assumption that suicidal behaviours exist on a continuum from fleeting suicidal ideas to severe suicide attempts and completed suicides (Claes et al., 2010; Corcoran et al., 2004; Johnson et al., 2008a; Mann et al., 1999; Sidley et al., 1999). Nevertheless, research suggests that different forms of suicidality (e.g., suicidal ideas and plans) and completed suicides might represent related but distinct phenomena (Beautrais, 2001). Finally, although SBQ-R has good psychometric properties further evaluation is needed among clinical and non-clinical populations (Osman et al., 2001).

2.3.6 Measuring self-appraisals.

As presented in Chapter 1, one core hypothesis to be examined in this thesis was that self-appraisals have a central role in the development of suicidal behaviour. Based on the assumptions of the Schematic Appraisal Model of Suicide (SAMS; Johnson et al., 2008a) it was predicted that negative self-appraisals would lead to suicidality in PTSD through their deleterious effect on feelings of defeat and entrapment. This hypothesis was empirically tested in Chapter 8 of this thesis.

In order to investigate the role of negative self-appraisals in the development of suicidal behaviour, a newly proposed self-report measure, the Suicide Resilience scale (RAS; Johnson et al., 2010a) was utilized. The RAS includes 12 items which are rated on 5 point scale which ranges from “strongly disagree” to “strongly agree”. Three particular types of self-appraisals are assessed through the RAS including emotion coping appraisals
(4 items), situation coping appraisals (4 items) and social support appraisals (4 items). A confirmatory factor analysis among 118 students of the University of Manchester provided support for the proposed three factor structure of the RAS (Johnson et al., 2010a). The internal consistency of the RAS has been found to be .88 for the total score and .92, .93 and .93 for the emotion coping factor, situation coping factor and social support factor, respectively (Johnson et al., 2010a).

The RAS measure was selected to assess negative self-appraisals in this thesis because it is was particularly developed to test the types of self-appraisals (e.g., appraisals of the ability to cope with negative emotions, to solve problems and access social support) which have been suggested by the SAMS to be central to the development of suicidal thoughts and behaviours (Johnson et al., 2008a). According to the SAMS, these three types of self-appraisals substantially worsen the risk for suicide when they are negatively-valenced (Johnson et al., 2010a; Johnson et al., 2011b). Thus, by selecting the RAS as a measure of negative self-appraisals, a core speculation of the theoretical model (e.g., the SAMS model) which guided the current thesis was directly tested. Additionally, the RAS measure has been previously used in two empirical studies which investigated the role of self-appraisals in suicidality (Johnson et al. 2010a,b). An additional empirical study used the RAS to investigate resilience to feelings of hopelessness in the elderly (Gooding, Hurst, Johnson, & Tarrier, in press). Finally, no other measure has been identified in the literature to examine these three types of self-appraisals.

A core limitation of the RAS measure is that it comprises a newly developed measure and as such its characteristics and usefulness have not been examined extensively. So far the RAS has been utilized to measure self-appraisals among psychotic individuals (Johnson et al., 2010b), University students (Johnson et al., 2010a) and elderly (Gooding et al., in press). A final problem is that the RAS may not measure key resilience concepts with enough breadth. For example, it does not contain items to measure of the ability to
‘bounce back’ from negative events which is considered to be an important feature of resilience (Johnson et al., 2011b). Thus, there is a dearth of studies which examine the efficacy of RAS across different research populations. Furthermore, the psychometric properties of the RAS need to be further examined in order to be established as a reliable and valid tool for measuring self-appraisals.

2.4. Statistical Techniques

The statistical techniques which were employed to test the hypotheses of the current thesis are explained in each empirical chapter. Nevertheless, two statistical approaches, the Structural Equation Modelling (SEM) and Bootstrapping require some further discussion since they might be less familiar than other statistical methods. A basic overview of these two techniques is provided below.

2.4.1. Structural Equation Modelling (SEM).

Structural Equation Modelling (SEM) is a statistical technique which is mainly used for testing pre-defined (confirmatory) models (Kline, 1998) but can also be used for estimating exploratory models (Ting, 1998). Thus, SEM can be employed for both theory testing and theory development. In the current thesis, SEM was utilized for investigating potential paths to suicidal behaviour in PTSD (Chapter 5) and for testing the meditational effects of perceptions of defeat and entrapment on suicidal behaviour in PTSD (Chapter 7).

SEM was used to investigate the core hypotheses of this thesis on the grounds of its following strengths. First, one important advantage of the SEM is that allows the testing of relationships between observed and latent variables based on covariance or correlation matrices (Kline, 1998). Latent variables are constructs which cannot be measured directly but can be only inferred from other directly measured (observed) variables. The use of latent variables increases the validity of the resulting model because it allows SEM to test underlying constructs which are an aggregation of a number (small or large) of observed variables (Kline, 1998). Another advantage of the SEM is that the assessment of the final
constructed model is based both on the significance of the individual parameters of the model and on the overall fit of the model with the observed data (Hu & Bentler, 1999; Kline, 1998). This implies that two competing theoretical models with different levels of complexity can be directly compared through SEM. These strengths of the SEM (the use of latent variables and the ability to compare competing models) are particularly useful for testing mediation effects. In particular, the ability to compare mediation models with variable complexity implies that full (e.g., the direct effect of the independent variable on the dependent variable is rendered insignificant when the mediator variable is added in the model) and partial (e.g., the direct effect of the independent variable on the dependent variable pertains even after the addition of the mediation variable into the model) can be directly compared (Cheung & Lau, 2008). A comparison between full and partial mediation models provides more accurate information about the nature of the mediational effect (Cheung & Lau, 2008) and supports the selection of the model which has the best fit. Furthermore, SEM provides the opportunity to test latent variables as mediators and examine their mediational effects (Cheung & Lau, 2008). These advances make SEM superior for testing mediation effects compared to other methods such as multiple regression (Baron & Kenny, 1986) and partial correlations.

Nevertheless, the use of the SEM approach has important limitations, such as requiring large sample sizes, normally distributed data and the absence of substantial multicollinearity (i.e., multicollinearity occurs when two or more independent variables in the model are strongly correlated with each other). To compensate for smaller sample sizes, a range of corrections to goodness-of-fit indices have been proposed in the literature, which have been found to be effective for reducing the possibility of a Type I or Type II error (Fouladi, 2000; Nevitt & Hancock, 2004). Furthermore, the use of various statistical techniques such as corrections to fit indices and polychoric correlation input matrices and
alternative estimation approaches have been proposed to compensate for skewed or ordinal data (Fouladi, 2000; Lei, 2009; Satorra & Bentler, 2001).

2.4.2. Bootstrapping.

Bootstrapping is a non-parametric method for statistical inferences through the use of random re-sampling (Mooney & Duval, 1993). Bootstrapping involves taking numerous subsamples with replacement from the original sample to estimate a statistic of interest (e.g., regression coefficient) in each subsample. Mooney and Duval (1993) suggested that at least 1000 re-samples are required for statistical inferences. The statistic of interest which has been calculated in each subsample is in turn used to construct an empirically-drawn sampling distribution for this statistic. The bootstrapping method assumes that the resulting empirically-drawn sampling distribution accurately reflects the distribution of the particular statistic in the population (Fox, 2008; Mooney & Duval, 1993). Thus, confidence intervals can be produced from the bootstrapped distribution to examine the null hypotheses of the research (Fox, 2008; Mooney & Duval, 1993; Wood, 2005).

Bootstrapping is considered the finest statistical method for testing mediation effects (Preacher & Hayes, 2004). One reason for this is that the bootstrapping approach does not require normally distributed data to be utilized for testing mediation effects (Fox, 2008). Another method for testing the mediated or indirect effects is the Sobel’s test which contrary to the bootstrapping method requires normally distributed data to reach valuable inferences. The assumption of normality has been suggested to limit the suitability of the Sobel’s test for testing mediation because the mediated effect is often non-normally distributed (Cheung & Lau, 2008). An additional advantage of the bootstrapping approach is that it continues to function well when testing mediation effects in smaller sample sizes. Furthermore, the bootstrapping approach allows the examination of multiple mediators and the inclusion of one or more covariates in the mediational model (Preacher & Hayes,
Consequently, bootstrapping represents a rigorous alternative method for testing mediation effects.

Bootstrapping was used in Chapter 8 of this thesis to examine the mediational effects of feelings of defeat and entrapment in the relationship between negative self-appraisals and suicidal behaviour. In addition, the bootstrapping method was utilized to examine the significance of indirect effects in the SEM analyses presented in Chapter 7 of the current thesis.
CHAPTER 3

3. Posttraumatic Stress Disorder and Suicidal Behaviour: A Narrative Review

3.1. Abstract

There is a large literature investigating the underlying mechanisms, risk factors and demographics of suicidal thoughts and behaviours across a number of psychiatric disorders, such as, major depression, anxiety and schizophrenia. However, less research has focused on the relationship between Posttraumatic Stress Disorder (PTSD) and suicide. There were two broad aims of this review. The first was to assess the extent to which PTSD is associated with suicide, and the second was to determine the effects of co-morbid disorders on this relationship. Overall, there was a clear relationship between PTSD and suicidal thoughts and behaviours irrespective of the type of trauma experienced. Very few studies directly examined whether depression was a mediating factor in the relationships reported. However, where this was investigated, the presence of comorbid depression appeared to boost the effect of PTSD on suicidality. It was noteworthy that hardly any studies had investigated concepts thought to be critical in other domains of research into suicidality, such as, feelings of entrapment, defeat and hopelessness.

3.2. Introduction

Suicidal behaviour is considered a major clinical and social problem especially in
developed countries (Haukka et al., 2008). Accurate information reflecting suicide rates is
not always available, however where it is, suicide is included in the ten leading causes of
death across different age groups (Bertolote & Fleischmann, 2005). Previous research has
estimated the lifetime prevalence of suicidal ideation to range from 4.8% (Paykel et al.,
1974) to 18.5% (Weissman et al., 1999) and the lifetime prevalence of suicide attempts to
range from 1.1% (Paykel et al., 1974) to 5.9% (Weissman et al., 1999). Recently, a 7.8%
lifetime prevalence of suicidal ideation and a 1.3% lifetime prevalence of suicide attempts
was reported in a large epidemiological community study in Europe (Bernal et al., 2007).
Sociodemographic factors have been identified as significant predictors of suicidal
behaviour including female gender, being of younger age, and being divorced or widowed
(Bernal et al., 2007) and some work indicates that these predictors apply to both Western
and Asian cultures (Tran Thi Thanh et al., 2006). Psychiatric diagnoses have also been
strongly related to suicidality with major depression, dysthymia, substance use disorders,
general anxiety disorders (GAD) and PTSD having a strong association with suicidal
behaviour (Bernal et al., 2007; Weissman et al., 1999). Of these disorders, the impact of
PTSD on suicidal behaviour has received the least attention in the literature. The overall
aim of this review is to redress this by examining the impact of PTSD on suicidal acts,
behaviours and thoughts.

PTSD is commonly conceptualized as an anxiety disorder occurring subsequent to a
traumatic event which is perceived as highly threatening. An individual does not have to
experience the traumatic event directly, but can develop the disorder after witnessing such
an event (APA, 2000). PTSD is multi-faceted, comprising three distinct symptom clusters:
a) repeated and persistent intrusive memories related to the experienced trauma (thoughts,
dreams/ nightmares), b) avoidance of situations that are reminders of the trauma and
psychological numbing, and c) hyper-arousal, such as, irritability, reduced concentration, exaggerated startle response (DSM IV-TR; APA, 2000). Estimates from general population samples indicate that PTSD is a common disorder with a lifetime prevalence ranging from 8% to 9%, with the incidence of the disorder being twice as common in women than men (Breslau, 2002; Kessler et al., 1995). The prevalence rate of PTSD is influenced by severity, duration and proximity of the experienced trauma. Specific types of trauma such as sexual/physical abuse and combat exposure appear to be more robustly associated with the subsequent development of PTSD (Adams & Lehnert, 1997). Other risk factors related to the development of PTSD include pre-existing anxiety disorders, depression and somatoform disorders (Frans, Rimmo, Aberg, & Fredrikson, 2005; Hapke, Schumann, Rumpf, John, & Meyer, 2006).

PTSD is associated with severe emotional disturbances such as intense feelings of anger and irritability, feelings of being alienated, guilt, shame or mistrust and frequent comorbid psychiatric disorders. Higher prevalence or incidence rates of suicidal behaviour have been documented in individuals with PTSD (Bullman & Kang, 1994; Davidson, Kudler, Saunders, & Smith, 1990; Ferrada-Noli et al., 1998b; Kramer, Lindy, Green, Grace, & Leonard, 1994). In a study examining suicidal behaviour after severe trauma, Ferrada-Noli et al. (1998b) reported that 57% of the PTSD participants reported suicidal behaviour compared with 29% of the participants with other psychiatric diagnoses (e.g. depressive disorders, anxiety disorders, personality disorders). Co-morbidity of PTSD with other psychiatric disorders heightens the risk of suicide. In one study, which assessed co-morbidity patterns in a large sample of young people (aged 14-24) with a history of previous suicide attempts, the highest risk for a suicide attempt was found among those suffering from PTSD, followed by dysthymia and simple phobias (Wunderlich, Bronisch, & Wittchen, 1998).
Explanations of suicidal behaviour have been mainly derived from identifying psychologically relevant correlates of suicide rather than from a theoretical perspective. It has been noted that the generic nature and the weak theoretical foundation of the proposed models hamper their applicability across a wide range of different clinical populations and limit their efficiency in generating clear and testable predictions (Westefeld et al., 2000). Consequently, it can be argued that there is a paucity of theoretically driven, clearly defined, empirically testable models of the psychological pathways leading to suicide in general (O'Connor & Sheehy, 2001) and to suicide in PTSD in particular.

A recent paper suggested three broad theoretical alternatives in understanding suicidal behaviour (Bolton et al., 2007).

First, suicidal behaviour may occur as a consequence of the enactment of a unitary transdiagnostic, albeit multi-factorial, causal mechanism which operates across a number of disorders and is, therefore, common across a range of mental illnesses.

Second, suicidal behaviour may result from factors which are specific to particular diagnoses implying non-unitary, diagnosis-specific mechanisms which underlie suicidal behaviour.

Third, in contrast to the first alternative, a cluster of symptoms, apparent in one type of disorder may account for the presence of suicidal behaviour. For example, high rates of major depression have been observed in individuals diagnosed with PTSD (Kessler et al., 1995) and this has been found to compound the risk for suicide (Freeman et al., 2000; Tarrier & Gregg, 2004). Therefore, an increased incidence or prevalence of suicidal behaviour in persons with a PTSD diagnosis may be due to co-morbid depression and not to PTSD per se.

A combination of any of the three theoretical possibilities proposed above may also apply. For instance, a fourth possibility is that there may be factors which are part of a transdiagnostic general mechanism that are common to a range of psychological disorders,
but they are moderated by specific features of a particular disorder. For example, appraisals of an individual's future may be devoid of any positive factors in those who are suicidal but it is amplified in PTSD by feelings that previously experienced traumas will re-occur, that this is inevitable, and that there is no escape. Clarifying the above alternatives is essential from both theoretical and clinical perspectives. Treatment implications will differ accordingly to whether suicidal behaviour in PTSD is evoked by a transdiagnostic set of factors, and/or by factors specific to PTSD.

Although the research evidence for heightened rates of suicidal behaviour among individuals diagnosed with PTSD has increased recently, reviews assessing the association between PTSD and suicidal behaviour are absent from the literature. This is surprising taking into account the great burden suicidal behaviour constitutes for individuals, communities and society in general. Thus, the main goal of the present paper is to provide a comprehensive account of the available research findings in the area of PTSD and suicidal behaviour. The particular objectives of the present review are:

1. To determine if there is a significant association between PTSD and suicidal behaviour, and if so, to investigate whether this association is direct or whether it is influenced by other factors.

2. To examine the possible effects of co-morbid psychiatric disorders on the relationship between PTSD with suicidal behaviour, with a focus on co-morbid depression.

3.3. Methods

3.3.1. Eligibility criteria of the studies included in the review.

Studies were selected for inclusion in this review if they met the following criteria:

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1 Studies were identified by the first author, MP. For all studies it was obvious whether the articles should or should not be included in the review. Hence, no interrater-reliability was considered necessary for the inclusion of studies.
1. They were published in a peer reviewed journal in the English language.

2. They included any measure of PTSD (e.g. self report, clinician rated) and any measure of suicidality.

3. The sample comprised participants aged 15 years and older. This was to optimize inclusivity and also because of differences between studies in terms of age inclusion criteria.

3.3.2. Search strategy for the identification of relevant studies.

A broad search strategy for potential articles was used in order to include all relevant studies. Electronic searches of Medline (1966 to October 2008), EMBASE (1966 to October 2008), PsycINFO (1966 to October 2008) and Web of Science (1966 to October 2008) were made with subject headings including PTSD, POSTTRAUMATIC, POSTTRAUMATIC, SUICIDE, SUICIDAL, SUICIDALITY and text words including SUICID*, POSTTRAUMATIC, POSTTRAUMATIC, PTSD.

3.4. Results

A total of 65 studies were identified and reviewed in terms of i) the type of trauma experienced (combat veterans, individuals exposed to physical or sexual victimization or intimate partner violence, individuals exposed to natural disasters and participants whose PTSD diagnosis resulted from a mixture of different traumas); ii) community-based surveys which have examined links between PTSD and suicide; iii) the presence of other Axis I or Axis II psychiatric diagnoses, in particular, major depression, substance use disorders, psychoses and borderline personality disorder (BPD); and iv) PTSD and suicide in specific populations, such as, refugees, HIV patients and police officers.
3.4.1. The types of trauma experienced: PTSD and suicidal behaviour.

3.4.1.1. Combat trauma, PTSD, suicidal behaviour.

It has been noted by numerous sources that military personnel returning from conflict zones are at a much greater risk of developing serious psychological problems, such as PTSD and suicidality than civilians (Friedman, 2004, 2005). The multiple and unrelenting stressors faced during combat are clear factors implicated in the development of such disorders. Furthermore, an important factor in explaining suicides is access to a means of suicide and knowledge of how to attempt suicide (Williams, 1997). It has been noted that war veterans with PTSD have access to a large range of weapons, including guns and knives, compared to other groups of psychiatric patients, e.g. those with schizophrenia and substance abuse disorders (Freeman, Roca, & Kimbrell, 2003) and that they report suicidal ideation involving such weapons (Freeman, Clothier, Thornton, & Keesee, 1994). Ready access to weapons as a means of suicide, and training in the use of those weapons, differentiates veterans with PTSD from those suffering from PTSD resulting from non-combat related traumas.

i. Successful suicides. The majority of studies investigating mortality rates among male war veterans report significantly heightened suicide rates in PTSD cases compared with non-PTSD cases (e.g., Boscarino, 2006; Drescher et al., 2003). Farberow, Kang, and Bullman (1990) investigated risk factors for suicide among deceased war veterans and concluded that although suicide cases did not differ substantially from non-suicide cases with respect to known socio-demographic risk factors and psychological profiles, PTSD symptoms were observed more frequently among suicide cases than those in whom accident was cause of death.

Increased rates of co-morbid psychiatric disorders such as depression and substance use disorders have been repeatedly observed among war veterans (e.g., Lehmann, McCormick, & McCracken, 1995). There is also evidence that PTSD patients with co-
morbid disorders exhibit a substantially greater frequency of suicides compared with PTSD patients without co-morbid psychiatric morbidities. For example, veterans with co-morbid psychiatric disorders had an almost 10-fold excess of suicides compared with the U.S population, whilst PTSD veterans without concurrent disorders had a 6-fold excess of suicides compared with U.S population (Bullman & Kang, 1994). Similar results were found when factors affecting survival rates between 1992-2002 were examined in World War II survivors in the Netherlands (Bramsen, Deeg, Van der Ploeg, & Fransman, 2007). A probable PTSD diagnosis as well as suicidal thoughts were significantly associated with risk of death, and this was found to be mediated, to some extent, by levels of depression.

One study, however, reported results which seemed completely contrary to these findings. Zivin and co-workers (2007), in a sample of deceased war veterans with a primary diagnosis of depression, not only failed to demonstrate a positive correlation between PTSD and suicide rates but, even more surprisingly, reported a lower rate of suicides among depressed veterans with co-morbid PTSD compared to those without PTSD (Zivin et al., 2007). However, the inverse association of PTSD diagnosis with suicide rates was more prominent among older veterans such that older depressed veterans with co-morbid PTSD had a lower rate of suicide than did younger depressed veterans with co-morbid PTSD. One explanation offered by the authors is that older veterans may have had better access to psychological services for a longer period of time than younger veterans. Clearly, youth in combat veterans is a serious risk factor for suicidal behaviours.

**ii. Suicide attempts.** In addition to the findings relating PTSD to completed suicides, a diagnosis of PTSD has been associated with an increased probability of unsuccessful suicide attempts in war veterans. The incidence of suicide attempts in war veterans with PTSD across different studies ranges from 24% to 40% (Freeman, Keesee, Thornton, Gillette, & Young, 1995; Freeman et al., 2000; Kramer et al., 1994; Nad, Marcinko, Vuksan-Aeusa, Jakovjevic, & Jakovjevic, 2008). A number of factors have been
identified as predicting heightened suicide risk including: higher IQ scores, more severe symptoms of depression and PTSD, current suicidal ideation, high levels of combat-related guilt as well as higher levels of anxiety and alexithymia (Freeman et al., 2000; Hendin & Haas, 1991; Nad et al., 2008). High rates of dissociation have been also implicated in elevated suicidal risk although the findings are contradictory. Although Freeman et al. (1995) indicated that current dissociative symptoms was the only significant difference between PTSD veterans with a previous history of suicide attempts compared to PTSD veterans without previous suicide attempt, a subsequent study conducted by the same team of researchers failed to detect any significant correlation between levels of dissociation and risk for suicide attempts (Freeman et al., 2000).

In a sample of veterans with chronic PTSD who had attempted suicide, almost half of the sample had a history of previous suicide attempts, ranging in lethality from intentional drug overdose to self-inflicted gunshot wound, (Hyer, Woods, McCranie, & Boudewyns, 1990) which is in accord with history of suicide attempts being a strong predictor of completed suicides in the non-combat literature (e.g., Caldwell & Gottesman, 1990; Hawton et al., 2005; Joiner & Rudd, 2000; Pinikahana, Happell, & Keks, 2003; Sher, 2006; Sinclair, Mullee, King, & Baldwin, 2004; Tandon & Jibson, 2003; Tremeau et al., 2005; Verdoux et al., 1999). Furthermore, there was some indication that PTSD veterans in this sample who were white, younger, had been exposed to greater inconsistency of love from the father, experienced more intense feelings of survivor guilt and expressed themselves by crying, were more likely to report previous suicide attempts (Hyer et al., 1990).

Lifetime suicide attempts have been related to low levels of spiritual well-being as measured by Spiritual Well-Being scale (SWB) in Croatian war veterans (Nad et al., 2008). The strongest association was found with the existential subscale of SWB which measures feelings of life satisfaction and purpose in life. It is noteworthy that the content of
existential scale of SWB resembles the lack of future positive thinking, a key facet of the concept of hopelessness (O'Connor, O'Connor, O'Connor, Smallwood, & Miles, 2004), which has been associated with suicidal behaviour in other disorders, such as schizophrenia (Tarrier, Barrowclough, Andrews, & Gregg, 2004). Thus, it can be speculated that feelings of having no personal future perspective are associated with suicidal behaviour in war veterans with PTSD in a similar manner to psychotic and depressed patients who are suicidal. A caveat of this speculation is that a feeling of having no personal future overlaps with PTSD symptoms (e.g., sense of a foreshortened future), and it may be impossible to distil a lack of positive future outlook from such symptoms.

iii. Suicidal ideation. PTSD has also been associated with high rates of suicidal ideation in veterans. In a study which followed-up over a thousand male Norwegian peacekeepers, 6% reported suicidal ideation, with levels being higher (17%), in a proportion of the sample who were repatriated early (Thoresen & Mehlum, 2008). Unsurprisingly, inter-relationships between PTSD and severe mental illness appear to escalate suicidal ideation in veterans. For example, 78% of a sample of veterans with chronic PTSD and schizophrenia reported suicidal ideation whilst 14% had made a suicide attempt in the previous 6 months. In contrast, 33% of participants who did not have symptoms of PTSD reported suicidal ideation and 5.8% exhibited suicidal behaviour (Butterfield et al., 2005). A large cross-sectional household survey conducted in Liberia indicated that exposure to sexual violence may also interact with PTSD to increase prevalence rates of suicidal ideation. The prevalence of suicidal ideation in combatants was 15.6% compared to 8.7% in non-combatants. These figures were 22.8% and 9.7% for combatants who did and did not report experiencing sexual violence against them, respectively (Johnson et al., 2008). Some work has also explored the association between the three different PTSD symptoms clusters with rates of suicidal ideation (Nye & Bell, 2007). The findings showed that only the re-experiencing symptoms cluster was
significantly positively associated with suicidal ideation. The remaining two symptom clusters (avoidance/numbing and increased arousal) did not have a significant positive or negative effect on the levels of suicidal ideation.

\textit{iv. Effects of different types of combat exposure.} Finally, there is some evidence that different types of combat exposure and different experiences during conflict may be associated with different patterns of findings regarding suicidality among war veterans with PTSD. Research focusing on the characteristics of subsamples of war veterans suggests that Vietnam Veterans displayed a more severe and impaired symptom profile compared with other subgroups of war veterans. For instance, Vietnam veterans were found to have more severe PTSD symptoms and depression as well as higher rates of suicide ideation/Attempts compared with World War II veterans (29% in World War II versus 75% in Vietnam veterans) (Davidson et al., 1990). It was suggested that this was because World War II combat veterans may have perceived their trauma as being more related to events that threatened their own physical integrity or freedom, whereas Vietnam veterans appear to have been struggling with traumatic experiences relating to interpersonal issues such as attachment, trust, and fear of their own destructive impulses. In support of the above explanation, when the two groups were asked to recall war experiences which they perceived as most upsetting, World War II veterans described physical injury, incapacity or captivity as being the most upsetting while Vietnam veterans recalled brutality, mutilated bodies, death of children and loss of friends as the most afflicting experiences.

One study expanded on this work by explicitly examining the effects that engaging in four different types of role in conflict had on PTSD and other psychiatric symptoms, including suicide, in a large group of Vietnam veterans (Fontana, Rosenheck, & Brett, 1992). The four roles, which were graded in terms of personal responsibility, were the i) target, ii) observer and iii) agent of death/injury, and iv) failure to prevent death/injury. It
was found that having been a target of others' attempts to kill or injure was related more robustly than any other role to a PTSD diagnosis but not to suicidal behaviours, while having been an agent of killing and failing to prevent death/injury was related to both subsequent suicide attempts and to PTSD. High levels of perceived personal responsibility (interpreted as including feelings of guilt) appeared to be differentially associated with PTSD and suicidal behaviours. Although interesting, these findings are tempered by a number of caveats some of which were noted by the authors. First, clinicians provided the data rather than the war veterans themselves. Second, the veterans were in treatment and were remembering experiences which occurred around 20 years ago. Third, the analysis was correlational and based on a large sample (approximately 1,700), hence although findings were significant the variance accounted for was small.

In summary, despite the complexity of the findings, there is a strong relationship between PTSD as a consequence of combat trauma and subsequent suicidal behaviour. This relationship has been confirmed across different studies examining completed suicides, suicide attempts and suicidal ideation. The majority of studies in the area with few exceptions suggest that co-morbid psychiatric disorders in veterans with a PTSD diagnosis are associated with an increased probability of suicidal behaviour.

3.4.1.2. Interpersonal victimization, PTSD, suicidal behaviour.

An increasing body of literature has focused on the role of PTSD in the relationship between various types of childhood/adult maltreatment and suicidal thoughts and behaviours (Ullman, 2004). Data are mainly derived from studies conducted on populations reporting childhood or adulthood physical and sexual abuse and victims of domestic violence.

i. Effects of childhood or adult sexual and physical abuse. There is evidence that in adult samples reporting various types of childhood maltreatment, a PTSD diagnosis is one of the strongest predictors of both recent and lifetime suicide attempts (Evren, Kural,
& Cakmak, 2006; GilRivas, Fiorentine, & Anglin, 1996; Joiner et al., 2007; Krakow et al., 2000; Roy, 2001; Thompson, Kaslow, Lane, & Kingree, 2000). In a sample of women who were sexually abused as children, PTSD was significantly associated with suicidal ideation, as was depression and symptoms of alcohol dependency (Ullman & Brecklin, 2002). The probability of suicide attempts in this study was associated with the frequency of additional lifetime traumatic events and depression. Longitudinal analyses have attempted to determine the temporal factors which lead to suicide attempts in those who have suffered abuse. In one 17 year follow-up study, childhood sexual and physical abuse was found to be linked to suicidal thoughts and behaviours in a sample of young adults, and there was some indication that PTSD and depression were mediating factors (Giaconia et al., 1995; Silverman, Reinherz, & Giaconia, 1996).

It should be noted, however, that current research indicates that a history of childhood abuse (primarily sexual or physical abuse) is significantly associated with increased incidence of later suicide attempts even in the absence of PTSD (Joiner et al., 2007), while co-morbid PTSD is associated with a higher frequency of suicidal behaviour (Thompson et al., 2000). In other words, although both PTSD and childhood maltreatment are independently related to the frequency of non-fatal suicide attempts, PTSD in combination with a form of childhood maltreatment significantly increases the likelihood of making a suicide attempt. A recent extension of the above findings demonstrated that adult participants with both a lifetime history and recent sexual/physical abuse were more likely, than those who had not experienced such abuse, to have recently attempted suicide (Tiet, Finney, & Moos, 2006). In accord with the findings of Thompson et al. (2000), a PTSD diagnosis was independently associated with increased likelihood of recent suicide attempts. An additional interesting finding from the study of Thompson et al. (2000) was that PTSD, even in the absence of abuse, is more predictive of suicide attempts than maltreatment in the absence of PTSD.
ii. Intimate partner violence (IPV). There is a large body of literature documenting the relationship between intimate partner violence and suicidal thoughts and behaviours (Golding, 1999). There is also a high prevalence of PTSD among battered women with a history of attempted suicide within the year prior to the measurements being taken, which range between 35% and 81%, compared to battered women without such a history (Bradley, Schwartz, & Kaslow, 2005; Thompson et al., 1999).

However, the underlying pathways through which a PTSD diagnosis is associated with increased rates of suicide attempts in battered women remain unclear. There is some evidence that PTSD is directly associated with more suicide attempts and that this mediates the link between partner violence and suicide attempts. For instance, Thompson et al. (1999) demonstrated that PTSD mediated the association between partner physical abuse and suicide attempts. After adjusting for the impact of PTSD, the relationship between partner physical abuse and suicide attempts did not remain statistically significant.

In contrast, it has also been shown that factors such as hopelessness, psychological distress, drug abuse and relationship discord but not PTSD were independently and robustly associated with suicide attempts (Kaslow et al., 2000). Although not yet tested, the last finding provides some support for the hypothesis that aspects of PTSD may be associated with factors which increase the likelihood of suicide attempts not directly but through exaggerating feelings of hopelessness and possibly defeat and entrapment which in turn are associated with more suicide attempts in people who have suffered abuse.

Unsurprisingly, the association between domestic violence, PTSD and suicide applies not only to suicide attempts but also to suicidal ideation (e.g., Sharhabani-Arzy, Amir, Kotler, & Liran, 2003). Focusing on intimate partner rape, recent work has found that symptoms of PTSD and depression mediate the relationship between intimate partner rape and suicidal ideation (Weaver et al., 2007). Weaver et al. (2007) suggest that suicidal thoughts are indicative of the need to escape unbearable psychological pain and that it is
the severity of this distress which is important, regardless of whether expressed via depression or PTSD. Leiner and colleagues extended this work in a large study which sampled 323 African American women at a hospital emergency department (Leiner, Compton, Houry, & Kaslow, 2008). It was the first study to demonstrate a link between IPV and suicidal ideation in African American women, which was further investigated with path analysis. A model was supported in which IPV led to the development of PTSD symptoms resulting in greater levels of depression, which then led to suicidal ideation. The role of helplessness and hopelessness (as components of depression) were highlighted by this study as important factors to consider in investigating the mechanism underlying IPV, PTSD and suicidality.

Overall, it can be argued that research on samples exposed to physical/sexual victimization or intimate partner violence indicates that PTSD is strongly associated with heightened rates of suicidal behaviour. Among those who have been physically or sexually abused in childhood or adulthood the vast majority of findings suggest an independent and direct positive relationship between PTSD diagnosis and suicidal behaviour. Among women exposed to intimate partner violence, PTSD and depression both play a role in the mechanism leading from violence to suicidality. That said, future work should concentrate on determining whether the route from PTSD to suicidality is direct or whether PTSD increases the risk of suicidality via hopelessness and other markers of distress.

3.4.1.3. Natural disasters, PTSD, suicidal behaviour.

Only one study in the current literature search has linked PTSD diagnosis after exposure to a natural disaster and subsequent suicidality. Caldera, Palma, Penayo, and Kullgren (2001) explored the prevalence of PTSD among people in four communities exposed to hurricane Mitch in Nicaragua, four months after the disaster. Hurricane Mitch occurred in 1998 and left 11,000 dead and a similar number missing with 2.7 million made homeless. The prevalence of a PTSD diagnosis varied between 9% in the most damaged
area of Quezalguaque, and 4.5% in the less damaged areas of La Paz Centro and Las Mercedes. Fifty-two (10.5%) participants reported suicidal thoughts during one month prior to data collection. Those with a PTSD diagnosis reported significantly higher levels of suicidal ideation (37.9%) compared to those without a PTSD diagnosis (9.0%). Research into this area is extremely difficult, opportunistic, and vulnerable to many design flaws. That said, as with research examining the relationships between PTSD and suicide in other domains of trauma, data in this area are also sparse.

3.4.1.4. Mixed trauma, PTSD, suicidal behaviour.

A series of studies have examined suicidal behaviour in civilian populations with PTSD resulting from a variety of different types of trauma, such as, accidents and criminal assaults. Across all of these studies, a strong and reliable relationship between a PTSD diagnosis and suicide ideation/planning/attempts has been documented. For example, Tarrier and Gregg (2004), in a sample of patients with chronic PTSD, found that as many as 56.4% of the participants reported experiencing some aspect of suicidal thoughts and/or behaviours. In particular, 38.3% of the total sample reported suicidal thoughts, 8.5% reported suicide plans and 9.6% had attempted suicide since the trauma. This finding is consistent with the results of other studies suggesting a high prevalence of suicidal behaviour (40%) in similar PTSD samples (Amir, Kaplan, Efroni, & Kotler, 1999; Kotler et al., 2001).

Furthermore, a number of factors additional to PTSD have been investigated across the different studies in an attempt to clarify the relationship between PTSD and suicide behaviour. Amir et al. (1999) examined the association between suicide ideation/attempts and coping styles in PTSD patients. The findings revealed that suppression was the only coping mechanism which was significantly associated with elevated risk for suicide among participants with PTSD. The obverse side of this result was also found in that the coping mechanisms of mapping (the ability to collect information for
planning and to consider alternative solutions), minimization (the ability to underrate the importance or seriousness of the negative experiences) and replacement (the ability to overcome negative life events by initiating in alternative actions) were negatively associated with the risk for suicide. Thus, according to the results of Amir et al. (1999), suicidal individuals are characterized by a reduced capacity to consider and generate alternative solutions; they constantly monitor their interpersonal environment for signs of danger; and they are more likely to adopt maladaptive thought suppression strategies as ways to deal with their anxious thoughts or feelings.

Finally, there is evidence that suicidal behaviour predicts treatment outcome. In a treatment trial of imaginal exposure and cognitive therapy, high suicidality scores (ideation, planning, and attempts) were associated with less successful treatment outcome in civilian PTSD patients (Tarrier, Sommerfield, Pilgrim, & Faragher, 2000). It should be noted that depression was not associated with treatment outcome in this study.

In summary, suicidal behaviour is highly prevalent in populations with a PTSD diagnosis resulting from various types of civilian trauma. The way in which different coping styles influence the impact of PTSD on suicidal thoughts and behaviours is a route worthy of further investigation in which a focus on resilience to developing both PTSD and suicidality should be investigated. As with all studies in this area, serious, co-morbid psychopathological disorders are likely to impact negatively on suicidality, and attempts should be made to delineate the points at which such disorders escalate the route from PTSD to suicide.

### 3.4.2. Community-based surveys, PTSD, suicidal behaviour.

Research focusing on clinical samples has been expanded by a series of community-based surveys which have investigated the relationship between PTSD and suicide risk. Recent estimates of suicidal behaviour in the general population of Europe are around eight percent (7.8%) for the incidence of suicidal ideation and two percent (1.8%)
for the incidence of suicide attempts (Sareen, Houlahan, Cox, & Asmundson, 2005b). When a diagnosis of PTSD has been included among the Axis I psychiatric diagnoses it has been more robustly associated with suicidal behaviour (Davidson, Hughes, Blazer, & George, 1991). PTSD has also been shown to be the only anxiety disorder which independently predicts suicidal ideation and suicide attempts even after controlling for the effects of co-morbid psychiatric diagnoses (Bernal et al., 2007; Sareen et al., 2005b). Similar to clinical samples, Marshall and co-workers, drawing on data from a National Anxiety Disorders Screening Day, demonstrated that the percentage of participants who reported suicidal thoughts in the past month increased proportionally with the number of PTSD symptoms. Among those with no PTSD symptoms, only 9% reported suicidal ideation, whilst among those with four PTSD symptoms, as high as 33% reported suicidal thoughts (Marshall et al., 2001). The relationship between the number of PTSD symptoms and the presence of suicidal ideation remained even after adjusting for the impact of co-morbid major depression. However, Sareen and co-workers (2007) reported that after controlling for socio-demographic factors, disorders such as depression, mania, panic attacks, agoraphobia, social phobia, alcohol dependence and drug dependence, as well as for the severity of physical disorders, a PTSD diagnosis remained significantly associated with suicide attempts but not with suicidal ideation (Sareen et al., 2007).

A number of studies have investigated PTSD and suicidality patterns in less expanded community samples. Ben-Ya'acov and Amir (2004) demonstrated that PTSD symptoms predicted suicide risk in an Israeli community sample of 103 men attending an out-patient clinic. Specifically, arousal symptoms were positively correlated with suicide risk whilst avoidance symptoms were negatively correlated with suicide risk. Giaconia et al. (1995) examined the way in which exposure to traumatic life events and PTSD influenced the psychosocial functioning of older adolescents in the community. Their findings revealed that by the age of 18 years, adolescents with PTSD were characterized by
more interpersonal and emotional-behavioural difficulties, elevated risk for other psychiatric disorders and significantly higher rates of suicidal ideation and suicidal attempts compared with the no-trauma group. Smith, Poschman, Cavaleri, Howell, and Yonkers (2006) investigated the prevalence of PTSD symptoms among low-income pregnant women in the community. The results showed that 11.9% of individuals who experienced a traumatic event qualified for a PTSD diagnosis during pregnancy and 33% of the pregnant women with PTSD had thoughts of self-harm. Finally, Prigerson and Slimack (1999) investigated risk factors for suicidality (suicide ideation/attempts) among young adult friends of suicide victims who were traumatized by the event. Aggression was the only significant predictor of suicidality among men, whereas depression and posttraumatic stress disorder independently contributed to suicidality among women. This suggests that gender issues should be systematically investigated in all relevant studies.

In conclusion, studies which have been based on community samples have yielded results which are in accordance with those from studies investigating the effects of specific traumas, such as those suffered by, combat veterans, those who have experienced sexual or physical abuse, and those who have experienced trauma from someone who is emotionally and physically close to them. In short, PTSD is a significant predictor of suicidality. Factors which differentiate suicidal ideation from suicidal plans and acts in PTSD would benefit from further research in this area, as would the mechanisms underlying reported gender differences.

3.4.3. PTSD, suicidal behaviour and co-morbid Axis I psychiatric disorders.

PTSD is often co-morbid with other Axis I psychiatric disorders and it is accompanied by a widespread impairment in psychosocial functioning. The National Comorbidity Survey reported that 88% of men and 79% of women with lifetime PTSD had at least one co-morbid psychiatric disorder with major depression being the most frequent. It
has been reported as being present in 48% of men and in 49% of women with PTSD (Kessler et al., 1995).

### 3.4.3.1. PTSD, depression and suicidal behaviour.

Depression has been robustly linked to a greater frequency of suicidal behaviour. Lifetime prevalence of suicide attempts in major depressive episodes is approximately 16% (Chen & Dilsaver, 1996). The relationship between depression and PTSD is reciprocal in that depression appears to exaggerate the effects of traumatic events (Fullerton et al., 2000) and PTSD increases susceptibility to major depression (Breslau, Davis, Peterson, & Schultz, 1997; Bullman & Kang, 1994; Kendler et al., 1995). A key issue is the extent to which depression exaggerates or facilitates the relationship between PTSD and suicidality. A further issue is whether depression has these effects regardless of whether it was identified as the primary or secondary diagnosis.

#### i. PTSD as the primary diagnosis.

Numerous studies including primary PTSD patients have identified major depression as being one of the most significant predictors of suicidal behaviour (Bullman & Kang, 1994; Clover, Carter, & Whyte, 2004; Drescher et al., 2003; Freeman et al., 2000; Tarrier & Gregg, 2004). As indicated in section 3.4.12 it was demonstrated that depression mediated the relationship between PTSD and suicidal ideation, at least in victims of IPV (Leiner et al., 2008). In contrast, a number of studies have found that the association of PTSD with elevated levels of suicidal behaviour remains significant even after controlling for the effects of major depression (Clum & Weaver, 1997; Lewis, 2005; Marshall et al., 2001). One study has shown a potentially different role for depression in the link between PTSD and suicide depending on whether previous suicide attempts, thoughts or plans were being considered (Ferrada-Noli et al., 1998b). A sample of 117 refugees were recruited who had a principal diagnosis of PTSD. Twice the number had a history of suicide attempt in the non-depressed group (19 cases) compared to the depressed group (8 Cases). Suicidal thoughts however were more frequent in the
depressed group (15) compared to the non-depressed group (6). The frequencies of suicidal plans were found not to differ between the two groups.

**ii. Depression as the primary diagnosis.** One of the first studies to examine the effects of PTSD on patients with a primary diagnosis of depression found that a) more patients attempted suicide who were depressed and had *past* PTSD experiences (75%) than those who were depressed and had no such PTSD history (54%) and b) more patients attempted suicide who were depressed and had current PTSD experiences (80%) than those who were depressed and had no current PTSD (54%) and c) major depression and PTSD was associated with greater levels of suicidal ideation than major depression alone (Oquendo et al., 2003). Consistent with this, a recent study by Campbell, and co-workers found that suicidal ideation was significantly more likely to be prevalent among depressed patients with co-morbid PTSD than in depressed patients without comorbid PTSD (Campbell et al., 2007). Severity of depression and lack of social support was also greater in the depressed sub-group with co-morbid PTSD in this study.

However, not all studies have produced consistent results, with some studies failing to find evidence that a PTSD diagnosis was a significant predictor of suicide attempts in primary depressed samples (e.g., Fordwood, Asarnow, Huizar, & Reise, 2007; Holtzheiner, Russo, Zatzick, Bundy, & Roy-Byrne, 2005; Zlotnick, Mattia, & Zimmerman, 2001). Suicide attempt status was more accurately predicted from factors such as the presence of co-morbid cluster B personality disorders (Oquendo et al., 2005) or externalizing behaviours and depression severity but not PTSD (Fordwood et al., 2007).

In conclusion, primary PTSD samples who also have co-morbid depression have an increased frequency of suicidal behaviour, with depression appearing to be a mediating factor. That said, the role of depression may vary depending on the types of suicidal thoughts and behaviours being expressed, i.e. thoughts, plans and attempts. Primary depressed samples with co-morbid PTSD are also more likely to attempt and think about
suicide. This is qualified to some extent by evidence showing that some factors, such as, severity of depression or externalizing behaviours, have been more robustly associated with suicidal behaviour compared to PTSD. No simple explanation is available for the above findings, but it could be hypothesized that PTSD in primary depressed subjects does not affect suicidality rates directly but indirectly through, for example, exaggerating the severity of depressive symptoms or through intensifying feelings of hopelessness.

### 3.4.3.2. PTSD, substance use disorders and suicidal behaviour.

The co-occurrence of PTSD with substance use disorders has been well documented in the literature. Two large epidemiological studies, conducted in the United States, have shown a frequent co-morbidity of PTSD with substance use disorders. The prevalence of drug abuse or dependence was 5 times more likely among men with PTSD and 1.4 times more likely among women with PTSD compared to responders without a diagnosis of PTSD (Regier et al., 1990). In addition, Kessler et al. (1995) demonstrated that among responders who met criteria for lifetime PTSD, as many as half (51.9%) of men and 27.9% of women also qualified for a diagnosis of lifetime alcohol abuse or dependence. Furthermore, studies on individuals with drug or alcohol abuse have indicated an extraordinarily high prevalence of PTSD, ranging from 36% to 50% for lifetime PTSD, and from 25% and 42% in current PTSD (Jacobsen, Southwick, & Kosten, 2001).

#### i. PTSD as the primary diagnosis.

Substance use disorders are highly prevalent in people with a primary PTSD diagnosis and these disorders, in tandem, are also associated with increases in suicidal behaviour (Bullman & Kang, 1994; Drescher et al., 2003; Kaslow et al., 2000; Sareen et al., 2007; Smith et al., 2006; Zimmerman & Mattia, 1999). However, in the majority of these studies no attempt has been made to further compare PTSD participants with co-morbid substance use disorders with PTSD participants without co-morbid substance abuse disorders in terms of suicidal behaviour. Nevertheless, a substantial number of studies on primary PTSD patients have demonstrated that substance
abuse is a significant predictor of suicidal behaviour. In particular, Bullman and Kang (1994) and Drescher et al. (2003) reported a significantly higher incidence of co-morbid substance use disorder in veterans who committed suicide. Kaslow et al. (2000) also showed that PTSD participants, with a history of previous suicide attempts, were significantly more likely to report substance abuse than PTSD participants without a history of previous suicide attempts. Some studies, however, have failed to identify any significant differences between PTSD patients with suicidal behaviour and PTSD participants without suicidal behaviour with respect to the presence or absence of substance use disorders (Butterfield et al., 2005; Clover et al., 2004; Freeman et al., 1995).

ii. Substance abuse disorder as the primary diagnosis. Studies examining suicidality among heroin users have demonstrated that the lifetime prevalence of suicidal ideas ranges from 52% to 60% (Rossow & Lauritzen, 1999; Vingoe et al., 1999) while the lifetime prevalence of suicide attempts has been estimated to range from 17% to 40% (Darke, Ross, Lynskey, & Teesson, 2004; Mills, Teesson, Ross, & Peters, 2006; Rossow & Lauritzen, 1999). The presence of PTSD as a co-morbid disorder in patients with primary substance use disorders and the impact of their co-occurrence on the rates of suicidal behaviour have received growing attention. For example, Villagomez, Meyer, Lin, and Brown (1995), in a sample of methadone maintenance patients, found that the proportion of men and women who reported lifetime PTSD was more than 10% and almost 20%, respectively. Lifetime PTSD was highly associated with lifetime suicidal ideation (36.5% of patients with lifetime PTSD reported having had suicidal thoughts, compared with 16.3% without PTSD), lifetime suicide attempts (26.9% in PTSD patients versus 9.9% in those without PTSD) as well as with a lifetime diagnosis of major depression. Additional studies investigating risk factors for suicidal behaviour in patients with substance use disorders showed that PTSD was a significant predictor of elevated suicidal ideation (Harned, Najavits, & Weiss, 2006) and suicide attempts (Darke et al., 2004; Maloney,
Across the above studies, other factors which were associated with a higher frequency of suicide attempts included screening positive for borderline personality disorder, major depression and female gender.

Overall, findings suggest that in individuals with substance use disorders, comorbid PTSD increases the risk for suicidal behaviour. However, the impact of co-morbid substance use disorders in primary PTSD samples in terms of suicidal behaviour is vague and occasionally contradictory. Some studies report a higher incidence of suicidal behaviour in PTSD patients with co-morbid substance use disorders while others fail to demonstrate such an association. As a consequence, it can be hypothesized that suicidal behaviour in samples with co-morbid PTSD and substance use disorders is more robustly predicted by features specific to PTSD than features specific to substance use disorders.

3.4.3.3. PTSD, psychoses and suicidal behaviour.

Estimates of co-morbid PTSD in first episode psychotic patients range from 10% (Neria, Bromet, Sievers, Lavelle, & Fochtmann, 2002), to 38% (Tarrier, Khan, Cater, & Picken, 2007b). Consequently, the prevalence of PTSD exceeds that of the general population where lifetime prevalence of PTSD is approximately 6% to 8% (Breslau et al., 1997; Frans et al., 2005). However, controversy exists as to the reliability and accuracy of self-reports of past events in people who suffer a disorder that distorts perceptions, thoughts and behaviours (Seedat, Stein, Oosthuizen, Emsley, & Stein, 2003). Some studies have been able to negate such doubts to some extent by demonstrating that the psychometric properties of assessments developed for general population samples are comparable in individuals with severe mental illnesses (Goodman et al., 1999; Mueser et al., 2001; Resnick, Bond, & Mueser, 2003). Thus, it appears that when reporting specific events and post traumatic symptoms related to them, individuals with schizophrenia are as reliable as individuals in the general population.
People with schizophrenia are at heightened risk for suicide with recent estimates indicating that approximately 5% to 10% die from suicide (Palmer, Pankratz, & Bostwick, 2005). Suicidal ideation and planning (Kontaxakis et al., 2004) or attempts increase susceptibility for later successful suicides (Hawton et al., 2005). Recent investigations suggest that as many as half of all patients with schizophrenia experience suicidal ideation at some point in their lives or have a history of suicide attempts (Fenton, 2000; Tarrier et al., 2004).

i. **PTSD as the primary diagnosis.** Investigations of the effects of psychosis as a secondary diagnosis to PTSD are sparse. There is, nevertheless, some initial evidence of heightened rates of suicidal behaviour in individuals with PTSD as a primary diagnosis who also have psychotic symptoms. Sareen and colleagues examined the relationship between PTSD and positive psychotic symptoms as well as their effects on suicidality. The outcomes indicated that participants with PTSD plus comorbid positive psychotic symptoms were significantly more likely to report lifetime suicidal ideation and lifetime suicide attempts. However, after adjusting for total number of PTSD symptoms, sociodemographics, mental disorders, and general medical comorbidity, the association between PTSD diagnosis plus psychotic symptoms with suicidal ideation and suicide attempts was insignificant (Sareen, Cox, Goodwin, & Asmundson, 2005a).

ii. **Psychosis as the primary diagnosis.** There is evidence that co-morbid PTSD further aggravates the already high risk for suicide in psychotic patients. Schizophrenic patients with co-morbid PTSD were significantly more likely to report suicidal ideation compared to those without co-morbid PTSD, and the incidence of suicide attempts was also increased, but not statistically significantly so, in patients with co-morbid PTSD (Strauss et al., 2006). Furthermore, Tarrier and colleagues (2007b) reported that symptomatic-PTSD in first episode psychotic patients was associated with greater suicidality rates although this association was not significant. Suicidal behaviour was
significantly associated with the experience of trauma, but not the severity of that trauma, prior to the onset of their psychosis (Tarrier et al., 2007b). Additional work from this group has shown, in a sample of dual diagnosis patients (schizophrenia comorbid with substance and/or alcohol abuse) that patients suffering from co-morbid PTSD had significantly higher scores of suicidal behaviour compared to those not suffering co-morbid PTSD (Picken & Tarrier).

In conclusion, although the existing literature on the impact of PTSD plus psychosis in suicidal behaviour is limited, current data suggest that among psychotic patients, symptomatic PTSD is accompanied with heightened rates of suicidality. In patients with pre-existing psychotic disorders, comorbid PTSD appears to increase the risk for suicidal behaviour. Again, the construct of hopelessness has been highlighted as a fruitful avenue for future research in samples with PTSD and psychosis.

3.4.3.4. PTSD, other Axis I and II comorbid psychiatric disorders, suicidal behaviour.

PTSD as a co-morbid diagnosis has been associated with a greater frequency of suicide attempts in populations with a range of other Axis I primary psychiatric diagnoses. For example, Warshaw and colleagues reported that at intake, lifetime or current PTSD was among the most significant clinical predictors of a previous suicide attempt or previous suicidal behaviour, in a sample of panic disordered patients (Warshaw, Massion, Peterson, Pratt, & Keller, 1995). All prospectively recorded suicidal behaviour occurred in participants with depressive disorders while certain disorders such as PTSD and substance use substantially increased the risk of suicide attempts/behaviours. Furthermore, Phillips et al. (2005), demonstrated that a PTSD diagnosis, a substance use disorder and a greater lifetime impairment due to Body Dysmorphic Disorder (BDD) were the only significant contributors to greater incidence rates of suicide attempts among patients with a principal diagnosis of BDD.
Only two studies have explored the impact of PTSD and borderline personality disorder (BPD) on suicide risk. The first study examined diagnostic predictors of prospectively observed suicide attempts in a personality disordered sample. It was found that prospective suicide attempts were significantly associated with baseline BPD and substance use disorders but not PTSD (Yen et al., 2003). In addition, worsening depression and substance abuse were significant predictors of suicide attempts, but worsening PTSD and panic disorder was not a significant predictor. The second study compared the suicidal behaviour of females with a history of childhood sexual abuse with BPD plus PTSD and with PTSD alone. The BPD criteria relevant to suicidality (attempt or threat) was endorsed by 58% of the sample diagnosed with both BPD and PTSD, and by 33% of the sample diagnosed with PTSD only, a difference which was significant (Heffernan & Cloitre, 2000).

In a sample of psychiatric in-patients with a range of Axis I and Axis II disorders, suicidal ideation was found to be positively associated with a number of different types of trauma, namely, incest or sexual molestation, being a witness to a severe injury or a fatality, and other infrequent terrifying experiences which were not listed in the interview protocol. A history of suicide attempts was associated with rape and being threatened with a knife, and a greater frequency of suicidal ideation in the month prior to admission to hospital was associated with PTSD. (It should be noted that suicidal ideation in the past month was also associated with bipolar disorder, BPD and anxiety disorders.) Previous suicide attempts, rather than ideation, were not associated with PTSD, but were associated with schizoaffective disorder, borderline personality disorder and anxiety disorders (Floen & Elklit, 2007). A limitation of this work was that the sample of participants with PTSD was small (n = 9).

A study carried out to examine the effects of PTSD and victimization in those with a serious mental illnesses found that suicide attempts were higher in patients with PTSD
who had been victimized (80.8%) compared to those with PTSD who did not report victimization (54%). Again the sample included individuals with a range of Axis I and Axis II disorders, psychosis being the most frequent (50%). It was interesting that although there was a high rate of PTSD found in this sample using the Composite International Diagnostic Interview (40%), this was recorded in only 5.4% of the case notes (McFarlane, Schrader, Bookless, & Browne, 2006).

In conclusion, serious mental illness when combined with PTSD escalates suicidal ideation and the risk of suicide attempts. A point high-lighted by these studies is that symptoms of PTSD may be missed by clinicians possibly because of avoidance, the overlap of symptoms between PTSD and different disorders, and inadequate exploration of traumatic experiences or victimization (Floen & Elklit, 2007; McFarlane et al., 2006).

3.4.4. PTSD and suicide in specific populations.

3.4.4.1. HIV, PTSD and suicidal behaviour.

There appears to be a high prevalence rate of PTSD in individuals diagnosed with HIV or AIDS (Tedstone & Tarrier, 2003) with ranges of between 12% to 60% being reported (e.g., Botha, 1996; Israelski et al., 2007; Kelly et al., 1998; Martinez, Israelski, Walker, & Koopman, 2002; Olley, Seedat, & Stein, 2006). Suicidal thoughts and behaviours are also more frequent in such individuals. For example, in a sample of participants with recently diagnosed HIV who met the criteria for current PTSD, suicidal ideation was significantly elevated (54%) compared to those without a diagnosis of PTSD (11%) (Olley, Zeier, Seedat, & Stein, 2005).

In a study which examined the lifetime prevalence of PTSD in a sample of HIV-positive incarcerated women, lifetime PTSD was the most common diagnosis in this population. Women with lifetime PTSD were also more likely to report a previous suicide attempt (Lewis, 2005). Additional analyses showed that a diagnosis of lifetime PTSD was the only factor that continued to be significantly correlated with a history of previous
suicide attempt. Lifetime PTSD was further associated with elevated lifetime prevalence of major depression and lifetime cannabis abuse/dependence. However no significant association was identified between major depression or cannabis abuse/dependence and past suicide attempts, suggesting a direct link between PTSD and suicidality in this sample. Overall, these initial findings support the association between PTSD diagnosis and suicidal behaviour in persons diagnosed with HIV or AIDS. Furthermore, this relationship appeared to remain significant even after controlling for the effects of other covariates, such as, major depression.

3.4.4.2. PTSD and suicidal behaviour in refugees.

High rates of PTSD have been reported among refugees, although rates do vary dependent on the sampling frames used. For example, a prevalence rate of 79% was reported in a sample from a number of different countries (Ferrada-Noli et al., 1998b) whilst a prevalence rate of 14% was reported from a sample of Somali asylum seekers in London (Bhui et al., 2006).

Data on the association of PTSD with suicidal behaviour in refugees are limited and mainly derived from the work of Ferrada-Noli and colleagues. A 1996 study found that 64% of refugees with PTSD reported suicide ideation and detailed suicide plans, and 46% had a history of previous suicide attempts (Ferrada-Noli & Sundbom, 1996). Consistent with this, Ferrada-Noli et al. (1998b) reported a 57% prevalence rate of suicidal behaviour (suicide ideation and suicide attempts) in a similar population. In an additional study conducted by Ferrada-Noli, Asberg, and Ormstad (1998a) significant associations were found between the preferred methods for suicide and the torture methods to which refugees with PTSD had been previously subjected. Torture that included blunt force to the head and body was related to jumping from heights or in front of trains; torture involving water was associated with drowning; and sharp force torture was associated with self-inflicted stabbing or cutting.
Overall, although the available evidence on the relationship between suicidal behaviour and PTSD in refugees is limited, the consistency of the above findings suggests that PTSD in refugees is accompanied by elevated levels of suicidal behaviour. Suicide behaviour in this group may be elevated due to fear of being returned to the country of origin and potentially dangerous consequences.

3.4.4.3. PTSD and suicidal behaviour in police officers.

High rates of PTSD have been reported among police officers and there is also some indication that PTSD in police officers is associated with higher rates of suicidality. For instance, a recent study demonstrated that the prevalence rates of a PTSD diagnosis and sub-threshold PTSD among 157 Brazilian police officers were 8.9% and 16%, respectively. Furthermore, police officers with a PTSD diagnosis were significantly more likely to report lifetime suicide ideation compared to those without a PTSD diagnosis or PTSD symptoms (Maia et al., 2007). Similarly, Violanti (2004) showed that among police officers who reported PTSD symptoms, the proportion of those reporting suicidal ideation increased by 13% with every 10-unit increase in the percentage of hours worked on afternoon shifts.

3.5. Clinical Implications

There has been considerable evaluation of the treatment of PTSD with strong evidence for the efficacy of trauma-focused cognitive behaviour therapy (Harvey, Bryant, & Tarrier, 2003). However, there has been little attention in the treatment literature to reducing suicide risk in PTSD patients. Thus any recommendations for treatment will be largely speculative. A recent systematic review and meta-analysis concluded that overall there was a highly significant effect for CBT in reducing suicide behaviour irrespective of diagnostic group (Tarrier, Taylor, & Gooding, 2008). This was in spite of considerable heterogeneity in the target populations, the types and delivery of treatments, and outcomes assessed. Sub-group analysis indicated a significant treatment effect for adult but not
adolescent samples, and for individual but not group treatments. Both Dialectic Behaviour Therapy and other forms of CBT demonstrated significant treatments effects although the latter were usually briefer and less intense. There was evidence for treatment effects, albeit reduced, over the medium term. Thus integration of CBT for reduction of suicide risk into the conventional CBT treatment programs for PTSD could be recommended in patients experiencing hopelessness or suicidal ideation. The exact nature of this integrated treatment which should be based upon a sound theoretical understanding of the psychological architecture underlying suicide risk, has yet to be developed.

3.6. Conclusions, Implications and Recommendations

The majority of the research discussed in the present paper clearly demonstrates an important relationship between PTSD and suicidal behaviour. These findings have been replicated both in clinical and in general population samples. There is evidence that the association between PTSD and suicidal behaviour pertains, irrespective of the type of trauma that led to PTSD. For example, high rates of suicidal behaviour have been consistently reported among PTSD patients exposed to combat trauma, physical/sexual abuse, intimate partner violence, natural disasters or a mixture of different traumatic events. A number of Axis I and Axis II disorders, (including depression, substance abuse, psychosis, and personality disorder) in association with PTSD led to more suicidal thoughts and behaviours. A high incidence of PTSD and suicidal behaviour as well as a significant association between the two variables has also been observed in specific populations such as HIV patients, refugees and police officers.

The bulk of studies included in this review reported a significant positive association between PTSD and at least one measure of suicidality, i.e. suicidal ideation, behaviours, plans, attempts or completed suicides. The only exception to this was the study by Zivin et al. (2007) whose results demonstrated that among deceased veterans with a primary diagnosis of major depression, co-morbid PTSD was associated with decreased
risk for suicide. This overall result may have been accounted for by different patterns in the association between PTSD and suicide depending on age.

Four key of issues emerge from this review.

The first issue is whether aspects of PTSD were associated with a direct route to suicidal thoughts and behaviours or whether the path is indirect, being mediated by depression. The number of studies to test this explicitly using path analyses were few and results were often contradictory. Nevertheless, on balance, there was some evidence across the different categories explored that depression was a mediating factor (e.g. studies investigating combat veterans, child abuse, intimate partner violence). One exception is presented in the investigation of Ferrada-Noli et al. (1998b) who demonstrated that among refugees with PTSD, major depression was not substantially associated with heightened levels of suicidal behaviour. However, it should be remembered that there are very few studies focusing on PTSD, suicide and depression in refugees, with most of the work being generated by one laboratory. Although depression was often cited as a mediator in the pathway from PTSD to suicidality, other disorders such as schizophrenia also seemed to escalate suicidal thoughts and behaviours, especially in combat veterans.

The second issue is whether there are stronger relationships between any one of the three symptom clusters and suicidality compared to the rest. In combat veterans, the cluster of symptoms involving re-experiencing the trauma, or aspects of the trauma, was the most important predictor of suicide compared to the other two (avoidance/numbing and arousal). In community based surveys the arousal symptom cluster was positively associated with suicidality, but avoidance/numbing was negatively correlated with this variable. This ties in, to some extent, with work showing that emotional withdrawal was negatively associated with suicidality in schizophrenia as it potentially represented restricted potential for the development of suicide related schema (Tarrier et al., 2007a).
The third issue is that across all the studies there was a smattering which either
directly investigated or made reference to processes which are already accepted as
important in the suicide literature. For example, entrapment, defeat and
helplessness/hopelessness together with appraisals of the future are considered key to
psychological explanations of suicide (Bolton et al., 2007; Johnson et al., 2008a; Williams,
1997; Williams et al., 2005). Yet, they have received sparse attention in the PTSD and
suicide literature. Similarly, different types of emotional regulation strategy, such as
suppression, were barely investigated. Although guilt and personal responsibility were
relevant constructs in some studies of war veterans, they appeared not to be investigated in
the remainder of the studies. Research into PTSD and suicidality would clearly benefit
from focusing on psychological models of suicide and considering which models can be
most useful adapted to the area.

Fourth, the treatment implications are as of yet at a rudimentary stage. Further
understanding of the psychological architecture underlying suicide risk is important to
identifying patients at risk and for the development of treatment strategies to reduce this
risk. How such treatment strategies can be developed and integrated into treatments of
PTSD that are supported by a strong evidence base will also require investigation and
should be a priority for future research.
CHAPTER 4

4. A Meta-Analysis of the Association between Posttraumatic Stress Disorder (PTSD) and Suicidality: The Role of Comorbid Depression.

4.1. Abstract

Objective: A considerable number of studies have reported an increased frequency of suicidal behaviours among individuals diagnosed with Posttraumatic Stress Disorder (PTSD). This study aims first, to provide a comprehensive systematic review and meta-analysis of the association between a PTSD diagnosis and frequency of suicidality and second, to examine the role of comorbid depression in the association between suicidality and PTSD. Methods: Searches of the Medline (June 2010), EMBASE (June 2010), PsycINFO (June 2010), PILOTS (June 2010) and Web of Science (June 2010) were conducted to identify studies that examined the association between PTSD and suicidality. The studies had to include an effect size of the association between PTSD and suicidality to be included in the meta-analysis. Sixty-three studies were eligible for inclusion in the meta-analysis. Overall and subgroup effect sizes were examined. Results: A highly significant positive association between a PTSD diagnosis and suicidality was found. The PTSD-suicidality association persisted across studies using different measures of suicidality, current and lifetime PTSD, psychiatric and non psychiatric samples and PTSD populations exposed to different types of traumas. Comorbid major depression significantly compounded the risk for suicide in PTSD populations. Conclusion: The current meta-analysis provides strong evidence that a PTSD diagnosis is associated with increased suicidality. The crucial role of comorbid major depression in the aetiology of suicidality in PTSD is also supported.

Currently under review at Journal of Psychosomatic Research
4.2. Introduction

Increased frequency of suicidal behaviours (suicidal thoughts, suicidal plans or suicidal acts) have been reported in Posttraumatic Stress Disorder (PTSD) (Amir et al., 1999; Nad et al., 2008; Oquendo et al., 2003; Tarrier & Gregg, 2004). Similar to other common Axis I psychiatric disorders, such as, Major Depression, Substance Use disorders and Psychoses, PTSD is strongly associated with increased frequency of suicidality (Bernal et al., 2007; Cougle et al., 2009a; Davidson et al., 1991; Sareen et al., 2007; Sareen et al., 2005b; Wilcox, Storr, & Breslau, 2009). Comorbid psychiatric disorders, and especially comorbid major depression, have been found to substantially increase the levels of suicidality in those with PTSD (Bullman & Kang, 1994; Clover et al., 2004; Freeman et al., 1995; Tarrier & Gregg, 2004). There is also some evidence that comorbid major depression mediates the relationship between suicidal ideation and PTSD (Leiner et al., 2008). One comprehensive narrative review has been published in the area of PTSD and suicidality which aimed to summarize the available research findings on the relationship between suicidality and PTSD. The vast majority of the studies indicated a strong positive association between PTSD and suicidality. The association between suicidality and PTSD appeared to hold across different populations, such as, war veterans, victims of interpersonal victimization in childhood and/or in adulthood, PTSD samples with mixed traumas, psychiatric populations and non-psychiatric community samples. A considerable proportion of the studies also indicated that apart from PTSD, a diagnosis of major depression significantly increased suicidal risk. Moreover, the presence of PTSD and major depression comorbidity was associated with substantially increased suicidal risk compared to a PTSD diagnosis alone (Panagioti et al., 2009). One important limitation of above narrative review is that it was largely descriptive.

Meta-analytic procedures offer the best means of summarizing and statistically estimating the overall significance of findings derived from individual studies. One
existing systematic review in the area of PTSD and suicidality indicated that a diagnosis of PTSD is positively associated with increased suicide attempts, suicidal ideation but not completed suicides. These findings were based on extracting and computing phi coefficients from twenty-five independent studies. This is a limited number of studies considering that more than sixty published studies have reported an association between PTSD and suicidality. Additionally, no subgroup analyses were conducted to examine further the association of PTSD and suicidality. Finally, the authors concluded that the association between PTSD and suicidality remained after controlling for comorbid disorders including depression but also reported evidence that depression mediates the relationship between PTSD and suicidality (Krysinska & Lester, 2010). Both of these contradictory outcomes concerning the role of depression in the association between suicidality and PTSD were based on a narrative interpretation of the extant literature and not by applying meta-analytic procedures.

Therefore, we conducted a comprehensive meta-analysis which aimed to expand and update the findings in the literature concerning the association between suicidality and PTSD. The specific objectives of this meta-analysis were to i. systematically quantify the research findings on the association of PTSD and suicidality across a large number of studies ii. examine the association of suicidality and PTSD across different PTSD populations (i.e., index trauma, psychiatric vs. community samples) and across studies using different measures of PTSD (current vs. lifetime, interviews vs. questionnaires), and iii. examine the role of comorbid depression in the association between PTSD and suicidality by applying meta-regression procedures. Based on the existing literature it was predicted that PTSD would be significantly positively associated with increased levels of suicide attempts and suicidal ideation. It was also predicted that the association between suicidality and PTSD would pertain across psychiatric and non-psychiatric samples and
across different trauma populations. Finally, it was hypothesized that the presence of comorbid depression would worsen suicide risk in those with PTSD.

4.3. Methods

4.3.1. Inclusion and exclusion criteria.

Studies were included in the meta-analysis if they met the following criteria:

a) they were published in a peer reviewed journal in the English language.

b) they reported original research findings regarding the relationship between PTSD and suicidality

c) the sample comprised participants aged 15 years or over

d) they included any measure of PTSD and any measure of suicidality (suicidal ideation, plans, behaviours, attempts, successful suicides)

e) they contained outcome measures which reflected the association between PTSD and suicidality.

4.3.2. Search strategy.

Searches of the databases of EMBASE (1966 to June 2010), PILOT (1966 to June 2010), Medline (1966 to June 2010), PsycINFO (1966 to June 2010) and Web of Science (1966 to June 2010) were made with text words including PTSD AND suicide OR suicidal OR suicidal behaviour, posttraumatic AND suicide OR suicidal OR suicidal behaviour, post traumatic AND suicide OR suicidal OR suicidal behaviour. The identified studies were screened for suitability by the first author. In cases where the results of a study were reported in more than one article, the most recent article was included in the meta-analysis.

4.3.3. Data analysis.

The results of the studies were combined using the Hedges’ $g$ effect size statistic. It has been suggested that the Cohen’s $d$ statistic tends to overestimate the absolute value of the standardized mean difference ($\delta$) (Borenstein, 2006; Borenstein, Hedges, Higgins, &
Rothstein, 2005; Hedges & Olkin, 1985). Hedge’s $g$ was chosen because it is the unbiased estimate of $\delta$ and it tends to control for small sample sizes (Borenstein et al., 2005). The between study heterogeneity was tested using Cochran’s Q. 95% confidence intervals were computed. Meta-analytic analyses were conducted with Comprehensive Meta-Analysis version 2.2.034 (Borenstein et al., 2005). A fully random effects model was used because there was considerable heterogeneity in the variables of interest. Initially, the overall effect sizes were calculated. Subsequently, subgroup calculations were performed and meta-regression analyses were computed to examine the associations between effect sizes and key predictor variables.

4.4. Results

The search strategy yielded 246 results. Of these, 165 studies were empirical English-language studies. Eighty-five of the 165 studies were identified as meeting the initial inclusion criteria. However, of the 85 studies, 19 did not provide an outcome of the association between PTSD and suicidality and thus they were excluded from further analysis. Two studies (Amir et al., 1999; Campbell et al., 2007) were excluded because they reported the same data with two more recent articles (Chan, Cheadle, Reiber, Unutzer, & Chaney, 2009; Kotler et al., 2001). Finally, five studies assessed the association between PTSD and suicidality only in terms of odds ratios. Since the odds ratio statistic cannot be transformed into Hedges’ $g$ coefficients (the statistic used to combine the results of the current Meta-analysis), these studies were also excluded (Boscarino, 2006; Nock et al., 2009; Pfeiffer, Ganoczy, Ilgen, Zivin, & Valenstein, 2009; Quarantini et al., 2010; Sareen et al., 2005b). A total of 59 studies fully met the inclusion criteria and were retained for the Meta-analysis. Four studies provided two independent samples of the association between PTSD and suicidality (Cacciola, Koppenhaver, Alterman, & McKay, 2009; Cougle et al., 2009b; Maloney et al., 2007; Oquendo et al., 2003). Thus, the association between PTSD
and suicidality was examined across 63 independent samples. The process of the Meta-analysis is presented in Figure 2.

<table>
<thead>
<tr>
<th>Inclusion/exclusion criteria set and search strategy established. Run search-246 results yielded.</th>
</tr>
</thead>
<tbody>
<tr>
<td>81 results were conceptual or theoretical papers rather than empirical studies.</td>
</tr>
<tr>
<td>The abstracts of the 165 studies or the full papers (if necessary) were reviewed and categorised for inclusion/exclusion criteria.</td>
</tr>
<tr>
<td>85 studies were identified as meeting the initial inclusion/exclusion criteria.</td>
</tr>
<tr>
<td>19 studies did not provide information to extract effect sizes of the PTSD-suicidality association.</td>
</tr>
<tr>
<td>Five studies included odds ratios and 2 studies were based on the same data with more recently published studies.</td>
</tr>
<tr>
<td>59 studies were included in the Meta-analysis. Data from 63 samples were extracted.</td>
</tr>
</tbody>
</table>

*Figure 2. The selection process used in the Meta-analysis.*
4.4.1. Characteristics of the studies.

Table 3 presents the characteristics of the 63 studies which were included in the meta-analysis. As shown, the vast majority of the studies were conducted in the US \((n = 43)\) and adopted cross-sectional designs \((n = 50)\). Thirty studies comprised predominately female samples, 27 studies comprised predominantly male samples, two studies included an equal number of male and female participants and four studies did not provide information about the gender characteristics of the total samples. Forty-five studies provided information about gender characteristics of their study groups (PTSD group or suicidal behaviour group). Across these studies, 31 studies comprised predominately female participants and 13 studies comprised predominantly male participants. Information regarding the mean age of the total sample was provided by 48 studies.

Thirty-seven studies used DSM-IV criteria, 16 studies used DSM-III-R criteria, four studies used DSM-III criteria, and one study used ICD-10 to diagnose the presence of PTSD. The majority of studies used standardized structured/semi-structured interviews to screen for, or confirm, the PTSD diagnosis. The most frequently used screening instruments were the Structured Clinical Interview (SCID-IV or III-R) (First, Spitzer, Gibbon, & Williams, 1995; Spitzer, Williams, & Gibbon, 1986) and the Composite International Diagnostic Interview (CIDI for DSM-IV or III-R) (WHO, 1900, 1997). Five studies did not provide information about the diagnostic criteria used for the diagnosis of PTSD. Three of these studies used information derived from the patients’ psychiatric case notes (Floen & Elklit, 2007; Tiet et al., 2006; Zivin et al., 2007) one study used a screening questionnaire developed for the purposes of the study (Marshall et al., 2001) and one study was based on the participants' self-report of whether they received a diagnosis of PTSD (Sareen et al., 2007). More details about the screening instruments used by the individual studies to diagnose PTSD are presented in Table 3.
<table>
<thead>
<tr>
<th>Study</th>
<th>Study Design</th>
<th>Depression in PTSD group &amp; Controls</th>
<th>Target Population</th>
<th>Traumatic Populations</th>
<th>Measure of Suicidality</th>
<th>Suicidality Instrument</th>
<th>PTSD Diagnostic Instrument</th>
<th>Study Group n</th>
<th>Control Group n</th>
<th>Women % N</th>
<th>Mean Age N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bernal et al. (2007)</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>n/a</td>
<td>Suicide attempts &amp; Suicidal ideation</td>
<td>Questions in a Computer-Assisted Personal Interview (CAPI)</td>
<td>The Composite International Diagnostic Interview (CIDI-3) according to DSM-IV</td>
<td>411</td>
<td>20834</td>
<td>52</td>
<td>47</td>
</tr>
<tr>
<td>Europe</td>
<td></td>
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<tr>
<td>Bullman and Kang (1994)</td>
<td>Retrospective cohort</td>
<td>n/a</td>
<td>Primary PTSD Diagnosis</td>
<td>War Veterans</td>
<td>Successful suicides</td>
<td>Veterans databases: BIRLS, SSA, IRS or NDI</td>
<td>Veterans Affairs (VA) databases for DSM-III-R or DSM-III</td>
<td>4247</td>
<td>12010</td>
<td>0</td>
<td>31</td>
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<tr>
<td>US</td>
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<tr>
<td>Cacciola et al.</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>War veterans</td>
<td>Suicide attempts &amp; Suicidal ideation</td>
<td>Addiction Severity Index (ASI)</td>
<td>The Structured Clinical Interview (SCID) for DSM-IV</td>
<td>221</td>
<td>22</td>
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<tr>
<td>Caldera et al. (2001)</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>Exposed to Natural Disasters</td>
<td>Suicidal ideation</td>
<td>An item was added to Harvard Trauma</td>
<td>The Harvard Trauma Questionnaire (HTQ)</td>
<td>29</td>
<td>467</td>
<td>81</td>
<td>n/a</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Sample</td>
<td>Other Primary Diagnosis/es</td>
<td>War Veterans</td>
<td>Suicide ideation</td>
<td>Questionnaire (HTQ)</td>
<td>Scale for Suicide Ideation (SSI)</td>
<td>N/A</td>
<td>Notes</td>
<td></td>
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<tr>
<td>Campbell et al. (2007)</td>
<td>Cross-sectional</td>
<td>PTSD group (M): 17.4, Controls(M): 14.7</td>
<td>Other Primary Psychiatric Diagnosis/es</td>
<td>n/a</td>
<td>Suicidal ideation</td>
<td>The suicide item of the PHQ-9 was dichotomized</td>
<td>The Primary Care PTSD Screen (PC-PTSD) for DSM-IV</td>
<td>244</td>
<td>433</td>
<td></td>
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<tr>
<td></td>
<td>US</td>
<td></td>
<td>Non-Psychiatric Sample</td>
<td>n/a</td>
<td>Suicide attempts</td>
<td>The Scale for Suicide Ideation (SSI)</td>
<td></td>
<td>9</td>
<td>75</td>
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<td>Clum and Weaver (1997)</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>n/a</td>
<td>Suicide attempts &amp; Suicidal ideation</td>
<td>Questions in the Assessment Interview</td>
<td>The Structured Clinical Interview for DSM-III-R/Nonpatient Version (SCID-IIIR)</td>
<td>298</td>
<td>3833</td>
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<tr>
<td></td>
<td>US</td>
<td></td>
<td></td>
<td>n/a</td>
<td></td>
<td></td>
<td>The World Mental Health Survey of Composite International Interview (WMH-CIDI) for DSM-IV</td>
<td>50</td>
<td>1757</td>
<td></td>
<td></td>
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<tr>
<td>Cougle et al. (2009a)</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>n/a</td>
<td>Suicide attempts &amp; Suicidal ideation</td>
<td>As part of the assessment (phone) interview</td>
<td>As part of phone interview according to DSM-IV</td>
<td>292</td>
<td>986</td>
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<td></td>
<td>US</td>
<td></td>
<td></td>
<td>n/a</td>
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<td></td>
<td></td>
<td>100</td>
<td>44.8</td>
<td></td>
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<tr>
<td>Cougle et al. (2009b)</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>n/a</td>
<td></td>
<td>As part of the assessment (phone) interview</td>
<td></td>
<td>50</td>
<td>1757</td>
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<tr>
<td></td>
<td>US</td>
<td></td>
<td></td>
<td>n/a</td>
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<td>Suicide attempts</td>
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<td>The 23-item behaviourally anchored Psychiatric Symptom Assessment Scale for DSM-IV</td>
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<td>Scale</td>
<td>Sample Size</td>
<td>% PTSD or Suicidal Ideation</td>
<td></td>
<td></td>
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<td>-------</td>
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<td>-----------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prigerson and Slimack (1999)</td>
<td>US</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>Suicidal ideation</td>
<td>The Scale for suicidal Ideation (SSI)</td>
<td>n/a</td>
<td>n/a</td>
<td>58, 23.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sareen et al. Canada</td>
<td>Cross-sectional</td>
<td>PTSD group (%): 37.2, Controls (%): 4.5</td>
<td>Non-Psychiatric Sample</td>
<td>n/a</td>
<td>Suicide attempts &amp; Suicidal ideation</td>
<td>Questions in the Assessment Interview</td>
<td>478</td>
<td>36476</td>
<td>53.5, n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sharhabani-Arzy et al. (2003)</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>Victims of Physical/Sexual Abuse</td>
<td>Suicidal behaviour</td>
<td>Suicide Risk Scale (SRS)</td>
<td>47</td>
<td>127</td>
<td>100, 37</td>
<td></td>
<td></td>
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<tr>
<td>Strauss et al. US</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Other Primary Psychiatric Diagnosis/</td>
<td>War Veterans</td>
<td>Suicide attempts &amp; Suicidal ideation</td>
<td>Part of a Validated Structured Interview</td>
<td>80</td>
<td>85</td>
<td>0, 48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tarrier and Gregg *2004) UK</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Primary PTSD Diagnosis</td>
<td>Samples with Various Traumas</td>
<td>Suicide attempts &amp; Suicidal ideation</td>
<td>Questions in the Assessment Interview</td>
<td>94</td>
<td>GPN</td>
<td>42.5, 36</td>
<td></td>
<td></td>
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<td>Study Authors</td>
<td>Study Design</td>
<td>n/a</td>
<td>Sample Description</td>
<td>Questionnaire/Scale Used &amp; Notes</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
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<td></td>
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<tr>
<td>Thompson et al.</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>Suicide attempt status ascertained by the principal investigator (CAPS) for DSM-III-R The National Women's Study (NWS) for DSM-III-R</td>
<td>119</td>
<td>85</td>
<td>100</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Thompson et al.</td>
<td>Case-control study</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>Suicide attempt status ascertained by the principal investigator (CAPS) for DSM-III-R The National Women's Study (NWS) for DSM-III-R</td>
<td>157</td>
<td>178</td>
<td>100</td>
<td>32.2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Thoresen and Mehlum</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>Four items from the Norwegian General Health Questionnaire (GHQ) The Posttraumatic Symptom Scale (PTSS-10) for DSM-III-R</td>
<td>106</td>
<td>1066</td>
<td>0</td>
<td>33.8</td>
<td></td>
<td></td>
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<tr>
<td>Tiet et al. (2006)</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Other Primary Psychiatric Diagnosis/ies</td>
<td>As part of Addiction Severity Index (ASI) Information from Nationwide VA databases</td>
<td>1120</td>
<td>32048</td>
<td>2.9</td>
<td>46.6</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Ullman and Brecklin</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>Questions in the Assessment Interview PTSD assessed during interview using DSM-III-R</td>
<td>82</td>
<td>545</td>
<td>100</td>
<td>34.0</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Study</td>
<td>Design</td>
<td>Setting</td>
<td>Sample Description</td>
<td>Measurement</td>
<td>III-R criteria</td>
<td></td>
<td></td>
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<tr>
<td>Villagomez et al. (1995)</td>
<td>Cross-sectional</td>
<td>US</td>
<td>PTSD group (%): 38.3, Controls (%): 9.6</td>
<td>Non-Psychiatric Sample</td>
<td>Suicide attempts</td>
<td>Addiction Severity Index (ASI)</td>
<td>107</td>
<td>625</td>
<td>36.6</td>
<td>37.1</td>
<td></td>
</tr>
<tr>
<td>Wenzel et al. Kosovo</td>
<td>Cross-sectional</td>
<td>n/a</td>
<td>War-related</td>
<td>Non-Psychiatric Sample</td>
<td>Suicidal ideation</td>
<td>Suicidal Ideation Index (SII)</td>
<td>256</td>
<td>905</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
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<tr>
<td>Wilcox et al. (2009)</td>
<td>Cross-sectional</td>
<td>US</td>
<td>n/a</td>
<td>Non-Psychiatric Sample</td>
<td>Suicide attempts &amp; Suicidal ideation</td>
<td>As part of standardized interview ascertained by trained interviewers</td>
<td>100</td>
<td>1173</td>
<td>50.2</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Yen et al. (2003)</td>
<td>Prospective</td>
<td>US</td>
<td>n/a</td>
<td>Other Primary Psychiatric Diagnosis/ies</td>
<td>Suicide attempts</td>
<td>As part of Longitudinal Interval Follow-Up Evaluation</td>
<td>58</td>
<td>563</td>
<td>n/a</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Country</td>
<td>N/A</td>
<td>Other Primary Psychiatric Diagnosis/es</td>
<td>War Veterans</td>
<td>Successful Suicides</td>
<td>National Death Index cause of death indicators</td>
<td>Comorbid condition index</td>
<td>N/A</td>
<td>Sample Size</td>
<td>Controls</td>
</tr>
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<td>-----------------------</td>
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</tr>
<tr>
<td>Zivin et al. (2007)</td>
<td>Retrospective cohort</td>
<td>US</td>
<td>n/a</td>
<td>Other Primary Psychiatric Diagnosis/es</td>
<td>War Veterans</td>
<td>Successful suicides</td>
<td>National Death Index cause of death indicators</td>
<td>Charlson Comorbidity Index (A weighted index designed to classify comorbid conditions)</td>
<td>357</td>
<td>1326</td>
<td>10</td>
</tr>
<tr>
<td>Zlotnick et al. (2002)</td>
<td>Cross-sectional</td>
<td>US</td>
<td>PTSD group (%): 61.5, Controls (%) 45.2</td>
<td>Other Primary Psychiatric Diagnosis/es</td>
<td>Samples with Various Traumas</td>
<td>Suicide attempts</td>
<td>Questions in the Assessment Interview</td>
<td>The Structured Clinical Interview (SCID) for DSM-IV</td>
<td>156</td>
<td>460</td>
<td>64</td>
</tr>
</tbody>
</table>

*Note. n/a = information not available in the article.*
Suicidality was assessed in terms of the frequency of successful suicides, suicide attempts and/or the presence of suicidal ideation and in terms of mean scores on a general measure of suicidal behaviour. Four studies included a measure of successful suicides, 25 studies included a measure of suicide attempts, 13 studies included a measure of suicidal ideation, 17 studies included measures of both suicide attempts and suicidal ideation and four studies included mean scores on a general measure of suicidality including thoughts, plans and/or suicide acts. A wide range of scales were used to assess suicidality. Asking questions about the presence and/or the intensity of suicidality during the assessment interview or using the suicidal behaviour items of standardized diagnostic interviews were the most common methods applied by the studies (n = 38) to ascertain the presence and/or the levels of suicidality. Additionally, a considerable number of studies (n = 20) used self-reports to assess suicidality. Only one study did not include details of the method used to measure suicidality (Oquendo et al., 2003). Further details concerning the specific diagnostic instruments which were used to assess suicidality across the 63 independent samples are presented in Table 3.

4.4.2. The association between suicidality and PTSD.

Initially, the magnitude of the association between suicidality and PTSD was calculated. A considerable number of studies (n = 17) provided information regarding the association of PTSD with more than one measures of suicidality (suicide attempts and suicidal ideation). In these cases, the measure of suicidality which was most proximal to successful suicide (suicide attempts) was included in the analysis.

The overall Hedges’ g coefficient was 0.783 (z = 10.558, p < .0001, CI = 0.637 to 0.928; Heterogeneity, Q-value = 2006.369, p < .0001). Within these studies, the Hedges’ g coefficients across 55 studies indicated a significant positive association between suicidality and PTSD (with p values ranging from .01 to .0001), the Hedges’ g coefficients across six studies did not show a significant association between suicidality and PTSD.
(Cacciola et al., 2009; Gradus et al., 2010; Jakupcak et al., 2009; Oquendo et al., 2005; Oquendo et al., 2003; Strauss et al., 2006) and the Hedges’ $g$ coefficient of two studies indicated a significant negative association between suicidality and PTSD ($p < .0001$) (Desai et al., 2005; Zivin et al., 2007).

### 4.4.3. Subgroup analyses.

A series of subgroup analyses were computed to examine if the association between PTSD and suicidality differed across studies using different measures of suicidal behaviour, different screening tools for suicidal behaviour, among psychiatric and non-psychiatric populations, and among PTSD populations exposed to different types of traumas. The results of the subgroup analyses are presented in Table 4.

#### 4.4.3.1. The association between different modes of suicidality and PTSD.

The overall effect sizes of the subgroups showed that all modes of suicidality apart from successful suicides were significantly positively associated with PTSD (see Table 4). The magnitude of the association between PTSD and suicidality was equivalent across the subgroups of suicidal ideation, suicidal behaviour and suicide attempts. However, within the subgroup of the four studies examining the association between successful suicides and PTSD, the association was not significant.

In the previous analysis, the association of PTSD with the most proximal suicide measure was examined. A further independent analysis was computed to examine the association of PTSD with suicidal ideation, regardless of whether it was the most proximal suicide measure. A total of 30 studies included an outcome of the association between suicidal ideation and PTSD. Consistent with the findings above a significant positive association of PTSD with suicidal ideation was found (see Table 4).
Table 4. *Results of the Subgroup Analyses (Random-Effects Model) Assessing the Association between PTSD and Suicidality*

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>$n$</th>
<th>Hedge’s $g$</th>
<th>$z$</th>
<th>95% CI</th>
<th>$P$</th>
<th>Q-value</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modes of suicidality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suicidal ideation</td>
<td>13</td>
<td>1.091</td>
<td>5.163</td>
<td>[0.677-1.505]</td>
<td>&lt; .0001</td>
<td>531.377</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Suicidal behaviours</td>
<td>4</td>
<td>0.650</td>
<td>3.852</td>
<td>[0.320-0.981]</td>
<td>&lt; .0001</td>
<td>5.844</td>
<td>ns.</td>
</tr>
<tr>
<td>Suicide attempts</td>
<td>42</td>
<td>0.752</td>
<td>12.949</td>
<td>[0.638-0.866]</td>
<td>&lt; .0001</td>
<td>354.837</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Successful suicides</td>
<td>4</td>
<td>0.188</td>
<td>0.447</td>
<td>[-0.637-1.014]</td>
<td>ns.</td>
<td>662.521</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Suicidal Ideation total</td>
<td>30</td>
<td>0.954</td>
<td>9.774</td>
<td>[0.762-1.145]</td>
<td>&lt; .0001</td>
<td>671.212</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td><strong>Screening tool for PTSD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standardized Interviews</td>
<td>41</td>
<td>0.735</td>
<td>8.894</td>
<td>[0.573-0.896]</td>
<td>&lt; .0001</td>
<td>884.724</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Screening Questionnaires</td>
<td>16</td>
<td>0.982</td>
<td>4.409</td>
<td>[0.590-1.374]</td>
<td>&lt; .0001</td>
<td>757.089</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td><strong>Target Population differences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary diagnosis of PTSD</td>
<td>5</td>
<td>0.941</td>
<td>3.204</td>
<td>[0.365-1.517]</td>
<td>&lt; .01</td>
<td>28.045</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Other Primary psychiatric</td>
<td>17</td>
<td>0.495</td>
<td>3.294</td>
<td>[0.200-0.789]</td>
<td>&lt; .01</td>
<td>575.342</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Non-psychiatric samples</td>
<td>40</td>
<td>0.896</td>
<td>11.010</td>
<td>[0.736-1.055]</td>
<td>&lt; .0001</td>
<td>979.520</td>
<td>&lt; .0001</td>
</tr>
</tbody>
</table>
Different traumatic populations

<table>
<thead>
<tr>
<th>Population</th>
<th>N</th>
<th>Mean</th>
<th>CI</th>
<th>p-value</th>
<th>Chi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>War veterans</td>
<td>16</td>
<td>1.009</td>
<td>[0.503-1.515]</td>
<td>&lt; .0001</td>
<td>1365.397</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Physical/sexual abuse</td>
<td>7</td>
<td>0.515</td>
<td>[0.394-0.635]</td>
<td>&lt; .0001</td>
<td>7.713</td>
<td>ns.</td>
</tr>
<tr>
<td>Mixed traumas</td>
<td>11</td>
<td>0.789</td>
<td>[0.565-1.013]</td>
<td>&lt; .0001</td>
<td>35.428</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Natural disasters</td>
<td>1</td>
<td>0.553</td>
<td>[0.350-0.715]</td>
<td>&lt; .0001</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Diagnosis of PTSD

<table>
<thead>
<tr>
<th>Type</th>
<th>N</th>
<th>Mean</th>
<th>CI</th>
<th>p-value</th>
<th>Chi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>36</td>
<td>0.880</td>
<td>[0.663-1.972]</td>
<td>&lt; .0001</td>
<td>1007.231</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Lifetime</td>
<td>21</td>
<td>0.725</td>
<td>[0.570-0.880]</td>
<td>&lt; .0001</td>
<td>215.070</td>
<td>&lt; .0001</td>
</tr>
</tbody>
</table>

Predictors of suicidality

<table>
<thead>
<tr>
<th>Predictor</th>
<th>N</th>
<th>Mean</th>
<th>CI</th>
<th>p-value</th>
<th>Chi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>20</td>
<td>0.789</td>
<td>[0.455-1.122]</td>
<td>&lt; .0001</td>
<td>2605.702</td>
<td>&lt; .0001</td>
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<tr>
<td>PTSD</td>
<td>20</td>
<td>0.860</td>
<td>[0.658-1.062]</td>
<td>&lt; .0001</td>
<td>446.251</td>
<td>&lt; .0001</td>
</tr>
</tbody>
</table>

*Note. N = number of included studies.*
4.4.3.2. The impact of the PTSD screening tool on the association between suicidality and PTSD.

Forty-one studies used standardized structured/semi-structured interviews to screen or to confirm a diagnosis of PTSD and 16 studies used a standardized or non-standardized questionnaire to screen for PTSD. The results showed that the effect sizes were statistically significant across the two subgroups indicating that the association between PTSD and suicidality is strong, independent of the instrument used to assess PTSD (see Table 4).

4.4.3.3. The impact of target population differences on the association between suicidality and PTSD.

Forty studies were carried out with non-psychiatric samples and general population samples, five studies were carried out with psychiatric patients primarily diagnosed with PTSD and 17 studies were carried out with psychiatric patients primarily diagnosed with other Axis I or Axis II psychiatric diagnoses. One study was excluded from the analyses because it included partly clinical and partly community participants (Kramer et al., 1994). As can be seen from Table 4, the effect sizes were statistically significant across the three sub-groups. The strongest association between suicidality and PTSD was found among primarily PTSD samples and the weakest association was found among psychiatric populations with other primary diagnoses.

4.4.3.4. The effects of index trauma on the association between suicidality and PTSD.

Of the total number of studies, seven were conducted with victims of sexual or physical abuse in adulthood and/or in childhood, 16 were conducted with war veterans or victims of wars, one was conducted with victims of hurricane Katrina, and 10 were
conducted with populations with mixed traumas. Again, the effect sizes were significant across all of the subgroups (see Table 4).

4.4.3.5. The impact of current vs. lifetime PTSD in the association between PTSD and suicidality.

Thirty-six studies examined the association between current diagnosis of PTSD and suicidality while 21 studies examined the association between a lifetime diagnosis of PTSD and suicidality. Six studies did not provide information as to whether PTSD was assessed currently or across the lifetime. The association of PTSD with suicidality remained robust across those studies examining the association of suicidality with a lifetime diagnosis of PTSD and those examining the association of suicidality with a current diagnosis of PTSD (as shown in Table 4).

4.4.4. Meta-regression analyses.

Meta-regression analyses were conducted to examine the impact of the percentage of women and mean age on the association between PTSD and suicidality. The percentage of women was not a significant predictor of the effect size between PTSD and suicidality both in the total samples of 48 studies and in the PTSD subgroups of the studies. Similarly, the mean age was not a significant predictor of the effect size between PTSD and suicidality both in total samples of the studies included in the meta-analysis and in the PTSD subgroups.

4.4.5. Depression, PTSD and suicidality.

One meta-regression analysis and one subgroup analysis were conducted to examine the impact of depression on the association of PTSD with suicidality.
4.4.5.1. Meta-regression analysis of the impact of depression on suicidality in PTSD.

Thirteen studies provided information about the levels of depression among PTSD participants and controls. A meta-regression analysis was computed to examine whether the difference in levels of depression in the PTSD participants compared to the levels of depression in controls had any impact on the association of PTSD with suicidality. When the levels of depression, as a predictor variable, were regressed onto Hedge’s $g$ effect sizes, the slope was significant ($z = 5.26, p < .0001$) indicating that the higher the levels of depression in PTSD participants compared to controls, the higher the levels of suicidality in PTSD participants compared to controls. A scatter-plot showing the relationship between the levels of depression and the effect sizes of the PTSD-suicidality association is presented in Figure 3.
Figure 3. A scatter-plots showing the relationship between effect sizes (Hedge’s g) and levels of depression. It should be noted that the 13 studies included in the analysis did not use one measure of depression. Rather they used as series of different measures including SCID for DSM-IV or DSM-IIIR, CIDI, DIS-III-R, MINI, PHQ-9 A and Hamilton Depression Scale

4.4.5.2. Subgroup analysis of the impact of PTSD and depression on suicidality.

Twenty studies which examined a wide range of predictors of suicidality were identified. These studies which were conducted either in general population samples or in samples with other primary psychiatric diagnoses examined the effects of PTSD and depression on suicidality. Thus, they included an outcome of the contribution of both depression and PTSD in suicidality. To compare the magnitude of the PTSD-suicidality association with the magnitude of the depression-suicidality association, an independent subgroup analysis examining the effects of PTSD on suicidality and an independent subgroup analysis examining the effects of depression on suicidality were computed. As
presented in Table 4, the overall effect sizes across these 20 studies indicated an equally significant contribution of both PTSD and depression on suicidality.

### 4.4.6. Publication bias.

We examined the likelihood of publication bias by plotting the standard error as a function of Hedges’ g for each of the 63 effect sizes. The Egger’s test was significant \( t = 2.21, \ p < .05 \). However, the Kendall’s tau test was insignificant and the fail-safe \( N \) indicated that 2408 insignificant unpublished studies would be need to nullify the effect found.

#### 4.4.6.1. Methodological appraisal of the studies.

The current review and meta-analysis was not restricted to studies with particular methodological strengths. Since the research area of PTSD and suicidality has not been systematically investigated (Panagioti et al., 2009), we aimed to be as inclusive as possible to maximize the amount of data available for the meta-analysis and to offer the first quantitative account of the association between PTSD and suicidality. However, an increased probability for heterogeneity of results due to broad inclusion criteria should not be disregarded (Sanderson, Tatt, & Higgins, 2007; Stroup et al., 2000). A retrospective assessment of the methodological quality of the included studies was applied in seven domains proposed as fundamental in assessing the methodological quality of the included studies (Craig, Irwig, & Stockler, 2001; Sanderson et al., 2007; Stroup et al., 2000): i. size of the study group, ii. adequacy of comparators, iii. methodological design, iv. measure of PTSD, v. measure of suicidality, vi. sample selection method and vii. control of confounders. The results showed that only eight studies addressed adequately five of the seven above domains and 16 studies addressed adequately four of the seven domains. In contrast, the remaining studies were restricted by using cross-sectional designs, unmatched controls, opportunistic samples, less than 100 participants in the study groups and some did
not control for confounders. The methodological assessment of the studies was conducted by the first author. Details of the criteria used are presented in Table 5. An additional analysis examining the association of PTSD with suicidality among the 8 studies which adequately addressed 5 of the 7 criteria above was conducted. The results indicated that the association between PTSD and suicidality remained robust (the overall Hedges’ g coefficient was 0.656, \( z = 4.067, p < .0001, CI = 0.342 \) to 0.977).

Table 5. Assessment Criteria of the Methodological Quality of the Studies

<table>
<thead>
<tr>
<th>Domains of Methodological Quality</th>
<th>Reviewer’s Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Study design</td>
<td></td>
</tr>
<tr>
<td>Prospective</td>
<td>Very good</td>
</tr>
<tr>
<td>Retrospective cohort</td>
<td>Good</td>
</tr>
<tr>
<td>Case-control study</td>
<td>Adequate</td>
</tr>
<tr>
<td>Cross-sectional</td>
<td>Inadequate</td>
</tr>
<tr>
<td>ii. Sample quality</td>
<td></td>
</tr>
<tr>
<td>&gt;400</td>
<td>Very good</td>
</tr>
<tr>
<td>&gt;200</td>
<td>Good</td>
</tr>
<tr>
<td>&gt;100</td>
<td>Adequate</td>
</tr>
<tr>
<td>&lt;100</td>
<td>Inadequate</td>
</tr>
<tr>
<td>iii. Adequacy of comparisons</td>
<td></td>
</tr>
<tr>
<td>Matched comparison</td>
<td>Very good</td>
</tr>
<tr>
<td>Partly matched comparison group</td>
<td>Adequate</td>
</tr>
<tr>
<td>Unmatched comparison group</td>
<td>Inadequate</td>
</tr>
<tr>
<td>iv. Sample selection method</td>
<td></td>
</tr>
<tr>
<td>Stratified</td>
<td>Very good</td>
</tr>
<tr>
<td>Consecutive</td>
<td>Adequate</td>
</tr>
<tr>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>Opportunistic</td>
<td>Inadequate</td>
</tr>
</tbody>
</table>

v. Control for Confounders

| Clinical and socio-demographics | Very good |
| Socio-demographics only | Adequate |
| None | Inadequate |

vi. Measure of PTSD

| Validated clinical interview administered d by a mental health professional | Very good |
| Validated clinical interview administered by trained research staff | Good |
| Validated self-report measure | Adequate |
| Invalidated interviews/ questionnaires | Inadequate |

vii. Measure of Suicidality

| Items of validated clinical interviews | Very good |
| Validated self-report measure | Good |
| Questions the assessment interview | Adequate |
| Invalidated self-report measure/ unspecified method | Inadequate |

4.5. Discussion

The aim of the current meta-analysis was twofold: first, to examine the association between PTSD and suicidality and second, to investigate the impact of depression on the association between PTSD and suicidality. Overall, the findings fully supported our initial hypothesis that a PTSD diagnosis would be associated with heightened rates of suicidality.
Additionally, consistent with our prediction, higher levels of comorbid depression in the PTSD groups compared to controls were associated with a stronger PTSD and suicidality association. These findings confirm the main conclusions of an existing narrative review of PTSD and suicidal behaviour (Panagioti et al., 2009). The findings concerning the association between PTSD and suicidality are also consistent with the findings of a recent systematic review (Krysinska & Lester, 2010). Nonetheless, the current results differ from the outcomes of that previous systematic review in that the current meta-analysis indicated a positive association between comorbid depression and suicidality in those with PTSD. The previous systematic review did not make a clear conclusion about the role of depression in the association between PTSD and suicidality (Krysinska & Lester, 2010).

One reason for these different findings is that the previous systematic review was based on a narrative description of the previous literature to examine the role of depression in the association between PTSD and suicidality while the current study was based on computing meta-regression analyses to examine the impact of depression on the PTSD and suicidality association.

Further subgroup analyses demonstrated that i. the relationship between suicidality and PTSD pertained across studies investigating the association of PTSD with suicide attempts, suicidal ideation and suicidal behaviours but not successful suicides, ii. the association between suicidality and PTSD was strong across studies using standardized interviews to confirm a PTSD diagnosis and across studies using a screening questionnaire to identify PTSD, iii. a PTSD diagnosis was associated with increased frequency of suicidality across studies irrespective of whether they were carried out with psychiatric or non psychiatric populations, iv. the relationship between PTSD and suicidality persisted irrespective of the type of traumas that led to a PTSD diagnosis, v. both, current and lifetime diagnoses of PTSD were strongly associated with increased levels of suicidality. These findings suggest that PTSD compounds suicidal risk in a wide range of
circumstances. Additionally, the association between PTSD and suicidality appeared independent of gender and age. This is only partly consistent with the results of a recent epidemiological study which showed that a diagnosis of PTSD significantly predicted suicidal ideation in both men and women, and suicide attempts in women but not in men (Cougle et al., 2009a).

Consistent with the findings of a previous systematic review (Krysinska & Lester, 2010) we found that the association between successful suicides and PTSD was not significant. This subgroup analysis was based on combining the results of only four studies and, thus, there is the potential for the analysis to be underpowered. Two of the studies included in the meta-analysis studies showed a significant positive association between PTSD and successful suicides while the other two showed a significant negative association between PTSD and successful suicides. Three other studies were identified in the literature examining the incidence rates of suicide among deceased veterans with PTSD. These studies consistently reported substantially increased incidence of suicides than would be expected in general population samples (Boscarino, 2006; Drescher et al., 2003; Farberow et al., 1990). Two studies (Drescher et al., 2003; Farberow et al., 1990) were not included in the meta-analysis because they did not provide an outcome measure of the association between PTSD and suicide and the third study (Boscarino, 2006) was rejected because it provided only odds ratios for the association of PTSD with suicide which cannot be transformed into Hedges’ g coefficients. Thus, due to the small number of studies examining the association between PTSD and suicidality and the conflicting results no clear conclusions can be reached about the relationship between PTSD and successful suicides. The findings confirmed our initial prediction that the presence of comorbid depression would have a significant impact on the association between PTSD and suicidality. The results of the meta-regression analysis showed that there was a linear positive relationship between depression and suicidality among PTSD samples, in that the
probability of suicide increased proportionally with the levels of comorbid depression. The findings underscore the conclusion made by Panagioti et al. (2009) in their narrative review that depression potentially has a central role in the aetiology of suicide risk among individuals diagnosed with PTSD. They are also in agreement with the findings of three studies which examined the frequency of suicidal behaviours in PTSD patients with comorbid depression compared to the frequency of suicidal behaviours in PTSD patients without comorbid depression. All three studies consistently reported that suicidal risk was significantly higher in PTSD groups with comorbid depression compared to the PTSD groups without depression (Clover et al., 2004; Freeman et al., 1995; Hendin & Haas, 1991). These studies were rejected from the meta-analysis because they did not include a comparison group. Finally, the subgroup analysis which examined predictors of suicidality among general population samples or psychiatric patients with other primary diagnoses, demonstrated that both PTSD and major depression are highly positively related to suicidality. Although the last finding does not add to our knowledge of how comorbid depression influences the relationship between PTSD and suicidality it further confirms that both PTSD and depression have a decisive influence on suicidal risk. Since PTSD and depression often co-occur, mental health professionals should be aware of the effects that this co-occurrence may have on the risk of suicide.

4.5.1. Limitations.

This meta-analysis has a number of limitations. One important methodological limitation in meta-analyses concerns publication bias wherein studies with small sample sizes and large effect sizes have an excessive impact on the overall results (Begg & Berlin, 1988). In our study, although such a bias appeared to be operating, the large number of studies which would have been needed to nullify the effects found, provides some reassurance that a large publication bias was not operating. A second limitation is that the
methodological quality of the majority of the studies was low. This was an unavoidable cost of evaluating an inherently heterogeneous area and attempting to be inclusive. A third limitation is that the effect sizes in the current meta-analysis were mainly derived from studies with cross-sectional designs and thus no casual inferences can be made regarding the role of PTSD as compounding the risk for suicide. Fourth, despite our effort to control for factors that may account for the association between PTSD and suicidality, there are numerous factors that may exert an influence on the magnitude of the outcome and which we were unable to evaluate. For example, less than a quarter of the total number of the studies included in the meta-analysis provided information about the proportion of the participants who also suffered from depression. Thus, our conclusion about the role of the comorbid depression on the PTSD-suicidality association is based on the outcomes of a limited proportion of the studies which examined the association of PTSD and suicidality. Nonetheless, the highly consistent findings concerning the impact of depression on the PTSD-suicidality association support our conclusions. Similarly, the influence of the levels of social support, severity of particular PTSD symptoms, feelings of hopelessness which have been involved in increased risk for suicide among persons with PTSD (Ben-Ya'acov & Amir, 2004; Hendin & Haas, 1991; Kotler et al., 2001; Leiner et al., 2008; Nye & Bell, 2007) could not be examined since very few studies included such information. Finally, the number of studies included in some subgroup analyses was small. For instance, only four studies examined the association of PTSD with successful suicides and one study examined the association of PTSD and suicidality among individuals exposed to a natural disaster (Caldera et al., 2001).

4.5.2. Conclusions and implications.

Taken as a whole, this pattern of findings confirms that PTSD, either as primary or secondary diagnosis, is significantly associated with an increased risk for suicide.
Additionally, the findings of this meta-analysis further contribute to the existing literature which indicates that individuals suffering from psychiatric disorders are at increased risk of suicide (Bernal et al., 2007). Similarly to PTSD, a considerable number of other psychiatric diagnoses have been identified in the literature to compound risk for suicide including major depression (Bernal et al., 2007; Chen & Dilsaver, 1996), psychosis (Tarrier et al., 2004), bipolar disorder (Chen & Dilsaver, 1996; de Abreu, Lafer, Baca-Garcia, & Oquendo, 2009) substance use disorders (Mills et al., 2006) and borderline personality disorder (McGirr, Paris, Lesage, Renaud, & Turecki, 2007). The current results indicated that a concurrent diagnosis of major depression appears to compound the risk for suicide in PTSD. There are several alternative explanations for the contribution of depression in the PTSD-suicidality association between PTSD. One possibility might be that comorbid depression acts on suicidality via exaggerating the effects of PTSD symptoms. A second possibility is that major depression fully mediates the association between PTSD and suicidality. A third possibility is that both PTSD and depression increase the likelihood of suicide by contributing to the emergence of feelings of hopelessness, defeat, entrapment and negative appraisals which may be the underlying factors that give rise to suicidal behaviour (Bolton et al., 2007; Johnson et al., 2008a; Panagioti et al., 2009). The topic is of high priority given the enormous burden of suicide for individuals and society (Begley & Quayle, 2007; De Groot et al., 2006). Future studies should concentrate on systematically investigating the putative mechanisms of suicidality in PTSD including the role of particular PTSD symptoms, comorbid major depression, feelings of hopelessness, levels of social support and negative dysfunctional appraisals. Clinicians should routinely fully assess suicidal risk when working with individuals who have been traumatized.
CHAPTER 5

5. Pathways to suicidal behaviour in Posttraumatic Stress Disorder: The role of negative perceptions of functional impairment and comorbid symptoms of depression.

5.1. Abstract

This study investigated paths to suicidal behaviour in 94 civilian participants with chronic posttraumatic stress disorder (PTSD). Two statistical modelling programs, TETRAD II version 2.1 and Mplus 5.21 were used to construct a working model of suicide in PTSD. Two paths to suicidal behaviour were identified. In the first path suicidal behaviour was directly associated with greater life-impairment which in turn was associated with poorer occupational and social functioning. In the second path suicidal behaviour was directly associated with depressive symptoms which in turn were associated with more severe PTSD symptoms. Psychotropic medication, employment status and threat to life further contributed to the model. The findings suggest that negative perceptions of functional impairment and depression are strongly associated with suicidal behaviour in PTSD.

5.2. Introduction

Whilst there is general consensus in the literature that there is a strong association between posttraumatic stress disorder (PTSD) and suicidal behaviour (Panagioti et al., 2009; Sareen et al., 2005b; Tarrier & Gregg, 2004), few studies have examined factors which may render those diagnosed with PTSD more susceptible to suicidal thoughts and behaviours. A number of studies demonstrated that suicidal risk was significantly and positively associated with the re-experiencing symptom cluster (Amir et al., 1999; Jurišić & Marušič†, 2009; Kotler et al., 2001; Nye & Bell, 2007) and hyper-arousal symptom cluster (Ben-Ya'acov & Amir, 2004) and negatively or insignificantly associated with the avoidance and numbing symptom cluster (Kotler et al., 2001; Nye & Bell, 2007).

A basic methodological limitation with the existing literature examining associations between PTSD and suicidal behaviour is that there is no evidence elucidating the mechanisms by which suicidal behaviour develops from PTSD. One possibility is that particular PTSD symptom clusters lead to depression which then leads to suicidal behaviour (Panagioti et al., 2009). In accord with this, co-morbid depressive symptoms appear to mediate the relationship between PTSD symptoms and suicidal ideation among African American women with a history of intimate partner violence (Leiner et al., 2008). A second possibility is that co-morbid depression may lead to suicidal behaviour because it exacerbates the effects of PTSD symptoms. A third possibility is that there might be an overriding factor which mediates the impact of both PTSD symptoms and depression on suicidal behaviour. For example, Tarrier and Gregg (2004) reported that increased severity of life-impairment, a subjective measure which mainly reflects levels of disability and negative perceptions of functional impairment, was the strongest predictor of suicidal behaviour. Similarly, two models of suicide emphasize the role of negative appraisals (i.e., interpretative negative perceptions of external events and internal states) as a central component of suicidal behaviour (Bolton et al., 2007; Johnson et al., 2008a; Williams,
Additionally, Joiner and Van Orden’s (2008) interpersonal-psychological theory of suicidal behaviour postulates that negative subjective perceptions of burdensomeness have a crucial role in developing suicidal behaviour. Currently, the use of these theoretical postulations in explaining suicidal behaviour in PTSD has not yet been tested.

The main aim of this study was to formulate paths to suicidal behaviour in those with PTSD. This was achieved by re-analyzing a data set from individuals with a diagnosis of PTSD (Tarrier & Gregg, 2004). Based on both theory and empirical data, it was predicted that the variables would follow a particular path to suicidal behaviour. Variables which reflect negative perceptions of functional impairment (i.e., life-impairment, occupational functioning impairment, social functioning impairment) and clinical symptoms (i.e., severity of depressive symptoms and each of the three PTSD symptom clusters) were hypothesized to be directly associated with suicidal behaviour. The characteristics of the traumatic experience (e.g., type of trauma, duration of trauma), receiving psychotropic medication and the demographic factors (e.g., younger age, being female, married or divorced/widowed, increased number of dependent children) were hypothesized to contribute to the path to suicidal behaviour via their association with the severity of clinical symptoms and/or the negative perceptions of functional impairment. These predictions were based on previous literature which has indicated that particular types of traumas (i.e., combat trauma, physical or sexual abuse) and prolonged exposure to traumatic events are strongly associated with symptoms of depression, PTSD symptoms/diagnosis and suicidal behaviour (e.g., Suliman et al., 2009; Ullman, 2004). Psychotropic medication was included in the hypothesized model since previous research has shown that receiving medication is associated with suffering co-morbid depressive disorders and more frequent use of mental health services (Harpaz-Rotem, Rosenheck, Mohamed, & Desai, 2008; Mohamed & Rosenheck, 2008). Finally, it has been found that a
number of demographic factors (e.g., being female, younger, unmarried or divorced/widowed, having dependent children) are predictive of increased suicidal thoughts and behaviours in the general population (e.g., Bernal, et al., 2007; Driver & Abed, 2004; Kessler et al., 1999).

5.3. Method

5.3.1. Participants.

Data from 94 individuals attending a screening process to enter a clinical trial of cognitive behavioural treatments of PTSD (Tarrier et al., 1999a; Tarrier, Sommerfield, Pilgrim, & Humphreys, 1999c) and data which had previously been presented in Tarrier and Gregg’s (2004) paper were re-analyzed for the purpose of this study. Potential participants were referred from primary and secondary health services in the north west of England. Those participants who were initially screened and assessed as meeting the inclusion criteria proceeded to the full assessment procedure. The inclusion criteria were: a DSM-III-R diagnosis of PTSD confirmed by the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995), retrospective analysis showed all patients also met DSM-IV criteria; a minimum of 6 months duration of PTSD but not more than 10 years (a maximum duration of 10 years was used to prevent the inclusion of a small number of outliers with a very long duration); childhood sexual abuse was not the index trauma; not suffering from a psychotic or organic brain illness; not having received a primary diagnosis of alcohol or substance abuse; if receiving psychotropic medication, then medication must have been constant for 3 months prior to the study; not receiving any concurrent psychological or psychosocial intervention; and not having received any type of cognitive behavioural intervention in the 6 months prior to referral (Tarrier & Gregg, 2004; Tarrier et al., 1999a).

Childhood sexual abuse was excluded as the index trauma as it may involve impairment to development in contrast to traumas in adult life and would thus not be comparable to adult trauma.
5.3.2. Measures.

Questions were asked as part of the initial assessment interview regarding suicidal thoughts (“Have you seriously thought about suicide?”), suicidal plans (“Have you ever made plans to commit suicide?”), and suicide attempts (“Have you ever attempted suicide or attempted to end your life?”) since exposure to the index trauma. Suicidal behaviour was an ordinal four-point variable: 0 = no suicidal behaviour, 1 = suicidal ideation, 2 = suicidal plans and 3 = suicide attempts. In the analyses, suicidal behaviour was treated as a continuous variable.

The Clinician Administered PTSD Scale (CAPS; Blake et al., 1995) was administered, from which a total severity score was computed by adding the intensity and frequency score for each symptom. Intensity and frequency scores were also computed for each symptom category (re-experiencing symptom cluster, avoidance numbing symptom cluster and hyper-arousal symptom cluster). The CAPS has been found to have excellent reliability, e.g., across items, raters and testing occasions, and validity, e.g., convergent and discriminant validity, diagnostic utility, and sensitivity to clinical change (Weathers et al., 2001). The Cronbach’s alpha coefficient has been estimated to range from .85 to .87 for the three symptom clusters and .94 for the total score (Blake et al., 1995).

The trauma characteristics (e.g., type, duration, threat to life) of the participants, the social functioning impairment (1 = none, 1 = mild, 2 = moderate, 3 = severe, 4 = extreme impairment in social functioning) the occupational functioning impairment (0 = none, 1 = mild, 2 = moderate, 3 = severe, 4 = extreme impairment in occupational functioning) and the subjective life-impairment (Subjective Distress subscale; 0 = none, 1 = mild, 2 = moderate, 3 = severe, 4 = extreme distress) were assessed as part of the CAPS. The Subjective Distress item of the CAPS assesses subjective impairment and disability/problems due to PTSD symptoms. Types of trauma were classified into three categories: crime (violent criminal assault), accident and other (e.g. war, combat). The
measures of life-impairment, occupational functioning and social functioning impairment are based upon subjective judgments of current levels of functioning and thus they may not reflect objective impairment but limiting, negative subjective perceptions of functional impairment (Tarrier & Gregg, 2004).

The *Beck Depression Inventory* (BDI; Beck, 1988), a 21-item measure of the severity of depression (range 0–63) was used to assess the severity of symptoms of depression. The BDI has good reliability and validity. The Cronbach’s alpha coefficient of the BDI is around .86 for psychiatric patients and .81 for not psychiatric individuals (Beck et al., 1988).

5.3.3. Data analysis.

The statistical analyses were based on organizing the variables in two groups. The main goal of the analysis was to examine the links between the dependent or outcome variables, psychotropic medication (1 if yes, 0 otherwise), current employment (1 if yes, otherwise 0), re-experiencing symptom cluster, avoidance and numbing symptom cluster, hyperarousal symptom cluster, severity of depressive symptoms (BDI), social functioning impairment, occupational functioning impairment, life-impairment, suicidal behaviour. The baseline covariates or independent variables, age, gender, cohabiting (1 if yes, otherwise 0), number of dependent children, type of trauma (1 if the trauma was a violent criminal assault, 0 otherwise), duration of trauma (1 if greater than 1 hour, 0 otherwise), threat to life (1 if yes, 0 otherwise), were considered only useful to help establish the direction of any links between the outcome variables and to allow them to act as potential confounders of those links. In some of the analyses, employment status and psychotropic medication were treated as members of the independent group.

In an initial descriptive analysis, Pearson cross-product correlations were calculated for all pairs of variables (regardless of whether the variables were binary, ordinal or
continuous). Similarly, partial correlations were calculated for each pair of variables, controlling for all the other variables in the data set (both independent and dependent). The statistical significance of these correlations was used to produce an initial non-directed graph. This is a graph in which there is no indication of causal direction between the variables. The links in the graph indicate which of the pairs of variables are correlated after controlling for all the other variables in the data set. It should be noted that these significance values are only approximate due to lack of bivariate normality.

TETRAD II Version 1.2 (Spirtes, Scheines, Meek, & Glymour, 1994) is capable of searching for patterns of causal relationships within datasets using various search algorithms. The use of TETRAD and similar algorithms for the discovery of causal patterns is described in Shipley (2000), Spirtes, Glymour, and Scheines (2000) and Pearl (2009). This process was used to generate statistical causal models that fit with the pattern of significant and non-significant partial correlations in the dataset. Statistical significance level for the individual links was set to be .05. The rationale for using TETRAD in the current study was to explore the data and produce an initial model of suicidal behaviour which would be confirmed afterwards using MPLUS Version 5.21 (Muthén & Muthén, 1998-2009). The TETRAD algorithms work with partial correlations (details of the algorithm can be found in Spirtes et al. (2000) and the final undirected links produced are the same as those produced by the partial correlations described above. Directed links are produced with the following procedure. Assuming that there are four variables (i.e., A, B, C, D) with the following relationships: i. A is directly associated with B, ii. B is directly associated with C, iii. There is no direct link between A and C. If A precedes C then the only direct link between the variables is: A->B->C. Further, if D is associated with C (with no direct links between the D and the other two variables) then the direct of the links has to be A->B->C->D.
Mplus Version 5.21 (Muthén & Muthén, 1998-2009) was used as a confirmatory analysis to fit the final model suggested for the outcome measures by interpretation of the TETRAD results. However, this model differed from that suggested by TETRAD in that all baseline covariates were initially allowed to influence all of the dependent variables in the model, irrespective of the statistical significance of these effects (i.e. their effects on the dependent variable were controlled for in the model). This is standard statistical practice when there is a suspicion that the baseline covariates are potential confounders of the relationships between the outcome variables of interest. As the non-normal distribution of the variables precludes parametric significance testing, statistical significance was determined by generating 95% confidence intervals via bootstrapping with 1,000 re-samples (Efron & Tibshirani, 1993). This technique provides a non-parametric alternative to inferential testing. The model was then refined by using a backwards elimination algorithm, sequentially removing the least significant links from the baseline covariates to the dependent variables until all links in the model were statistically-significant. If, in the course the backwards elimination procedure, a given baseline covariate had no significant links with any of the dependent variables then that covariate was dropped from the analysis, and the process continued.

5.4. Results

5.4.1. Sample characteristics and suicidal behaviour.

The mean age of the sample was 36.3 (SD = 12.1) years and more than half of the participants (n = 54, 55.6%) were male. The majority of individuals in the sample were married (n = 55, 56.7%), cohabitating (n = 71, 73%), currently unemployed (n = 78, 80.2%) and their mean age for completing full-time education was 16 years. No significant differences were found between participants who reported some level of suicidal behaviour
and participants who reported no suicidal behaviour with respect to demographic factors (Tarrier & Gregg, 2004).

As described in the paper by Tarrier and Gregg (2004), of the total number of participants \((N = 94)\), 41 (43%) reported no suicidal ideation, 36 (38.3%) reported suicidal thoughts, 8 (8.5%) reported definite plans, and 9 (9.6%) had attempted suicide since the trauma. Overall, 53 (54.4%) participants reported suicidal behaviour after the trauma exposure. A considerably higher percentage of those who reported suicidal behaviour were victims of violent criminal assaults \((n = 28, 52.8\%) \text{ versus } n = 18, 43\%, \chi^2(2, N = 94) = 6.230, \ p = .044\) and scored significantly higher on the CAPS total scale \((M = 74.83, SD = 15.48 \text{ versus } M = 62.56, SD = 18.59, F(2, 91) = 6.52, p = .002\) compared to those without suicidal behaviour.

**5.4.2. Correlations and partial correlations.**

There were five participants with missing BDI scores. All the analyses presented below were based on data from the remaining 89 participants. Significant positive correlations were found between suicidal behaviour and the severity of re-experiencing symptom cluster, the severity of hyper-arousal symptom cluster, symptoms of depression and life-impairment (see below the diagonal in Table 6).
Table 6. *Pearson Correlations and Partial Correlations with Both Independent and Dependent Measures Partialled Out*

<table>
<thead>
<tr>
<th>Measures</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Employment</td>
<td>0.18</td>
<td>0.38</td>
<td>.16</td>
<td>.08</td>
<td>-.12</td>
<td>-.09</td>
<td>-.13</td>
<td>.18</td>
<td>-.34*</td>
<td>.01</td>
<td>-.10</td>
<td></td>
</tr>
<tr>
<td>2. Psychotropic medication</td>
<td>0.56</td>
<td>0.49</td>
<td>.30**</td>
<td>-.01</td>
<td>.20</td>
<td>.10</td>
<td>.02</td>
<td>.32*</td>
<td>.08</td>
<td>-.08</td>
<td>.26*</td>
<td></td>
</tr>
<tr>
<td>3. CAPS Re-experiencing</td>
<td>15.78</td>
<td>6.05</td>
<td>-.18</td>
<td>.27*</td>
<td>.01</td>
<td>.27*</td>
<td>.16</td>
<td>.19</td>
<td>-.02</td>
<td>.14</td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td>4. CAPS Avoidance/Numbing</td>
<td>27.01</td>
<td>8.93</td>
<td>-.26*</td>
<td>.15</td>
<td>.40***</td>
<td>.25*</td>
<td>.26*</td>
<td>.45***</td>
<td>-.07</td>
<td>.04</td>
<td>-.17</td>
<td></td>
</tr>
<tr>
<td>5. CAPS Hyperarousal</td>
<td>26.96</td>
<td>7.15</td>
<td>-.25*</td>
<td>.29**</td>
<td>.48***</td>
<td>.51***</td>
<td>.26*</td>
<td>-.02</td>
<td>-.02</td>
<td>-.09</td>
<td>.02</td>
<td></td>
</tr>
<tr>
<td>6. BDI</td>
<td>25.99</td>
<td>11.68</td>
<td>-.27*</td>
<td>.26*</td>
<td>.44***</td>
<td>.50***</td>
<td>.56***</td>
<td>-.07</td>
<td>.16</td>
<td>.01</td>
<td>.18</td>
<td></td>
</tr>
<tr>
<td>7. Social impairment</td>
<td>2.37</td>
<td>1.12</td>
<td>-.18</td>
<td>.46***</td>
<td>.43***</td>
<td>.56***</td>
<td>.39***</td>
<td>.40***</td>
<td>.29*</td>
<td>.12</td>
<td>.13</td>
<td></td>
</tr>
<tr>
<td>8. Occupational impairment</td>
<td>2.59</td>
<td>11.35</td>
<td>-.47***</td>
<td>.37***</td>
<td>.29**</td>
<td>.34**</td>
<td>.26*</td>
<td>.34**</td>
<td>.53***</td>
<td>.37**</td>
<td>-.18</td>
<td></td>
</tr>
<tr>
<td>9. Life impairment</td>
<td>2.57</td>
<td>0.71</td>
<td>-.26*</td>
<td>.31**</td>
<td>.37***</td>
<td>.33**</td>
<td>.26*</td>
<td>.34**</td>
<td>.50***</td>
<td>.57***</td>
<td>.27*</td>
<td></td>
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<tr>
<td>10. Suicidal behaviour</td>
<td>0.88</td>
<td>0.95</td>
<td>-0.19</td>
<td>0.40***</td>
<td>0.34**</td>
<td>0.18**</td>
<td>0.30</td>
<td>0.43***</td>
<td>0.37***</td>
<td>0.20</td>
<td>0.41***</td>
<td></td>
</tr>
</tbody>
</table>

*Note. N = 89. Pearson correlations are presented below diagonal and partial correlations are presented above diagonal. Employment = Current employment; Psychotropic medication = Receiving psychotropic medication; CAPS Reexperiencing = CAPS Reexperiencing symptom cluster; CAPS Avoidance/numbing = Avoidance and numbing symptom cluster; CAPS Hyperarousal = CAPS Hyperarousal symptom cluster; BDI = Symptoms of depression; Occupational impairment = Occupational functioning impairment; Social impairment = Social functioning impairment.*

*p < .05, **p < .01, ***p < .001.
Possible casual pathways cannot be inferred with any confidence from these correlations and partial correlations (Aldrich, 1995; Ellett & Ericson, 1986). The use of partial correlations, however, yielded some interesting patterns (see above the diagonal in Table 6). Of particular note is that suicidal behaviour was conditionally independent of all other variables in the data set except life-impairment and psychotropic medication. That is, all of the partial correlations between suicidal behaviour and other variables were non-significant (the correlation is ‘explained’ by the other variables) except for those between suicidal behaviour and life-impairment and psychotropic medication. Similarly, the only direct link between the PTSD symptom clusters with the other outcome variables appeared to be between the avoidance and numbing symptom cluster and social functioning impairment.

5.4.3. Tentatively inferring the direction of causal influences.

In the TETRAD analyses, it was hypothesized that the demographic variables (age, gender, cohabiting, current employment, number of dependent children) and trauma characteristics (type of trauma, duration of trauma, threat to life) preceded all the other variables. In the first analysis, psychotropic medication and current unemployment were included within the group of dependent variables; in the second they were classified as being members of the independent group (the distinction was specified in TETRAD through the use of “/knowledge add temporal” option. Table 7 presents the model that resulted from the exploratory TETRAD analyses.
Table 7. Statistically Significant Links between the Dependent Variables as Indicated by TETRAD Analyses Assuming No Omitted Variables

<table>
<thead>
<tr>
<th>Current employment, psychotropic medication as independent variables</th>
<th>Current employment, psychotropic medication as dependent variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment -&gt; Occupational impairment</td>
<td>Employment -&gt; Occupational impairment</td>
</tr>
<tr>
<td>Medication -&gt; Social impairment</td>
<td>Medication -&gt; Social impairment</td>
</tr>
<tr>
<td>Medication -&gt; Suicidal behaviour</td>
<td>Medication -&gt; Suicidal behaviour</td>
</tr>
<tr>
<td>Hyperarousal -&gt; Reexperiencing</td>
<td>Hyperarousal -&gt; Reexperiencing</td>
</tr>
<tr>
<td>Avoidance/numbing -&gt; Hyperarousal</td>
<td>Avoidance/numbing -&gt; Hyperarousal</td>
</tr>
<tr>
<td>Avoidance/numbing -&gt; Depression</td>
<td>Avoidance/numbing -&gt; Depression</td>
</tr>
<tr>
<td>Depression -&gt; Hyperarousal</td>
<td>Depression -&gt; Hyperarousal</td>
</tr>
<tr>
<td>Depression &lt;-&gt; Suicidal behaviour</td>
<td>Depression &lt;-&gt; Suicidal behaviour</td>
</tr>
<tr>
<td>Social impairment -&gt; Occupation impair</td>
<td>Social impairment -&gt; Occupation impair</td>
</tr>
<tr>
<td>Occupation impair &lt;-&gt; Life impairment</td>
<td>Occupation impair &lt;-&gt; Life impairment</td>
</tr>
<tr>
<td>Life impairment &lt;-&gt; Suicidal behaviour</td>
<td>Life impairment &lt;-&gt; Suicidal behaviour</td>
</tr>
</tbody>
</table>

*Note.* Employ = Current employment; Occupational impairment/Occupation impair = Occupational functioning impairment; Medication = Psychotropic medication; Social impairment = Social functioning impairment; Hyperarousal = Hyperarousal symptom cluster; Reexperiencing = Reexperiencing symptom cluster; Avoidance/numbing = Avoidance and numbing symptom cluster; Depression = Symptoms of depression. For two variables, A and B: A -> B = A has a direct effect on B; B -> A = B has a direct effect on A; A <-> B = Either A has a direct effect on B, or B has a direct effect on A; A <-> B = Suggests that A and B have a common cause.
As expected, the three PTSD symptom clusters were closely related. Even though the relationships between the PTSD symptom clusters were not entirely clear, the severity of avoidance and numbing symptom cluster was directly associated with social functioning impairment and symptoms of depression. A direct positive association between symptoms of depression and suicidal behaviour was identified but it was not possible to determine its direction. Receiving psychotropic medication was directly associated with both social functioning impairment and suicidal behaviour. Social functioning impairment was directly associated with occupational functioning impairment which, in turn, was associated directly with life-impairment. Finally, a direct link between life-impairment and suicidal behaviour was found, but neither the direction of the link could be determined nor a common cause excluded. The model suggested by the TETRAD analyses is presented in Figure 4.

**Figure 4.** Pattern of causal influences suggested by the exploratory TETRAD analyses.
5.4.2. A confirmatory working model.

A confirmatory working model was constructed following a number of hypotheses and procedures. First, it was hypothesized that the patterns of correlations between the three PTSD symptoms could be explained by the fact that they are indicators of a common latent variable (i.e., CAPS total score). Second, all demographic, trauma-related variables and psychotropic medication were allowed to be arbitrarily correlated and to influence each of the remaining outcome variables (i.e., they were treated as exogenous variables which may have an influence on the outcomes and as potential confounders of causal effects between the outcome variables themselves) but their effects were removed one by one as described in the Method section (the links from the baseline covariates to the dependent variables were actually found to have little impact on the links between the dependent variables – i.e. there was little evidence of confounding). Initially, it was assumed that the CAPS total score was associated with both symptoms of depression and social functioning impairment. However, a much better fit was obtained after allowing the CAPS total score to be associated with symptoms of depression, and the avoidance and numbing symptom cluster to have a direct link with social functioning impairment. Following the outcomes from the TETRAD analyses, it was hypothesized that social functioning impairment would be associated with occupational functioning impairment which, in turn, would be associated with life-impairment. Finally, symptoms of depression and life-impairment were predicted to have a direct association with suicidal behaviour but the direction of the link was not specified. The final model (informed by the TETRAD results, but not completely determined by them) was fitted using Mplus. The model appeared to fit the data very well. A well-fitting model is indicated by a Comparative Fit Index (CFI) greater than 0.90, and a Root Mean Square Error of Approximation (RMSEA) less than .05. The goodness-of-fit of the final model was indicated by the following: $\chi^2(37)$
42.18; CFI = .98; RMSEA = .04. The alternative (with a link from the CAPS total factor, to social functioning, rather than from the CAPS numbing variable, produced the following: 50.48 with 37 degrees of freedom; CFI = .95; RMSEA = .06. The Mplus estimates for the final model are presented in Table 8. The key links are shown in Figure 5.

Table 8. Mplus Estimates for the Confirmatory Model of Suicidal Behaviour Following Background Elimination Algorithm

<table>
<thead>
<tr>
<th>Regression coefficients (factor loadings) CAPS total by</th>
<th>B</th>
<th>SE</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reexperiencing</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoidance/numbing</td>
<td>1.72</td>
<td>0.49</td>
<td>[1.07, 2.85]</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>1.53</td>
<td>0.36</td>
<td>[0.99, 2.33]</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Regression of CAPS Total on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td>-3.42</td>
<td>1.45</td>
<td>[-6.44, -0.56]</td>
<td>.018</td>
</tr>
<tr>
<td>Threat to life</td>
<td>.087</td>
<td>0.41</td>
<td>[0.11, 1.66]</td>
<td>.034</td>
</tr>
<tr>
<td>Regression of Depression on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAPS total</td>
<td>2.30</td>
<td>0.63</td>
<td>[1.47, 3.72]</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Regression of Social functioning on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoidance/numbing</td>
<td>0.06</td>
<td>0.01</td>
<td>[0.04, 0.09]</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Psychotropic medication</td>
<td>0.86</td>
<td>0.19</td>
<td>[0.49, 1.24]</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Regression of Occupational functioning on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social functioning</td>
<td>0.55</td>
<td>0.11</td>
<td>[0.34, 0.76]</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Employment</td>
<td>-1.35</td>
<td>0.29</td>
<td>[-1.94, -0.79]</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Regression of Life impairment on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupational functioning</td>
<td>0.28</td>
<td>0.04</td>
<td>[0.19, 0.36]</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>
Regression of Suicidal behaviour on

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>95% Confidence Interval</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychotropic medication</td>
<td>0.68</td>
<td>0.19</td>
<td>[0.31, 1.24]</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

Covariance of Suicidal behaviour with

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>95% Confidence Interval</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>2.05(^a)</td>
<td>0.76</td>
<td>[0.60, 3.67]</td>
<td>.007</td>
</tr>
<tr>
<td>Life-impairment</td>
<td>0.16(^a)</td>
<td>0.5</td>
<td>[0.06, 0.27]</td>
<td>.002</td>
</tr>
</tbody>
</table>

**Note.** N = 89. CAPS total = the sum of Reexperiencing, Avoidance/numbing and Hyperarousal.

\(^a\)Equivalent correlations of .30.

### 5.5. Discussion

The principle aim of the current study was to formulate a model of suicidal behaviour in PTSD. In the final model, two paths to suicidal behaviour were identified. The first path was acting on suicidal behaviour by exacerbating the severity of life-impairment. Life-impairment was directly associated with low levels of occupational impairment which in turn, was associated with greater social functioning impairment. The avoidance and numbing symptom cluster and receiving psychotropic medication contributed to the path to suicidal behaviour through their association with poorer social functioning. Finally, being currently unemployed added to the path through its association with occupational functioning impairment. The second path was acting on suicidal behaviour through the severity of depressive symptoms. Depressive symptoms were associated with increased severity of PTSD symptoms. PTSD symptoms, in turn, were associated with experiencing threat to life during the traumatic event that led to the PTSD diagnosis and being currently unemployed. The current findings are consistent with our hypothesis that clinical symptoms and variables that reflect functional impairment are closely associated with suicidal behaviour.
Based on previous findings (Leiner et al., 2008; Panagioti et al., 2009; Tarrier & Gregg, 2004), it was hypothesized that symptoms of depression would be a strong predictor of suicidal behaviour. Consistent with these predictions, the findings demonstrated that symptoms of depression were significantly correlated with suicidal behaviour. Nonetheless, the direction of the association between suicidal behaviour and symptoms of depression was not identified in the final model. This is the first study which provides evidence that measures of life-impairment, occupational functioning and social functioning impairment which may reflect limiting, negative subjective perceptions of functional impairment (Tarrier & Gregg, 2004) are associated with suicidal behaviour in...
PTSD. Life-impairment was directly associated with suicidal behaviour. Likewise with symptoms of depression however, the direction of the association between life-impairment and suicidal behaviour could not be clarified in the model. Thus, it appears possible that a common factor which was not measured in the current study may mediate the impact of both symptoms of depression and life-impairment on suicidal behaviour. Recent models of suicide propose that negative dysfunctional appraisals such as feelings of hopelessness, defeat and entrapment are the overriding factors which drive suicidal behaviour in other psychiatric disorder (i.e., psychosis; Bolton et al., 2007; Johnson et al., 2008a; O’Connor et al., 2004; Williams et al., 2005). Surprisingly, to date no research has examined the role of such negative dysfunctional appraisals in the development of suicidal behaviour in PTSD. A primary focus of the research on PTSD and suicidal behaviour in the future should be to rectify this limitation.

Consistent with previous findings the PTSD symptoms contributed to the second path to suicidal behaviour through increasing the severity of symptoms of depression (Leiner et al., 2008). Additionally the avoidance and numbing symptom cluster contributed also to the first pathway to suicidal behaviour because it resulted in impaired social functioning. One explanation for this finding is that avoidance and numbing symptoms result in decreased levels of social functioning as a consequence of their association with more severe re-experiencing symptoms. In other words, the higher the severity of the re-experiencing symptom cluster (i.e., memories, flashbacks, nightmares) the more likely it is for individuals to adopt cognitive and behavioural avoidance strategies together with other dysfunctional strategies (e.g., alcohol consumption) to cope with the distressing intrusions which clearly have an adverse effect on their functioning.

Receiving psychotropic medication had a direct impact on suicidal behaviour. An explanation supported by the model is that receiving psychotropic medication is associated
with increased negative perceptions of social functioning impairment. Although this is not adequately shown in the model, negative perceptions of social functioning may mask the presence of more severe PTSD symptoms and co-morbid depression.

Perceived threat to life during the traumatic event that led to the PTSD diagnosis had a direct impact on the severity of PTSD symptoms and thus contributed indirectly to the model of suicidal behaviour. This finding is consistent with the findings of a previous study which showed that perceived threat to life predicts the development of PTSD after the trauma (Holbrook, Hoyt, Stein, & Sieber, 2001). Other trauma characteristics such type of trauma and duration of trauma and threat to life were not associated directly or indirectly with suicidal behaviour. It should be noted, however, that those PTSD patients who experienced childhood sexual abuse as an index trauma were excluded from the current study because childhood sexual abuse was considered potentially different from traumas occurring in adult life. Previous studies, have reported a strong relationship between childhood sexual abuse and suicidal behaviour (Adams & Lehnert, 1997; Dube et al., 2001). Thus, the exclusion of those having childhood sexual abuse as index trauma in the current study may underestimate the impact of previously experienced traumas on suicidal behaviour.

This study has a number of limitations which warrant discussion. Data were provided by a convenience sample recruited as part of a screening process to participate in a clinical trial. Individuals obviously and acutely suicidal may have been screened out of the original study for ethical and clinical reasons since the majority of the participants were referred from primary and secondary health services. The current results are based on a re-analysis of a previous data set (Tarrier & Gregg, 2004) and thus only those variables which were available from the previous study were included in the current analyses. A clinical measure was used to assess suicidal behaviour based on the principle that the subcategories
of suicidal behaviour (i.e., suicidal ideation, plans, attempts) lie on a continuum (Tarrier et al., 2004). Life-impairment was hypothesized to reflect subjective evaluative judgments about aspects of an individual’s perceptions of themselves and their ability to cope in their own environments. However, we appreciate that the role of such perceptions in suicidal behaviour need further clarification and that the current findings are the first step for future investigations. The sample size is modest and one issue is whether or not the results generalize. Given the characteristics of the sample and the recruitment method, we are confident that the sample is representative of PTSD patients seeking treatment in a UK public health system. The study design is cross-sectional. Future larger longitudinal studies are needed to validate the current model.
CHAPTER 6

6. Hopelessness, defeat and entrapment in Posttraumatic Stress Disorder: Their association with suicidal behaviour and severity of depression.

6.1. Abstract

Research has shown an increased frequency of suicidal behaviours in those with PTSD but few studies have investigated factors that underlie the emergence of suicidal behaviour in PTSD. Two theories of suicide, the Cry of Pain and the Schematic Appraisal Model of Suicide propose that feelings of hopelessness, defeat and entrapment are core components of suicidality. This study aimed to examine the association between suicidal behaviour and hopelessness, defeat and entrapment in trauma victims with and without a PTSD diagnosis. The results demonstrated that hopelessness, defeat and entrapment were significantly positively associated with suicidal behaviour in those with PTSD. Hopelessness and defeat were also significantly positively associated with suicidal behaviour in trauma victims without PTSD. In those with PTSD the relationship between suicidal behaviour and hopelessness and entrapment remained significant after controlling for comorbid depression. The findings provide support for the contemporary theories of suicidality and have important clinical implications.

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6.2. Introduction

Suicidal behaviour, including suicidal thoughts, plans or attempts, is a major clinical and social problem (Haukka et al., 2008). A large epidemiological study in Europe indicated a 7.8% lifetime prevalence of suicidal ideation and a 1.3% lifetime prevalence of suicide attempts (Bernal et al., 2007). The levels of suicidal behaviour are heightened among individuals suffering from psychiatric illnesses including those diagnosed with Posttraumatic Stress disorder (PTSD). Across a series of studies investigating the association between suicidal behaviour and PTSD in community populations, the prevalence of suicide attempts in those with PTSD was found to range from 7% to 24% (Bernal et al., 2007; Cougle et al., 2009a; Maia et al., 2007; Sareen et al., 2007; Tarrier & Gregg, 2004; Weissman et al., 1999; Zlotnick et al., 2002) while the incidence of suicidal ideation/plans has been reported as ranging from 22% to 46% (Bernal et al., 2007; Cougle et al., 2009a; Marshall et al., 2001; Sareen et al., 2007). These estimates of suicidal ideation and suicide attempts in PTSD are considerably higher when PTSD is combined with the presence of one or more comorbid psychiatric diagnoses (McFarlane et al., 2006; Oquendo et al., 2005; Oquendo et al., 2003; Phillips et al., 2005). A large community study conducted recently in the US showed that the risk for suicide attempts was strongly related with a PTSD diagnosis while exposure to traumatic events without a diagnosis of PTSD was not significantly associated with suicide attempts (Wilcox et al., 2009).

The extant literature on PTSD and suicide suggests that comorbid depression significantly increases the risk for suicide in those with PTSD and potentially mediates the association between suicidal behaviour and PTSD. For example, Panagioti et al. (2009) in their narrative review reported that across a considerable number of studies examining the association of PTSD with suicidal behaviour, comorbid major depression substantially increased the risk for suicide in those with PTSD (Clover et al., 2004; Freeman et al., 2000;
Hendin & Haas, 1991; Kramer et al., 1994; Tarrier & Gregg, 2004). Furthermore, in a study using path analyses, depression was found to contribute to one pathway to suicidal behaviour in those with PTSD (Panagioti et al., 2011). Consistent with the above findings, Leiner and colleagues (2008) found that symptoms of depression mediated the impact of PTSD symptoms on suicidal behaviour. A recent meta-analysis indicated that higher levels of comorbid depression were associated with a stronger PTSD and suicidal behaviour association across 13 studies (Panagioti et al., submitted-a). Bolton and colleagues (2007) have proposed three different theoretical perspectives of suicidal behaviour, one of which is that depression drives suicidality. This theoretical perspective is important clinically because it implies that the risk for suicide will be resolved if depression is tackled. A significant problem is that it is not clear whether this is the most optimal way to view suicidal behaviour. Psychological models of suicidal behaviour advocate defining the mechanisms leading to suicide directly and then targeting those mechanisms irrespective of psychiatric diagnosis. Such psychological models of suicidal behaviour are currently sparse (Bolton et al., 2007; Panagioti et al., 2009).

Two contemporary theoretical models of suicide, namely, the Cry of Pain model of suicide (Williams, 1997; Williams et al., 2005) and the Schematic Appraisals Model of Suicide (SAMS; Johnson et al., 2008a) postulate that defeat and entrapment are the proximal psychological processes which underlie the development of suicidal thoughts and behaviours. Defeat encompasses feelings of failure and low social rank while entrapment is defined as a desire for movement and escape when all the escape routes are blocked (Gilbert & Allan, 1998). Both models suggest that suicidal behaviour emerges as a plan of action to escape from an intolerable situation when other alternative plans of escape become unavailable (Johnson et al., 2008a; Pratt et al., 2010; Taylor et al., 2011a; Williams et al., 2005). Consistent with the postulations of the Cry of Pain and SAMS model, a
number of studies have shown that perceptions of defeat and entrapment are strongly associated with suicidal behaviour in students (Taylor et al., 2010b) parasuicide and self-harming populations (O'Connor, 2003; Rasmussen et al., 2010) and in individuals with psychosis (Taylor et al., 2010a). An important dispute between the two theoretical models is whether of defeat and entrapment represent two distinct factors or one unitary construct. Whereas, the Cry of Pain perspective views defeat and entrapment as two separate but related factors (O'Connor, 2003; Rasmussen et al., 2010; Williams, 1997) the SAMS model argues that defeat and entrapment are better conceptualized as a single construct (Johnson et al., 2008a; Taylor et al., 2009). The SAMS’ assertion is grounded on the suggestions that defeat and entrapment overlap conceptually (i.e., both concepts encompass perceptions of having no way forward) and emerge from the same cognitive mechanism (e.g., a negatively biased appraisal system) (Johnson et al., 2008a). Currently, one study failed to demonstrate that defeat and entrapment act on suicidal behaviour independently (O'Connor, 2003) and a number of recent studies have favoured the view of defeat and entrapment as a unitary construct (Taylor et al., 2010a,b; Taylor et al., 2009). However, more research is needed to fully understand the phenomenology of defeat and entrapment.

In the PTSD literature, no previous research has linked perceptions of defeat with suicidal behaviour. This is surprising considering that mental defeat (a similar concept to feelings of defeat referred to in the suicide literature) which includes perceptions of total loss of personal autonomy, has been found to predict the onset of PTSD in victims of assault (Dunmore et al., 2001), the development of chronic PTSD in assault survivors (Kleim et al., 2007), and a low positive response to exposure therapy in rape victims (Ehlers et al., 1998). Similarly, no known research has investigated the presence of perceptions of entrapment in those with PTSD or trauma victims (Taylor et al., 2011a).
Nevertheless, negative cognitive appraisals such as evaluations of permanent change and alienation, are present in those with PTSD (Ehlers et al., 2000; Taylor et al., 2011a). Additionally, individuals with PTSD often experience repetitive unwanted thoughts, nightmares or flashbacks which could be appraised as distressing, uncontrollable and inescapable (Ehlers & Clark, 2000; Ehlers & Steil, 1995; van den Hout & Engelhard, 2004) and to give rise to feelings of entrapment. Thus, there is a clear need to investigate the association between suicidal behaviour and levels of defeat and entrapment in those with PTSD.

The literature on psychological risk factors for suicide suggests that hopelessness is strongly related with suicidal thoughts and behaviours (Conner, Duberstein, Conwell, Seidlitz, & Caine, 2001; Hawton & van Heeringen, 2009). Additionally, there is evidence that hopelessness increases the risk for suicide in a range of clinical and non-clinical samples (Beautrais, 2004; Conner et al., 2001; Johnson et al., 2010a; Kuo et al., 2004; Mazza & Reynolds, 1999; O'Connor et al., 2000; Pompili et al., 2009; Ran et al., 2005). Hopelessness is also a key component of both the Cry of Pain model of suicide (Bolton et al., 2007; Williams et al., 2005) and the SAMS (Johnson et al., 2008a). In the SAMS framework, hopelessness is thought to result from a negative appraisal system and interacts with, and worsens, perceptions of defeat and entrapment which in turn interacts with suicide schema and leads to suicidal behaviour (Johnson et al., 2008b). A number of studies have shown that the association between hopelessness and suicidal behaviour persists even after controlling for the effects of comorbid depression across different populations including suicide attempters (Davison, 2002), patients with terminally advanced cancer (Chochinov et al., 1998), and individuals with psychosis (Nordentoft et al., 2002; Tarrier et al., 2004). In the PTSD literature, there is some preliminary evidence that individuals with PTSD report increased levels of hopelessness. For instance, a study
investigating the psychological correlates of hopelessness in a community sample of men found that posttraumatic symptoms and depressive symptoms were strong predictors of moderate to severe hopelessness (Soares, Macassa, Grossi, & Viitasara, 2008). In an investigation of the associations between levels of hopelessness, suicidal behaviour and PTSD which recruited African-American women who attended hospital following a suicide attempt, it was found that hopelessness remained a strong predictor of suicide attempts after controlling for the effects of PTSD (Kaslow et al., 2000). Consistent with this, a recent study of childhood sexual abuse victims demonstrated that hopelessness mediated the association between childhood sexual abuse and suicide attempts. Hopelessness continued to mediate the association between childhood sexual abuse and suicidal ideation in women after controlling for PTSD and depression (Spokas et al., 2009). Although these findings are supportive of the role of hopelessness in leading to suicidal behaviour in PTSD, they are, as yet, preliminary. Furthermore, it is unclear whether hopelessness is linked with suicidal behaviour in those with PTSD independently of depression, or whether hopelessness leads to suicidal behaviour as a function of depression.

The aim of this study was to investigate the relationship between suicidal behaviour and levels of hopelessness, defeat and entrapment in trauma victims with PTSD compared to trauma victims who may have experienced a range of posttraumatic symptoms but whose symptoms were not numerous or severe enough to warrant a diagnosis of PTSD. First, we examined the levels of hopelessness, defeat, entrapment and suicidal behaviour in trauma victims with PTSD compared to trauma victims without PTSD. Second, we sought to determine if feelings of hopelessness, defeat and entrapment were associated with increased levels of suicidal behaviour in trauma victims with PTSD and whether these results differed in trauma victims without PTSD. Since depression has been found to be a
strong predictor of suicidal behaviour in those with PTSD (Panagioti et al., 2009), we aimed to investigate the association between suicidal behaviour and feelings of hopelessness, defeat and entrapment in trauma victims with a diagnosis of PTSD and trauma victims with no such diagnosis after controlling for the effects of comorbid depression. Based on previous theoretical and empirical evidence (Johnson et al., 2008a; Taylor et al., 2009), defeat and entrapment were represented in the analyses both, as distinct factors and as a unitary construct (i.e., defeat/entrapment). Our rationale for comparing trauma victims with PTSD to trauma victims without a PTSD diagnosis was to examine whether trauma victims with a PTSD diagnosis differed from trauma victims without a PTSD diagnosis in their levels of suicidal behaviour, and perceptions of hopelessness, defeat and entrapment. Thus, the current results provide evidence of whether a PTSD diagnosis or a single exposure to traumatic events may be associated with suicidal behaviour and feelings of hopelessness, defeat and entrapment.

6.3. Method

6.3.1. Participants.

Ninety-five participants were recruited using adverts (i.e., newspaper advertising, online advertising in the University of Manchester (UK), posters in mental health services based in Manchester, such as, Victim Support and the Rape Crisis Centre). The adverts were seeking volunteers who had experienced a traumatic event (i.e., crime, physical threat, serious accident, military combat, natural disaster, terrorist attack, diagnosed with a life-threatening illness) in the past, and had been affected by it. Potential participants were sent by post or email the Posttraumatic Stress Diagnostic Scale (PDS; Foa et al., 1997) to assess whether they met the inclusion criteria for the study. Those participants who returned the PDS scale and met the inclusion criteria of the study proceeded to the full assessment procedure. Participants had to fulfil the following criteria to participate in the
study: have experienced a serious traumatic event in the past and meet the criterion A\(^3\) of the PDS scale; being aged between 18-65 years; and have a thorough grasp of the English language (this was necessary for participation in the assessment interview and for the understanding of questionnaire items). In addition, participants had to provide informed consent and be willing to come into the University of Manchester to carry out the study. Participants were excluded if they suffered from dementia, organic brain disorder, or active psychotic disorder. A Posttraumatic Stress Disorder (PTSD) diagnosis or the number and severity of PTSD symptoms were determined by the Clinical Administered PTSD scale for DSM IV (CAPS; Blake et al., 1995) during the testing session. Those participants who met the CAPS criteria for a PTSD diagnosis comprised the PTSD group of the study while those who did not meet the CAPS criteria for a PTSD diagnosis comprised the Trauma group of the study. The participants in the Trauma group reported a number of PTSD symptoms (ranging from two to seven PTSD symptoms) but failed to meet the criteria for a PTSD diagnosis according to the CAPS interview.

6.3.2. Measures.

The Clinician Administered PTSD Scale (CAPS; Blake et al., 1995) was used to confirm a PTSD diagnosis or to assess the number and severity of PTSD symptoms. The total CAPS severity score was computed by adding the intensity and frequency score for each of the PTSD symptoms. Previous research has found that the Cronbach’s alpha

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\( ^3 \)The criterion A of the PDS scale consists of four questions which assess if the person experienced or witnessed an event that involved actual or threatened death or serious injury or a threat to the physical integrity of self or others and if the person felt intense fear, helplessness, or horror as a consequence of that event (Foa et al., 1997). This inclusion criterion was used in order to ensure that all the participants (both trauma victims with PTSD and without PTSD) have been exposed to a traumatic experience which was severe enough to meet the criterion A of the PDS scale.
coefficient ranges from .85 to .87 for the three symptom clusters and .94 for the total CAPS score (Blake et al., 1995; Weathers et al., 2001). The alpha coefficient for the total CAPS severity score was .91 in the current study.

The Beck Depression Inventory II (BDI II; Beck et al., 1996a) comprises 21 items which measure the severity of depressive symptoms (range 0–63) in the past two weeks. The BDI II has high internal consistency (mean coefficient alpha of 0.91), test re-test reliability ($r = .93$) and concurrent validity with the Hamilton Psychiatric Rating Scale for Depression (HRSD; $r = .71$) (Beck et al., 1996a,b; Dozois et al., 1998; Richter et al., 1998). The alpha coefficient was .91 in the current sample.

The Beck Hopelessness Scale (BHS; Beck et al., 1974) consists of 20 true or false items assessing the prevalence of thoughts and beliefs about feelings of hopelessness in the past week (e.g., “My future seems dark to me”). Previous studies have provided evidence for the convergent validity of the scale since it was found to be negatively associated with measures of hope (Miller & Powers, 1988; Raleigh & Boehm, 1994; Steed, 2001) and positive future thinking (O'Connor et al., 2004). The scale has been found to have an alpha coefficient of .93 and a test-retest reliability of $r = .85$ over three weeks (Holden & Fekken, 1988). The alpha coefficient was .92 in the current study.

The Defeat Scale (Gilbert & Allan, 1998) consists of 16 items assessing perceptions of defeat including those of failed struggle and low social rank (e.g., “I feel that I am one of life's losers”) in the past week. The items are rated on a five-point scale ranging from ‘Never’ to ‘Always/all the time’. Higher scores indicate greater feelings of defeat. There are no previous reports giving the internal consistency of this scale in a trauma or PTSD groups. The alpha coefficient for this scale has been found to be .94 in a student group and .93 in a depressed group (Gilbert & Allan, 1998). The alpha coefficient in the current study was .94.
The *Entrapment Scale* (Gilbert & Allan, 1998) consists of 16 items assessing perception of being trapped by external (e.g., I feel trapped by other people) or internal stressors (e.g., “I feel trapped inside myself”). The items are rated on a five-point scale ranging from ‘Not at all like me’ to ‘Extremely like me’. There are no previous reports concerning the internal consistency of this scale in trauma or PTSD groups. The alpha coefficient for this scale has been found to range from .86 to .89 in a depressed group (Gilbert & Allan, 1998) and it was .93 in the present sample.

The *Suicidal Behaviors Questionnaire-Revised* (SBQ-R; Osman et al., 2001) is a four-item measure which assesses the level of suicidality experienced by the participants. The first item measures levels of lifetime suicidality including thoughts, plans and attempts (i.e., “Have you ever thought about or attempted to kill yourself?”); the second item assesses the frequency of suicidal thoughts in the past year (i.e., “How often have you thought about killing yourself in the past year?”); the third item measures the communication of the intent to commit suicide (“Have you ever told someone that you were going to commit suicide, or that you might do it?”) and the fourth item assesses the likelihood of committing suicide in the future (“How likely is it that you will attempt suicide someday?”). The total score ranges from 3 to 18 with higher scores indicating greater levels of suicidality. Osman et al. (2001) have shown that the questionnaire is a reliable research tool in both clinical and non-clinical samples with an alpha coefficient ranging from .76 to .88 (Osman et al., 2001). The alpha coefficient was .87 in the present sample.

6.3.3. Procedure.

Upon arrival at the testing session, and after signing the consent forms, participants were administered the CAPS and afterwards completed a number of standardized questionnaires about defeat, entrapment, hopelessness, depression, and suicidal behaviour
in the order detailed above. The CAPS interview and all the self-report measures were administered by the first author (MP) in one session. The research was conducted in a private room and opportunities for questions and breaks were provided. Following the completion of the study, participants were debriefed about the nature of the study and provided an information sheet listing support groups, counselling services and help-lines in the Manchester region. Participants who were identified as being at risk for suicide (criteria: SBQ-R item 1 ≥ 3; item 2 ≥ 3; item 3 ≥ 2; item 4 ≥ 4) were referred to their GP and/or mental health professional if they consented. Ethical approval was obtained from the relevant NHS research ethics committee before this study commenced.

6.3.4. Data analysis.

The data were initially screened for normality. The variables to be used in the analyses were not normally distributed. Transformations (log10 and square root) were applied to the measures of defeat, entrapment, defeat/entrapment (e.g., a composite score of defeat and entrapment which was created by summing the two variables), hopelessness, depression and suicidal behaviour to correct for skew. For the measures of defeat, defeat/entrapment, hopelessness, depression and suicidal behaviour, transformed log10 values were used in the analysis. For the measure of entrapment, the square root transformation was used in the analyses. Following the transformations, the mean z scores for skewness were reduced from 3.57, 3.83, 3.58, 3.77, 4.84, and 5.62 (for defeat, entrapment, defeat/entrapment, hopelessness, depression and suicidal behaviour, respectively) to -0.97, 1.19, 1.17, -0.81, 0.59 and 2.04 respectively. Furthermore, multivariate analysis of variance (MANOVA) and a series of analysis of variance (ANOVA) tests were conducted with the PTSD group and trauma group as the between subjects factor and levels of defeat, entrapment, symptoms of depression, hopelessness and suicidal behaviour were entered as dependent variables. The Pearson’s correlation
coefficient (two-tailed significance) was used to examine the relationship between suicidal behaviour and levels of defeat, entrapment, depression and hopelessness. Partial correlations were computed to examine the association of suicidal behaviour with perceptions of hopelessness, defeat and entrapment after controlling for the effects of comorbid depression. Significance levels were set at $p < .05$.

6.4. Results

6.4.1. Sample characteristics.

A total of 95 participants took part in the study. Of these, three cases were excluded from the analyses because they had substantial missing data. Another participant was also excluded from the current analyses because he was experiencing an active psychotic episode which became obvious during the research session. This resulted in a final sample of 91 participants ($M_{age} = 29.02$ years, $SD = 10.6$) either suffering from PTSD or having experienced a serious traumatic event in the past. Of the total sample, 50 participants fulfilled the CAPS criteria for a current PTSD diagnosis and comprised the PTSD group of the study. Forty-one participants failed to meet the CAPS criteria for a current PTSD diagnosis and comprised the Trauma group of the study. The majority of participants were female ($n = 69, 75.8%$), unmarried ($n = 59, 64%$), and white ($n = 70, 76.9%$). In the Trauma group, 23 (56.1%) participants fulfilled the CAPS criteria for a lifetime diagnosis of PTSD while the remaining participants ($n = 18, 44, 9%$) did not meet the criteria for a PTSD diagnosis. Individuals in the PTSD group did not differ significantly from those in the Trauma group in terms of the percentage of men/women ($\chi^2(2) = 0.83, p = .661$), mean age ($t(89) = 1.276, p = .20$), ethnic origin ($\chi^2(1) = 0.59, p = .442$), and marital status ($\chi^2(2) = 0.04, p = .982$). In the total sample, 48 (52.7%) participants reported lifetime suicidal behaviours including thoughts, plans and attempts, and 31 (34.1%) participants reported suicidal thoughts in the past year. Those in the PTSD group were significantly more likely
to report lifetime suicidal behaviour ($\chi^2(2) = 26.53, p < .001$) and suicidal behaviour in the past year ($\chi^2(2) = 23.77, p < .001$) compared to those in the Trauma group. The sample characteristics of the two subgroups are presented in Table 9.

Table 9. *Sample Characteristics of the Two Groups of Participants*

<table>
<thead>
<tr>
<th></th>
<th>PTSD group ($n = 50$)</th>
<th>Trauma group ($n = 41$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic group n (%)</td>
<td>White 40 (80%),</td>
<td>White 30 (73.2%),</td>
</tr>
<tr>
<td></td>
<td>other 10 (20%)</td>
<td>other 11 (26.8%)</td>
</tr>
<tr>
<td>Marital status n (%)</td>
<td>Cohabitating 14 (28%),</td>
<td>Cohabitating 11 (26.8%),</td>
</tr>
<tr>
<td></td>
<td>single 32 (64%),</td>
<td>single 27 (65.9%),</td>
</tr>
<tr>
<td></td>
<td>widowed 4 (8%)</td>
<td>widowed 3 (7.3%)</td>
</tr>
<tr>
<td>Gender (%)</td>
<td>Female 38 (76.0%),</td>
<td>Female 31 (75.6%),</td>
</tr>
<tr>
<td></td>
<td>male 12 (24.0%)</td>
<td>male 10 (24.4%)</td>
</tr>
<tr>
<td>Mean age (SD)</td>
<td>30.3 (11.1)</td>
<td>27.4 (9.8)</td>
</tr>
<tr>
<td>Lifetime suicidal</td>
<td>Suicidal thoughts 9 (18%),</td>
<td>Suicidal thoughts 8 (19.5%),</td>
</tr>
<tr>
<td>behaviour</td>
<td>plans 12 (24%),</td>
<td>plans 2 (4.9%),</td>
</tr>
<tr>
<td></td>
<td>attempts 16 (32%)</td>
<td>attempts 1 (2.4%)</td>
</tr>
<tr>
<td>Past year suicidal</td>
<td>28 (56%)</td>
<td>3 (7.3%)</td>
</tr>
<tr>
<td>behaviour</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.4.2. Hopelessness, defeat, entrapment and suicidal behaviour in the PTSD group versus the Trauma group.

A MANOVA was performed with the two groups of participants (PTSD group and Trauma group) as the independent variable and defeat, entrapment, hopelessness, depression and suicidal behaviour scores as dependent variables. Using Pillai’s trace there
was a significant effect of the two groups (PTSD and Trauma group) on the dependent variables, \( V = 0.537, F(5, 85) = 19.70, p < .001 \). There were significant differences in the levels of defeat \( F(1, 89) = 43.57, p < .001 \), entrapment \( F(1, 89) = 58.51, p < .001 \), depression \( F(1, 89) = 89.91, p < .001 \), hopelessness \( F(1, 89) = 45.53, p < .001 \), and suicidal behaviour \( F(1, 89) = 48.52, p < .001 \), between the two groups. The means and standard deviations (for both transformed and untransformed variables) for the two groups are reported in Table 10.

Table 10. *Defeat, Entrapment, Depression, Hopelessness and Suicidal Behaviour in the Two Groups of Participants in the Study*

<table>
<thead>
<tr>
<th></th>
<th>PTSD group M (SD)</th>
<th>Trauma group M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Untransformed</td>
<td>Transformed</td>
</tr>
<tr>
<td>Defeat</td>
<td>26.96 (15.83)</td>
<td>1.34 (0.31)</td>
</tr>
<tr>
<td>Entrapment</td>
<td>25.42 (16.92)</td>
<td>4.71 (1.81)</td>
</tr>
<tr>
<td>Depression</td>
<td>21.72 (13.94)</td>
<td>1.26 (0.31)</td>
</tr>
<tr>
<td>Hopelessness</td>
<td>9.30 (5.86)</td>
<td>0.93 (0.30)</td>
</tr>
<tr>
<td>Suicidal behaviour</td>
<td>7.94 (4.44)</td>
<td>0.83 (0.25)</td>
</tr>
</tbody>
</table>

6.4.3. The association between suicidal behaviour and hopelessness, defeat and entrapment in the PTSD group and Trauma group.

Next, we examined the association between suicidal behaviour and levels of defeat, entrapment, defeat/entrapment, depression and hopelessness. Pearson correlations between suicidal behaviour and levels of defeat, entrapment, defeat/entrapment, depression and hopelessness are presented in Table 11. Suicidal behaviour was significantly positively associated with heightened levels of defeat, entrapment, defeat/entrapment, depression and
hopelessness in the PTSD group. Suicidal behaviour was significantly positively associated with increased levels of defeat, defeat/entrapment, depression and hopelessness in the trauma group. No significant association was found between suicidal behaviour and perceptions of entrapment in the trauma group.

Additionally, partial correlations were conducted to examine the association of suicidal behaviour with defeat, entrapment, defeat/entrapment and hopelessness after controlling for the effects of comorbid depression. The partial correlations showed that after controlling for the effects of comorbid depression the association between suicidal behaviour and entrapment, defeat/entrapment and hopelessness remained significant in the PTSD group. However, the association between suicidal behaviour and defeat, defeat/entrapment and hopelessness were non-significant after controlling for comorbid depression in the Trauma group (see Table 12).
### Table 11. Correlations of Suicidal Behaviour with Defeat, Entrapment, Defeat/Entrapment, Hopelessness and Depression

<table>
<thead>
<tr>
<th></th>
<th>PTSD group (n = 50)</th>
<th>Trauma group (n = 41)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1. Defeat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Entrapment</td>
<td>.83**</td>
<td></td>
</tr>
<tr>
<td>3. Defeat/entrapment</td>
<td>.95**</td>
<td>.95**</td>
</tr>
<tr>
<td>4. Depression</td>
<td>.82**</td>
<td>.81**</td>
</tr>
<tr>
<td>5. Hopelessness</td>
<td>.83**</td>
<td>.82**</td>
</tr>
<tr>
<td>6. Suicidal behaviour</td>
<td>.67**</td>
<td>.77**</td>
</tr>
</tbody>
</table>

*Note.* **p < .01, *p < .05
Table 12. The Association of Suicidal Behaviour with Defeat, Entrapment, Defeat/Entrapment and Hopelessness after Controlling for the Effects of Comorbid Depression (Partial Correlations)

<table>
<thead>
<tr>
<th></th>
<th>PTSD group (n = 50)</th>
<th>Trauma group (n = 41)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>.50**</td>
<td>.67**</td>
</tr>
<tr>
<td>3</td>
<td>.76**</td>
<td>.87**</td>
</tr>
<tr>
<td>4</td>
<td>.83**</td>
<td>.88**</td>
</tr>
<tr>
<td>5</td>
<td>.50**</td>
<td>.77**</td>
</tr>
<tr>
<td>6</td>
<td>.70**</td>
<td>.47**</td>
</tr>
<tr>
<td>7</td>
<td>.49**</td>
<td>.48**</td>
</tr>
</tbody>
</table>

Note. **p < .01, *p < .05
6.5. Discussion

The major findings of the present study were that individuals with PTSD scored significantly higher than the trauma victims without PTSD on the measures of suicidal behaviour, depression, hopelessness, defeat and entrapment. Suicidal behaviour in the PTSD group was significantly associated with increased severity of depression and feelings of hopelessness, defeat and entrapment and the composite variable of defeat and entrapment (defeat/entrapment). Suicidal behaviour in the trauma group was also significantly associated with increased severity of depression, hopelessness, defeat and defeat/entrapment. However, entrapment was not significantly associated with suicidal behaviour in the Trauma group. Hopelessness, entrapment and defeat/entrapment in the PTSD group continued to be significantly associated with increased levels of suicidal behaviour after controlling for the effects of the severity of depression. In contrast to this, none of the relationships between suicidal behaviour and hopelessness, defeat, entrapment and defeat/entrapment remained significant after controlling for the effects of depression in the trauma group.

In the current study, only seven percent of the trauma victims reported suicidal plans or attempts in their past while as many as fifty-five percent of those with PTSD had made a suicidal plan or attempt at least once in their lifetime. Similarly, more than half of the participants in the PTSD group reported suicidal thoughts in the past year while less than ten percent of those in the trauma group reported suicidal thoughts in the past year. The increased suicidal behaviour in the PTSD group found in this study supports several earlier studies which have reported heightened rates of suicidal thoughts, behaviours and attempts in those with a diagnosis of PTSD (Bernal et al., 2007; Cougle et al., 2009a; Sareen et al., 2007; Tarrier & Gregg, 2004). The finding of this study, that suicidal behaviour was considerably higher in the PTSD individuals compared to trauma victims without PTSD, supports the idea that a PTSD diagnosis rather than exposure to traumatic
events increases risk for suicide among trauma victims (Wilcox et al., 2009). The mechanisms involved in the association between PTSD and suicidal behaviour are not yet known. The increased severity of PTSD symptoms could be a potential mechanism which drives suicidal behaviour in PTSD by its association with negative cognitive appraisals, such as, perceptions of defeat and entrapment. This mediation hypothesis needs to be tested in future studies.

A core finding of this study was that perceptions of entrapment remained significantly associated with suicidal behaviour in the PTSD group even after controlling for the severity of depression. This finding is in agreement with both the Cry of Pain model of suicide and the SAMS (Bolton et al., 2007; Johnson et al., 2008a; Williams, 1997) which suggest that perceptions of entrapment are a core component of the mechanisms behind suicidal behaviour. Furthermore, it is worthy of note that the current pattern of findings did not alter when defeat and entrapment were represented as a single construct in the correlational analyses. This outcome indicates that defeat and entrapment are reliable indicators of suicidal behaviour either considered as a single factor or two distinct factors. Thus, the findings provide support for the assertion of the evolving SAMS model (Johnson et al., 2008a) that defeat and entrapment are best conceptualized as a single construct which drives suicidal behaviour (O'Connor, 2003; Taylor et al., 2010a,b; Taylor et al., 2009). Considering that defeat and entrapment are strongly related processes (O'Connor, 2003; Taylor et al., 2010a,b; Taylor et al., 2009), this unidimensional approach is more parsimonious.

One central advance of the SAMS model is that it clearly explains how perceptions of defeat and entrapment emerge (i.e., as a consequence of the negatively biased appraisal system) (Johnson et al., 2008a). In the SAMS perspective, perceptions of defeat and entrapment are believed to lead to suicidal behaviour because they limit the extent to which individuals appraise themselves as being competent to resolve difficulties and consider
possible alternative solutions. People with PTSD often experience a range of recurring symptoms (e.g., intrusive thoughts, flashbacks, nightmares) which could be viewed by those with PTSD as exhausting, inevitable and impervious (Ehlers & Clark, 2000; Ehlers & Steil, 1995). Perceptions of defeat and entrapment and subsequent suicidal thoughts and behaviours might comprise a maladaptive psychological means of coping with the adversities associated with the experience of PTSD. Thus, one potential mechanism of suicidal behaviour in PTSD is that negative dysfunctional appraisals of PTSD symptoms and comorbidity factors (e.g., depression) result in perceptions of entrapment which in turn lead to suicidal behaviour. This hypothesis needs to be empirically tested in future studies.

In addition to the association of suicidal behaviour with perceptions of entrapment and defeat/entrapment in the PTSD group, hopelessness continued to be significantly associated with suicidal behaviour in this group after controlling for the severity of depression. This outcome is in agreement with a large number of previous studies which have shown that feelings of hopelessness are strongly associated with suicidal behaviour among clinical and non-clinical populations (Johnson et al., 2010a,b; Kuo et al., 2004; O’Connor, 2003; Pompili et al., 2009) One frequent debate in the literature investigating the underlying psychological mechanisms of suicidal behaviour is whether suicidal behaviour is primarily due to the effects of major depression or hopelessness (Bolton et al., 2007). The current pattern of findings provides evidence that hopelessness is independently associated with suicidal behaviour in PTSD and that the association of hopelessness with suicidal behaviour is not due to its shared variance with depression. Hopelessness has also a central role in the mechanisms underlying suicidal behaviour in the Cry of Pain model (Bolton et al., 2007; Williams et al., 2005) and SAMS (Johnson et al., 2008a). Therefore, this finding further validates these models. In the context of the SAMS, feelings of hopelessness are conceptualized as part of a negatively biased appraisal system of the future. Hopelessness is viewed as a combination of reduced/lack of positive future plans
coupled with expecting negative future events (Johnson et al., 2008a; O'Connor et al., 2004). It is suggested that feelings of hopelessness together with other forms of negative appraisals (i.e., negative appraisals of the current situation or historical factors) interact with a negatively biased information processing system to produce feelings of defeat and entrapment which in turn give rise to suicidal thoughts and behaviours (Johnson et al., 2008a). Overall, this study supports the idea that hopelessness is closely associated with suicidal behaviour in PTSD but further research is needed to examine whether hopelessness impacts on suicidal behaviour in PTSD in the context proposed by the SAMS model (e.g., hopelessness results from a negatively oriented future appraisal system and gives rise to or worsen feelings of defeat and entrapment, which then leads to suicidal behaviour).

The current findings imply that perceptions of entrapment and hopelessness are potentially useful indicators of suicidal behaviour in PTSD. A clinical implication of these findings is that perceptions of entrapment and hopelessness together with comorbid depression could be used as a means of assessing the risk of suicide in individuals diagnosed with PTSD. Our results regarding the heightened levels of suicidal behaviour in those with PTSD suggest that there is a need for psychological therapies which target suicidal behaviour in those with PTSD. Identifying and addressing perceptions of entrapment and hopelessness should be an important part of the psychological interventions aiming at reducing suicidal risk in those with PTSD. Tarrier et al. (2008) conducted a systematic review and meta-analysis which aimed to assess the utility of cognitive-behavioural interventions in reducing suicidal behaviour. They found that cognitive-behavioural therapies had a significant effect on reducing suicidal behaviour. This suggests that cognitive-behavioural therapy is a useful framework in which suicidal behaviour, including perceptions of entrapment and hopelessness, could be targeted. Furthermore, based theoretically on the SAMS, Johnson and colleagues (2008a) offered a
detailed description of a cognitive-behavioural intervention which aims to reduce suicidal behaviour by targeting perceptions of defeat, entrapment and hopelessness. Whether this psychological therapy (Johnson et al., 2008a) could also be useful in reducing suicidal behaviour and perceptions of entrapment and hopelessness in those with PTSD warrants further investigation.

Three main factors which limit the interpretation of the findings should be noted. First, the cross-sectional design of the study limits the extent to which hopelessness, defeat and entrapment can be interpreted as leading to suicidal behaviour in PTSD in a causal manner. It is possible that feelings of hopelessness, defeat and entrapment might be the result of being depressed or suicidal. Future prospective studies are needed to determine the direction of the relationship between suicidal behaviour and feelings of hopelessness, defeat and entrapment. Second, self-report measures were employed to test depression, hopelessness, defeat and entrapment and suicidal behaviour. However, all the self-report measures used were previously validated questionnaires which have shown good psychometric properties (Beck et al., 1988; Gilbert & Allan, 1998; Miller & Powers, 1988; O'Connor et al., 2004; Raleigh & Boehm, 1994; Taylor et al., 2010a,b). Third, despite previous recommendations (O'Connor, 2003; Williams et al., 2005) that the absence of rescue factors have an equivalent effect with defeat and entrapment on the emergence of suicidal behaviour, no measure of “no rescue” has been included in this study. The role of rescue factors was not examined in the present study firstly because there are not well-developed measures of rescue factors in the current literature, and secondly because the concept of “no rescue” is not clearly defined and often confused with other concepts such as hopelessness (Johnson et al., 2008a; Williams, 1997) and social support (O'Connor, 2003; Weber et al., 1997).

In conclusion, this is the first study which has examined the presence of perceptions of hopelessness, defeat and entrapment among individuals with PTSD and their association
with suicidal behaviour. The findings provide empirical support for the hypothesis that apart from comorbid depression, negative perceptions of hopelessness and entrapment are highly influential in determining suicidal risk in those with PTSD. These factors should be investigated and incorporated into psychological interventions which aim to reduce risk in PTSD patients. An additional advantage of this study is that it examined the association between PTSD and suicidal behaviour in light of recent theoretical explanations of suicide (Bolton et al., 2007; Johnson et al., 2008a; Williams et al., 2005). These theoretical explanations underscore the role of dysfunctional negative perceptions of hopelessness, defeat and entrapment in the development of suicidal behaviour. A primary focus of the research on PTSD and suicidal behaviour in the future should be to test the way in which a range of factors such as PTSD severity, comorbid depression and hopelessness, defeat and entrapment interact with each other to predict the presence and severity of suicidal behaviours in PTSD populations.
CHAPTER 7

7. A Model of suicidal behaviour in those with Posttraumatic Stress Disorder: The mediating role of perceptions of defeat and entrapment

7.1. Abstract

Objective: There is strong evidence in the literature that the rates of suicidal behaviour are heightened among individuals with PTSD. A limited number of studies have examined the psychological mechanisms underlying suicidal behaviour in PTSD. The aim of this study was to examine whether depression, hopelessness and perceptions of defeat and entrapment mediated the effects of PTSD symptoms on suicidal behaviour. Method: Participants of the study were 73 individuals (Mage = 29.2, SD = 10.9, 79.5% female) diagnosed with PTSD (currently or lifetime) and reported at least one PTSD symptom in the past month. Participants completed a series of self-report measures assessing depression, hopelessness and defeat and entrapment (Beck Depression Inventory, Beck Hopelessness Scale, Defeat Scale, and Entrapment Scale). The Clinician Administered PTSD Scale for DSM-IV was administered to assess the presence and severity of PTSD symptoms. Results: The results of Structural Equation Modelling supported a model whereby perceptions of defeat and entrapment fully mediated the effects of PTSD symptom severity upon suicidal behaviour. The finding that perceptions of defeat and entrapment mediate the relationship between PTSD symptom severity and suicidal behaviour was replicated in a subgroup of participants (n = 50) who met the full criteria for a current PTSD diagnosis. Conclusions: The results support a recent theoretical model of suicidal behaviour (The Schematic Appraisal Model of Suicide) which argues that perceptions of defeat and entrapment have a key role in the development of suicidal behaviours. The study discusses the clinical implications of the findings.
7.2. Introduction

Suicidal behaviour including suicidal thoughts, plans and attempts are a common phenomenon in individuals diagnosed with Posttraumatic Stress Disorder (PTSD) (Bernal et al., 2007; Cougle et al., 2009a; Panagioti et al., 2011; Tarrier & Gregg, 2004). In the National Comorbidity Survey, Sareen et al. (2005b) reported that PTSD was the only anxiety disorder which remained significantly associated with suicidal ideation and suicide attempts after controlling for the effects of comorbid diagnoses and demographic correlates. The estimated rates of suicide attempts in PTSD range from 7% to 24% (Bernal et al., 2007; Cougle et al., 2009a; Tarrier & Gregg, 2004; Zlotnick et al., 2002) and the rates of suicidal ideation range from 22% to 46% (Bernal et al., 2007; Cougle et al., 2009a; Marshall et al., 2001; Sareen et al., 2007).

The results of a recent study suggest that a PTSD diagnosis, rather than simple exposure to traumatic events without PTSD, is the overriding factor which drives suicidal behaviour in trauma victims (Wilcox et al., 2009). Nonetheless, there is evidence in the literature that not only a current but also a lifetime diagnosis of PTSD are associated with increased levels of suicide attempts and suicidal ideation (Bernal et al., 2007; Davidson et al., 1991). Oquendo et al. (2005) reported that depressed individuals with a lifetime diagnosis of PTSD were significantly more likely to have made a suicide attempt in the past compared to those who did not have a history of PTSD. A recent meta-analysis investigating the association between a PTSD diagnosis and suicidal behaviour found both current and lifetime PTSD were strongly associated with increased frequency of suicidal behaviours (Panagioti et al., submitted-a). Similarly, the rates of suicidal behaviour are significantly heightened in those experiencing PTSD symptoms but do not fulfil the criteria for a current PTSD diagnosis. For example, a large study in the US using data from the National Anxiety Disorders Screening Day found that current suicidal ideation was significantly increased in individuals who reported PTSD symptoms in the past month.
compared to those who did not report PTSD symptoms in the past month (Marshall et al., 2001). The aim of the current study is to investigate the psychological mechanisms of suicidal behaviour in those fulfilling the criteria for a PTSD diagnosis (current or lifetime) and currently experiencing a range of PTSD symptoms. We are specifically focusing on the role of perceptions of defeat and entrapment, hopelessness and comorbid depression (Williams, 1997).

7.2.1. Perceptions of defeat and entrapment in relation to suicidal behaviour.

A generic theoretical model of suicidal behaviour, namely the Schematic Appraisal Model of Suicide (SAMS model; Johnson et al., 2008a) has been recently developed to explain the psychological mechanisms underlying suicidal behaviour. The SAMS model is a modification of a previous theoretical account of suicide, the Cry of Pain model of Suicide (Bolton et al., 2007; Williams, 1997; Williams et al., 2005) aiming at building on and expanding the previous model. As with the Cry of Pain model of suicide, the SAMS model argues that perceptions of defeat and entrapment are a core component of the mechanisms underlying suicidal behaviour. In accord with the SAMS model and Cry of Pain model, a number of studies have found a strong positive association between suicidal behaviour and perceptions of defeat and entrapment in a range of different populations such as students (Taylor et al., 2010b), parasuicide individuals (O'Connor, 2003; Rasmussen et al., 2010) and individuals with psychoses (Taylor et al., 2010a). The concepts of defeat and entrapment encompass perceptions of loss and failure, low social rank and an inability to escape or move forward (Gilbert & Allan, 1998). One important argument of the SAMS model is that perceptions of defeat and entrapment are synonymous and best described as a single construct (Johnson et al., 2008a). This argument is based on the suggestion that both defeat and entrapment emerge as a consequence of the same cognitive process (i.e., a negatively biased appraisal system) and share many common features such as an inability to move forward and lack of viable solutions (Johnson et al.,
A recent study conducted on students provided empirical support to this argument. Using factor analysis the authors showed that a single construct underlies both defeat and entrapment (Taylor et al., 2009).

In the context of the SAMS model, suicidal behaviour is viewed as the only available means of escape from the intolerable feelings of defeat and entrapment when all the alternative escape routes have been blocked (Johnson et al., 2008a; Pratt et al., 2010; Taylor et al., 2011a). A central prediction of the SAMS model is a mediational path in which negative cognitive appraisals (e.g., negative cognitive appraisals may relate to a range of factors such as negative appraisals of the psychiatric illness or clinical symptoms) result in overwhelming perceptions of defeat and entrapment which in turn give rise to suicidal thoughts and behaviours (Johnson et al., 2008a; Taylor et al., 2010b). Currently, two recent studies have empirically tested the above prediction and both of them provided support to the SAMS model. Specifically, Taylor et al., (2010b) tested a mediational model in which perceptions of defeat and entrapment mediated the effects of appraisals of social support and problem solving ability in students who reported some degree of suicidality. The results of the study confirmed the mediational model. The same authors tested another mediational path in which perceptions of defeat and entrapment mediate the impact of positive psychotic symptoms on suicidality in individuals with psychoses. Again, the findings confirmed the hypothesis of the study (Taylor et al., 2010a). In both of the above mediational models, perceptions of defeat and entrapment were represented a single latent variable (Taylor et al., 2010a,b).

In the PTSD literature, an extensive narrative review of the literature on the association between PTSD and suicidal behaviour concluded that a core limitation in the research area of PTSD and suicidal behaviour is the lack of studies to investigate the mechanisms underlying suicidal behaviour in PTSD. It was also proposed that the SAMS model provides a promising framework for investigating the mechanisms of suicidal
behaviour in PTSD (Panagioti et al., 2009). In the light of the recent theoretical developments (Johnson et al., 2008a), a study using path analyses provided evidence that negative cognitive appraisals such as negative appraisals of current levels of functioning together with severity of depressive symptoms drive suicidal behaviour in those with PTSD. The severity of PTSD symptoms added to the paths to suicidal behaviour indirectly through their association with severity of depression and negative appraisals of functioning (Panagioti et al., 2011). Furthermore, our research team conducted recently the first study which investigated the association between suicidal behaviour and perceptions of defeat and entrapment in PTSD. The results showed a strong positive association between suicidal behaviour and perceptions of defeat and entrapment in those with PTSD. The association between suicidal behaviour and perceptions of entrapment remained significant after controlling for the effect of comorbid depression (Panagioti et al., in press). It follows that perceptions of defeat and entrapment would mediate the impact of PTSD on suicidal behaviour.

7.2.2. Depression and hopelessness in relation to suicidal behaviour.

There is strong evidence in the literature that comorbid depression is a robust predictor of suicidal behaviour in those with PTSD (Clover et al., 2004; Freeman et al., 2000; Hendin & Haas, 1991; Kramer et al., 1994; Tarrier & Gregg, 2004). Panagioti et al. (2009) in their narrative review suggested that depression potentially mediates the relationship between PTSD and suicidal behaviour in PTSD. Consistent with this suggestion, Leiner et al. (2008) found that depressive symptoms mediate the effects of PTSD symptoms on suicidal behaviour in a sample of physically abused women. More recently, a meta-analysis of the association between suicidal behaviour and PTSD found that comorbid depression mediated the association between PTSD and suicidal behaviour in a meta-regression analysis (Panagioti et al., submitted-a). Likewise depression, hopelessness is included among the most significant cognitive factors which predict
suicidal thoughts and behaviours (Beautrais, 2004; Johnson et al., 2010b; Kuo et al., 2004; O’Connor et al., 2000; Ran et al., 2005). The importance of hopelessness as a risk factor for suicide has been recognized by recent theoretical perspectives of suicidal behaviour which have incorporated hopelessness as a key aspect that drives suicidal thoughts and behaviours (Bolton et al., 2007; Johnson et al., 2008a; Williams, 1997). One recent study on sexually abused victims showed that hopelessness was a significant predictor of suicidal ideation in women who had been sexually abused (Spokas et al., 2009). In accord, hopelessness together with perceptions of entrapment remained significantly associated with suicidal behaviour in those diagnosed with PTSD after controlling for the effects of comorbid depression (Panagioti et al., in press).

7.2.3. Aim of the study.

Overall, the aim of this study was to construct a model of suicidal behaviour in a sample of individuals diagnosed with PTSD (currently or lifetime) and experiencing PTSD symptoms in the past month. This was achieved by examining the role of perceptions of defeat and entrapment, comorbid depression and hopelessness as potential mediators in the association between PTSD symptoms and suicidal behaviour. Defeat and entrapment were used as a single latent variable in the analyses of the study. It was predicted that PTSD symptoms would have a positive association with suicidal behaviour and that this relationship would be fully mediated by perceptions of defeat and entrapment and severity of comorbid depression and hopelessness. In addition, the hypothesized model was re-fitted in those participants who met the criteria for a current PTSD diagnosis. This was done to examine whether the pathways to suicidal behaviour persist or alter when participants report severe enough PTSD symptoms to warrant a current PTSD diagnosis.
7.3. Method

7.3.1. Participants.

Participants were recruited using adverts (i.e., newspaper advertising, online advertising in the University of Manchester (UK), posters in mental health services based in Manchester, such as, Victim Support and the Rape Crisis Centre) asking for people who have experienced a traumatic event (i.e., crime, physical threat, serious accident, military combat, natural disaster, terrorist attack, diagnosed with a life-threatening illness) in the past and have been affected by it to volunteer. Potential participants were sent by post or email the Posttraumatic Stress Diagnostic Scale (PDS; Foa et al., 1997) to assess whether they met the inclusion criteria for the study. Those participants who returned the PDS scale and met the inclusion criteria of the study proceeded to the full assessment. Participants had to fulfil the following criteria to participate in the study: 1) they had to have experienced a serious traumatic event in the past and meet the criterion A\(^4\) of the PDS scale; 2) be aged between 18-65 years; 3) meet the criteria for a lifetime diagnosis of PTSD confirmed by the Clinical Administered PTSD scale for DSM IV (CAPS; Blake et al., 1995); 4) have experience at least one PTSD symptom in past month with \(\geq 1\) frequency and \(\geq 2\) intensity score determined by the CAPS; 5) and have a thorough grasp of the English language (this was necessary for participation in the assessment interview and for the understanding of questionnaire items). In addition, participants had to provide informed consent and be willing to come into the University of Manchester to carry out the study.

\(^4\) The criterion A of the PDS scale consists of four questions which assess if the person experienced or witnessed an event that involved actual or threatened death or serious injury or a threat to the physical integrity of self or others and if the person felt intense fear, helplessness, or horror as a consequence of that event (Foa et al., 1997). This inclusion criterion was used in order to ensure that all the prospective participants have been exposed to a traumatic experience which was severe enough to meet the criterion A of the PDS scale.
Participants were excluded if they suffered from dementia, organic brain disorder or active psychotic disorder. None of the potential participants and those who were finally recruited into the study reported suffering from dementia or organic brain disorder.

**7.3.2. Measures.**

The *Clinician Administered PTSD Scale* (CAPS; Blake et al., 1995) was used to diagnose PTSD (current and lifetime) and to assess the number and severity of PTSD symptoms in the past month. The CAPS is a 30-items structured interview according to DSM-IV criteria for PTSD. The PTSD symptom severity score which was used in the statistical analyses was computed by adding the intensity and frequency score for each of the 17 PTSD symptoms. Previous research has found that the Cronbach’s alpha coefficient ranges from .85 to .87 for the three symptom clusters and .94 for the total CAPS score (Blake et al., 1995; Weathers et al., 2001). The alpha coefficient for the total severity of the 17 PTSD symptoms in the current study was $\alpha = .92$.

The *Beck Depression Inventory II* (BDI II; Beck et al., 1996a) comprises 21 items which measure the severity of depressive symptoms (range 0–63) in the past two weeks. The BDI II has high internal consistency (mean coefficient alpha of 0.91), test re-test reliability ($r = .93$) and concurrent validity with the Hamilton Psychiatric Rating Scale for Depression (HRSD; $r = .71$) (Beck et al., 1996a,b; Dozois et al., 1998; Richter et al., 1998). The alpha coefficient was $\alpha = .94$ in the current sample.

The *Beck Hopelessness Scale* (BHS; Beck et al., 1974) consists of 20 true or false items assessing the prevalence of thoughts and beliefs about feelings of hopelessness in the past week (e.g., “My future seems dark to me”). Previous studies have provided evidence for the convergent validity of the scale since it was found to be negatively associated with measures of hope (Miller & Powers, 1988; Raleigh & Boehm, 1994; Steed, 2001) and positive future thinking (O'Connor et al., 2004). The scale has been found to have an alpha
coefficient of .93 and a test-retest reliability of $r = .85$ over three weeks (Holden & Fekken, 1988). The alpha coefficient was $a = .93$ in the current study.

The Defeat Scale (Gilbert & Allan, 1998) consists of 16 items assessing perceptions of defeat including those of failed struggle and low social rank (e.g., “I feel that I am one of life's losers”) in the past week. The items are rated on a five-point scale ranging from ‘Never’ to ‘Always/all the time’. Higher scores indicate greater feelings of defeat. There are no previous reports giving the internal consistency of this scale in a trauma or PTSD groups. The alpha coefficient for this scale has been found to be .94 in a student group and .93 in a depressed group (Gilbert & Allan, 1998). The alpha coefficient in the current study was $a = .96$.

The Entrapment Scale (Gilbert & Allan, 1998) consists of 16 items assessing perception of being trapped by external (e.g., I feel trapped by other people) or internal stressors (e.g., “I feel trapped inside myself”). The items are rated on a five-point scale ranging from ‘Not at all like me’ to ‘Extremely like me’. There are no previous reports concerning the internal consistency of this scale in trauma or PTSD groups. The alpha coefficient for this scale has been found to range from .86 to .89 in a depressed group (Gilbert & Allan, 1998) and it was $a = .96$ in the present sample.

The Suicidal Behaviors Questionnaire-Revised (SBQ-R; Osman et al., 2001) is a four-item measure which assesses the level of suicidality experienced by the participants. The first item measures levels of lifetime suicidality including thoughts, plans and attempts (i.e., “Have you ever thought about or attempted to kill yourself?”); the second item assesses the frequency of suicidal thoughts in the past year (i.e., “How often have you thought about killing yourself in the past year?”); the third item measures the communication of the intent to commit suicide (“Have you ever told someone that you were going to commit suicide, or that you might do it?”) and the fourth item assesses the likelihood of committing suicide in the future (“How likely is it that you will attempt
suicide someday?”). The total score ranges from 3 to 18 with higher scores indicating greater levels of suicidality. Osman et al. (2001) have shown that the questionnaire is a reliable research tool in both clinical and non-clinical samples with an alpha coefficient ranging from .76 to .88 (Osman et al., 2001). The alpha coefficient was $\alpha = .86$ in the present sample.

### 7.3.3. Procedure.

Upon arrival at the testing session, and after signing the consent forms, participants were administered the CAPS and afterwards completed a number of standardized questionnaires about defeat, entrapment, hopelessness, depression, and suicidal behaviour in the order detailed. The CAPS interview and all the self-report measures were administered by the first author (MP) in one session. The research was conducted in a private room and opportunities for questions and breaks were provided. Following the completion of the study, participants were debriefed about the nature of the study and provided an information sheet listing support groups, counselling services and help-lines in the Manchester region. Participants who were identified as being at risk for suicide (criteria: SBQ-R item 1 ≥ 3; item 2 ≥ 3; item 3 ≥ 2; item 4 ≥ 4) were referred to their GP and/or mental health professional, with their consent. Ethical approval was obtained from the relevant NHS research ethics committee before this study commenced.

### 7.3.4. Data analysis.

The data were initially screened for normality. Transformations (logarithmic and square root) were applied to the measures of defeat, entrapment, hopelessness, depression, PTSD symptom severity and suicidal behaviour to correct for positive skew. Transformed values are used in subsequent analyses. Following the transformations, all the transformed variables had non-significant values of skewness ($z < 1.96$). Multicollinearity was not a serious problem in the data since all the values of the variance inflation factor (VIF) were
bellow 10 (Myers, 1990) with its highest value being 6.2 and all tolerance statistics were above 0.1 (Field, 2009) with the lowest value being 0.16.

The hypothesized model was tested via Structural Equation Modelling (SEM). Covariances were analyzed using Amos version 7 using Maximum Likelihood estimation (Arbuckle, 2006). To assess the goodness of fit of the model the chi-squared statistic was examined. The chi-squared statistic assesses whether there is a statistically significant difference between the hypothesized model and the observed data. For the Chi-squared statistic a non-significant result ($p < .05$) indicates good fit. In accord with the recommendations of Hu and Bentler (1999) the Comparative Fit Index (CFI) and the Standardized Root Mean squared Residual (SRMR) were used to further assess the fit of the model. Scores of >.95 and <.09 for the CFI and the SRMR, respectively, indicate good fit based on the combinational rules found to minimize type I and II errors (Hu & Bentler, 1999). In the hypothesized model, the defeat and entrapment variables were represented as one single latent variable (named defeat/entrapment). Following the recommendations of Preacher and Hayes (2004), the significance of the indirect or mediated effect of PTSD symptoms on suicidality was determined using bootstrapping (2000 samples). Bootstrapping is a non-parametric re-sampling technique that can be used to generate confidence intervals.

### 7.4. Results

#### 7.4.1. Sample characteristics.

Overall, 95 participants were recruited into the study. Of those, three participants were excluded because they had substantial missing data and another participant was excluded because he was experiencing an active psychotic episode. Additionally, 18 participants were excluded from the current analyses either because they were currently experiencing a range of PTSD symptoms but did not meet the criteria for a current or
lifetime PTSD diagnosis or they did not experience at least one posttraumatic symptom (≥ 1 frequency, ≥ 2 intensity) in the past month. As a result, the current results were based on analyzing data from 73 individuals diagnosed with current or lifetime PTSD ($M_{age} = 29.2, SD = 10.9$) and reported a range of PTSD symptoms (≥ 1) in the past month. The majority of participants were female ($n = 58, 79.5\%$) unmarried ($n = 48, 65.8\%$) and white ($n = 56, 76.7\%$). Of the total sample, 50 (68.5\%) participants fulfilled the CAPS criteria for a current PTSD diagnosis and 23 (31.5\%) participants fulfilled the CAPS criteria for a lifetime diagnosis of PTSD. Participants experienced on average 10.8 PTSD symptoms ($SD = 4.1$) in the past month. As many as 46 (63.1\%) participants reported some form of suicidal behaviour (i.e., suicidal ideation, plans or attempts) in their lifetime while 30 (41.1\%) participants reported suicidal ideation in the past year. Means, standard deviations (for both untransformed and transformed variables) and Pearson’s correlations between all the variables included in the model are reported in Table 13.

Table 13. *Means, Standard Deviation and Correlations for the Variables in the Model*

<table>
<thead>
<tr>
<th></th>
<th>Untransformed</th>
<th>Transformed</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M (SD)$</td>
<td>$M (SD)$</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1. Defeat</td>
<td>21.62 (15.92)</td>
<td>1.20 (0.36)</td>
<td>.86**</td>
<td>.83**</td>
<td>.83**</td>
<td>.73**</td>
<td>.77**</td>
</tr>
<tr>
<td>2. Entrapment</td>
<td>19.34 (16.98)</td>
<td>3.91 (2.03)</td>
<td>.81**</td>
<td>.86**</td>
<td>.79**</td>
<td>.78**</td>
<td></td>
</tr>
<tr>
<td>3. Depression</td>
<td>16.44 (14.03)</td>
<td>1.09 (0.39)</td>
<td>.85**</td>
<td>.77**</td>
<td>.87**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Hopelessness</td>
<td>7.26 (5.82)</td>
<td>0.80 (0.34)</td>
<td></td>
<td>.76**</td>
<td></td>
<td>.74**</td>
<td></td>
</tr>
<tr>
<td>5. Suicidal behaviour</td>
<td>6.67 (4.17)</td>
<td>0.75 (0.25)</td>
<td></td>
<td></td>
<td>.74**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. PTSD symptom severity</td>
<td>48.62 (23.53)</td>
<td>6.76 (1.72)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Note. **$p < .01$; *Correlations only provided for transformed variables.
7.4.2. Testing the model.

The hypothesized model is presented in Figure 6 including the associated standardized regression weights and squared multiple correlations. The model fitted the data well, $\chi^2(4, n = 73) = 5.64, p = .228$, SRMR = .011, CFI = .99. The path from perceptions of defeat and entrapment was significant ($p < .05$). Nonetheless, both the path from depression and the path from hopelessness to suicidal behaviour were non-significant. Overall, in this model, perceptions of defeat and entrapment explained 69% of the variance in suicidal behaviour. The results of the bootstrap analysis suggests that the indirect effect of the PTSD symptom severity on suicidal behaviour was also significant, $p = .001$. 95% CI [0.08 – 0.12].
Figure 6. The model displaying that defeat/entrapment mediates the impact of PTSD symptom severity on suicidal behaviour. Defeat and entrapment is represented as a single latent variable. Standardized regression weights and squared multiple correlations are reported. The path from defeat and entrapment variable was the only significant path to suicidal behaviour in the model ($p < .05$). The non-significant paths to suicidal behaviour are indicated by dashed arrows. After refitting the model with defeat and entrapment being used as two distinct observed variables, the results showed that the path from entrapment to suicidal behaviour was statistically significant ($p < .01$). The paths from defeat, hopelessness and depression were non-significant.

The model described in Figure 6 assumes that comorbid depression, hopelessness and perceptions of defeat and entrapment fully mediate the association between PTSD symptom severity and suicidal behaviour. A second model was fitted in Amos which assumed that in addition to the indirect effect of the PTSD symptom severity on suicidal behaviour, there was also a direct effect of PTSD symptom severity on suicidal behaviour independent of depression, hopelessness and defeat and entrapment. The two models compared in terms of changes in the chi-squared statistic and Akaike’s Information Criterion (AIC). Burnham and Anderson (2004) propose that differences ≤ 2 in the AIC provide support for the most parsimonious model. The chi-squared statistic for the partial mediation model was $\chi^2 = 5.05$, $p = .168$. The difference in the chi-squared statistic was not statistically significant, $\Delta \chi^2 (1) = 0.59$, $p = .442$, and the difference in the AIC was < 2, $\Delta$AIC = 1.41 which both favour the more parsimonious, full mediation model. These results suggest that the effect of PTSD symptom severity on suicidal behaviour was fully explained by heightened levels of depression, hopelessness and defeat/entrapment.
7.4.3. Re-testing the model in those with a current PTSD diagnosis.

The hypothesized model was re-fitted using data from those participants ($n = 50$) who fulfilled the criteria for a current PTSD diagnosis. The model is presented in Figure 7 including the associated standardized regression weights and squared multiple correlations. The model fitted the data well, $\chi^2 (4, n = 50) = 7.52, p = .111$, SRMR = .021, CFI = .99. In this model, the path from the defeat/entrapment variable was the only significant path to suicidal behaviour ($p < .05$). The paths from depression and hopelessness were non-significant. Overall, perceptions of defeat and entrapment explained 67% of the variance in suicidal behaviour. The results of the bootstrap analysis suggests that the indirect effect of the PTSD symptom severity on suicidal behaviour was also significant, $p = .002$, 95% CI [0.52 – 0.83]. A second model was fitted which assumed that PTSD symptom severity would have a direct effect on suicidal behaviour. Likewise the model in the total sample, the more parsimonious full mediation model was favoured (the difference in the chi-squared statistic was not statistically significant, $\Delta \chi^2 (1) = 0.03, p = .862$, and the difference in the AIC was <2, $\Delta$AIC = 1.87).
Figure 7. The full mediation model in those who fulfilled the criteria for a current PTSD diagnosis is depicted. Standardized regression weights and squared multiple correlations are reported. The path from defeat and entrapment variable was the only significant path to suicidal behaviour in the model ($p < .05$). The non-significant paths to suicidal behaviour are indicated by dashed arrows.

7.5. Discussion

This study aimed to test mediational paths to suicidal behaviour in individuals diagnosed with current or past PTSD using Structural Equation Modelling (SEM). It was predicted that PTSD symptoms would affect suicidal behaviour indirectly through their association with depression, hopelessness and perceptions of defeat and entrapment. Consistent with our predictions, the outcomes of the analyses showed that the link between PTSD symptoms and suicidal behaviour was mediated by perceptions of defeat and entrapment. The paths from both depression and hopelessness to suicidal behaviour were not significant. Overall, perceptions of defeat and entrapment explained a large proportion of the variance (69%) on suicidal behaviour. A partial mediation model was tested whereby PTSD symptoms were hypothesized to have both, an indirect (through depression, hopelessness and perceptions of defeat and entrapment) and a direct impact on suicidal behaviour. The partial mediation model did not improve the fit of the model, suggesting that the association between PTSD symptoms and suicidal behaviour was fully mediated by depression, hopelessness and perceptions of defeat and entrapment. The hypothesized model was refitted in a subsample of 50 participants who fulfilled the full criteria for a current PTSD diagnosis. The results showed that in those with a PTSD diagnosis, PTSD symptoms acted on suicidal behaviour only through their association with perceptions of defeat and entrapment which accounted for a large proportion (67%) of the variance on suicidal behaviour. Similarly to the model in the total sample, the paths from hopelessness and depression to suicidal behaviour were not significant.
The current findings suggest that perceptions of defeat and entrapment together are core components of suicidal behaviour in those diagnosed with PTSD. Johnson et al. (2008) argued that perceptions of defeat and entrapment have conceptual similarities with hopelessness and potentially the impact of defeat and entrapment on suicidal behaviour could be explained by their shared variance with hopelessness. In this study hopelessness was included in the mediation model indicating that the association between perceptions of defeat and entrapment and suicidal behaviour was independent of their shared variance with hopelessness. Furthermore, only the path from perceptions of defeat and entrapment had a significant impact on suicidal behaviour whilst the paths from comorbid depression and hopelessness were non-significant. This finding suggests that potentially perceptions of defeat and entrapment are the overriding factor which drives suicidal behaviour in those diagnosed with PTSD. These results are in agreement with the findings of a recent study which found that in those with PTSD, perceptions of entrapment were correlated with suicidal behaviour independently of the effects of comorbid depression (Panagioti et al., in press). The findings of this study are also consistent with a portion of the suicide literature which suggests that perceptions of defeat and entrapment have a key role in the development of suicidal thoughts and behaviours in other research populations (O'Connor, 2003; Rasmussen et al., 2010; Taylor et al., 2010a,b; Williams, 1997). For example Taylor et al. (2010a) fitted a mediational path in a sample of psychotic individuals whereby perceptions of defeat and entrapment mediated the association of positive psychotic symptoms with suicidal ideation. Thus, it could be assumed that perceptions of defeat and entrapment are a part of a generic trans-diagnostic psychological mechanism which drives suicidality independent of diagnosis. The current findings provide support to recent theoretical models of suicide including the SAMS model (Johnson et al., 2008a) and Cry of Pain Model of Suicide (Williams, 1997), which postulate that perceptions of defeat and
entrapment are the psychological mechanism through which suicidal behaviour emerges as a plan of escape.

The current study suggests that there is a link between severity of PTSD symptoms and suicidal behaviour and that this link is explained by negative perceptions of defeat and entrapment. This finding is fully supportive of the main assertion of the SAMS model (Johnson et al., 2008a; Taylor et al., 2010b) that specific negative appraisals such as appraisals of clinical symptoms give rise to increasingly severe perceptions of defeat and entrapment which in turn lead to the development of suicidal thoughts and behaviours. It is noteworthy that perceptions of defeat and entrapment account for the relationship between PTSD symptom severity and suicidal behaviour in both, the total sample which included individuals with current and lifetime diagnosis of PTSD and the subsample of those currently diagnosed with PTSD. This outcome suggests that there is a generic pathway to suicidal behaviour in those diagnosed with PTSD at some point in their lives. In other words, the underlying psychological mechanisms to suicidal behaviour follow are relatively the same in those who are experiencing severe enough PTSD symptoms to warrant a current PTSD and in a subclinical group currently experiencing a range of PTSD symptoms. Furthermore, the findings imply that in those with PTSD, the presence of severe depressive symptoms or feelings of hopelessness might be inadequate to identify those who are at heightened risk for suicide. The presence of severe negative perceptions of defeat and entrapment rather than severity of comorbid depression or hopelessness is potentially the most reliable indicator of the associated risk for suicide in PTSD.

The findings of this study have two main clinical implications. First, when assessing individuals diagnosed with PTSD or experiencing PTSD symptoms for suicide risk, clinicians should be mindful that the presence of perceptions of defeat and entrapment in addition to other indicators of suicidal behaviour such as depression and hopelessness may indicate a heightened risk for suicide. Furthermore, the presence of perceptions of
defeat and entrapment might highlight that there is an increased risk for the subsequent
development of suicidal thoughts and behaviours. The usefulness of perceptions of defeat
and entrapment as early indicators of suicidal behaviour needs to be assessed from future
studies. Second, the current pattern of findings suggests that in order to be successful at
preventing or reducing suicidal behaviour in PTSD, forthcoming psychological
interventions should operate on two different stages by targeting: i. the direct impact of
perceptions of defeat and entrapment and ii. the indirect impact of negative appraisals of
the PTSD symptoms and comorbid conditions (e.g., depression) which act on suicidal
behaviour by increasing the detrimental effect of perceptions of defeat and entrapment on
suicidal behaviour. Tarrier and colleagues (2008) in their meta-analysis reported that
cognitive behavioural therapies (CBT) had a significant effect at reducing suicidal
behaviour and it might be possible for suicide prevention programs to be incorporated into
existing CBT programs which aim to target clinical symptoms.

This study includes two main caveats which limit the interpretation of the findings.
First, the sample size of the study was relatively small. This was especially the case for the
subgroup of those with a current diagnosis of PTSD. Future larger studies would be useful
to replicate the current findings. An interesting future research goal would be to fit the
current model in a larger sample of individuals currently diagnosed with PTSD. A second
caveat is that the cross-sectional design of the research limits the extent to which we can
draw casual inferences about the nature of the association between the variables of interest.
For example, the findings reported above might reflect overlapping variances between the
variables included in the analyses. Nonetheless, there are two important findings that
remain irrespective of casual inferences: i. a large proportion of the association between
suicidal behaviour and PTSD symptoms is explained by the presence of perceptions of
defeat and entrapment, ii. when perceptions of defeat and entrapment are considered the
association between PTSD symptom severity and suicidal behaviour becomes redundant.
Perceptions of defeat and entrapment might represent important aspects for further research when investigating the mechanisms of suicidal behaviour in those with PTSD. The use of more rigorous methodologies such as prospective or case-control research designs would benefit the research area of PTSD and suicidal behaviour.

In conclusion, the current study found that perceptions of defeat and entrapment mediate the relationship between severity of PTSD symptoms and suicidal behaviour. This suggests that PTSD symptoms lead to suicidal behaviour to the extent to which they coexist with perceptions of defeat and entrapment.
CHAPTER 8


8.1. Abstract

Background: A considerable body of literature has shown a strong association between Posttraumatic Stress Disorder (PTSD) and suicidal behaviour but only a limited number of studies have investigated the putative psychological mechanisms underlying suicidal behaviour in PTSD. Based on a recent theoretical model of suicide, the Schematic Appraisals Model, the current study aimed to examine whether perceptions of defeat and entrapment mediated the effects of three types of negative self-appraisals (emotion coping, problem solving and social support) on suicidal behaviour among individuals experiencing PTSD symptoms in the past month. Methods: The sample comprised 56 individuals who had been previously exposed to a traumatic event and reported at least one PTSD symptom in the past month. The mediational analyses were conducted using a non-parametric, bootstrapping method. Results: The results showed that defeat and entrapment fully mediated the effect of all the three types of self-appraisals on suicidal behaviour. When controlling for PTSD symptom severity, defeat and entrapment continued to mediate fully the effect of two types of self-appraisals, namely the perceived ability to control negative emotions (emotion coping) and the perceived ability to cope with difficult situations/problems (problem solving) on suicidal behaviour. Conclusions: The current findings provide support for the Schematic Appraisals Model of Suicide and suggest that both specific types of negative self-appraisals and general perceptions of defeat and entrapment are key components of suicidal behaviour in those with PTSD. The findings have important clinical implications.

Resubmitted at Depression and Anxiety
8.2. Introduction

The robust relationship between Posttraumatic Stress Disorder (PTSD) and suicidal behaviour including suicidal thoughts, plans or attempts, has been confirmed across a large number of investigations (Bernal et al., 2007; Cougle et al., 2009a,b; Davidson et al., 1991; Sareen et al., 2007; Sareen et al., 2005b; Tarrier & Gregg, 2004). A narrative review (Panagioti et al., 2009) and a meta-analysis (Panagioti et al., submitted-a) of the available findings on PTSD and suicidality concluded that there is a strong positive association between PTSD and suicidal behaviour irrespective of variations across the studies, such as, the target populations and the type of trauma that led to a PTSD diagnosis. The experience of PTSD symptoms without a full diagnosis of PTSD has also been found to compound the risk for suicide (Kaslow et al., 2000; Leiner et al., 2008). A large study in the US found that the rates of suicidal ideation were significantly heightened among individuals who reported PTSD symptoms in the past month compared to those who did not report PTSD symptoms. Furthermore, the levels of suicidal ideation increased linearly with the number of PTSD symptoms endorsed by the responders (Marshall et al., 2001).

The Schematic Appraisals Model of Suicide (SAMS) is a theoretical framework which has been developed by members of our research team (Johnson et al., 2008a) to elucidate the psychological processes that underlie the development of suicidal behaviours. The SAMS has been developed based on a previous theoretical model of suicide (Cry of Pain Model) (Bolton et al., 2007; Williams, 1997; Williams et al., 2005) in an attempt to expand the previous model and offer empirically testable predictions (Johnson et al., 2008a; Panagioti et al., 2009). Both, the SAMS and the Cry of Pain model share one central argument that suicidal thoughts and behaviours emerge as a means of escape from the increasingly severe feelings of defeat and entrapment (Johnson et al., 2008a; Pratt et al., 2010; Taylor et al., 2011a). The concepts of defeat and entrapment are derived from the social rank theory (Gilbert & Allan, 1998) and include perceptions of loss, failure and
inability to move or escape (Taylor et al., 2010a,b; Taylor et al., 2009). Recent studies have emphasized the role of defeat and entrapment in the development of suicidal behaviour in clinical and non-clinical populations (O’Connor, 2003; Rasmussen et al., 2010; Taylor et al., 2010a,b) and recently in those with PTSD (Panagioti et al., in press). The SAMS has proposed that defeat and entrapment have many conceptual similarities and thus could be best described as a single factor (Taylor et al., 2009). A number of studies have supported the view that defeat and entrapment constitute a single construct which drives suicidal behaviour (Panagioti et al., in submission-a; Taylor et al., 2010a,b).

A core prediction of the SAMS model is the enactment of a negatively biased appraisals system in those who are suicidal (Johnson et al., 2008a). The appraisal system comprises evaluative judgments, beliefs and attitudes held by suicidal individuals. Two types of negative appraisals are considered important in the context of the SAMS model: i. situation appraisals (e.g., past, current and future situation) and ii. self-appraisals which encompass negatively distorted evaluations of personal attributes, cognitive and problem solving abilities, and accessibility to social resources and rescue factors (Johnson et al., 2010a,b; Johnson et al., 2011b). These two types of negative appraisals (situation appraisals and self-appraisals) are hypothesized to act on suicidal behaviour by giving rise to, and amplifying, feelings of defeat and entrapment. In the current study we were particularly interested in examining the second type of negative appraisals (e.g., self-appraisals) in relation to perceptions of defeat and entrapment and suicidal behaviour.

There is empirical evidence that negative self-appraisals, such as negative appraisals of social support, are associated with suicidal behaviour in those experiencing traumatic events (Lieberman, Solomon, & Ginzburg, 2005; Thompson et al., 2002) and PTSD (Jakupcak et al., 2010; Kotler et al., 2001). Furthermore, a recent study found that subjective negative appraisals of functional impairment were strongly associated with suicidal behaviour in those with PTSD (Panagioti et al., 2011). Based on the predictions of
the SAMS model, Taylor et al. (2010b) found that defeat and entrapment fully mediated the effect of negative appraisals of both problem solving abilities and social support on suicidal behaviour among university students. Johnson et al. (2010a) proposed that three particular types of self-appraisals are particularly important in understanding the mechanisms behind suicidal behaviour. These self-appraisals concern the individual’s ability to handle difficult life circumstances. In particular, the three types of self-appraisals are related the individuals’ perceived ability to cope with their emotions, to handle difficult situations or problems, and to access social support (Johnson et al., 2010a). The above self-appraisals in their positive form confer resilience to suicide while in their negative form they increase the risk for suicide because they give rise to severe feelings of defeat and entrapment (Johnson et al., 2008a; Johnson et al., 2010b).

In the current study we aimed to test a mediational pathway whereby three types of self-appraisals (emotion coping, problem solving/situation coping and social support) drive suicidal behaviour indirectly via their effect on perceptions of defeat and entrapment among individuals experiencing PTSD symptoms in the past month. Based on theory (Johnson et al., 2008a) and empirical data (O’Connor, 2003; Panagioti et al., in press; Taylor et al., 2010b), it was predicted that perceptions of defeat and entrapment would mediate fully the relationship between negative self-appraisals and suicidal behaviour. Furthermore, since PTSD symptoms have been found to be strongly related to suicidal behaviour (Kotler et al., 2001; Leiner et al., 2008; Marshall et al., 2001; Panagioti et al., in press; Wilcox et al., 2009) we aimed to examine whether the above mediation model held after controlling for the severity of PTSD symptoms experienced by the participants.
8.3. Methods

8.3.1. Participants.

Participants were recruited using adverts (i.e., newspaper advertising, online advertising in the University of Manchester (UK), posters in mental health services based in Manchester, such as, Victim Support and the Rape Crisis Centre) asking for people who have experienced a traumatic event (i.e., crime, physical threat, serious accident, military combat, natural disaster, terrorist attack, diagnosed with a life-threatening illness) in the past, and have been affected by it, to volunteer. Potential participants had to fulfil the following criteria to participate in the study: 1) they had to have experienced a serious traumatic event in the past and experienced at least one PTSD symptom in the past month determined by the Posttraumatic Stress Diagnostic Scale (PDS; Foa et al., 1997); 2) be aged between 18-65 years; and 3) have a thorough grasp of the English language (this was necessary for participation in the assessment interview and for the understanding of the questionnaire items). Participants were excluded if they suffered from dementia, organic brain disorder or active psychosis. None of the potential participants of those who were finally recruited into the study reported suffering from dementia or organic brain disorder.

8.3.2. Measures.

The *Posttraumatic Stress Diagnostic Scale* (PDS; Foa et al., 1997). The PDS was used to assess the number and severity of PTSD symptoms in the past 30 days. The PDS is a 49-item self-report measure which is used to diagnose PTSD in the past month according to DSM-IV criteria. The PDS scale includes a total PTSD symptom severity score which is computed by adding the frequency score for each of the 17 PTSD symptoms. Each of the 17 PTSD symptoms is measured on a four-point scale, and the total PTSD symptom severity score for the 17 symptoms ranges from 0 to 51. The test-retest reliability for a diagnosis of PTSD and PTSD symptom severity score over a 2 to 3 week period has been
found to be .74 and .83 respectively (Foa et al., 1997). The alpha coefficient for the total severity of the 17 PTSD symptoms in the current study was .93.

The Resilience Appraisals Scale (RAS; Johnson et al., 2010a). The RAS consists of 12 items assessing self-appraisals. The RAS comprises three, four-item subscales, namely, the emotion coping, situation coping, and the social support subscale. The emotion coping subscale assesses the individual’s perceived ability to cope with their emotions (e.g., “In difficult situations I can manage my emotions”), the situation coping subscale assesses the individual’s perceived problem solving skills (e.g., “When faced with a problem I usually find the solution”) and the social support subscale assesses the individual’s perceived ability to access social support (i.e., “If I were to have problems, I have people I could turn to”). The items are rated on a five-point scale ranging from ‘Strongly disagree’ to ‘Strongly agree’. Johnson et al. (2010a) confirmed the proposed three-factor structure of the scale using confirmatory factor analysis. Higher scores on the RAS scale indicate increased levels of positive self-appraisals. In the current study the alpha coefficient was .91 for the total scale, .87 for the emotion coping subscale, .92 for the situation coping subscale, and .93 for the social support subscale.

The Defeat Scale (Gilbert & Allan, 1998). The defeat scale consists of 16 items assessing perceptions of defeat including those of failed struggle and low social rank (e.g., “I feel that I am one of life's losers”) in the past week. The items are rated on a five-point scale ranging from ‘Never’ to ‘Always/all the time’. Higher scores indicate greater feelings of defeat. The alpha coefficient in the current study was .94.

The Entrapment Scale (Gilbert & Allan, 1998). The entrapment scale consists of 16 items assessing perceptions of being trapped by external (e.g., I feel trapped by other people) or internal stressors (e.g., “I feel trapped inside myself”). The items are rated on a five-point scale ranging from ‘Not at all like me’ to ‘Extremely like me’. The alpha coefficient for this scale was .93 in the present sample.
The Suicidal Behaviors Questionnaire-Revised (SBQ-R; Osman et al., 2001). The SBQ-R is a four-item measure which assesses the level of suicidal behaviour experienced by the participants. The first item measures levels of lifetime suicidal behaviour including thoughts, plans and attempts (i.e., “Have you ever thought about or attempted to kill yourself?”); the second item assesses the frequency of suicidal thoughts in the past year (i.e., “How often have you thought about killing yourself in the past year?”); the third item measures the communication of the intent to commit suicide (“Have you ever told someone that you were going to commit suicide, or that you might do it?”); and the fourth item assesses the likelihood of committing suicide in the future (“How likely is it that you will attempt suicide someday?”). The total score ranges from 3 to 18 with higher scores indicating greater levels of suicidal behaviour. The alpha coefficient was .87 in the present sample.

8.3.3. Procedure.

Upon arrival at the testing session, and after signing the consent forms, participants completed a number of standardized questionnaires about PTSD symptoms, self-appraisals, defeat, entrapment and suicidal behaviour in the order detailed above. All the self-report measures were administered by the first author (MP) in one session. The research was conducted in a private room and opportunities for questions and breaks were provided. Participants who were identified as being at risk for suicide (criteria: SBQ-R item 1 ≥ 3; item 2 ≥ 3; item 3 ≥ 2; item 4 ≥ 4) were referred to their GP and/or mental health professional, with their consent. Ethical approval was obtained from the relevant NHS research ethics committee before this study commenced.
8.3.4. Data analysis.

Initially, Pearson’s correlations were computed among all the key variables of the study. Next, mediation analyses were conducted using a bootstrapping method suggested by Preacher and Hayes (Preacher & Hayes, 2004, 2008). This was conducted via the INDIRECT script developed for use in SPSS (Preacher & Hayes, 2008). Bootstrapping is a non-parametric method to generate confidence intervals through random re-sampling. Bootstrapping has a lower rate of type II error compared to the casual step approach (Baron & Kenny, 1986) and is most suitable for testing mediation in small sample sizes (Hayes, 2009; MacKinnon & Fairchild, 2009). An additional advantage of this method (Preacher & Hayes, 2008) is that it allows the examination of models with multiple mediators. Furthermore, one or more variables can be included as covariates in the hypothesized model. Contrary to the postulation of the casual step approach (Baron & Kenny, 1986) that in order to have a mediation effect the total direct effect of the independent to the dependent variable needs to be significant, recent approaches (Preacher & Hayes, 2004, 2008) have argued that this is a fallible postulation. Hayes (2009) suggests that when there is no significant direct effect of the independent variable on the dependent variable, the two variables can be still causally linked via the mediator. In the current study, bootstrapping with 2000 re-samples and 95% percentile-based confidence intervals were computed to examine the indirect effects of negative self-appraisals (RAS) on suicidal behaviour via defeat and entrapment. The 95% confidence intervals are equivalent to the .05 significance level. The indirect effects are considered significant when the percentile confidence intervals do not include zero.
8.4. Results

8.4.1. Sample characteristics.

Fifty-eight individuals who reported a range of PTSD symptoms (≥ 1) in the past month participated in the study. Two cases were excluded from the analyses because they had substantial missing data. From the remaining 56 participants ($M_{\text{age}} = 29.1$, $SD = 11.5$), 82.1% ($n = 46$) were female, 64.3% ($n = 36$) were unmarried and 75% ($n = 42$) were white. Thirty-four (60.7%) participants met the PDS criteria for a current PTSD diagnosis. The 22 participants, who failed to meet the PDS criteria for a current PTSD diagnosis, comprised a subclinical group who reported a range of PTSD symptoms in the past month but did not fulfil the full criteria for a current PTSD diagnosis. Participants experienced an average of 10.4 PTSD symptoms ($SD = 4.4$) in the past month. Thirty-five (62.5%) participants reported lifetime suicidal behaviour (i.e., suicidal thoughts, plans or attempts) and 29 (51.8%) participants reported suicidal thoughts in the past year. Table 14 presents the descriptive statistics of the variables in the study.

8.4.2. Main mediational analyses

Mediation analyses were performed to examine the potential mediating role of defeat and entrapment on the association between negative self-appraisals (e.g., as measured by RAS scale) and suicidal behaviour. Based on previous recommendations (2009) and considering that defeat and entrapment were highly correlated ($r = .81, p < .01$; see Table 14) they were summed into a composite variable (referred to as defeat/entrapment hereafter). The Cronbach’s alpha for the composite variable (defeat/entrapment) was .89. In the first set of analyses, negative self-appraisals were separately examined as independent variables, suicidal behaviour was the dependent variable and the defeat/entrapment composite score was the proposed mediator. The results of the mediational analyses are presented in Table 15.
Table 14. Means, Standard Deviation and Correlations for the Variables in the Model

<table>
<thead>
<tr>
<th></th>
<th>M (SD)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Defeat</td>
<td>20.46 (12.6)</td>
<td>.82**</td>
<td>.63**</td>
<td>-.69**</td>
<td>-.53**</td>
<td>-.64**</td>
<td>-.48**</td>
<td>.70**</td>
</tr>
<tr>
<td>2. Entrapment</td>
<td>15.93 (14.20)</td>
<td>.62**</td>
<td>-.60**</td>
<td>-.54**</td>
<td>-.56**</td>
<td>-.33*</td>
<td>.75**</td>
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<tr>
<td>3. PTSD symptom severity (PDS)</td>
<td>18.36 (11.83)</td>
<td></td>
<td>-.45**</td>
<td>-.37**</td>
<td>-.32*</td>
<td>-.37**</td>
<td>69**</td>
<td></td>
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<tr>
<td>4. Coping Self- Appraisals (RAS)</td>
<td>31.75 (7.81)</td>
<td></td>
<td></td>
<td>.84**</td>
<td>.86**</td>
<td>.70**</td>
<td>-.54**</td>
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<tr>
<td>5. Emotion Coping Appraisals subscale (RAS Emo)</td>
<td>8.59 (3.47)</td>
<td></td>
<td></td>
<td>.70**</td>
<td>.32*</td>
<td>.49**</td>
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<td>6. Situation Coping Appraisals Subscale (RAS Situ)</td>
<td>10.75 (3.06)</td>
<td></td>
<td></td>
<td></td>
<td>.38**</td>
<td>.41**</td>
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<tr>
<td>7. Social Support Appraisals Subscale (RAS Social)</td>
<td>12.41 (3.29)</td>
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<td></td>
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<td></td>
<td>.41**</td>
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<td>8. Suicidal behaviour (SBQ-R)</td>
<td>6.52 (3.99)</td>
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</table>

Note. *p < .05, **p < .01
Table 15. Results of the Single-Mediator Model in Which Defeat/Entrapment was Represented as Mediator in the Relationship Between Negative Self-Appraisals and Suicidal Behaviour (With and Without Controlling for PTSD Severity)

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Independent variable</th>
<th>Mediator variable</th>
<th>Dependent variable</th>
<th>Effect of IV on M</th>
<th>Effect of M on DV</th>
<th>Direct Effect</th>
<th>Indirect Effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDS severity</td>
<td>RAS Total</td>
<td>Defeat/Entrapment</td>
<td>SBQ-R</td>
<td>-1.48***</td>
<td>.08**</td>
<td>-.02</td>
<td>[-.20, -.05]</td>
<td>-.13*</td>
</tr>
<tr>
<td>RAS Total</td>
<td>Defeat/Entrapment</td>
<td>SBQ-R</td>
<td>-2.17***</td>
<td>.12***</td>
<td>-.02</td>
<td>-.25***</td>
<td>[.38, -.14]</td>
<td>-.27***</td>
</tr>
<tr>
<td>RAS Emo</td>
<td></td>
<td></td>
<td>-4.12***</td>
<td>.12***</td>
<td>-.04</td>
<td>-.48***</td>
<td>[-.74, -.24]</td>
<td>-.52**</td>
</tr>
<tr>
<td>RAS Situ</td>
<td></td>
<td></td>
<td>-5.14***</td>
<td>.13***</td>
<td>.17</td>
<td>-.68***</td>
<td>[-1.05, -.37]</td>
<td>-.50*</td>
</tr>
<tr>
<td>RAS Social</td>
<td></td>
<td></td>
<td>-3.21*</td>
<td>.11***</td>
<td>-.16</td>
<td>-.35*</td>
<td>[-.61, -.10]</td>
<td>-.51**</td>
</tr>
<tr>
<td></td>
<td>RAS Emo</td>
<td>RAS Situ</td>
<td>RAS Social</td>
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<tr>
<td></td>
<td>-2.69**</td>
<td>-3.73***</td>
<td>-1.30</td>
<td></td>
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<td>.08**</td>
<td>.09**</td>
<td>.08***</td>
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<td>-.05</td>
<td>.11</td>
<td>.09</td>
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<tr>
<td></td>
<td>[-.38, -.07]</td>
<td>[-.60, -.13]</td>
<td>[-.27, .08]</td>
<td></td>
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<tr>
<td></td>
<td>-.26*</td>
<td>-.23</td>
<td>-.19</td>
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</table>

Note. Defeat/entrapment= Composite score of defeat and entrapment; PDS severity = Posttraumatic Stress Diagnostic Scale severity score; RAS Total = Resilience Appraisals Scale; RAS Emo = Resilience Appraisals Scale Emotion Coping subscale; RAS Situ = Resilience Appraisals Scale Situation Coping subscale; RAS Social = Resilience Appraisals Scale Social Support subscale; SBQ-R = Suicidal Behaviors Questionnaire Revised.

* p < .05, ** p < .01, *** p < .001.
As shown in Table 15, the results of the analyses (indirect effects and 95% confidence intervals) indicated that defeat/entrapment mediated the impact of the negative self-appraisals (total RAS and the three subscales) on suicidal behaviour. The absence of statistically significant direct effects of the Total RAS and the three subscales on suicidal behaviour indicated that defeat/entrapment fully mediated the relationship between negative self-appraisals and suicidal behaviour. Overall, perceptions of defeat and entrapment accounted for 56% of the variance on suicidal behaviour explained by the RAS Total scores. After controlling for PDS severity, defeat/entrapment continued to fully mediate the impact of the RAS total scale and the Emotion Coping subscale on suicidal behaviour. Furthermore, despite the absence of a significant total direct effect of the Situation Coping subscale on suicidal behaviour, defeat/entrapment fully mediated the impact of the Situation Coping subscale on suicidal behaviour. Details of the outcomes of the mediational analyses after controlling for the severity of PTSD symptoms experienced by the participants are presented in Table 15. Figure 8 presents the mediation model between RAS subscales and suicidal behaviour, and associated path coefficients, after controlling for PDS severity.

Figure 8. The results of the single-mediator model showing the indirect effects of negative self appraisals (RAS subscales) on suicidal behaviour via the composite score of defeat and entrapment (defeat/entrapment) controlling for PTSD symptom severity. Coefficients are shown for each path and a dotted line indicates an insignificant indirect effect.
8.4.3. Further mediational analyses.

Two additional sets of mediation analyses were conducted to explore whether mediation effects similar to those described above occurred when defeat and entrapment were treated as lone mediators, rather than a single composite variable. In these analyses, defeat and entrapment were entered into separate models as mediators of the association between negative self-appraisals and suicidal behaviour in two simple mediation models. The results showed that both defeat and entrapment fully mediated the impact of the RAS (total scores) and the three subscales on suicidal behaviour. When controlling for PDS severity, both defeat and entrapment continued to mediate the impact of total RAS scores, Emotion Coping and Situation Coping subscale scores on suicidal behaviour. Table 16 shows the outcomes of the two mediator analyses in which defeat and entrapment were examined as separate mediators in two simple mediation models. Figure 9 provides a schematic illustration of the two single mediation models in which defeat (9a) and entrapment (9b) were examined as mediators on the relationship between the three RAS subscales and suicidal behaviour after controlling for PDS severity. The path coefficients are included in the figure.

8.5. Discussion

The overarching aim of the current study was to test a mediational model whereby perceptions of defeat and entrapment mediated the relationship between three types of negative self-appraisals, namely, emotion coping, situation coping, and social support, and suicidal behaviour. These three types of self-appraisals may be crucial in understanding the underlying psychological mechanisms of suicidal behaviour (Johnson et al., 2008a; Johnson et al., 2010a,b).
Table 16. Results of the Mediation Analyses in Which Defeat and Entrapment Were Represented as Separate Mediators of the Relationship Between Negative Self-Appraisals and Suicidal Behaviour (With and Without Controlling for PTSD Severity) in Two Single-Mediator Models

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Independent Variable (IV)</th>
<th>Mediator(s) (M)</th>
<th>Dependent Variable (DV)</th>
<th>Effect of IV on M</th>
<th>Effect of M on DV</th>
<th>Direct Effect (c’)</th>
<th>Indirect Effect (a × b) 95% CI</th>
<th>Total Effect (c)</th>
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<tr>
<td>RAS Total</td>
<td>Defeat</td>
<td>SBQ-R</td>
<td>-1.13***</td>
<td>.20***</td>
<td>-.04</td>
<td>-.23*** [-.39, -.11]</td>
<td>-.27***</td>
<td></td>
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<tr>
<td>RAS Emo</td>
<td></td>
<td></td>
<td>-1.93***</td>
<td>.12***</td>
<td>-.13</td>
<td>-.39** [-.65, -.17]</td>
<td>-.52**</td>
<td></td>
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<tr>
<td>RAS Situ</td>
<td></td>
<td></td>
<td>-2.63***</td>
<td>.24***</td>
<td>.13</td>
<td>-.68*** [-1.13, -.32]</td>
<td>-.50**</td>
<td></td>
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<tr>
<td>RAS Social</td>
<td></td>
<td></td>
<td>-1.93***</td>
<td>.21***</td>
<td>-.12</td>
<td>-.39** [-.63, -.15]</td>
<td>-.52**</td>
<td></td>
</tr>
<tr>
<td>RAS Total</td>
<td>Entrapment</td>
<td>SBQ-R</td>
<td>-1.04***</td>
<td>.18***</td>
<td>-.08</td>
<td>-.19** [-.29, -.10]</td>
<td>-.27***</td>
<td></td>
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<tr>
<td>RAS Emo</td>
<td></td>
<td></td>
<td>-2.19***</td>
<td>.20***</td>
<td>-.09</td>
<td>-.43** [-.68, -.22]</td>
<td>-.52**</td>
<td></td>
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<tr>
<td>PDS severity</td>
<td>RAS Total</td>
<td>Defeat</td>
<td>SBQ-R</td>
<td>RAS Situ</td>
<td>RAS Social</td>
<td>RAS Emo</td>
<td>RAS Situ</td>
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<td></td>
<td></td>
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<td></td>
<td>-2.50***</td>
<td>.21***</td>
<td>.02</td>
<td>-.52**</td>
<td>[-.82, -.29]</td>
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<tr>
<td></td>
<td>-1.28*</td>
<td>.19***</td>
<td>.28*</td>
<td>-.24*</td>
<td>[-.27, -.08]</td>
<td>-.52**</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>-1.99***</td>
<td>.14**</td>
<td>.05</td>
<td>[-.57, -.09]</td>
<td>.23</td>
<td></td>
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<tr>
<td></td>
<td>-1.11*</td>
<td>.13**</td>
<td>-.05</td>
<td>[-.28, .02]</td>
<td>-.20</td>
<td></td>
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<tr>
<td></td>
<td>-1.44***</td>
<td>.13***</td>
<td>-.07</td>
<td>[-.34, -.06]</td>
<td>-.26*</td>
<td></td>
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<tr>
<td></td>
<td>-1.74***</td>
<td>.14***</td>
<td>.01</td>
<td>[-.43, -.08]</td>
<td>-.23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAS Social</td>
<td>-.19</td>
<td>.13***</td>
<td>-.17</td>
<td>[-.19, .14]</td>
<td>-.20</td>
<td></td>
<td></td>
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</tbody>
</table>

*Note. PDS severity = Posttraumatic Stress Diagnostic Scale severity score; RAS Total = Resilience Appraisals Scale; RAS Emo = Resilience Appraisals Scale Emotion Coping subscale; RAS Situ = Resilience Appraisals Scale Situation Coping subscale; RAS Social = Resilience Appraisals Scale Social Support subscale; SBQ-R = Suicidal Behaviors Questionnaire Revised.

*p < .05, **p < .01, ***p < .001,
The results of this study confirmed the hypothesized model since perceptions of defeat and entrapment fully mediated the impact of all the three types of self-appraisals on suicidal behaviour. Furthermore, when controlling for PTSD symptom severity, perceptions of defeat and entrapment continued to fully mediate the effect of negative self-appraisals of emotion and situation coping on suicidal behaviour. Only negative appraisals of social support were not found to be associated (directly or indirectly through defeat and entrapment) with suicidal behaviour after controlling for PTSD symptom severity.

Figure 9. The results of the two single-mediator models, showing the indirect effects of negative self appraisals (RAS subscales) on suicidal behaviour via defeat (9a) and entrapment (9b) controlling for PTSD symptom severity. Coefficients are shown for each path and a dotted line indicates an insignificant indirect effect.
Overall, the current findings supported the previous theoretical (Cry of Pain and SAMS models of suicide) (Bolton et al., 2007; Johnson et al., 2008a; Williams, 1997; Williams et al., 2005) and empirical evidence which suggests that perceptions of defeat and entrapment are proximal mechanisms which drive suicidal behaviour in a range of populations including those with PTSD (Panagioti et al., in press; Taylor et al., 2010a,b). Furthermore, the postulation of the SAMS model, that negative self-appraisals are core aspects of suicidal behaviour because they give rise to severe feelings of defeat and entrapment which in turn lead to suicidal behaviour (Johnson et al., 2008a), was supported by the current pattern of findings. Two types of self-appraisals, the perceived ability to cope with negative emotions and difficult situations, continued to be significantly associated indirectly (via defeat and entrapment) with suicidal behaviour after controlling for the severity of the PTSD symptoms experienced by the participants. This finding suggests that certain types of negative self-appraisals may have a more critical effect on the development of suicidal behaviour compared to other types of self-appraisals. Furthermore, the SAMS model argues that self-appraisals can function both as inhibitors and amplifiers of suicidal behaviour depending on whether they are positively or negatively directed. Consistent with the above hypotheses, Johnson et al. (2010b) found that a heightened perceived ability to cope with negative emotions was a strong protective factor against the development of suicidal behaviour compared to the two other types of self-appraisals (situation coping, social support) among psychotic individuals. Future studies are needed to clarify the role of specific self-appraisals (negative and positive) in relation to suicidal behaviour in those with PTSD.

Perceptions of defeat and entrapment were conceptualized as a single psychological construct in the main set of the analyses. The findings provided support for the argument that both, defeat and entrapment represent a unique generic psychological mechanism which drives suicidal behaviour in a wide range of populations (Johnson et al., 2008a;
Panagioti et al., in press; Sturman, 2011; Taylor et al., 2010a,b; Taylor et al., 2009). The subsequent analyses in which defeat and entrapment were used separately as mediators in two single-mediator models resulted in the same pattern of results as the main analyses (whereby defeat and entrapment were conceptualized as a single construct). This suggests that defeat and entrapment affect the relationship between negative self appraisals and suicidal behaviour in a similar manner when used as two distinct constructs or as a combined single construct.

The current findings have two core clinical implications. First, since perceptions of defeat and entrapment are proposed to be the proximal psychological processes to suicidal behaviour, clinicians should be aware that those individuals who report severe feelings of defeat and entrapment are potentially at high risk for suicide. Thus, perceptions of defeat and entrapment might be used in clinical practice as early indicators of suicide risk. Second, psychological interventions which aim to reduce suicide risk in those with PTSD should target both clinical symptoms and subjective negative appraisals (i.e., including specific negative self-appraisals and more general perceptions of defeat and entrapment). Cognitive behavioural therapies have been found to reduce suicide risk and thus may provide a useful context for targeting negative subjective appraisals and perceptions of defeat and entrapment (Tarrier et al., 2008).

One important limitation of this study is the small sample size. However, the resultant mediation models were tested using the Preacher and Hayes’ (2008) bootstrapping method which is suitable for testing mediational hypotheses in small sample sizes. The cross-sectional design of the study is an additional caveat which limits the extent to which findings can be interpreted as evidence of a causally mediating role of perceptions of defeat and entrapment. Future longitudinal studies using larger sample sizes are needed to replicate the current findings. Moreover, the use of a self-report measure to assess the severity of PTSD symptoms is another limitation of the study. Nonetheless, the PDS scale
which was used to measure the severity of PTSD symptoms is a well-known standardized measure which has been found to have excellent psychometric properties (Foa et al., 1997). The PDS has good agreement with the Clinician Administered PTSD Scale (CAPS) which is considered the current gold-standard instrument for diagnosing PTSD (Weathers et al., 2001).

8.6. Conclusions

In conclusion, the current study highlights the importance of both, specific negative self-appraisals and more general perceptions of defeat and entrapment in the development of suicidal thoughts and behaviours in those suffering from full or sub-threshold PTSD. These findings suggest that specific negative self-appraisals and general perceptions of defeat and entrapment might be an important area for further research aiming to understand the underlying mechanisms of suicidal behaviour in PTSD.
CHAPTER 9

9. Perceived social support buffers the impact of PTSD symptoms on suicidal behaviour: Implications into suicide resilience research.

9.1. Abstract

A growing body of research has highlighted the importance of identifying resilience factors against suicidal behaviour. However, no previous study has investigated potential resilience factors among individuals with Posttraumatic Stress Disorder (PTSD). The aim of this study was to examine whether perceived social support buffered the impact of PTSD symptoms on suicidal behaviour. The sample comprised 56 individuals who had previously been exposed to a traumatic event and reported PTSD symptoms in the past month ($n = 34$, 60.7% participants met the full criteria for a current PTSD diagnosis). Participants completed a range of self-report measures assessing PTSD symptoms, perceived social support and suicidal behaviour. The results showed that perceived social support moderated the impact of the number and severity of PTSD symptoms on suicidal behaviour. For those who perceived themselves as having high levels of social support, an increased number and severity of PTSD symptoms were less likely to lead to suicidal behaviour. The current findings suggest that perceived social support might confer resilience to individuals with PTSD and counter the development of suicidal thoughts and behaviours. The milieu of social support potentially provides an area of further research and an important aspect to incorporate into clinical interventions for suicidal behaviour in PTSD or trauma populations.
9.2. Introduction

A considerable body of literature suggests that suicidal behaviour lies on a continuum from covert suicidal thoughts to overt suicidal ideation/planning and suicide attempts (Carter, Reith, Whyte, & McPherson, 2005; Johnson et al., 2010a,b; Johnson et al., 2008b; Mann et al., 1999; Taylor et al., 2010b). Exploring those factors which account for an individual’s place on this continuum is an important area of research. The prevalence of suicidal behaviour is heightened in those with Posttraumatic Stress Disorder (PTSD) (Panagioti et al., 2009). More than half of those diagnosed with PTSD report suicidal thoughts (Ferrada-Noli et al., 1998b; Oquendo et al., 2003; Panagioti et al., 2011; Panagioti et al., submitted-a; Tarrier & Gregg, 2004) and as many as a quarter report suicide attempts (Ferrada-Noli et al., 1998b; Panagioti et al., 2011; Tarrier & Gregg, 2004).

Across a series of studies investigating the mechanisms of suicidal behaviour in PTSD populations, an increased number and severity of PTSD symptoms have been found to be strongly associated with suicidal behaviour (Freeman et al., 2000; Tarrier & Gregg, 2004). Furthermore, there is empirical evidence that the presence and severity of PTSD symptoms are strong predictors of suicidal behaviour among subclinical populations experiencing PTSD symptoms but do not fulfil the full criteria for a PTSD diagnosis. For example, Weaver et al. (2007) reported that increased frequency of PTSD symptoms together with depressive symptoms mediated the association between intimate partner violence and suicidal ideation in a sample of raped women. Leiner et al. (2008), using path analyses, found that the severity of PTSD symptoms mediated the association between intimate partner violence and suicidal ideation. Marshall and colleagues (2001) reported that individuals who experienced PTSD symptoms in the past month were significantly more likely to report current suicidal ideation compared to those who did not report PTSD symptoms in the past month. Additionally, the levels of suicidal ideation increased linearly with the number of PTSD symptoms experienced by the individuals (Marshall et al., 2001).
Overall, the current literature findings suggest that heightened number and severity of PTSD symptoms are key risk factors for the development of suicidal behaviour in both clinical populations suffering full PTSD and subclinical populations with subthreshold PTSD.

The vast majority of the studies in the general suicide literature have focused on investigating risk factors for suicidal behaviour. A number of studies have advanced the previous literature by emphasizing the usefulness of identifying protective/resilience factors that reduce the risk for suicide (Chang, 2002; Greening & Stoppelbein, 2002; Hirsch, Wolford, LaLonde, Brunk, & Morris, 2007). Consistent with this, the concept of psychological resilience has received a growing attention lately (Gooding et al., in press; Heisel & Flett, 2004; Johnson et al., 2011b; Osman et al., 2004; Rutter et al., 2008). The Schematic Appraisals Model of Suicide (SAMS; Johnson et al., 2008a) is a recently proposed theoretical model of suicide which provides a useful framework under which the mechanisms conferring resilience to suicide can be theoretically understood and empirically investigated (Johnson et al., 2010a,b). The SAMS model emphasizes the importance of an appraisal system and suggests that two appraisal subsystems are critical in relation to suicidal behaviour. First, the SAMS model argues that negative situation appraisals are key components of suicidal behaviour. When the individual’s situation appraisals are geared towards the negative, feelings of defeat and entrapment emerge, which in turn can lead to suicidal behaviour. Subjective negative evaluations/perceptions of psychiatric illness or clinical symptoms are examples of these negative situation appraisals. Second, the SAMS model proposes a self-appraisal system which encompasses subjective evaluations regarding personal attributes, problem solving skills or availability of social support and rescue factors. These self-appraisals are thought to interact and to strengthen situation appraisals. This suggests that negative self-appraisals may result in more negative situation appraisals and increase the likelihood of suicidal thoughts and
behaviours. In contrast, positive self-appraisals are thought to provide a source of resilience to suicide (Johnson et al., 2008a). More recently, Johnson and colleagues have conceptualized positive self-appraisals as potential resilience factors, which protect individuals against the development of suicidal behaviours because they buffer the impact of factors which increase the risk for suicide (Johnson et al., 2010a,b). Furthermore, it has been suggested that resilience factors coexist with risk factors in two separate dimensions and that resilience factors moderate or buffer the impact of risk factors on suicide (Johnson et al., 2011b). Finally, it has been suggested that individuals with high perceived social support are more aware of the availability of external resources and establish the possibility of being ‘rescued’ (Johnson et al., 2008a; Williams, 1997).

On the basis of these theoretical developments (Johnson et al., 2008a; Johnson et al., 2011b) one core prediction is that resilience factors would be inversely associated with suicidal behaviour and more importantly would buffer the impact of risk factors on suicidal behaviour. The outcomes of two recent studies fully supported this buffering hypothesis. Johnson et al. (2010a) showed that a general measure of positive self-appraisals regarding the ability to cope with difficult emotions, manage external situations, and utilize social support moderated the impact of stressful life events on suicidal behaviour in a student sample. The same research team (Johnson et al., 2010b) found that positive self-appraisals of the ability to cope with negative emotions moderated the association between hopelessness and suicidal ideation among psychotic patients. There is a clear gap in the literature examining resilience to suicide in those experiencing the symptoms of PTSD with a focus on social support.

However some studies in the context of PTSD offer a reason for optimism with respect to identifying resilience to suicide. In particular, some studies have demonstrated an inverse relationship between high levels of social support and the PTSD experience (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). High
perceived social support has been associated with lower PTSD severity (Hyman, Gold, & Cott, 2003; Schumm, Briggs-Phillips, & Hobfoll, 2006) and better psychological treatment outcomes (Thrasher, Power, Morant, Marks, & Dalgleish, 2010). In contrast, low perceived social support has emerged as a strong predictor of the subsequent presence and severity of PTSD symptoms (Holeva, Tarrier, & Wells, 2001; Ozer et al., 2003; Vranceanu, Hobfoll, & Johnson, 2007). Additionally, an inverse relationship between heightened perceived social support and suicidal behaviour has been found across three studies using PTSD populations (Freeman et al., 2000; Jakupcak et al., 2010; Kotler et al., 2001).

To sum up, high levels perceived social support have been linked with positive outcomes in those with PTSD including a lower risk for suicide. That said, to date, no previous study has investigated whether perceived social support confers resilience to suicide in those with PTSD. The investigation of resilience or buffering factors in PTSD is crucial because resilience factors, such as perceived social support, may protect individuals from developing suicidal behaviour by buffering the pernicious impact of PTSD symptoms. Thus, the current study aimed to examine whether high levels of perceived social support have a buffering impact on suicidal behaviour in a sample of trauma victims reporting a range of PTSD symptoms in the past month. Trauma victims with full or subthreshold PTSD report increased levels of suicidal thoughts and behaviours (Marshall et al., 2001; Panagioti et al., 2009; Zlotnick et al., 2002) but, currently, there is no empirical evidence regarding the existence of resilience factors in this group. Since number and severity of PTSD symptoms have been found to be strongly associated with increased frequency of suicidal behaviours (Freeman et al., 2000; Leiner et al., 2008; Marshall et al., 2001; Tarrier & Gregg, 2004), it was predicted that positive perceptions of social support would buffer or moderate the impact of increased number and severity of PTSD symptoms on suicidal behaviour.
9.3. Method

9.3.1. Participants.

Participants were recruited using adverts (i.e., newspaper advertising, online advertising in the University of Manchester (UK), posters in mental health services based in Manchester, such as, Victim Support and the Rape Crisis Centre) asking for people who have experienced a traumatic event (i.e., crime, physical threat, serious accident, military combat, natural disaster, terrorist attack, diagnosed with a life-threatening illness) in the past and have been affected by it to volunteer. Adverts asking for volunteers were used as the main recruitment strategy for practical reasons to aid recruitment since many people with PTSD symptoms do not seek treatment and, thus, they are not in contact with mental health services. Potential participants had to fulfil the following criteria to participate in the study: 1) they had to have experienced a serious traumatic event in the past and experience at least one PTSD symptom in the past month determined by the Posttraumatic Stress Diagnostic Scale (PDS; Foa et al., 1997). This criterion was used to investigate suicidal behaviour and resilience to suicidal behaviour among individuals experiencing a range of PTSD symptoms; 2) be aged between 18-65 years; 3) and have a thorough grasp of the English language (this was necessary for participation in the assessment interview and for the understanding of questionnaire items). Participants were excluded if they suffered from dementia, organic brain disorder, or psychotic disorder.

9.3.2. Measures.

The Posttraumatic Stress Diagnostic Scale (PDS; Foa et al., 1997). The PDS was used to assess the number and severity of PTSD symptoms in the past 30 days. The PDS is a 49-item self-report measure which is used to diagnose PTSD in the past month according to DSM-IV criteria. The PDS scale includes a total PTSD symptom severity score which is computed by adding the frequency score for each of the 17 PTSD symptoms. Each of the 17 PTSD symptoms is measured on a four-point scale, and the total PTSD symptom
severity score for the 17 symptoms ranges from 0 to 51. Previous research has found that
the PDS scale had a Cronbach’s alpha coefficient of .92 (Foa et al., 1997). The test-retest
reliability for a diagnosis of PTSD and PTSD symptom severity score over 2 to 3 weeks
period has been found to be .74 and .83 respectively (Foa et al., 1997). The alpha
coefficient for the total severity of the 17 PTSD symptoms in the current study was .93.

The Social Support Inventory (SSI; Holeva et al., 2001). The SSI was used to assess
perceived social support in this study. Based on Hooley and Teasdale’s (1989) perceived
criticism scale, the SSI is a five-item measure which measures perceptions of criticism and
social support. Each of the five items is scored on a 10-point scale. Two items of the SSI
assess the levels of perceived criticism by, and towards, a key significant other. The
remaining three items of the SSI assess the levels of perceived general social support (e.g.,
emotional support, practical support) given by a significant other. Holeva (2001)
conducted a factor analysis and showed that perceived criticism and social support are two
separate factors (referred to as perceived criticism and perceived social support hereafter).
The authors also found that the Cronbach’s alpha for the perceived social support subscale
and perceived criticism was .83 and .67 respectively. The total SSI measure is reverse-
scored so a high score on the perceived criticism subscale means that individuals perceive
themselves and their key other as being highly critical and a high score on perceived social
support represents individuals who perceive low levels of good support and high levels of
negative support from their key other. This study aimed to examine the paths through
which low levels of social support lead to suicidal behaviour and thus only the subscale of
perceived social support was used in the analysis. Furthermore, the original but not the
reversed score on the social support subscale was used in the analysis. In this study
therefore, a high score on SSI social support subscale indicates heightened levels of
perceived social support. The alpha coefficient for the perceived social support subscale in
this study was .78.
The Suicidal Behaviors Questionnaire-Revised (SBQ-R; Osman et al., 2001). The SBQ-R is a four-item measure which assesses the level of suicidality experienced by the participants. The first item measures levels of lifetime suicidality including thoughts, plans and attempts (i.e., “Have you ever thought about or attempted to kill yourself?”); the second item assesses the frequency of suicidal thoughts in the past year (i.e., “How often have you thought about killing yourself in the past year?”); the third item measures the communication of the intent to commit suicide (i.e., “Have you ever told someone that you were going to commit suicide, or that you might do it?”) and the fourth item assesses the likelihood of committing suicide in the future (i.e., “How likely is it that you will attempt suicide someday?”). The total score ranges from 3 to 18 with higher scores indicating greater levels of suicidality. Osman et al. (2001) have shown that the questionnaire is a reliable research tool in both clinical and non-clinical samples with an alpha coefficient ranging from .76 to .88. The alpha coefficient was .87 in the present sample.

9.3.3. Procedure.

Upon arrival at the testing session, and after signing the consent forms, participants completed a number of standardized questionnaires about PTSD symptoms, social support and suicidality in the order detailed above. All the self-report measures were administered by the first author (MP) in one session. The research was conducted in a private room and opportunities for questions and breaks were provided. Following the completion of the study, participants were debriefed about the nature of the study and provided an information sheet listing support groups, counselling services and help-lines in the Manchester region. Participants who were identified as being at risk for suicide (criteria: SBQ-R item 1 ≥ 3; item 2 ≥ 3; item 3 ≥ 2; item 4 ≥ 4) were referred to their GP and/or mental health professional, with their consent. Ethical approval was obtained from the relevant NHS research ethics committee before this study commenced.
9.3.4. Data analysis.

Initially, the variables to be included in the analyses were screened for skew and multicollinearity. The measures of PTSD symptom severity and suicidal behaviour were positively skewed. Logarithmic (suicidal behaviour) and square root transformations (PSTD symptom severity) were applied to correct for positive skew. The social support measure was negatively skewed, thus the root of the variable was used to correct for negative skewness. Following the transformations, the z scores for skewness were reduced from 3.61, 1.98 and -2.82 (for suicidal behaviour, PTSD symptom severity and social support, respectively) to 1.18, 0.35, and -0.85, respectively. Table 17 presents the means and standard deviations (for both transformed and untransformed values) and Pearson’s correlations among the key variables. All the tolerance values were above .2 suggesting that there was not substantial multicollinearity in the data (Menard, 1995).

A hierarchical regression analysis was conducted to examine whether perceived social support measured by the SSI social support subscale moderated the association between PTSD symptoms (number and severity) on suicidal behaviour using SPSS version 17. In order to avoid multicollinearity, the variables were standardized before inclusion in the regression model (Frazier, Tix, & Barron, 2004). In the first step of the regression analysis the number of PTSD symptoms experienced by the participants was entered into the regression model. In the second step, the perceived social support score was entered. In the third step, the interaction term between number of PTSD symptoms and social support was entered. If the interaction term made a significant contribution to the variance explained in suicidal behaviour in the model, this indicates that perceived social support moderated the impact of the number of PTSD symptoms on suicidal behaviour (Cohen & Cohen, 1983). To examine whether perceived social support also buffered the impact of the severity of PTSD symptoms (as it did with the number of PTSD symptoms) on suicidal behaviour the above three steps of the hierarchical analysis were repeated with number of
PTSD symptoms replaced by PTSD symptom severity. Any significant interaction effects were probed using the MODPROBE script (Hayes & Matthes, 2009) for SPSS 17.0. In particular, simple slopes analyses were applied to examine the effects of the focal predictor on the dependent variable at 1 SD above and 1 SD below the mean value of the moderator.

9.4. Results

9.4.1. Participant characteristics.

The current analyses were based on analyzing data from 56 individuals (Mage = 29.1, SD = 11.5) who experienced at least one PTSD symptom in the past month. The sample comprised predominately white (n = 42, 75%) and unmarried (n = 36, 64.3%) females (n = 46, 82.1%). The majority of the participants (n = 34, 60.7%) fulfilled the full criteria of the PDS scale for a current diagnosis of PTSD. The remaining 22 participants, who failed to meet the PDS criteria for current PTSD, comprised a subclinical group of individuals who reported a range of PTSD symptoms in the past month but did not fulfil the full criteria for a current PTSD diagnosis. Those with PTSD experienced an average of 13.3 (SD = 2.7) PTSD symptoms in the past month while those who did not meet the criteria for a current PTSD diagnosis experienced an average of 5.9 (SD = 2.3) symptoms in the past month. More than sixty percent of the participants (62.5%) reported some form of suicidal behaviour (i.e., suicidal thoughts, plans or attempts) in their lifetime and more than half of the participants (51.8%) reported suicidal thoughts in the past year.

Pearson correlation coefficients, means and standard deviations for the variables included in the analyses are presented in Table 17. The outcomes of the correlations indicated that suicidal behaviour was highly positively correlated with increased number and severity of PTSD symptoms. Perceived social support was significantly negatively associated with suicidal behaviour. Additionally, an inverse correlation between perceived social support and number and severity of PTSD symptoms was found.
Table 1. Means, Standard Deviation and Correlations for the Variables of Interest

<table>
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<th>Untransformed</th>
<th>Transformed</th>
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<th>3</th>
<th>4</th>
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<tr>
<td></td>
<td>M (SD)</td>
<td></td>
<td>M (SD)</td>
<td></td>
<td></td>
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<tr>
<td>3. PTSD symptom number (PDS N)</td>
<td>10.38 (4.42)</td>
<td>-</td>
<td>.94**</td>
<td>-.43**</td>
<td>.66**</td>
</tr>
<tr>
<td>2. PTSD symptom severity (PDS sev)</td>
<td>18.36 (11.83)</td>
<td>4.05 (1.42)</td>
<td>- .44*</td>
<td>.69**</td>
<td></td>
</tr>
<tr>
<td>3. Social support (SSI)</td>
<td>21.63 (6.43)</td>
<td>508.30 (246.96)</td>
<td>- .47**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Suicidal Behaviour (SBQ-R)</td>
<td>6.52 (3.99)</td>
<td>0.74 (0.25)</td>
<td></td>
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</tbody>
</table>

*Note. PDS N = Posttraumatic Stress Diagnostic Scale Number of symptoms; PDS Sev = Posttraumatic Stress Diagnostic Scale Severity; SSI = Social Support Inventory.

*Correlations only provided for transformed variables.

*p < .05, **p < .01.

9.4.2. Regression analyses.

As shown in Table 18, social support was found to moderate the effect of the increased number of PTSD symptoms on suicidal behaviour. Although lack of social support did not significantly predict suicidal behaviour above the number of PTSD symptoms, the interaction term between social support and number of PTSD symptoms was significant indicating a moderating effect of social support on the number of PTSD symptoms experienced by the responders. As presented in Figure 10, those who reported high levels of social support, increased number of PTSD symptoms were associated with only minimal increases on suicidal behaviour.
Table 18. *Hierarchical Regression Analyses Showing that Perceived Social Support Moderated the Impact of Number and Severity of PTSD Symptoms on Suicidal Behaviour*

<table>
<thead>
<tr>
<th>Moderator Variable</th>
<th>Step</th>
<th>Variable</th>
<th>$B$</th>
<th>$SE\beta$</th>
<th>Total $R^2$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td>Entered</td>
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<td></td>
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<tr>
<td>Social support (SSI)</td>
<td>1</td>
<td>PDS N</td>
<td>.664***</td>
<td>.106</td>
<td>.441</td>
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<tr>
<td></td>
<td>2</td>
<td>PDS N</td>
<td>.567***</td>
<td>.114</td>
<td>.483</td>
<td>.042*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SSI</td>
<td>-.227*</td>
<td>.107</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>PDS N</td>
<td>.590***</td>
<td>.108</td>
<td>.544</td>
<td>.061**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SSI</td>
<td>-.119</td>
<td>.109</td>
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<tr>
<td></td>
<td></td>
<td>PDS N × SSI</td>
<td>-.266**</td>
<td>.106</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social support (SSI)</td>
<td>1</td>
<td>PDS Sev</td>
<td>.690***</td>
<td>.102</td>
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<tr>
<td></td>
<td>2</td>
<td>PDS Sev</td>
<td>.599***</td>
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<tr>
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<td></td>
<td>SSI</td>
<td>-.209</td>
<td>.105</td>
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<tr>
<td></td>
<td>3</td>
<td>PDS Sev</td>
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<td>.107</td>
<td>.549</td>
<td>.037*</td>
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<td>SSI</td>
<td>-.130</td>
<td>.108</td>
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<tr>
<td></td>
<td></td>
<td>PDS Sev × SSI</td>
<td>-.210*</td>
<td>.102</td>
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<td></td>
<td></td>
<td>Interaction</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*Note.* PDS N = Posttraumatic Stress Diagnostic Scale Number of symptoms; PDS Sev = Posttraumatic Stress Diagnostic Scale Severity; SSI = Social Support Inventory.

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

Next, perceived social support was examined as a moderator of the severity of PTSD symptoms experienced by the participants. As shown in Table 18, social support significantly moderated the relationship between the severity of PTSD symptoms and suicidal behaviour. As shown in Figure 11, for those individuals who reported increased
levels of social support, they had only minimal increases in the levels of suicidal behaviour at heightened severity of PTSD symptoms.

Figure 10. Simple regression slopes showing the effect of number of PTSD symptoms on suicidal behaviour at low and high levels of perceived social support.

9.4.3. Probing interactions using simple slope analyses of the MODPROBE script.

The significant interactions found in hierarchical regression analyses were explored using the MODPRODE script for SPSS to apply the simple slopes analyses using one $SD$ above and below the mean. The results of the simple slopes analyses showed that at one $SD$ below the mean of perceived social support, the increased number of PTSD symptoms were significantly related to suicidal behaviour. In contrast, at one $SD$ above the mean of perceived social support, the number of PTSD symptoms endorsed by the participants was not significantly related to suicidal behaviour (see Figure 10). Hence, an increased number of PTSD symptoms were related to suicidal behaviour only for participants who reported low levels of social support. Similarly, at one $SD$ below the mean of perceived social
support, the severity of PTSD symptoms was significantly related to suicidal behaviour. At one $SD$ above the mean of perceived social support, the effect of the severity of PTSD symptoms on suicidal behaviour was reduced but still remained significantly related to suicidal behaviour. Figure 10 and 11 display graphs of the association between suicidal behaviour and the number and severity of PTSD symptoms, respectively, at low and high levels of perceived social support.

![Graph showing the relationship between perceived social support and suicidal behaviour](image)

**Figure 11.** Simple regression slopes showing the effect of the severity of PTSD symptoms on suicidal behaviour at low and high levels of perceived social support.

### 9.5. Discussion

The overarching aim of this study was to investigate whether heightened levels of perceived social support buffered individuals with PTSD symptoms against the development of suicidal thoughts and behaviours. The outcomes of the analyses demonstrated that perceived social support moderated the impact of the number and severity of PTSD symptoms on suicidal behaviour. For those individuals who reported high levels of perceived social support, their levels of suicidal behaviour did not increase significantly even when they experienced a heightened number of PTSD symptoms.
Similarly, those who reported high levels of perceived social support were less likely to experience suicidal behaviour even at the highest severity of the PTSD symptoms.

The current findings provide empirical support for the assertion of the Schematic Appraisals Model of Suicide (SAMS; Johnson et al., 2008a) that positive self-appraisals of the individual’s ability to access social support are an important source of resilience against the development of suicidal behaviour. In addition, the results of this study expand the previous suicide resilience literature by demonstrating that perceived social support is a significant resilience factor acting against suicidal behaviour in those experiencing PTSD symptoms. To date, the majority of research conducted on resilience to suicide has focused on investigating factors which are inversely related with suicidal behaviour (Osman et al., 2004; Perkins & Jones, 2004; Rutter et al., 2008). Johnson and colleagues (2011b) have advanced the understanding of resilience to suicide by suggesting that resilience and risk factors to suicide are two separate dimensions which coexist. According to the Johnson et al. (2011b) conceptualization of resilience, resilience factors are not only inversely related with suicidal behaviour but more importantly moderate or weaken the impact of risk factors on suicidal behaviour. The current findings support this buffering hypothesis since high perceived social support was not only found to be inversely associated with suicidal behaviour but also to buffer the negative impact of the number and severity of the PTSD symptoms on suicidal behaviour. These findings are totally consistent with the outcomes of two recent studies in which positive self-appraisals of the ability to cope with negative emotions, manage difficult situations and gain social support buffered the impact of key risk factors such as hopelessness and stressful life-events on suicidal behaviour (Johnson et al., 2010a,b). Importantly, the finding that positive self-appraisals buffer individuals against suicidal behaviour has been replicated across three different research populations (e.g., suicidal students, psychotic patients and individuals with PTSD symptoms). The consistency of the findings regarding the role of positive self-appraisals in the development
of suicidal behaviour across different research populations suggests that potentially the SAMS model provides a useful framework under which the mechanisms of resilience to suicide can be investigated in both clinical and non-clinical populations.

This study is the first to examine resilience factors which counter suicidal behaviour in PTSD on the grounds of recent theoretical developments including the SAMS model and the buffering hypothesis (Johnson et al., 2011b). A number of studies have indicated that perceived social support was negatively associated with suicidal risk in those with PTSD (Freeman et al., 2000; Jakupcak et al., 2010; Kotler et al., 2001). Other factors which have been found to be negatively correlated with suicidal behaviour in those with PTSD include certain coping styles such as mapping, minimization, and replacement (Amir et al., 1999) and perceptions of spiritual well being and life satisfaction (Nad et al., 2008). However, neither perceived social support nor other psychological factors were previously investigated as buffers against suicidal behaviour in those with PTSD. Across a considerable number of studies which investigated the association between suicidal behaviour and PTSD, the number and severity of the PTSD symptoms experienced by the participants have been found to be a strong predictor of the frequency and severity of suicidal behaviours (Freeman et al., 2000; Leiner et al., 2008; Marshall et al., 2001; Panagioti et al., 2011; Tarrier & Gregg, 2004). According to the findings of this study, high levels of perceived social support weaken the pernicious impact of robust clinical risk factors (e.g., PTSD symptoms) which have been found to be key predictors of suicidal behaviour among individuals with full and subthreshold PTSD. This highlights the importance of investigating the role of perceived social support and potentially other forms of positive self-appraisals in relation to suicidal behaviour in PTSD. The previous literature has shown that negative self-appraisals and perceptions of defeat and entrapment are the proximal processes underlying suicidal behaviour in a range of populations (Johnson et al., 2011a; Taylor et al., 2010a) including those with PTSD (Panagioti et al., in submission-a).
This study further suggests that self-appraisals in their positive form such as positive perceptions of social support are strong buffers against suicidal in trauma victims with PTSD symptoms.

The outcomes regarding the role of perceived social support in the development suicidal behaviour have important clinical implications. First, the current findings indicate that the presence and severity of stressors such as PTSD symptoms are not adequate indicators of the risk for suicide among individuals with PTSD. The assessment of both PTSD symptoms and levels of perceived social support potentially predict more reliably the risk for suicide in those with PTSD. For example, for individuals who perceive themselves as having low levels of social support, an increased number and severity of PTSD symptoms might have a particularly severe impact on their levels of suicidal behaviour. In contrast, for individuals who perceive themselves as having social resources, the impact PTSD symptoms on suicidal behaviour may weaken. Thus, when assessing the risk for suicide in those with PTSD, resilience factors such as perceived social support could be used alongside risk factors to identify those individuals who are at the highest risk for suicide. It must be emphasized that it appears to be the perceived nature of social support which is important rather than objective measures of social support. Second, since perceived social support has been found to buffer the impact of clinical predictors of suicide (e.g., PTSD symptoms) it could be incorporated into psychological treatments which aim to reduce suicidal behaviour among PTSD or trauma populations. The present results suggest that enhancing individuals’ beliefs and perceptions that they have social resources and external support may reduce suicidal behaviour indirectly by acting upon the impact of risk factors. The interpersonal environment has been proposed to be an important area to target as part of clinical interventions which aim to alleviate the PTSD symptoms (Tarrier, 2010b). Two areas of social support such as the ability to receive and provide social support (reciprocity) and the underlying beliefs held by the significant others
(expressed emotion) were proposed to be crucial in those with PTSD that need to be addressed therapeutically (Barrowclough, Gregg, & Tarrier, 2008; Tarrier & Humphreys, 2003; Tarrier et al., 1999b). These areas of social support are potentially important aspects to investigate in relation to suicidal behaviour in PTSD and subsequently to incorporate into clinical interventions.

This study has a number of limitations requiring mention. First, the cross-sectional nature of the study does not permit the conclusion that perceived social support causally moderates the impact of PTSD symptoms on suicidal behaviour. A longitudinal investigation would be necessary to make this conclusion. Second, the sample of the study was composed from individuals who had either full or subthreshold PTSD. However, there is evidence that subthreshold PTSD is associated with equal levels of work and social impairment and number of suicide attempts with full PTSD (Zlotnick et al., 2002). Third, the number and severity of PTSD symptoms were assessed using a self-report measure (PDS; Foa et al., 1997). The use of diagnostic interviews such as the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995) would be more suitable for the assessment of the PTSD symptoms. Nonetheless, the PDS is a widely used standardized self-report measure was used which has excellent psychometric properties and a good agreement with the CAPS instrument.

To conclude, the current study demonstrated that heightened levels of perceived social support buffered the impact of the PTSD symptoms on suicidal behaviour among a sample of trauma victims currently experiencing PTSD symptoms. The outcomes of the study are consistent with recent developments in suicide resilience literature (i.e., buffering hypothesis) (Johnson et al., 2011b) and provide support to the Schematic Appraisals Model of Suicide (SAMS; Johnson et al., 2008a) which advocates that subjective perceptions of social support are key elements of suicidal behaviour. On the whole, these findings suggest that i. the milieu of social support might comprise a key area for further research into
suicide resilience in those with PTSD and ii., aspects of social support need to be incorporated into clinical interventions for suicidal behaviour.
CHAPTER 10

10. An Empirical investigation of the effectiveness of the Broad-Minded Affective Coping procedure (BMAC) to boost mood in a sample of individuals diagnosed with Posttraumatic Stress Disorder.

10.1. Abstract

The broaden-and-build theory postulates that positive emotions broaden people’s cognitions and actions, and facilitate the building of personal and social resources which enhance resilience in a range of clinical populations. The Broad-Minded Affective Coping procedure (BMAC) is a recently developed clinical technique which utilizes the recall of positive autobiographical memories and mental imagery to elicit positive affect. This study aims to investigate the ability of the BMAC to boost mood among 50 individuals with Posttraumatic Stress Disorder (PTSD). To assess mood, a series of Visual Analogue Scales (VASs) and Likert scales measuring feelings of sadness, calmness, happiness, hopelessness, defeat and frustration were administered at baseline, immediately following the completion of the BMAC and two hours and two days afterwards. Participants in the BMAC condition demonstrated greater increases in self-reported levels of positive emotions and greater reductions in self-reported levels of negative emotions following the BMAC technique compared to those in the control condition. The results suggest that the BMAC is a useful clinical technique which can be incorporated into other clinical interventions such as cognitive behavioural therapy to elicit positive affect and promote resilience.

Under review at Behaviour Research and Therapy
10.2. Introduction

The broaden-and-build theory states that positive emotions, such as contentment, happiness, hope, and joy, broaden individuals’ thought-action repertoires and assist them in building physical and social recourses which boost their emotional well-being (Fredrickson & Branigan, 2005; Fredrickson & Joiner, 2002). On the grounds of the broaden-and-build theory of positive emotions, Tarrier (2010a) proposed that positive emotions might represent a useful tool to incorporate into existing clinical interventions (such as cognitive-behavioural therapies; CBT) because they may facilitate attentional processes which are a pre-requisite for some clinical techniques (e.g., evaluation of evidence). The Broad-Minded Affective Coping (BMAC) procedure is a recently developed clinical technique which aims to elicit positive emotions and reduce the experience of negative affective states through the recall of past positive events. The current study aims to provide an empirical investigation of the effectiveness of the BMAC procedure in boosting mood compared to a control task, among individuals diagnosed with Posttraumatic Stress Disorder (PTSD).

The majority of the existing psychological interventions, including CBT have focused on eliminating negative cognitions and negative emotions during the therapeutic process. Positive psychology proposes that cultivating people’s personal strengths and positive emotions optimize psychological well-being and might result in better therapeutic outcomes (Seligman, Steen, Park, & Peterson, 2005). Within the emerging field of positive psychology, Fredrickson (1998, 2001) has formulated a valuable theoretical framework to understand the effect of positive emotions, namely, the broaden-and-build theory of positive emotions. The broaden-and-build perspective offers a thorough understanding of the function of both, positive and negative emotions (Fredrickson, 1998, 2001; Fredrickson & Losada, 2005) and a useful scaffold for the development of a positive approach to CBT (Tarrier, 2010a). In particular, the broaden-and-build theory suggests that negative
emotions narrow attention and assist individuals in initiating behaviours which are optimal for survival. Positive emotions are also associated with thought-action repertoires but these repertoires are expanded rather than narrowed to support the development of complex social interactions and the improvement of personal and social skills (Fredrickson, 2001; Tarrier, 2010a). A considerable body of research has provided empirical support for the broad-and-build theory of positive emotions by demonstrating that positive emotions facilitate the development of social cohesion, psychological resilience, mindfulness, and physical and psychological health (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009; Fredrickson, Cohn, Coffey, Perk, & Finkel, 2008). Furthermore, there is evidence that positive emotions can counter the adverse impact of negative emotions (Fredrickson & Levenson, 1998; Fredrickson, Mancuso, Branigan, & Tugade, 2000) and that the benefits of positive emotions are not weakened by the concurrent presence of negative emotions (Cohn et al., 2009).

Individuals with Posttraumatic Stress Disorder (PTSD) report increased levels of negative emotions, such as fear, anger, disgust and sadness (Finucane, Dima, Ferreira, & Halvorsen, 2011). Emotional numbness and anhedonia (inability to experience positive affect) are also common emotional deficits reported among PTSD populations. Emotional numbing symptoms have been found to be strong predictors of negative outcomes, such as unremitting PTSD (Malta, Wyka, Giosan, Jayasinghe, & Difede, 2009) poor treatment outcome (Asmundson, Stapleton, & Taylor, 2004) and suicidal behaviour (Guerra & Calhoun, 2011). The presence of anhedonia in PTSD veterans has been linked with a tendency to over-report clinical symptoms and a concurrent diagnosis of another anxiety disorder (Kashdan, Elhai, & Frueh, 2006, 2007). A recent review of the literature which explored the role of positive emotions in treating emotional dysfunctions, postulated that the intentional self-generation of positive emotions may counter the underlying emotional and cognitive mechanisms of the anxiety disorders (Garland et al., 2010). Consistent with
this, a study has shown that positive emotions help people to find positive meaning in
negative life experiences (Tugade & Fredrickson, 2004). It follows that boosting the
experience of positive emotions in those with PTSD might override and prevent the
pathogenic effects of the traumatic experiences and PTSD symptoms on mood.

On the basis of the broaden-and-build theory of positive emotions, a number of
clinical methods to boost mood have been proposed in literature (Bishop et al., 2004;
Garland et al., 2010). One such method is the newly developed Broad-Minded Affective
Coping procedure (BMAC; Tarrier, 2010a) which aims to elicit positive affect among
clinical groups through the use of mental imagery and cued memory retrieval. The BMAC
is grounded on the findings of previous literature which suggest that threat-related mental
imagery is common among individuals suffering from anxiety disorders (Day, Holmes, &
Hackmann, 2004) and memories of pleasant events maintain their positive valence in the
present (Caballero & Moreno, 1993; Joormann, Siemer, & Gotlib, 2007). The BMAC has
been mostly developed as an adjunct to conventional CBT rather than as a full intervention
to facilitate the experience positive emotions in clinical practice. Since the BMAC is
relatively brief (lasts only fifteen to twenty minutes) it can be easily incorporated into a
range of therapeutic interventions. As described previously (Johnson et al., in submission;
Tarrier, 2010a) if the BMAC is used within the CBT framework it may result in a series of
clinical benefits for clients including a sense of personal achievement and self-efficacy, a
balance of positive and negative emotions and a greater awareness of the link between
cognitions and emotions. These benefits are particularly useful among individuals with
PTSD who demonstrate high levels of negative self-appraisals and feelings of defeat and
entrapment which in turn have been linked with increased levels of depression and suicidal
risk (Panagioti et al., 2011; Panagioti et al., 2009). Tarrier (2010a) provided case-study
evidence that the BMAC in combination with CBT among individuals with PTSD is a
useful procedure. Recently, Johnson and colleagues (in submission) examined the short-
term effects of the BMAC on mood among 50 individuals with psychosis. The results showed that individuals in the BMAC condition reported increased levels of happiness at post-induction compared to those in the control task (Johnson et al., in submission).

Overall, preliminary evidence (Johnson et al., in submission; Tarrier, 2010a) suggests that the BMAC is a useful clinical method which can be incorporated into existing therapeutic interventions to stabilize mood and facilitate the therapeutic process. This study aimed to investigate the effectiveness of the BMAC in boosting mood at three time-points i. immediately after the technique had finished, ii. two hours later, and iii. two days later in a sample of individuals with PTSD. It was predicted that participants allocated to the BMAC condition would show a greater mood improvement compared to a control condition particularly in the short-term. Since it has been previously proposed that the BMAC needs to be practiced frequently and in combination with other therapeutic methods in order to maintain its benefits, no specific predictions were made about the effectiveness of the BMAC after longer durations (two hours and two days following the procedure). The control condition was the recall of positive memories while he BMAC was designed to elicit multi-sensory recollective experiences. Thus, the control condition provides a robust test of whether the BMAC goes beyond positive memory recall.

10.3. Method

10.3.1. Participants.

Participants in the current study had previously participated in a different study which investigated the mechanisms of suicidal behaviour in those with PTSD (Panagioti et al., in press). The recruitment of the original sample was based on newspaper and online advertising in the University of Manchester (UK) and posters placed in mental health services based in Manchester. The recruitment lasted eight months and was completed three months before the commencement of the current study. The initial inclusion criteria were the following: 1) participants had to have experienced a serious traumatic event (i.e.,
crime, physical threat, serious accident, military combat, natural disaster, terrorist attack, diagnosed with a life-threatening illness) in the past; 2) be aged between 18-65 years; and 3) have a thorough grasp of the English language. Participants were excluded if they reported suffering from dementia, organic brain disorder, or psychotic disorder. To be included in the current study, individuals had to fulfil two additional criteria: 1) they had to have received a PTSD diagnosis (current or lifetime) determined by the Clinician Administered PTSD Scale (Blake et al., 1995) assessed in the previous study and 2) to have experience at least one PTSD symptom in the past month as assessed by the Posttraumatic Diagnostic Scale in the current study (PDS; Foa et al., 1997). This criterion was used to investigate the effects of the BMAC among individuals experiencing a range of PTSD symptoms.

10.3.2. Measures.

The Posttraumatic Stress Diagnostic Scale (PDS; Foa et al., 1997). The PDS is a 49-item self-report measure which is used to diagnose PTSD in the past month according to DSM-IV criteria. The PDS scale includes a total PTSD symptom severity score which is computed by adding the frequency score for each of the 17 PTSD symptoms. Each of the 17 PTSD symptoms is measured on a four-point scale, and the total PTSD symptom severity score for the 17 symptoms ranges from 0 to 51. The overall PDS score has been found to have an alpha coefficient of .92 and a test-retest reliability of .74 and .83 for a diagnosis of PTSD and PTSD symptom severity, respectively (Foa et al., 1997). The alpha coefficient for the total severity of the 17 PTSD symptoms in the current study was .86.

The Beck Depression Inventory II (BDI II; Beck et al., 1996a) comprises 21 items which measure the severity of depressive symptoms (range 0–63) in the past two weeks. The BDI II has high internal consistency (mean coefficient alpha of 0.91), test re-test reliability ($r = .93$) and concurrent validity with the Hamilton Psychiatric Rating Scale for
Depression (HRSD; \( r = .71 \)) (Beck et al., 1996a,b; Dozois et al., 1998; Richter et al., 1998). The alpha coefficient was .94 in the current sample.

The *Suicidal Behaviors Questionnaire-Revised* (SBQ-R; Osman et al., 2001). The SBQ-R is a four-item measure which assesses the level of suicidality experienced by the participants. The first item measures levels of lifetime suicidality including thoughts, plans and attempts (i.e., “Have you ever thought about or attempted to kill yourself?”); the second item assesses the frequency of suicidal thoughts in the past year (i.e., “How often have you thought about killing yourself in the past year?”); the third item measures the communication of the intent to commit suicide (“Have you ever told someone that you were going to commit suicide, or that you might do it?”) and the fourth item assesses the likelihood of committing suicide in the future (“How likely is it that you will attempt suicide someday?”). The total score ranges from 3 to 18 with higher scores indicating greater levels of suicidality. The alpha coefficient was .84 in the present sample.

*Measure of current mood.* Six numbered visual analogue scales (VASs) were administered to the participants to assess how sad, calm, defeated, happy, hopeless and frustrated they were feeling at the moment at baseline and immediately after the completion of the BMAC or control task. The VASs were vertical lines with a length of 100mm. The bottom of each VAS line corresponded to the absence of the emotion (“Not at all happy”) while the top of the VAS line corresponded to the presence of the emotion in high levels (“Very happy”). Participants were asked to mark a dash at that point of the VAS which best described their current mood. A series of studies have shown that VASs successfully capture mood fluctuations resulting from experimental mood inductions (Johnson et al., 2008b; Liverant, Brown, Barlow, & Roemer, 2008). Additionally, there is evidence in the literature that VASs have good agreement with more extensive measures of mood, such as the BDI (Davies, Burrows, & Poynton, 1975; Johnson et al., in submission). In the current study, the VASs of sadness, defeat, hopelessness and frustration at baseline
were positively associated with baseline levels of depression ($r = .521, p < .01, r = .510, p < .01, r = .622, p < .01$ and $r = .451, p < .01$, respectively) and the VAS calmness and happiness at baseline were inversely with depression ($r = -.383, p < .01$ and $r = -.392, p < .01$, respectively).

The levels of sadness, calmness, defeat, happiness, hopelessness and frustration of the participants two hours and two days following the completion of the testing session were assessed by telephone through the use of six 0-10 Likert scales (0 represented the absence of the emotion and while 10 represented the presence of the emotion at high levels). Likert scales are frequently used in the literature as measures of affective states (Fredrickson, Tugade, Waugh, & Larkin, 2003; Jimenez, Niles, & Park, 2010; Neufeld, O'Rourke, & Donnelly, 2010; Punkanen, Eerola, & Erkkila, 2011; Vanden Bogaerde & De Raedt, 2011). Single Likert scales have been found to correlate well with longer measures of affect (Davey, Barratt, Butow, & Deeks, 2007).

10.3.3. Procedure.

After signing the consent forms, participants completed a number of standardized questionnaires about PTSD symptoms, depression, and suicidal behaviour in the order detailed. Following this, the BMAC session began with the administration of the VASs. The participants were randomly assigned either to the BMAC or the control condition. This random process was the following: the first individual who participated in the study was allocated to the BMAC condition, the second individual was allocated to the control condition and so on. Immediately after the completion of the BMAC or the control condition, participants completed the VASs a second time (post-induction time 1). Furthermore, participants were contacted (by phone) two hours (post-induction time 2) and two days (post-induction time 3) after the end of the BMAC session and asked to report verbally using six 0-10 Likert scales how sad, calm, defeated, happy, hopeless and frustrated they were feeling at the moment.
**Broadminded Affective Coping Procedure (BMAC).** Before the administration of the BMAC, a detailed description about the procedure was provided to the participants. Overall, the BMAC session lasted about 15-20 minutes. Following the completion of the task, participants were debriefed about the nature and the aims of the BMAC. The BMAC consists of five stages: i. preparation, ii. guided imagery of positive memories, iii. engaging the senses, iv. exploration of the emotions, and v. interrogating the memory. Details about the BMAC procedure and the above five stages are provided elsewhere (Johnson et al., in submission; Tarrier, 2010a).

**Control task:** The control task consisted of writing a detailed description about a positive memory for 15 minutes. Participants were instructed to recall a positive memory/experience that happened recently (previous week or so) and write as many details as they could about this memory and to describe the impact that this memory had on their emotions.

**10.3.4. Data analysis.**

A number of variables including depression, suicidal behaviour and the four VASs and Likert scales (sadness, defeat, hopelessness and frustration) were positively skewed. Logarithmic (log10) and squared root (sqrt) transformations were conducted to correct for positive skewness. Furthermore, for two VASs and Likert scales (calmness, happiness) transformations were also conducted to correct for negative skewness. Following the transformations, the level of skewness for all the variables were non-significant ($z < 1.96$).

Independent sample t-tests were conducted to compare participants in the BMAC condition to the participants in the control condition in terms of depression severity, PTSD symptom severity and suicidal behaviour at baseline.

In order to examine whether the BMAC task led to a greater mood improvement compared to the control task, a series of ANCOVAs were conducted to investigate whether the levels of the post-induction mood (immediately after the completion of the
task, two hours and two days later) differed in the two groups whilst covarying for baseline mood levels (as measured with the six VASs).

10.4. Results

10.4.1. Participant characteristics.

A total of 50 individuals (43 female; \(M_{\text{age}} = 29.5, \ SD = 11.4\)) with PTSD (current or lifetime) participated in the study. The participants were predominately white \((n = 38, 76\%)\) and unmarried \((n = 33, 66\%)\). Thirty-one (62\%) participants met the PDS criteria for a current diagnosis of PTSD while the remaining 19 (38\%) participants were currently experiencing a range of PTSD symptoms but they did not fulfil the full criteria for a current PTSD diagnosis. Those with current PTSD experienced an average of 13.2 \((SD = 2.8)\) PTSD symptoms in the past month while those with a lifetime PTSD diagnosis experienced an average of 6.1 \((SD = 2.4)\) symptoms in the past month. As many as 33 (66\%) participants reported some form of suicidal behaviour (i.e., suicidal thoughts, plans or attempts) in their lifetime and 27 (54\%) reported suicidal thoughts in the past year. From the total sample, 25 (22 female; \(M_{\text{age}} = 30.6, \ SD = 11.9\)) participants were allocated to the BMAC condition and 25 (21 female; \(M_{\text{age}} = 28.5, \ SD = 10.8\)) were allocated to the control condition.

As shown in Table 19, those in the BMAC condition reported slightly higher levels of depression, PTSD symptom severity and suicidal behaviour compared to those in the control condition. However, these differences were not statistically significant, \(t(48) = 0.763,\) n.s., \(t(48) = 0.613,\) n.s., and \(t(48) = 0.315,\) n.s., respectively.
Table 19. Means and Standard Deviations of PTSD Severity, Depression and Suicidal Behaviour among Those in the BMAC Condition and Those in the Control Condition

<table>
<thead>
<tr>
<th></th>
<th>BMAC group $M (SD)$</th>
<th>Control group $M (SD)$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Untransformed</td>
<td>Transformed</td>
</tr>
<tr>
<td>PTSD symptom severity (PDS sev)</td>
<td>19.40 (10.59)</td>
<td>-</td>
</tr>
<tr>
<td>Depression severity (BDI-II)</td>
<td>16.64 (12.47)</td>
<td>3.77 (1.59)</td>
</tr>
<tr>
<td>Suicidal Behaviour (SBQ-R)</td>
<td>7.40 (4.32)</td>
<td>0.80 (0.26)</td>
</tr>
</tbody>
</table>

*Note: PDS Sev = Posttraumatic Stress Diagnostic Scale Severity.*
10.4.2. The effects of BMAC at post-induction time 1 (immediately after the BMAC task).

All the participants \((n = 25 \text{ in the BMAC condition}; \ n = 25 \text{ in the control condition})\) completed the VASs immediately after the completion of the BMAC task. As shown in Table 2, the participants’ mean scores on the six VASs (sadness, calmness, defeat, happiness, hopelessness and frustration) appeared to be approximately equivalent in both, the BMAC and the control condition at baseline. However, post-induction (time 1) calmness and happiness appeared to be higher among those in the BMAC condition while post-induction sadness, defeat, hopelessness and frustration appeared to be lower in those in the BMAC condition. The results of a series of six ANCOVAs showed a significant effect of condition upon post-induction (time 1) levels of sadness \((F (1, 47) = 13.41, p < .01)\), calmness \((F (1, 47) = 16.41, p < .01)\), defeat \((F (1, 47) = 7.78, p < .05)\), happiness \((F (1, 47) = 12.02, p < .01)\), hopelessness \((F (1, 47) = 7.78, p < .05)\) and frustration \((F (1, 47) = 20.42, p < .01)\) whilst covarying for the levels of each of the above VASs at baseline.

10.4.3. The effects of BMAC at post-induction time 2 and time 3 (two hours and two days after the BMAC session, respectively).

Forty-seven participants \((n = 24 \text{ in the BMAC condition}; \ n = 23 \text{ in the control condition})\) completed six Likert scales two hours after the completion of the BMAC session. A series of six ANCOVAs showed no significant impact of the condition (BMAC/control) on the levels of post-induction (time 2) sadness \((F (1, 44) = 1.04, p = .313)\) calmness \((F (1, 44) = 0.36, p = .550)\), defeat \((F (1, 44) = 0.11, p = .737)\), happiness \((F (1, 44) = 0.432, p = .514)\), hopelessness \((F (1, 44) = 0.57, p = .454)\) and frustration \((F (1, 44) = 0.04, p = .852)\) controlling for the baseline levels of the above emotions. The mean scores of the 47 participants on the six Likert scales at post-induction (time 2) are presented in Table 20.
A total of 45 participants (n = 23 in the BMAC condition; n = 22 in the control condition) completed the 0-10 scales two days after the BMAC session. Again, no significant impact of the condition (BMAC/control) on the levels of post-induction (time 3) sadness (F (1, 42) = 0.04, p = .836), calmness (F (1, 42) = 0.36, p = .550), defeat (F (1, 42) = 0.05, p = .830), happiness (F (1, 42) = 0.61, p = .438), hopelessness (F (1, 42) = 0.82, p = .370) and frustration (F (1, 42) = 0.06, p = .812), was found after controlling for the baseline levels of the above emotions. The mean scores of the 45 participants on the six Likert scales at post-induction (time 3) are displayed in Table 20.

Table 20. Means and Standard Deviations of Sadness, Calmness, Defeat, Happiness, Hopelessness and Frustration at Baseline and the Three Post-Induction Time Points

<table>
<thead>
<tr>
<th>Condition</th>
<th>Baseline</th>
<th>Post-induction Time 1</th>
<th>Post-induction Time 2</th>
<th>Post-induction Time 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Condition</td>
<td>Sadness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMAC</td>
<td>2.92 (2.27)</td>
<td>1.24 (1.54)</td>
<td>2.63 (1.79)</td>
<td>3.39 (2.21)</td>
</tr>
<tr>
<td>Control</td>
<td>2.84 (2.69)</td>
<td>2.72 (2.05)</td>
<td>2.74 (2.07)</td>
<td>3.36 (2.95)</td>
</tr>
<tr>
<td>Condition</td>
<td>Calmness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMAC</td>
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<td>8.68 (1.46)</td>
<td>6.96 (1.83)</td>
<td>6.43 (1.75)</td>
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<td>Control</td>
<td>BMAC</td>
<td>Control</td>
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<td>------------</td>
<td>---------------</td>
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<tr>
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<td>2.64 (2.81)</td>
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### 10.5. Discussion

The overarching aim of this study was to investigate whether the Broad-Minded Affective Coping (BMAC) procedure was more effective in eliciting positive affect compared to a control task among individuals diagnosed with Posttraumatic Stress Disorder (PTSD). Participants in the BMAC condition reported significantly higher levels of positive emotions (calmness and happiness) and significantly lower levels of negative emotions (sadness, hopelessness, defeat and frustration) compared to participants in the control condition following the task. No significant differences in the levels of self-reported positive and negative emotions were found between the two groups (BMAC, controls) two hours and two days after the completion of the task. The control task which comprised a written description of a past positive memory did not result in a substantial mood improvement following the application of the technique. Since both tasks (BMAC, control) involved an active recall of past positive memories, their different impact on mood suggests that the BMAC has a unique therapeutic value. These results are consistent with our initial hypothesis that the BMAC would result in greater mood improvement at least in the short-term. The findings support previous qualitative evidence which indicated that the BMAC is a useful method for boosting mood in those with PTSD (Tarrier, 2010a). The absence of significant differences between the two groups (BMAC, control) on the levels of BDI depression and PTSD symptom severity further validate the current outcomes (i.e., the beneficial impact of the BMAC procedure on mood) since previous evidence suggests
that positive memory recall can be deleterious in those suffering from depression (Joormann et al., 2007).

The current study was inspired by the broaden-and-build theory which postulates that positive emotions expand an individual’s thoughts and actions and facilitate the building of psychological resilience (Fredrickson, 2001). Consistent with these suggestions, there is firm evidence in the literature that positive affect predicts a range of positive outcomes including better mental and physical health, job satisfaction, income level and satisfying interpersonal relationships across cross-sectional and prospective investigations (Diener, Nickerson, Lucas, & Sandvik, 2002; Lyubomirsky, King, & Diener, 2005; Ruvolo, 1998). More importantly, a recent study demonstrated that even brief, in-moment inductions of positive affect are linked with increases in life satisfaction and trait resilience one month later (Cohn et al., 2009). The findings of this study propose that the BMAC helps an individual to experience transient mood improvements and potentially facilitates the therapeutic process if used as an adjunct to other psychological interventions. Consistent with this, it has been suggested that a brief mood enhancement as a consequence of the BMAC supports the achievement of a series of important therapeutic goals such as the development of positive self-appraisals and behavioural changes which in turn promote recovery (Johnson et al., in submission; Tarrier, 2010a). The failure of the BMAC to endure over two hours and two days following its administration implies that it is better used in the context of other long-lasting psychological therapies. Indeed, the BMAC has been mostly designed to comprise an additional clinical strategy which will be practiced frequently as a part of a CBT program (Tarrier, 2010a). Thus, the current study provides preliminary evidence of the effectiveness of the BMAC in the short-term while a future research is needed to assess the full impact of the BMAC when used repeatedly and in context of other psychological interventions.
Research has suggested that heightened levels of hopelessness and defeat are core affective processes which underlie the development of depressive symptoms and suicidal behaviours in a range of clinical populations (Johnson et al., 2008b; Tarrier, 2010a; Taylor et al., 2011a; Taylor et al., 2010a,b) including those with PTSD (Panagioti et al., 2009; Panagioti et al., submitted-a). The identification of clinical methods which could buffer the development of suicidal behaviours in PTSD is a crucial research and clinical goal since the prevalence rates of suicidal thoughts and behaviours in those with PTSD are particularly high (Panagioti et al., 2009; Tarrier & Gregg, 2004). Overall, the present results imply that the BMAC can be utilized clinically not only for enhancing positive affect but also for reducing the deleterious impact of negative emotions, in particular those associated with suicidality, in those with PTSD. Therefore, the incorporation of the BMAC into the therapeutic process of those with PTSD might be beneficial for two reasons: i. to help reduce or eliminate feelings of anhedonia and boost the experience of positive emotions among those with PTSD and ii. to provide a way for individuals with PTSD to be more resilient against the development of suicidal thoughts and behaviours by ameliorating the severity of self-reported feelings of hopelessness and defeat.

There are three main limitations in this study which warrant mention. First, single-item scales (Visual Analogue Scales or Likert Scales) were employed for measuring mood. Longer measures of mood might be more suitable for capturing complex emotions such as happiness, defeat or hopelessness. However, Likert scales have been used in the literature to assess positive and negative emotions (Fredrickson et al., 2003; Neufeld et al., 2010; Punkanen et al., 2011) and the VASs were selected to measure mood in this study on the basis of previous evidence which showed that the VASs are appropriate for detecting mood changes as a consequence of mood induction tasks (Johnson et al., 2008b; Liverant et al., 2008). Furthermore, the scores on the VASs were consistent with the scores on more extensive measures of mood such as the Beck Depression Inventory in the present study.
The second limitation concerns the use of two different measures to assess mood at baseline (e.g., VASs) and two hours and two days following the BMAC session (e.g., Likert scales). This raises concerns about the ability to compare directly the baseline measurements with the post-induction measurements (two hours and two days afterwards). Nevertheless, previous evidence from medicine and nursing research suggest that there is a high agreement between VASs and Likert scales (Brunier & Graydon, 1996; Holdgate, Asha, Craig, & Thompson, 2003). Third, the results of this study are based on assessing the impact of only one BMAC session. Tarrier (2010a) proposed the BMAC to be practiced on a regular and recurring basis in order to have durable effects. Consequently, the BMAC failed to maintain its benefits in the current study potentially because it was not used in the proposed context (e.g., to be frequently practiced and used in combination with other clinical interventions).

In conclusion, this study has demonstrated that the BMAC procedure increases the levels of positive emotions and reduces the levels of negative emotions among individuals with PTSD in the short-term. The outcomes of the study suggest that the BMAC is a potentially useful clinical method for eliciting positive affect and enhancing resilience in those with PTSD. The incorporation of the BMAC into existing clinical intervention schemes, such as CBT might result in important therapeutic benefits and lead to recovery.
CHAPTER 11

11. General Discussion

11.1. Overview

The primary aim of this thesis was to investigate the psychological mechanisms which underlie the emergence of suicidal thoughts and behaviours among individuals diagnosed with Posttraumatic Stress Disorder (PTSD) or experience subthreshold PTSD symptoms. To accomplish this aim, this thesis i. proposed a theoretical framework under which the mechanisms of suicidal behaviour in PTSD can be investigated more systematically, ii. conducted the first narrative and meta-analytic review of the association between various forms of suicidal behaviour and PTSD, iii. obtained evidence that perceptions of defeat and entrapment comprise the proximal predictors of suicidal behaviour in PTSD and iv. demonstrated that perceptions of defeat and entrapment emerge from negative self-appraisals and in reaction to severe PTSD symptoms.

The secondary aim of this thesis was to investigate psychological factors which might confer resilience to suicide in those with PTSD. In order to achieve this aim, i. the potential protective role of positive self-perceptions of social support against suicidality under the presence of numerous and severe PTSD symptoms was examined, and ii. an empirical investigation was conducted to examine the effectiveness of a recently proposed clinical technique which might represent a useful tool for reducing negative emotions including those which give rise to suicidal thoughts and behaviours.

Overall, the theoretical and empirical chapters of this thesis advanced the current conceptualization of suicidal behaviour in PTSD. Evidence was provided that particular psychological processes (i.e., defeat and entrapment) have a key role in the development of suicidal thoughts and behaviours in PTSD and the literature on the resilience factors which counter suicidality in PTSD was expanded.
11.1.1 Chapter summary.

Although a considerable number of studies have reported an increased frequency of suicidal thoughts and behaviours in those diagnosed with PTSD, no previous literature review was identified to examine the association between suicidal behaviour and a PTSD diagnosis. A review of the literature on the area of suicidal behaviour and PTSD was important for confirming the existence of a positive association between suicidal behaviour and PTSD and for identifying the psychological factors (including comorbid psychiatric disorders) which might heighten the risk for suicide in PTSD. Therefore, a comprehensive narrative review examining the link between suicidal behaviour and PTSD was conducted. This review is presented in Chapter 3 of this thesis.

Since this was the first review on this area, an extensive search strategy was adopted and several online databases were searched. A total of 65 studies were identified which investigated the relationship between suicidal behaviour and PTSD. Across the vast majority of the studies included in the review, a strong association between a PTSD diagnosis and suicidal behaviour (e.g., suicidal thoughts, behaviours, attempts and completed suicides) was found. The suicidal behaviour and PTSD association was evident among a range of different trauma populations including war veterans, victims of physical or sexual abuse, victims of intimate partner violence, individuals exposed to natural disasters and PTSD populations with a mixture of different traumas (e.g., war, traffic accidents, assault). The presence of PTSD and suicidal behaviour and their association was heightened among specific populations, such as refugees, police officers and HIV patients. Furthermore, the co-existence of a PTSD diagnosis with other Axis I or Axis II psychiatric diagnoses (e.g., depression, substance abuse, psychosis and personality disorders) was associated with considerable increases in the levels of suicidal behaviours. Furthermore, initial evidence was obtained that comorbid depression potentially mediates the impact of PTSD on suicidal behaviour. Other factors which were found to escalate the risk for
suicide in those with PTSD include the re-experiencing symptom cluster, the lack of social support and the coping mechanism of suppression. Finally, this review identified a lack of reference to psychological factors, such as perceptions of defeat and entrapment, feelings of hopelessness, and negative appraisals of the present and the future, which have been found to strongly predict suicide in other research populations (O'Connor, 2003; Rasmussen et al., 2010; Taylor et al., 2010a,b). Thus, the lack of empirical evidence concerning the psychological mechanisms which drive suicidality in PTSD provided a strong justification for the work planned for this thesis.

Although the review in Chapter 3 provided strong evidence that the levels of suicidal behaviour are increased in those with PTSD, its conclusions are limited because they are based on a narrative presentation of the results of previous empirical studies. To overcome this limitation, a meta-analysis was conducted. The meta-analysis aimed, first, to investigate the link between suicidality and PTSD and second, to examine the role of comorbid depression in the relationship between PTSD and suicidal behaviour using meta-regression analyses. Five databases (e.g., EMBASE, PILOT, Medline, PsycINFO and Web of Science) were searched and 59 studies were included in the meta-analysis. The analyses showed that PTSD was strongly positively associated with different modes of suicidality including suicidal ideation, suicidal behaviour and suicide attempts, and that this association held irrespective of important variations across the studies (e.g., research samples with current or lifetime PTSD, standardized interviews or screening questionnaires to assess PTSD, psychiatric or non psychiatric populations, and different index traumas). Importantly, the meta-regression analyses showed that the levels of suicidality in the PTSD samples increased linearly with the levels of comorbid depression. The findings of the meta-analysis, therefore, fully confirmed the conclusions of the narrative review and provided more firm evidence that comorbid depression considerably worsens the risk for suicide in PTSD. That said, it must be remembered that meta-analytic
techniques can be criticised. These include, i. that although meta-analyses appear objective, subjective decisions have to be made, such as deciding on scope, and inclusion and exclusion criteria, ii. that, as with narrative reviews, there is a danger of overgeneralisation, iii. that although attempts are usually made to estimate publication biases the analyses still rely on published material, and iv. that the quality of studies included in meta-analyses is often not estimated, although this was not the case for the meta-analysis presented in Chapter 3. With these caveats in mind, overall, the narrative review and the meta-analysis established a strong theoretical and empirical basis for the conduction of subsequent empirical studies which aimed to further examine the role of depression and other psychological factors in the occurrence of suicidal behaviour in PTSD.

The first empirical investigation of the current thesis is presented in Chapter 5. This empirical investigation was based on re-analysing a previous data set of 94 individuals with PTSD. The rationale for conducting this re-analysis was to empirically investigate paths to suicidal behaviour in PTSD which would further lead the development of research hypotheses for the subsequent studies of this thesis (Chapter 6 to 8). It was hypothesised that comorbid depression and negative perceptions of functional impairment would represent key factors which drive suicidality in those with PTSD. The prediction regarding the role of negative perceptions of functioning in the emergence of suicidal behaviour was based on the assertions of recent theoretical models of suicide (Johnson et al., 2008a; Williams, 1997; Williams et al., 2005). One of these models, the Schematic Appraisals Model of Suicide (SAMS; Johnson et al., 2008a) postulates that negative appraisals of clinical symptoms and negative appraisals of the current and future situation lead to suicidal thoughts and behaviours because they result in overwhelming feelings of defeat and entrapment. Two statistical modelling programmes (e.g., TETRAD and MPlus) were applied to investigate paths to suicidal behaviour in PTSD. The path analyses identified two independent paths to suicidal behaviour. In the first path, severity of depression was
the proximal factor to suicidal behaviour. In the second path, negative perceptions of functioning (e.g., severe life-impairment) were the most closely related factors to suicidal behaviour. Thus, the outcomes of the path analyses confirmed the initial hypotheses of the research and provided some initial support for recent theoretical perspectives in the area of suicidality (i.e., the SAMS model). Nonetheless, the main limitation of this study was that it did not use measures which were direct tests of those psychological processes (e.g., negative self-appraisals and perceptions of hopelessness, defeat and entrapment) which have been proposed by the SAMS to be the key drivers of suicidal thoughts, feelings and behaviours.

The studies presented in Chapter 6 and 7 of this thesis directly tested the core assertion of two contemporary theoretical perspectives of suicide, the Cry of Pain model of suicide (CoP; Williams et al., 2005) and the SMAS model (Johnson et al., 2008a) that perceptions of hopelessness, defeat and entrapment are key psychological components of suicide. Due to the absence of previous evidence in the literature concerning the association between suicidal behaviour and perceptions of hopelessness, defeat and entrapment in those with PTSD, it was first necessary to determine whether hopelessness, defeat and entrapment were significantly associated with suicidality in PTSD. Therefore, the main aim of the study presented in Chapter 6 was to examine whether feelings of defeat, entrapment and hopelessness would be positively associated with suicidal behaviour among trauma victims with or without PTSD. A further assumption of the SAMS model was that defeat and entrapment represent a single psychological construct. Thus, based on this assumption, in Chapter 6, defeat and entrapment were represented in the analyses both as two independent factors and as a unitary factor. The outcomes of the study demonstrated that perceptions of hopelessness, defeat and entrapment were strongly correlated with increased severity of suicidal behaviours among trauma victims with PTSD. Hopelessness and defeat were also positively associated with suicidal behaviour in
trauma victims without a PTSD diagnosis. After controlling for the severity of comorbid depression, the link between suicidal behaviour and entrapment remained significant in those with PTSD. Furthermore, consistent with the SAMS model, defeat and entrapment had a similar impact on suicidal behaviour either represented as a single factor or as two independent factors. Thus, the results of Chapter 6 supported the premises of the SAMS model. However, one issue with this study was that it was correlational and did not probe the mechanisms by which defeat and entrapment lead to suicidality.

Following the findings of the study in Chapter 6, additional research was pursued to test the hypothesis that perceptions of defeat and entrapment are the overriding factors which give rise to suicidality in PTSD. This hypothesis was tested using Structural Equation Modelling (SEM) procedures as presented in Chapter 7. The resultant SEM model supported a mediational pathway whereby more severe PTSD symptoms were positively related to a latent defeat/entrapment variable which in turn was directly associated with increased levels of suicidal behaviour. Severity of depressive symptoms and hopelessness were also included as potential mediators (together with defeat/entrapment) in the above mediational model but their direct impact on suicidal behaviour was not significant. Thus, perceptions of defeat and entrapment held their mediational role in the association between PTSD symptoms and suicidal behaviour whilst adjusting for both the severity of depressive symptoms and hopelessness. Although previous research indicated that the link between suicidal behaviour and particular PTSD symptom clusters varies, this hypothesis was not tested in Chapter 7. For example, a number of studies have shown that suicidal behaviour is positively associated with the re-experiencing symptom cluster (Ben-Ya'acov & Amir, 2004; Jurišić & Marušič†, 2009; Kotler et al., 2001; Nye & Bell, 2007) and negatively associated with the avoidance/numbing symptom cluster (Ben-Ya'acov & Amir, 2004; Kotler et al., 2001). The contribution of each of the three symptom clusters to suicidal behaviour was not examined
in this Chapter because the sample size \((n = 73)\) was limited, and testing a more complex model could lead to estimation difficulties in SEM (Kline, 1998). Nonetheless, replication of this study with a larger sample size which would test the role of each of the three or four symptom clusters (i.e., the impact of avoidance and numbing symptoms could be examined separately since as noted in 1.2.2 section might have a different effect on suicide) is highly recommended.

Chapter 8 provided a further test of the association between suicidal behaviour and perceptions of defeat and entrapment. The SAMS suggests that maladaptive self-appraisals relating to the ability to control negative emotions, to handle difficult problems/situations, and to gain social support produce, and worsen, the severity of perceptions of defeat and entrapment which in turn lead to suicidality. This mediational hypothesis was tested in Chapter 8 among 56 individuals with full or subthreshold PTSD. Due to the small size of the sample, a non-parametric bootstrapping method was used to construct and test the mediational model. The results were consistent with the previous chapter, demonstrating that perceptions of defeat and entrapment (defeat/entrapment variable) fully mediated the association between the three types of negative self-appraisals and suicidal behaviour. Secondary analyses indicated that defeat and entrapment continued to fully mediate the association between two types of negative self-appraisals (emotion coping and problem solving) and suicidal behaviour whilst controlling for the effects of the severity of the PTSD symptoms. Comorbid depression and hopelessness, as noted, are closely related to perceptions of defeat and entrapment (Chapter 6 and 7). Despite this, comorbid depression and hopelessness were not included as covariates in Chapter 8. The mediation model tested in Chapter 8 was complex, including four independent variables and PTSD severity was used as covariate. Hence, it was felt that also controlling for depressive symptoms and hopelessness would result in an over-complex model.
The studies described so far have involved the examination of the mechanisms under which suicidal thoughts and behaviours arise in those with PTSD. Nonetheless, in addition to investigating the mechanisms of suicidal behaviour in PTSD, the identification of resilience factors which counter suicidality in PTSD was also a fundamental aim of this thesis. The subsequent two chapters (Chapter 9 and Chapter 10) explored psychological factors which might confer resilience to suicidal behaviour in PTSD. In particular, the research described in Chapter 9 investigated the potential buffering role of perceived social support on suicidal behaviour in a sample of 56 individuals with full of subthreshold PTSD. This study was based on the postulation of the SAMS that a self-appraisal system has a central position in the conceptualization of suicide. In agreement with the SAMS perspective, increased levels of perceived social support were found to moderate the effects of the PTSD symptoms on suicidal behaviour. This pattern of finding suggests that positive self-perceptions of social support represent a key resilience mechanism in those with PTSD which counters the emergence of suicidal thoughts and behaviours. One key limitation of this research is that it focused only on testing the buffering impact of perceived social support on suicidal behaviour in the presence of increased PTSD symptoms. A core issue which should be addressed by future larger studies is the investigation of whether perceived social support buffers the impact of both comorbid depression and PTSD symptoms on suicidal behaviour in those with PTSD.

The final research work of this thesis (Chapter 10) addressed another issue related to resilience, namely, the beneficiary effects of the experience of positive emotions. Based on previous suggestions that the experience of positive emotions may counter the negative effects of stressors (Fredrickson et al., 2000) and boost resilience (Cohn et al., 2009), the effectiveness of a recently developed clinical technique, the Broadminded Affective Coping procedure (BMAC; Tarrier, 2010), to boost positive mood and reduce negative emotions, was empirically examined. The BMAC technique involves cued recall of a past
positive memory including its multi-sensory, emotional and cognitive details. The study described in Chapter 10 investigated whether the BMAC procedure is more effective in boosting positive emotions (calmness, happiness) and reducing negative emotions (sadness, hopelessness, defeat and frustration) compared to a control task which involved active recall of a past positive memory but without the multi-sensory, emotional and cognitive details among 50 individuals with PTSD. Individuals with PTSD in the BMAC condition reported increased levels of positive emotions and reduced levels of negative emotions following the BMAC task compared to those with PTSD in the control condition. The BMAC potentially represents a useful clinical method to boost mood and enhance resilience in clinical settings.

11.2. Theoretical Implications

11.2.1. Mechanisms underlying suicidal ideation and behaviour in PTSD.

11.2.1.1. Defeat/entrapment as a psychological driver of suicidality.

The empirical studies in this thesis supported the hypothesised role of defeat/entrapment (Johnson et al., 2008a; Taylor et al., 2011a; Taylor et al., 2009) as the superseding psychological mechanism which underlies suicidal thoughts and behaviours among individuals with PTSD. Increased levels of perceptions of defeat and entrapment led to considerable increases in the severity of suicidal behaviour experienced by PTSD populations across three studies included in this thesis (Chapters 6, 7 and 8). So far, the extant literature has demonstrated a strong link between suicidality and perceptions of defeat and entrapment among Korean adolescents (Park et al., 2010), students (Taylor et al., 2011b; Taylor et al., 2010b), parasuicidal populations (O'Connor, 2003; Rasmussen et al., 2010) and psychotic individuals (Taylor et al., 2010a). The outcomes of this thesis confirm and expand these findings to PTSD populations. Overall, the current pattern of findings provide support for two contemporary perspectives of suicide, the CoP model and
the SAMS (Johnson et al., 2008a; Williams, 1997; Williams et al., 2005) which view perceptions of defeat and entrapment as the central psychological drivers which give rise to suicidal thoughts and behaviours.

It should be also noted that perceptions of defeat and entrapment mediated the effects of PTSD symptoms and negative self-appraisals on suicidal behaviour in Chapter 7 and 8 of this thesis. These outcomes are fully consistent with the postulation of the SAMS model that perceptions of defeat and entrapment are produced by the operation of a negatively biased appraisal system (Johnson et al., 2008a). Additionally, across two empirical studies of this thesis (Chapter 6 and 8), perceptions of defeat and entrapment yielded similar results either analysed as two independent variables or as a singular variable. This is an important result since the SAMS model maintains that defeat and entrapment represent a unitary psychological construct because the two factors (defeat and entrapment) have several common conceptual characteristics and are generated by the same psycho-cognitive scheme (e.g., a maladaptive appraisal system) (Johnson et al., 2008a; Taylor et al., 2011a; Taylor et al., 2009). The inability to detect substantial differences between defeat and entrapment in this thesis, therefore, adds verifying evidence to the SAMS model. Nonetheless, both the CoP perspective (O’Connor, 2003; Rasmussen et al., 2010; Williams, 1997) and the social rank theory (Gilbert & Allan, 1998) assert that defeat and entrapment represent two strongly related but discrete constructs. The presence of a temporal order of defeat and entrapment has been also proposed whereby the emergence of perceptions of defeat precedes the occurrence of perceptions of entrapment (Williams, 1997). That said, work presented in an unpublished research paper indicated that in an interpersonal problem solving context, defeat and entrapment may be different concepts. Entrapment fully mediated the relationship between depression and the production of irrelevant problem solutions. Defeat mediated the relationship between depression and negative appraisals of the problem solutions produced (Dempsey, Gooding,
Although suicidality was not directly measured in this work, depression has been shown to be strongly related to feelings of suicidality (Bernal et al., 2007; Kaslow et al., 2002; Kessler et al., 1999; Nock et al., 2008; Weissman et al., 1999) and poor problem solving ability has also been associated with aspects of suicidality (Esposito & Clum, 2002; McAuliffe et al., 2003; Pollock & Williams, 1998; Speckens & Hawton, 2005). Furthermore, to date, the most definite evidence concerning the unitary formation of defeat and entrapment has been based on a single study which utilized exploratory factor analysis to investigate the structure of defeat and entrapment among a student sample (Taylor et al., 2009). Hence, although the findings of this thesis (Chapters 6, 7 and 8) together with research evidence among students (Taylor et al., 2009; Taylor et al., 2010b) and psychotic individuals (Taylor et al., 2010a) favour the emerging SAMS view of defeat and entrapment, further research is required to elucidate the structure of defeat and entrapment.

From the SAMS perspective, suicidal thoughts and behaviours arise as a response to continuously entrenched feelings of defeat and entrapment and represent a desire to escape from a painful situation which cannot be surpassed through the agency of personal/internal or external resources. It follows that perceptions of defeat and entrapment should be combined with this urge to escape in order to give rise to suicide acts (Johnson et al., 2008a). This theoretical understanding of the suicide desire as an urge to escape has been found to be present in the suicide literature (Bancroft et al., 1976; Baumeister, 1990; Holmes et al., 2007; Shneidman, 1996). Suicide might also be considered as a feasible alternative solution, a secondary plan which can be applied if all the other escape options are proven unsuccessful. Thus, suicide might be viewed as a desirable or even reassuring thought since it offers a permanent escape and the last way out of a most defeating and entrapping situation. Consistent with this last proposition, a positive view of suicide is also evident across personal descriptions of the experience of suicide (Shneidman, 1996;
One limitation of the work presented in this thesis is that it did not test the desire to escape nor did test feelings of relief in relation to suicide and in relation to escape potential. A future research programme which would investigate how perceptions of defeat/entrapment, the desire to escape, and suicide-related feelings of relief inter-correlate to give rise to suicidal behaviours, would contribute significantly to the understanding of the underlying mechanisms of suicide.

One core dispute in the existing literature is the difficulty in explaining why some individuals who report elevated levels of defeat/entrapment engage in severe suicidal behaviours or eventually kill themselves while others engage in only mild suicidal ideation. These discrepancies might be partly explained by differences in the severity and chronicity of the inner defeating and entrapping feelings. There is the possibility that in some cases just thinking about suicide as an alternative escape route might be adequate to alleviate the intensity of perceptions of defeat and entrapment (Shneidman, 1996; Walen, 2002). However, the effectiveness of suicidal thoughts to ameliorate the severity of the defeating and entrapping perceptions might be reduced if these perceptions are excessively prolonged or severe (Taylor, 2010). This explanation is primarily grounded on, and is consistent with, the suicide continuum conceptualization. Although there is work supporting the continuum model of suicide (Brent et al., 1988; Casey et al., 2008; Claes et al., 2010; Johnson et al., 2008a; Osman et al., 2001) other work has challenged this idea (Beautrais, 2001; Beck et al., 1979; McAuliffe et al., 2002; O’Carroll et al., 1996). For example, Beautrais (2001) has indicated that individuals who died by suicide and individuals with a history of serious but unsuccessful suicides represent two overlapping but distinct populations. However, overall, there appears to be a larger evidence base for the continuum model of suicide whereby suicidal thoughts lead to plans and then to behaviours.
An alternative explanation of the translation process of perceptions of defeat and entrapment into different severity levels of suicidal behaviour is offered by the SAMS. Influenced by previous theoretical accounts of suicide (Lau et al., 2004; Williams et al., 2005), the SAMS model proposed a latent beliefs structure, namely the suicide schema, as a core component of suicidal behaviour (Johnson et al., 2008a). This schema structure is believed to be strengthened each time it is activated, and such activation increases the potential to incorporate further elements into this schema network (Johnson et al., 2008a; Pratt et al., 2010). Consequently, each activation of the suicide schema might be followed by the addition of more severe forms of suicidal behaviours into the individual’s behavioural repertoire including details about specific plans and behaviours for suicide (Lau et al., 2004; Tarrier et al., 2007a; Williams et al., 2005). A tentative prediction of the SAMS is that experiencing mild suicidal ideas in response to brief instances of feeling defeated and trapped facilitates the emergence of more severe forms of suicidality in response to entrenched or prolonged perceptions of defeat and entrapment. Testing suicide schema empirically is challenging. Recently, Pratt and colleagues (2010) presented the first investigation which tested suicide schema among individuals with psychosis. The authors used a series of direct or indirect cognitive tasks to assess suicide schema (details of these tasks are described in Pratt et al., 2010). The results of the study were encouraging, suggesting that suicide schema was significantly more elaborated and extended among psychotic individuals with a history of suicide attempts compared to psychotic individuals without a history of suicide attempt (Pratt et al., 2010). Although this thesis did not examine the suicide schema construct, this might represent a fruitful avenue for further research.
11.2.1.2. The effects of hopelessness, depression, and PTSD severity on suicidality.

The outcomes of this thesis offered a strong justification for the initial hypothesis that defeat and entrapment are the proximal psychological factors which underlie the development of suicidal thoughts and behaviours in those with PTSD. The key role of defeat and entrapment in driving suicidality was further supported by showing that these effects are independent of the effects of the comorbid depression (Chapter 6 and 7). As was noted in Chapter 3 and 4 of this thesis, comorbid depression has been identified as the most robust predictor of suicidal behaviour in the PTSD literature (Panagioti et al., 2009). Existing research evidence together with the findings of this thesis (Chapter 3, 4 and 5) also yielded depression as a potential mediator of the association between PTSD and suicidal behaviour (Leiner et al., 2008; Panagioti et al., 2011; Panagioti et al., 2009). Additionally, the origins of the perceptions of defeat and entrapment are in the depression literature, namely the social rank theory of depression (Gilbert & Allan, 1998) and thus, there is a strong theoretical and empirical basis to support the presence of significant conceptual similarities between depression and perceptions of defeat and entrapment. Consequently, establishing the effects of defeat and entrapment on suicidal behaviour over and above the effects of depression was a central goal in this thesis because comorbid depression might account for the link between suicidal behaviour and perceptions of defeat and entrapment. Two empirical studies in the current thesis demonstrated that the significant association between suicidal behaviour and perceptions of defeat and entrapment pertained after controlling for the effects of comorbid depression (Chapter 6 and 7). Therefore, the findings of these two studies (Chapter 6 and 7) showed that the effects of perceptions defeat and entrapment on suicidality was not due to their shared variance with depression.
There is a sound theoretical framework (Clum, Patsiokas, & Lucomb, 1979; Cornette, Abramson, & Bardone, 2000) and increasing empirical accounts which suggest that there is a direct link between hopelessness and suicidal thoughts and behaviours (Elliott & Frude, 2001; Kuo et al., 2004; O’Connor, Armitage, & Gray, 2006). Among trauma populations with full or partial PTSD, however, the role of hopelessness in the development of suicidality has not been well-investigated (Panagioti et al., 2009). For example, only two studies to date have examined the interrelations between hopelessness, PTSD and suicidal behaviour (Soares et al., 2008; Spokas et al., 2009). In order to compensate for this lack of research, one study featured in this thesis showed that heightened levels of hopelessness were significantly associated with increased levels of suicidal behaviour in those with PTSD. Similarly to defeat and entrapment, the construct of hopelessness encompasses perceptions of an inability to escape and failure (Taylor et al., 2010b). This conceptual overlap between hopelessness and defeat/entrapment suggest that there is a need for research to investigate whether suicidality in PTSD is better explained in terms of hopelessness or defeat/entrapment. One study which is included in the current thesis demonstrated that the effects of defeat/entrapment on suicidal behaviour in PTSD hold even whilst controlling for the effects of hopelessness (Chapter 7). Consequently, the impact that perceptions of defeat/entrapment exert upon suicidality in those with PTSD cannot be explained in terms of hopelessness.

One issue which has been highlighted (Bolton et al., 2007) is whether there are transdiagnostic mechanisms which underlie suicidality and also whether there are aspects of suicidality which are driven by features which are specific to some mental illnesses (e.g., hallucinations and delusions in psychosis). Therefore, a final aim of this thesis was to investigate whether there were any factors which were unique to PTSD and which drive suicidal thoughts and behaviours. Identifying whether PTSD-specific factors such as the PTSD symptom severity, act on suicidal behaviour directly or indirectly, through
transdiagnostic psychological processes (e.g., defeat/entrapment or hopelessness) and comorbid depression is particularly important for elucidating the putative routes to suicidal behaviour in PTSD. Two empirical studies in the present thesis indicated that the association between PTSD severity and suicidal behaviour is rendered redundant when controlling for the effects of comorbid depression (Chapter 5 and 6). Furthermore, one additional study in this thesis demonstrated that the link between PTSD symptom severity and suicidality is fully mediated by perceptions of defeat and entrapment (Chapter 7). These outcomes support the presence of an indirect relationship between PTSD severity and suicidal behaviour. Various other PTSD-specific characteristics including severe re-experiencing symptoms and severe dissociative symptoms are likely to contribute to the risk for suicide (Amir et al., 1999; Freeman et al., 1995; Jakupcak et al., 2010; Kotler et al., 2001) because they may worsen an individual’s sense of being defeated and trapped. This thesis presented only initial evidence concerning the association of PTSD-specific factors with suicidal behaviour (e.g., PTSD symptom severity) and clearly there is a need for future investigations to fill this research gap. The role of PTSD specific symptoms, for instance, in the development of suicidal behaviour should be a central focus of future investigations which seek to elucidate the mechanisms of suicidal behaviour in PTSD.

11.2.2. Resilience factors to suicidal thoughts and behaviours in PTSD.

One important observation to be noted following the results of this thesis concerns the concept of resilience to suicide. Up until recently, the investigation of potential resilience factors to suicidality was limited to identifying psychological processes which were inversely correlated with the frequency and severity of suicidal thoughts and behaviours (Johnson et al., 2011b; Perkins & Jones, 2004; Ristikari et al., 2005). Recently, two important advances have been proposed in the examination of potential resilience factors to suicide. First, it was proposed that resilience factors should be defined as those which alter the strength of the association between risk factors and suicidal behaviour and
second that risk factors and resilience factors to suicidality are best understood as two different dimensions which operate separately (Johnson et al., 2010a; Johnson et al., 2011b). These two advances informed the research which examined the potential buffering role of perceived social support to suicidal behaviour in PTSD (Chapter 9). These developments in the resilience research area inspired an empirical investigation which tested the utility of a resilience-boosting intervention (Chapter 10).

11.2.2.1. The protective role of heightened levels of perceptions of social support.

One empirical research study included in this thesis gave substantial support to the hypothesis that particular positive self-appraisals, such as subjective perceptions of receiving high levels of social support represent key resilience factors to suicidality in those with PTSD (Chapter 9). This study showed that increased levels of perceived social support buffered the impact of the number and severity of PTSD symptoms on suicidal behaviour among individuals with full PTSD or subthreshold symptoms. These findings are consistent with the outcomes of a number of previous studies which have shown that positive self-appraisals (i.e., relating to the ability to cope with negative emotions, problem solving and social support) buffered the effects of risk factors on suicidal behaviours among students (Johnson et al., 2010a) and psychotic patients (Johnson et al., 2010b). Together, these findings support the SAMS which emphasized the importance of boosting positive self-appraisals in order to prevent or reduce the levels of suicidal behaviour. The SAMS ascertains that positive self-appraisals have a strong protective effect and can buffer the adverse impact of important stressors on suicidal risk (Johnson et al., 2008a; Johnson et al., 2010a). Johnson and colleagues (2010a) has also proposed that positive self-appraisals confer resilience to suicidal behaviour because they undo the adverse effects of negative situation appraisals such as negative appraisals of clinical symptoms or future appraisals. Consistent with this postulation is the finding that heightened perceived social support (i.e., a domain of positive self-appraisals) buffers the impact of the PTSD symptoms (i.e., a type
of negative situation appraisals which might reflect the individual’s subjective perceptions of symptom severity) on suicidality. A direct test of the hypothesized role of positive self-appraisals would involve the use of path analysis, which was beyond the scope of this thesis.

It is noteworthy that although the SAMS perspective highlights the protective role of the positive self-appraisal component, it does not propose a clear theoretical framework to understand the function of appraisals of social support within the appraisal system. One possibility could be that appraisals of social support together with self-appraisals of the ability to gain social support, are both incorporated within the self-appraisal system and increase the risk for, or confer resilience, to suicide through their impact on situation appraisals. A second possibility is that appraisals of social support might comprise a distinct component (i.e., appraisals of external agency) of the appraisal system which has been overlooked in the current SAMS theory (i.e., hence, three subcomponents of the appraisal system might be evident: situation appraisals, self-appraisals and appraisals of external agency). This last option is closely related to the possibility of being rescued which is a key component of the CoP model (Williams et al., 2005) but not the SAMS (Johnson et al., 2008a). Other unresolved issues concern whether positive appraisals of social support confer resilience to suicide because they boost feelings of self-esteem and self-worth or because people value and feel proud of their strong social networks. It is clear that appraisals of social support do need to be better defined and better developed within the SAMS framework in order to fully understand the mechanisms through which perceived social support exerts its buffering effects on suicidality.

A final remark concerns the lack of evidence regarding potential resilience factors to suicidal behaviour in PTSD populations. Currently, this is the first study which investigated resilience factors to suicidal behaviour in PTSD in the light of recent theoretical developments (Johnson et al., 2008a; Johnson et al., 2011b). Only a limited
number of previous studies in the PTSD literature indicated that suicidal behaviour in PTSD is inversely associated with heightened levels of social support and specific coping styles (Amir et al., 1999; Jakupcak et al., 2010; Kotler et al., 2001). In addition, Johnson and colleagues (2011b) in their review proposed a range of factors (e.g., positive attributional style, high levels of agency) which have been found to undo the effects of stressors on suicide among other research populations. The ability of these factors, however, to confer resilience to suicidality in PTSD has not yet been examined. To sum up, suicide resilience in PTSD is in its infancy and there is a need for theory-driven research to examine the mechanisms of resilience in PTSD.

11.2.2.2. The protective role of positive emotions: The BMAC technique.

The last empirical study which featured in the current thesis indicated that a single BMAC session resulted in substantial mood improvement in a sample of individuals with PTSD (Chapter 10). In particular, those who were assigned to the BMAC condition reported increased levels of calmness and happiness and lower levels of sadness, hopelessness, defeat and frustration following the BMAC task compared to those who were assigned to the control task. This finding is consistent with previous reports which indicated that even fleeting, in-the-moment instances of positive emotions can result in greater levels of resilience one month later (Cohn et al., 2009). Additionally, research has demonstrated that positive emotions are associated with better mental and physical health, great job satisfaction, higher income and more fulfilling interpersonal relationships (Diener et al., 2002; Lyubomirsky et al., 2005; Ruvolo, 1998). It should be noted, however, that one study which examined the effectiveness of positive memories in improving mood found that the recall of positive memories worsened the sad mood of currently depressed individuals and did not confer any mood improvement among formerly depressed individuals. The recall of positive memories did result in mood improvements only among never depressed individuals (Joormann et al., 2007). The results of Joormann’s and
colleagues work suggest that the careful assessment of levels of depression before and during the administration of the BMAC might be required. Additionally, the replication of the current study (Chapter 10) among PTSD individuals who are also depressed would be helpful prior to the incorporation of the BMAC into a treatment plan.

One tentative hypothesis generated by these research findings is that the BMAC boosts resilience because it enhances the experience of positive self-appraisals. In particular, it might be expected that the BMAC technique would increase the individual’s awareness of past positive events and successes which in turn would encourage the development of more positively-directed self-appraisals. This theoretical possibility could inform future research which would focus on investigating the links between the BMAC, positive self-appraisals, and resilience levels. Potentially, this research approach might shed more light on the mechanisms underlying resilience and identify the conditions under which the BMAC achieves the best results for promoting resilience.

11.3. General Limitations

The limitations of each of the empirical studies in this thesis are outlined in the discussion sections of the individual chapters. Additionally, the rationale, the advantages and the limitations of core methodological choices including the research design, the recruitment strategy, the measures used, and the advanced statistical methods used, are discussed in the methodology section of this thesis (Chapter 2). This section aims to present some key general limitations which are critical for the interpretation of the outcomes of this thesis, and for leading to further research developments. Four key limitation areas have been identified and are described below.

11.3.1. Cross-sectional design.

A cross-sectional design was employed across all the studies of this thesis. Although this cross-sectional approach was deemed appropriate to provide initial evidence of the mechanisms underlying suicidal thoughts and behaviours in PTSD and the operation
of particular resilience factors, future research is needed in order to establish the validity of the current findings. Cross-sectional questionnaire designs do not allow cause and effect to be deduced. Determination of cause and effect either requires an experimental design (as used in Chapter 10) or a longitudinal design in which measures taken at baseline are used to predict outcome measures at follow up, for instance 6 or 12 months later (Taylor et al., 2011b). An additional consideration is that mediation effects are also limited by cross-sectional designs. Ideally, the measurement of mediator variables should precede the measurement of predictor variables (see section 11.5.1).

11.3.2. Sample.

The individuals recruited for this research constituted a subclinical population either diagnosed with current or lifetime PTSD or experiencing a range of PTSD symptoms without fulfilling the criteria for a full PTSD diagnosis. The lack of diagnostic homogeneity of the current sample may impair the external validity of the current findings and limit their transferability to other research samples.

An optimal approach to provide evidence for the external validity of these outcomes would be to compare the characteristics of this sample with the characteristics of a previous similar sample in the existing literature. No previous research has been identified in the literature, however, which utilized a research population with similar diagnostic characteristics to the current population. This represents, potentially, a constraint of the opportunistic sampling methodology employed in this thesis (i.e., recruiting from the community through advertising). Nonetheless, the conclusions drawn in this thesis concerning the mediational impact of perceptions of defeat and entrapment in the link between suicidality and negative self-appraisals or clinical symptoms (Chapter 6, 7 and 8) have been already reported in other research populations (Taylor et al., 2010a,b). Similarly, the ability of positive self-appraisals to confer resilience to suicidality and the effectiveness of the BMAC technique to boost positive affect have been previously tested.
in other research groups with similar findings (Johnson et al., in submission; Johnson et al., 2010a). The consistency of these findings with previous findings in other research populations provides support for the validity of the current conclusions and suggests that these results are transferable to other populations.

Furthermore, the present recruitment strategy was theoretically based by recent suggestions that categorical diagnostic systems fail to clearly distinguish normal behaviour from psychopathology (Helmchen & Linden, 2000; Widiger & Clark, 2000) and on the empirical evidence which suggests that individuals with subthreshold PTSD symptoms experience an increased risk for suicide and an equivalent impairment to those diagnosed with full PTSD (Marshall et al., 2001; Stein et al., 1997; Weiss et al., 1992; Zlotnick et al., 2002). Thus, the investigation of the psychological conditions under which suicidal thoughts and behaviour occur among individuals reporting a wide spectrum of PTSD symptoms (e.g., one PTSD symptom to full PTSD diagnosis) was based on these developments. Additionally, a series of important changes (details of these are described in section 1.2.1.) have been proposed to be included in the fifth version of the Diagnostic and Statistical Manual (DSM-5) which are expected to alter the way that PTSD is conceptualized (Friedman et al., 2010). The diagnostic characteristics of this sample would potentially alter if DSM-5 was utilized as the diagnostic tool for PTSD in this thesis.

11.3.3. Limitations associated with the choice of the measures.

Throughout this thesis, the measures which were used to assess key constructs such as suicidal thoughts and behaviours, perceptions of defeat and entrapment, hopelessness, depression, negative self-appraisals and perceived social support, were all in self-report format. This means that these measures suffer from the limitations which are inherent to the use of self-report measures, such as susceptibility to respondent bias (i.e., social desirable responses and subjective evaluations/distortions of the past events or current experiences; Stone, 2000). Future research would benefit from the incorporation of
additional measures, such as interviewer-ratings or third person ratings for the assessment of the above constructs. Nevertheless, some of the constructs measured in this thesis represent subjective psychological processes which are difficult to be externally observed (e.g., defeat, entrapment, hopelessness) or private phenomena which might be difficult to be disclosed in the context of an interview (e.g., suicidal behaviour). Alternative assessment methodologies, such as interviewer-ratings or third person ratings (i.e., relatives) would not reduce substantially the biases associated with the use of self-reports. Furthermore, the use of external raters would introduce further biases associated with the presence of another individual’s subjective judgements or observations of the participants’ experiences (Velmans, 2009). The use of ESM methodology would be an interesting approach for future research in this area (see 11.5.2 section). Although ESM is based on self-reports, the ecological validity of its conclusions might be heightened because it assesses in-the-moment responses.

A second concern is that the same set of measures was used to assess a series of variables (e.g., suicidal behaviour, defeat, entrapment) throughout the empirical chapters of this thesis. Consequently, the validity of the present conclusions is determined to a great extent by the psychometric qualities of the measures utilized in this research. It should be noted, however, that the employed measures for the assessment of the key variables of the thesis have acceptably high validity and reliability. Details for the psychometric properties of each individual scale are presented in the methodology section (Chapter 2). There is, therefore, a strong basis to suggest that the conclusions drawn in this thesis are valid. Furthermore, the use of particular measures across the different empirical chapters facilitates the direct comparison of the results across the studies of this thesis.

The inconsistent assessment of PTSD symptoms across the research run in the first and second recruitment phases potentially comprises an additional limitation of this thesis. For instance, the CAPS interview was used to assess the number and severity of PTSD
symptoms in the first research phase (Chapter 6 and 7) and the PDS measure was used for
the same purposes in the second research phase (Chapter 8, 9 and 10). This discrepancy in
the PTSD measures potentially hampers the comparability of the results across the two
research phases. Nonetheless, the high agreement between the two PTSD measures (Foa et
al., 1997) together with the consistency of the findings with the initial hypotheses and
across the different chapters of the thesis reduces the impact of the different PTSD
measures on the validity of the conclusions.

A final measurement limitation concerns the levels of suicidality assessed in this
thesis. All the empirical studies of this thesis focused on assessing non-lethal suicidal
behaviours using the SBQ-R measure (Osman et al., 2001) which offers a composite score
of various forms of suicidality (e.g., past suicide attempts, current suicidal ideation,
communication of suicide intent and future intent). It appeared that perceptions of defeat
and entrapment were the proximal psychological mechanisms of suicidal behaviour in
PTSD and that positive self-perceptions of social support buffered the association between
risk and suicidal behaviour in PTSD. Nevertheless, future research is needed to investigate
whether the outcomes of the current research differ among trauma populations with a
history of suicide attempts or completed suicides. In the case of completed suicides there
are a number of methodological approaches which could be employed including
longitudinal studies or psychological autopsy studies. For the psychological autopsy
approach it would be necessary to identify individuals who have died by suicide and obtain
information by their relatives or from recorded files (Cavanagh et al., 2003). Although the
aforementioned approaches are complex and resource-demanding, it is hoped that the
research featured this thesis will encourage more ambitious future investigations to
elucidate the psychological aspects of suicide in psychiatric populations including those
with PTSD.
11.3.4. Statistical power.

A final issue to be raised in this section concerns the statistical efficiency of the current sample sizes to adequately examine the aims of this thesis. For instance, the sample sizes utilized in this thesis to test mediation effects through Structural Equation Modelling (SEM) procedures ($n = 73$; Chapter 7) and moderation effects through moderated regression ($n = 56$; Chapter 9) are considered low and susceptible to type II error. Nonetheless, across all the studies of this thesis, statistically significant effects were obtained which were fully consistent with the initial hypotheses. Based on the significance and consistency of the findings throughout the empirical studies of this thesis, no further power calculations were considered necessary. One problematic issue is whether any non-significant results obtained in this thesis (which was consistent with the initial hypotheses) would have been significant if the sample size was larger. For example, Chapter 7 examined whether perceptions of defeat/entrapment, depression and hopelessness mediated the impact of PTSD symptom severity on suicidal behaviour. The outcomes showed that only the path from perceptions of defeat/entrapment was significant. Although these findings fully supported the initial hypotheses of the research, there is still the possibility that the non-significant effects of hopelessness and depression on suicidal behaviour were merely the result of the low statistical power (which was caused by the small sample size). Replication of this research with larger sample sizes would be particularly helpful in confirming the current findings.

11.4. Clinical Implications

The findings of the present thesis have important clinical implications which can be summarised as two main areas: prediction of suicide risk and therapeutic interventions.

11.4.1. Prediction.

One important clinical challenge is the accurate identification of those individuals who are at heightened risk for committing suicide in the future (Nock & Banaji, 2007;
Paris, 2006). The prediction of future suicides is particularly difficult, first, because only a small minority of individuals who engage in suicidal behaviours or who have suicidal thoughts go on to kill themselves, and second, the majority of the identified risk factors for suicide in the literature lack specificity (Goldney, 2005; Hawton & van Heeringen, 2009; Paris, 2006). For example, a wide range of variables including various psychiatric diagnoses, psychosocial and demographic factors, personality factors, poor physical health and many others have been reported as risk factors for suicide in the literature (Hawton & van Heeringen, 2009). The majority of the above variables represent general risk factors with limited predictive value (Johnson et al., 2008a; Paris, 2006). The research included in this thesis has demonstrated that perceptions of defeat and entrapment accounted for a large degree of variance in suicidal behaviour among individuals with PTSD. Furthermore, defeat and entrapment were found to be more robust predictors of suicidal behaviour compared to other well-established risk factors for suicide, such as comorbid depression and hopelessness. These findings indicate that defeat and entrapment are considered the proximal psychological constructs to suicidal behaviour and, as such, might represent reliable indicators of suicidal risk. Consequently, it would be expected that the incorporation of measures of defeat and entrapment into the suicide risk assessment procedures might improve the accurate identification of individuals who are at high risk for suicide. Clinicians dealing with PTSD populations might find the inclusion of measures of defeat and entrapment in their battery of suicide risk assessment tools particularly useful since PTSD populations are at heightened risk for suicide.

Additionally, the outcomes of an empirical study of this thesis (Chapter 9) further suggests that resilience factors such as positive perceptions of social support interact with risk factors (e.g., PTSD symptoms) to reduce the effects of risk factors on suicidal behaviour. Consequently, considering both risk and resilience factors could be a more efficient means of assessing the risk for suicide during standard risk assessment than
considering either risk factors or resilience factors in isolation. Based on recent theoretical advances on the conceptualization of resilience, it would be predicted that among a sample of individuals experiencing a serious stressor (e.g., traumatic event), those who consider themselves as having low levels of resilience factors (e.g., perceived social support) would be at the highest risk for suicide. Alternatively, among those who report high levels of perceived social support and other forms of positive self-appraisals, the exposure to a traumatic event should not be considered as indicative of heightened risk for suicide.

11.4.2. Intervention.

A number of implications which could guide the development of clinical interventions for suicidal risk were drawn from the conclusions of this thesis. Prior to outlining the main therapeutic implications of the current findings, it should be noted that recent accounts suggest that suicide is best conceptualized as a distinct phenomenon with its own psychological mechanisms rather than a feature of a psychiatric diagnosis such as depression (O'Connor et al., 2006; Shneidman, 1996). This suggestion is consistent with the finding of this thesis that PTSD symptoms lead to suicidal behaviour to the extent to which they add to the severity of feelings of defeat and entrapment (Chapter 7).

Based on the above suggestion, one implication for interventions which could be drawn is that future psychological therapies which intend to prevent or reduce suicide risk among PTSD populations need to target the underlying psychological mechanisms of suicide in addition to addressing PTSD symptoms and comorbid depression. Consistent with this suggestion are the findings of a meta-analysis which examined the effectiveness of randomised-controlled trials of Cognitive Behavioural Therapy (CBT) to reduce suicidality (Tarrier et al., 2008). This meta-analysis found that CBT significantly altered the levels of suicidality provided that it targeted suicidality directly. In contrast to this, CBT interventions which targeted other outcomes such as comorbid diagnoses did not have a significant effect on suicidality.
A related therapeutic inference would be that those CBT interventions which focus more directly on the psychological mechanisms of suicide are expected to achieve the best outcomes in eliminating suicide risk. Tarrier and Gooding (2007), have developed a CBT-based intervention which aims at preventing suicide risk in psychosis. The advantage of this intervention is that it focuses directly on the psychological mechanisms of suicide such as those described by the SAMS perspective. Currently, suicidality has not been the target of any psychological intervention in those with PTSD. The development of a similar intervention plan which would focus on preventing suicidality in those with PTSD would be a critical step for addressing the issue of suicide prevention in PTSD.

On the grounds of the CBT-paradigm in psychosis (Tarrier & Gooding, 2007), previous research findings (Johnson et al., 2010a; Johnson et al., 2011b; Taylor et al., 2011a; Taylor et al., 2010b) and the current outcomes of this thesis, a number of therapeutic strategies to target perceptions of defeat/entrapment could be proposed.

The first of these strategies could embrace challenging the individual’s loss of self-identity and reconstructing a more positive identity of the self. This strategy has been proposed to be particularly helpful when the defeating and trapping perceptions occur as a consequence past negative or traumatic experiences (Taylor et al., 2011a). In these cases, maladaptive cognitions associated with these negative experiences could be modified through guided re-imaging of the experiences so that the individual realizes that no permanent damage was done to his/her status or identity (Lee, 2006). Furthermore, a more positive identity could be built by highlighting the individual’s successful coping in the face of these experiences or other successes that the individual has managed to achieve (Tarrier, 2010). The second therapeutic strategy could aim at easing the individual’s tendency to posit unreasonable and unrealistic goals which increase the likelihood of feeling defeated and trapped (Taylor et al., 2011a). The third therapeutic strategy could focus on building resilience with a particular emphasis on specific positive self-appraisals,
such as perceived availability of social support, problem solving skills, and ability to cope with negative emotions and cognitions. The incorporation of positive self-appraisals into clinical therapies is very important since previous research suggests that these can alter the negative effects of risk factors (Johnson et al., 2010a,b). For example, boosting resilience as part of a suicide intervention plan might be especially useful for PTSD individuals who have been exposed to severe traumatic events. Traumatic experiences cannot be easily tackled and thus the enhancement of resilience factors could be particularly beneficial for confronting the adverse impact of trauma. One useful technique for boosting the individual’s perceptions of social support and positive self-appraisals might be the positive data-logging method whereby individuals are required to record instances of successful coping (Tarrier & Gooding, 2007). The individual’s perceptions of self-efficacy and social support might be considerably enhanced by the recorded successes and enjoyable social interactions.

Finally, the BMAC has been found to be an effective clinical method for enhancing positive emotions and improving mood among individuals with PTSD in this thesis. These findings are consistent with previous qualitative reports which explored the efficiency of the BMAC to boost mood among individuals with PTSD and depression (Tarrier, 2010a). Consequently, the BMAC could be employed in clinical practice as a method of increasing positive emotions which in turn might promote resilience (Cohn et al., 2009). The original idea behind the BMAC (Tarrier, 2010a) was that as it promoted positive mood it might also enhance cognitive processes which CBT and other therapies rely on, for instance, assessing evidence for a particular belief. This is, as yet, untested, but if true it further supports the use of the BMAC as an adjunct to therapy by delineating the mechanisms by which it enhances therapeutic techniques.
11.5. Recommendations for future research

This section aims to describe a series of research proposals which would expand the findings of this thesis and would advance the extant literature on the area of suicidal behaviour and PTSD.

11.5.1. A longitudinal investigation of perceived defeat and entrapment and positive self-appraisals in PTSD.

A central limitation of the research included this thesis is that it was cross-sectional in nature. A longitudinal research design would, therefore, be necessary to demonstrate that perceptions of defeat and entrapment lead to significant changes in the levels of suicidal behaviour among individuals diagnosed with PTSD. Similarly, the establishment of an inverse relationship between positive self-appraisals and suicidal behaviour in those with PTSD in a prospective study would be required to draw clear conclusions about whether or not positive self-appraisals confer resilience to suicidality in PTSD. The core advantage of longitudinal research is that it allows the investigation of complex causal links, including mediation and moderation effects, over time. A longitudinal future research programme is proposed among PTSD individuals that would focus on elucidating i. the effects of perceptions of defeat and entrapment, and ii. the buffering role of positive self-appraisals on suicidal behaviour.

A three year longitudinal research programme which would measure perceptions of defeat and entrapment and levels of suicidality at baseline and then every four or six months is proposed. On the grounds of the current findings, the main hypothesis of the study would be that perceived defeat and entrapment would mediate the relationship between various stressors or negative appraisals and suicidal behaviour. A series of stressors, such as adverse live events, PTSD symptom severity or particular symptoms (i.e., re-experiencing symptom cluster), maladaptive situation appraisals or self-appraisals would be predicted to increase the severity of suicidal thoughts and behaviours to the
extent to which they generate/ contribute to more severe perceptions of defeat and entrapment. Furthermore, the mediational effects of perceptions of defeat and entrapment would be expected to pertain when controlling for the effects of comorbid depression and feelings of hopelessness.

A longitudinal research approach would also be particularly valuable for obtaining causal evidence for the potential buffering effects of positive self-appraisals on suicidality among PTSD populations. Positive self-appraisals and suicidal thoughts and behaviours would be necessary to be assessed at least at two time points, at baseline and follow up. Moderation regression analyses would be employed to examine whether the interaction term between positive self-appraisals and risk factors at follow up predict suicidal behaviour at follow up, whilst controlling for baseline levels of suicidal behaviour. It should be noted that the possibility of a Type II error is elevated when investigating interaction effects and thus a high degree of power is required to detect significant effects (Johnson et al., 2011b). In order to avoid this caveat, the recruitment of a large initial sample (i.e., \( n = 120 \)) is particularly useful to conduct this kind of analyses.

11.5.2. An experience sampling research study investigating the cognitive processes which underlie suicidal behaviour in PTSD.

A core assertion of the SAMS model is the operation of a negatively-biased appraisal system which generates increasingly entrenched perceptions of defeat and entrapment. The proposed role of the appraisal system has received initial support in this thesis by demonstrating that negative self-appraisals exert their effects on suicidal behaviour through their association with perceptions of defeat and entrapment (Chapter 8). However, more research is needed to investigate the role of different aspects of this negative appraisal system in generating a sense of being defeated and trapped. Previous theorists defined the appraisal system as a set of evaluation judgements which emerge rapidly and automatically and involve attention, interpretation, and inference (Johnson et
The appraisal system is believed to incorporate belief systems and attitudes held by individuals and is considered vital since it affects the degree to which events and experiences are viewed as stressful, challenging, or indeed, an opportunity (Lazarus & Folkman, 1984; Roe et al., 2006). Investigations employing cross-sectional approaches limit their focus on the generic characteristics of this cognitive appraisal system and fail to capture the automatic and momentary facets of appraisals. In contrast, experience sampling methodologies involve a detailed assessment of both transient/in the moment (e.g., diary-like assessments) and more general features of various behaviours and experiences (Myin-Germeys et al., 2009). On the basis of these characteristics, experiencing sampling methods have been suggested to be a valuable means of assessing phenomenological and aetiological aspects of psychopathology (Myin-Germeys et al., 2009). An experience sampling research programme could, therefore, be pursued to elucidate the processes through which particular maladaptive appraisals contribute to the development of the feeling of being defeated and trapped.

In such an experience sampling study it would be preferable to recruit PTSD individuals with moderate to severe forms of suicidality such as a history of suicide attempts or persistent suicidal ideation. This recommendation is based on the assumption that individuals with high levels of suicidality would be expected to exhibit elevated levels of defeat/entrapment. The assessment of particular types of appraisals which have been suggested to be closely associated with defeating and entrapping feelings should be emphasized. Examples of these appraisals include judgements of personal status/importance, self-evaluated efficiency in achieving goals and handling difficult problems, negative emotions or symptoms, and perceived availability of social resources. The core aim of such a study would be the investigation of the associations between these momentary cognitive appraisals and more general measures of defeat and entrapment. A
central prediction would be that differences in the levels of general feelings of defeat and entrapment would be accurately predicted by the levels of transient appraisals.

11.5.3. Broad-Minded Affective Coping procedure (BMAC).

The last empirical study of this thesis (Chapter 10) demonstrated that a single BMAC session increased the levels positive emotions and reduced the levels of negative emotions at post-induction. These findings imply that the BMAC represents an effective technique for boosting mood. The beneficial effects of the BMAC on mood, however, did not pertain over two hours and two days following the completion of the BMAC session. The inability of the BMAC to obtain significant results in the long-term was justified in terms of the following limitations: i. this study examined the impact of only a single BMAC session, and ii. the BMAC was used solely and not as part of a more extended therapeutic plan (Chapter 10). Tarrier (2010a) proposed that BMAC should be used on a recurrent and regular basis and as part of other long term interventions (e.g., CBT). A future research strategy which would avoid the limitations of the current work is, therefore, needed to investigate the efficiency of the BMAC to improve mood.

Subsequent research is proposed to investigate the impact of the BMAC which would last one week. In this research plan, half of the participants would practice the BMAC technique every day for a week and half would practice a control task for the same period of time. Similar to the study reported in this thesis, participants could be asked to complete visual analogue scales at the same time each day. As it has been previously noted, the BMAC potentially boosts mood because it enhances the experience of positive self-appraisals. This hypothesis could be empirically tested through adding a measure of positive self appraisals (e.g., Resilience Appraisals Scale) into the study and examining the inter-relations between BMAC, positive self-appraisals and mood improvement. Finally, one potential fruitful approach would be to examine the effects of BMAC using ESM techniques.
11.6. Conclusions

In conclusion, this thesis investigated the psychological mechanisms which underlie the occurrence of suicidal behaviour in those with PTSD and potential resilience factors that buffer the risk for suicide in PTSD.

Perceptions of defeat and entrapment have been proposed to be the key psychological drivers of suicidal behaviour in the previous literature. The role of these variables in the development of suicidal behaviour has been particularly emphasized by two recent theoretical perspectives of suicidal behaviour, the CoP and SAMS. Despite the theoretical and empirical evidence for the importance of defeat and entrapment in suicidal behaviour, no empirical research had investigated these processes among PTSD populations prior to the commencement of this thesis. The present thesis advanced the understanding of the link between suicidal behaviour and PTSD, and the function of defeat and entrapment in this association. Empirical evidence was obtained that perceptions of defeat and entrapment were strongly positively associated with the levels of suicidal behaviour in PTSD. Two further empirical studies demonstrated that perceptions of defeat and entrapment mediated the effects of PTSD symptoms and negative self-appraisals on suicidal behaviour among individuals with full PTSD or subthreshold PTSD symptoms. Overall, these findings supported the predictive effects of defeat and entrapment on suicidality, and favoured the suggestion that perceptions of defeat and entrapment are proximal psychological indicators of suicide.

The current thesis has also made important advances in the area of resilience to suicidal behaviour in PTSD. On the basis of the SAMS perspective and the contemporary view of resilience as a factor which buffers the impact of risk factors on suicidality, two investigations were conducted. The first investigation demonstrated that high levels of perceived social support buffered the effects of PTSD symptoms on suicidal behaviour. The second investigation provided evidence for the utility of a recently developed clinical
method, the BMAC, for boosting mood. The research in this thesis was the first to investigate resilience to suicide among PTSD populations on the basis of recent theoretical propositions. The present findings concerning the protective effects of perceptions of social support and the BMAC could be incorporated into future psychological interventions which aim to promote resilience.
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Holdgate, A., Asha, S., Craig, J., & Thompson, J. (2003). Comparison of a verbal numeric rating scale with the visual analogue scale for the measurement of acute pain. *Emergency Medicine, 15*(5-6), 441-446. doi: 10.1046/j.1442-2026.2003.00499.x


on Alcohol and Related Conditions. Depression and Anxiety, 27(9), 791-798. doi: 10.1002/da.20674


suicidal behavior and severity of depression. *Journal of Nervous and Mental Disease*.


APPENDIX I: PARTICIPANT INFORMATION SHEET FOR RESEARCH PHASE 1 (CHAPTERS 6 AND 7).

School of Psychological Sciences

Participant Information Sheet

Title of project: Hopelessness and suicidal behaviour after trauma.

We would like to invite you to take part in a research study. Before you decide you need to understand why the research is being done, and what it would involve for you. Please read the following carefully.

Introduction

People exposed to a serious psychological trauma often experience posttraumatic symptoms or develop Posttraumatic Stress Disorder (PTSD) and depressive symptoms. The majority of the trauma victims manage to cope well with their experience. Some trauma victims however, become increasingly negative about themselves, their past and present situation and pessimistic about the future. They may also experience feelings of low self-worth, guilt and thoughts of ending their lives. In order to develop effective treatments for the prevention or reduction of these negative feelings among trauma victims, it is necessary to understand why some people with a previous traumatic experience are vulnerable to these feelings while others are not. Some traumatic experiences affect the way people see themselves and the world. Also the levels of the support they receive may be particularly important in distinguishing those who, manage to cope well from those who do not manage to cope so well. The aim of this research is to investigate these factors in more detail.

What will I be asked to do if I take part?

Once you decide to participate in the study you will be sent two copies of a questionnaire to assess the presence and severity of a number of PTSD symptoms such as distressing memories, flashbacks e.g. You should complete the first copy of the questionnaire accordingly to how you were feeling when your condition was at its worse and the second copy accordingly to the way you feel now. This part of the study should last no longer than 15 minutes. Once you have finished both copies of the questionnaire you can simply post them back to us in the stamped and addressed envelope provided.

Next, if you meet the inclusion criteria of the study, you will be invited (by phone or mail) to an interview which should not last more than 60-70 minutes. The interview will be arranged at a date and time that you find convenient and it will take place in the Zochonis building 2nd floor, The University of Manchester, Oxford road, M13 9PL. Your interviewer will be a psychologist.

During the interview you will be asked to describe your traumatic experience, the impact that this experience had on your life and how did you manage to cope. You will be asked then to rate on a simple rating scale how the feelings or symptoms you experienced made you feel when your condition was at its worst and now.

After the completion of the interview you will be asked to complete a series of questionnaires which assess aspects of yours psychological well-being such as
depressive symptoms, feelings of hopelessness and suicidal thoughts or behaviours.

There will be a short follow-up call, which will be made by the interviewer one or two days after you have completed the questionnaires. This is not part of the study, but simply to ensure your well-being and will not take up much of your time.

**Will my data be confidential?**

Everything you discuss in the interview and the information collected during the study will be kept completely confidential. Only the research team and staff responsible for monitoring and audit of research conduct on behalf of the sponsor, will have access to it. However, if a serious risk of harm to yourself or others disclosed during the interview this has to be reported to the appropriate bodies.

**Do I have to take part?**

There is no obligation to take part in this study. Furthermore, you may withdraw from the study at any time without giving a reason, and if you wish, the data collected from you, will be destroyed.

**What are the benefits of taking part?**

During the interview you will have the opportunity to tell your story and to talk openly about your feelings. This study aims to lead to further research in the area and to develop effective interventions among people exposed to serious psychological trauma. Thus, by participating in the research you may help other people who experience similar problems to you. Furthermore, your participation will be beneficial for research in the area of trauma and suicidal behaviour.

**What are the risks of taking part?**

You may find some questions asked during the interview personal or upsetting. However, you do not have to answer any question if you do not want to. Opportunities for breaks will be offered and if you feel distressed you can contact one of the project supervisors. Furthermore, at the end of the study, information and a list of contacts that you may find helpful will be given to you.

**Who is organizing the study?**

The study is organized by the University of Manchester.

**What if there is a problem?**

If you have any concerns about the study please contact the research team in the first instance that will do their best to answer them. I you do not wish to raise your concern with the research team or if you want to make a complaint, please contact a Research Governance and Practice Coordinator on 0161 2757583 or 0161 2758093 or by email to research-governance@manchester.ac.uk.

**What will happen to the results of the study?**

This project is a PhD student study. The results of the project may be published in scientific journals. However, no personal information will be contained in any publication. Furthermore, a summary of the main findings of the research will be provided to you if you indicate that you would like to receive them.
Any out of pocket expenses incurred through participation in the study will be reimbursed.

**Where can I obtain further information if I need it?**

If you have any questions or concerns about anything mentioned or involved in this study, please contact:
Maria Panagioti, maria.panajoti@postgrad.manchester.ac.uk,

The project supervisors:
Dr Patricia Gooding, patricia.a.gooding@manchester.ac.uk,
Professor Nicholas Tarrier, nicholas.tarrier@manchester.ac.uk Tel: 0161 306 0404

**This project has been approved by the Stockport Research Ethics Committee**

(Reference Number :09/H1012/40)
APPENDIX II: PARTICIPANT INFORMATION SHEET FOR RESEARCH

PHASE 2 (CHAPTERS 8, 9 AND 10).

School of Psychological Sciences

Participant Information Sheet

Title of project: Hopelessness and suicidal behaviour after trauma.

*We would like to invite you to take part in a research study. Before you decide you need to understand why the research is being done, and what it would involve for you. Please read the following carefully.*

**Introduction**

People exposed to a serious psychological trauma often experience posttraumatic symptoms or develop Posttraumatic Stress Disorder (PTSD) and depressive symptoms. The majority of the trauma victims manage to cope well with their experience. Some trauma victims however, become increasingly negative about themselves, their past and present situation and pessimistic about the future. They may also experience feelings of low self-worth and thoughts of ending their lives. In order to develop effective treatments for the prevention or reduction of these negative feelings among trauma victims, it is necessary to understand why some people with a previous traumatic experience are vulnerable to these feelings while others are not. Some traumatic experiences affect the way people see themselves and the world. Also the levels of the support they receive may be particularly important in distinguishing those who, manage to cope well from those who do not manage to cope so well. The first aim of this research is to investigate these factors in more detail.

A recently developed therapy suggests that remembering a past happy memory can help boost mood. However, it is not clear how effective memory recall is for boosting mood and the length of time for which improved mood may last. The second aim of this study is to investigate how effective memory recall is for boosting mood.

**What will I be asked to do if I take part?**

If you agree to take part you will be invited (by phone or mail) to an interview which will take place in the Zochonis building 2nd floor, the University of Manchester, Oxford road, M13 9PL. The interview will be arranged at a date and time that you find convenient and it. Your interviewer will be a psychologist. During the interview you will be asked to complete some practical tasks that will require you to think about some concepts that the researcher will introduce to you (i.e., happiness, suicide). This part should last about 15 minutes. Afterwards, you will be asked to complete some simple questionnaires which assess aspects of your psychological well-being (e.g., feelings of depression, levels of support, feelings of hopelessness). This part should last about 40 minutes. Next you will be asked some questions about your current mood state. Examples of the sorts of questions include rating your current experience of emotions such as “determined” and “scared”. You will then be requested to either recall a past positive memory
assisted by the researcher, or to write about a past happy memory. Following this you will be asked to complete the questions again. You will also be asked some questions about how you found the task, which will be recorded. This should take between 25 and 30 minutes.

Overall, the study should last no more than 1 hour and 30 minutes. You will be reimbursed £10 for taking part in the study. Following the session, you will receive a phone call 2 hours later and again 2 days later. During these calls you will be asked to complete some brief questions on your current mood state. These phone calls should take around 5-10 minutes each.

**Will my data be confidential?**

Everything you discuss in the interview and the information collected during the study will be kept completely confidential. Only the research team and staff responsible for monitoring and audit of research conduct on behalf of the sponsor, will have access to it. However, if a serious risk of harm to yourself or others disclosed during the interview this has to be reported to the appropriate bodies.

**Do I have to take part?**

There is no obligation to take part in this study. Furthermore, you may withdraw from the study at any time without giving a reason, and if you wish, the data collected from you, will be destroyed.

**What are the benefits of taking part?**

During the interview you will have the opportunity to tell your story and to talk openly about your feelings. This study aims to lead to further research in the area and to develop effective interventions among people exposed to psychological trauma. Thus, by participating in the research you may help other people who experience similar problems to you. Furthermore, your participation will be beneficial for research in the area of trauma and suicidal behaviour.

**What are the risks of taking part?**

You may find some questions asked during the interview personal or upsetting. However, you do not have to answer any question if you do not want to. Opportunities for breaks will be offered and if you feel distressed you can contact one of the project supervisors. Furthermore, at the end of the study, information and a list of contacts that you may find helpful will be given to you.

**Who is organizing the study?**

The study is organized by the University of Manchester.

**What if there is a problem?**

If you have any concerns about the study please contact the research team in the first instance that will do their best to answer them. I you do not wish to raise your concern with the research team or if you want to make a complaint, please contact
What will happen to the results of the study?

This project is a PhD student study. The results of the project may be published in scientific journals. However, no personal information will be contained in any publication. Furthermore, a summary of the main findings of the research will be provided to you if you indicate that you would like to receive them.

Where can I obtain further information if I need it?

If you have any questions or concerns about anything mentioned or involved in this study, please contact:
Maria Panagioti, maria.panagioti@postgrad.manchester.ac.uk,

The project supervisors:
Dr Patricia Gooding, patricia.a.gooding@manchester.ac.uk,
Professor Nicholas Tarrier, nicholas.tarrier@manchester.ac.uk Tel: 0161 306 0404

This project has been approved by the Stockport Research Ethics Committee

(Reference Number :09/H1012/40)
APPENDIX III: ENTRAPMENT SCALE (CHAPTERS 6, 7 and 8)

Please read each of the following statements carefully and indicate how much you feel like this by circling a number on the scale.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not at all like me</th>
<th>A little like me</th>
<th>Moderately like me</th>
<th>Quite a bit like me</th>
<th>Extremely like me</th>
</tr>
</thead>
<tbody>
<tr>
<td>I want to get away from myself</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel powerless to change myself</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would like to escape from my thoughts and feelings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel trapped inside myself</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would like to get away from who I am and start again</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel I'm in a deep hole I can't get out of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am in a situation I feel trapped in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have a strong desire to escape from things in my life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am in a relationship I can't get out of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I often have the feeling that I would just like to run away</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel powerless to change things</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel trapped by my obligations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can see no way out of my current situation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would like to get away from other more powerful people in my life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have a strong desire to get away and stay away from where I am now</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel trapped by other people</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX IV: DEFEAT SCALE (CHAPTERS 6, 7 and 8)

Please read each of the following statements carefully and indicate how often you have felt like this in the previous seven days by circling a number on the scale.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Mostly</th>
<th>Always/ All the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel that I have not made it in life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that I am a successful person</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel defeated by life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that I am basically a winner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that I have lost my standing in the world</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that life has treated me like a punchbag</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel powerless</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that my confidence has been knocked out of me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel able to deal with whatever life throws at me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that I have sunk to the bottom of the ladder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel completely knocked out of action</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that I am one of life’s losers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that I have given up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel down and out</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel I have lost important battles in life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that there is no fight left in me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX V: SOCIAL SUPPORT INVENTORY (CHAPTER 9)

We are interested in the amount of support you have received in the past from those close to you and the amount of support you would expect to receive following a traumatic event.

Please read each question carefully. You will notice that below the question is a line with two extreme answers, one at each end. Please mark 1-10 which represents how you feel about the question.

1. How critical of you is the person closest to you?

Not at all                                               Very Critical

1  2  3  4  5  6  7  8  9  10

2. How critical are you of the person closest to you?

Not at all                                               Very Critical

1  2  3  4  5  6  7  8  9  10

3. How satisfactory is the emotional support you get from those close to you?

Very Poor                                              Very Good

1  2  3  4  5  6  7  8  9  10

4. How satisfactory is the practical support you get from those close to you?

Very Poor                                              Very Good

1  2  3  4  5  6  7  8  9  10

5. What type of support do you expect to get following a traumatic event?

Very Poor                                              Very Good

1  2  3  4  5  6  7  8  9  10
APPENDIX VI: RESILIENCE APPRAISALS SCALE (CHAPTER 8)

Please read each item and consider the extent to which you agree with it. Please circle on the scale next to it which best reflects your response.

<table>
<thead>
<tr>
<th>Item</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. If I were to have problems, I have people I could turn to</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>2. My family or friends are very supportive of me</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>3. In difficult situations, I can manage my emotions</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>4. I can put up with my negative emotions</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>5. When faced with a problem I can usually find a solution</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>6. If I were in trouble, I know of others who would be able to help me</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>7. I can generally solve problems that occur</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>8. I can control my emotions</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>9. I can usually find a way of overcoming problems</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>10. I could find family or friends who would listen to me if I needed them to</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>11. If faced with a set-back, I could probably find a way round the problem</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>12. I can handle my emotions</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>
APPENDIX VII: VISUAL ANALOGUE SCALES (CHAPTER 10)

Below are six descriptors of mood. Mark a dash on each line at where you feel your current mood falls.

*Currently, I feel that I am……*

<table>
<thead>
<tr>
<th>Sad</th>
<th>Calm</th>
<th>Defeated</th>
<th>Happy</th>
<th>Hopeless</th>
<th>Frustrated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very sad</td>
<td>Very calm</td>
<td>Very defeated</td>
<td>Very happy</td>
<td>Very hopeless</td>
<td>Very frustrated</td>
</tr>
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Not at all sad    Not at all calm   Not at all defeated   Not at all happy   Not at all hopeless   Not at all frustrated
USEFUL INFORMATION AND CONTACTS FOR PARTICIPANTS

If you feel distressed you should contact your G.P. or the appropriate mental health professional with whom you are in contact within mental health services. In an emergency attend the Accident and Emergency Department.

These are some contacts you may find helpful:

**SAMARITANS:** 08457 90 90 90 (24 HOUR HELP)

**MIND (Info line):** 0161 272 8205

**PTSD Forum- Post Traumatic Stress Disorder Community:**
http://www.ptsdforum.org/

**PTSD Forum, PTSD support group community:**
http://ehealthforum.com/health/ptsd.html
APPENDIX IX: PARTICIPANT FEEDBACK SHEET

You can use this sheet to provide us with feedback about what it was like taking part in the study, and about your attitudes to research in general. Feel free to mention anything you liked or disliked about the study. Responses can be written below each question in the spaces provided.

How did you find it talking about the issues raised in the study?

What was your general experience like, taking part in this study?

How do you feel about research in this area?

Any additional comments?
Finally, we would like you to list characteristics about yourself which you like or feel proud of

Please take a moment to think about specific instances where you feel you have displayed these characteristics, and note them below.

If you find this difficult, you can just think of activities or events, which you find particularly enjoyable, and list them below.

Are there any comments you would like to make, or anything you feel may help us.

Thank you very much!