An investigation into healthcare staff exposed to workplace violence.

Daniel C. Salter

Clinical Psychology Unit

Department of Psychology

University of Sheffield

Declaration

This work has not been submitted to any other institution or for any other qualification.

Thesis Abstract

Violence towards healthcare staff is increasingly prevalent in today's NHS. The aim of this thesis was twofold: to establish the current state of research into this problem; and to contribute to the theoretical understanding of one of the common outcomes of this phenomenon: posttraumatic stress disorder. The literature review assessed research relating to the incidence, prevalence and effects of workplace violence (WPV), focussing on healthcare settings. Studies indicate a range of effects on victims including physical injury, behaviour changes and psychological symptoms, although methodological problems exist with this research. Also lacking is an over-arching psychological framework to account for the full effects of WPV. Models accounting for PTSD are described and drawn upon to outline psychological methods necessary to develop such a framework.

In the current study, psychological response variables were investigated for their involvement in the development of persistent symptoms of PTSD in 99 NHS staff exposed to violence at work. Factors associated with PTSD symptoms at four months post-trauma included: disorganised memory, data-driven processing, state dissociation, self-referent processing, appraisal of PTSD symptoms, trait dissociation and avoidant behaviour. All these factors accounted for significant variance in PTSD symptoms after controlling for pre-trauma and stressor severity factors.

A risk index consisting of 'educational qualification', 'trait dissociation' and 'avoidant behaviour', measured two months post-trauma, discriminated individuals with persistent symptoms at four months post-trauma from those without. This enabled better than chance predictions to be made. Further validation is required. Clinical implications are discussed.

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Word Counts

The literature review has been prepared according to the guidance of the Journal of Traumatic Stress (see Appendix A). The thesis is submitted under option B and also prepared according to the guidance of the Journal of Traumatic Stress.

Literature Review	7989
Literature Review References	1731
Literature Review Total	**9720**
Research Study	7991
Research Study References	1455
Research Study Total	**9446**
Critical Appraisal	4215
Critical Appraisal References	301
Critical Appraisal Total	**4516**
Thesis Total (excluding references & appendices)	**20,195**
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Healthcare employees exposed to workplace violence: a review of incidence, effects and theory.

Daniel C. Salter

Clinical Psychology Unit, University of Sheffield, United Kingdom

Word Count: 7989

44 Carr Lane York YO26 5HX UK Tel. +44 1904 332 494

pcp00dcs@shef.ac.uk

Abstract

Violence towards healthcare staff represents a live, but little researched, problem in today's NHS. Research describing the incidence, prevalence and effects of workplace violence (WPV) is therefore reviewed, focussing on healthcare settings, to establish the extent of the problem and its impact on victims.

Studies indicate a range of effects including physical injury, behaviour changes and psychological symptoms, although methodological problems exist with this research. Also lacking is an over-arching psychological framework to account for these effects. Developed theoretical explanations only exist for one major psychological outcome of WPV: posttraumatic stress disorder. Models accounting for PTSD are described and drawn upon to outline appropriate psychological methods to develop a framework to account for the full effects of WPV.

Key words:

Workplace, violence, aggression, effects, theory.

Introduction

This review aims to investigate and critique research relating to violence and aggression in the workplace, particularly drawing on research relating to health service employees. Having first defined the relevant terms, the extent of the problem will be described. Research identifying the effects of workplace violence (WPV) on victims will then be reviewed, and the methodological limitations of these studies will be highlighted.

One of the limitations of this body of research is a relative dearth of guiding psychological theory. Two theoretical approaches that have been proposed for other effects of WPV will be reviewed and critiqued first. However, the only outcome of WPV with substantially researched explanatory theories is Post Traumatic Stress Disorder (PTSD). Having outlined the key features of PTSD, a description and evaluation of three recent PTSD theories will be given. Although there are still limitations to these approaches, they illustrate that psychological research can provide the methods and models to overcome current deficiencies and deficits in our understanding of other WPV outcomes.

Search strategy

Relevant studies were identified from searches from 1990 to 2003 of PsychINFO and Medline, which contain published articles, books, dissertation abstracts and conference proceedings. Key terms employed included 'workplace violence', 'aggression', 'assault', 'trauma', 'effects', 'psychological theory'. A backwards

search strategy, identifying articles from the reference sections of papers, was also employed. Other researchers in this field also contributed further relevant articles.

Violence at work - Definition of terms

Before describing and evaluating any body of literature, it is appropriate to define the relevant terms in order to clarify the remit of the review. The definitions given in this section are taken from studies or documents relating specifically to violence at a place of employment. More general definitions will therefore not be given.

Violence

Broadly two types of definition of the term 'violence' can be found. These differ on whether acts only involving physical contact are specified or whether verbal intimidation is also included. The lack of a standard definition obviously makes comparisons between studies problematic (Hansen, 1996). Examples of both are given below:

> " *... violence can be defined as violent acts: including physical assaults and threats of assaults, directed towards persons ...*" (Choe, 2000; p159)

> " *...violence is assault, or the use of physical force, either from an object or body with the intention of inflicting harm on another.*" (Williams, 1996; p 73)

A definition of verbal aggression is rarely given separate from physical aggression. Buss (1961; cited in Rippon, 2000) does provide differentiated definitions, breaking verbal aggression down further into active and passive, direct and indirect axes. These are illustrated in Table 1.

It follows that WPV consists of violent acts directed towards individuals who are at work or on duty (Choe, 2000). Both definitions above focus on acts which deliberately cause harm to individuals, rather than violence towards objects, whose aim may not be to threaten individuals. Both are possible in the workplace and either may involve persons feeling threatened. Such an inclusive definition was not found in this review.

The term 'aggression' was regularly found though, in ways suggesting it is either directly interchangeable with violence (Steensma, 2002), or that some distinction exists (Bourn, Maxfield, Terry & Taylor, 2003). Tobin (2001) and Rippon (2000) regard 'aggression' and 'violence' as representing different points on a continuum. An aggressive act is defined as "a hostile invasion to person or property" which might involve "open hostility, intimidation and threats to safety". Violence is considered an extreme form of aggression and defined as " a severe, extreme, negative and harmful disturbance to person or property, which includes violation of the rights of those involved" (Tobin, 2001).

In the current review, an inclusive definition of 'violence' has been adopted. As well as reviewing publications that defined violence only in terms of physical abuse, those that included verbal abuse in their definitions have also been reviewed.

Table 1: Different types of verbal aggression

Type of Verbal aggression	Example
Active-direct	Insulting or causing a person to 'lose face' in public
Active-indirect	Spreading malicious rumours about another person
Passive-direct	Refusing to speak to another person
Passive-indirect	Failing to make specific verbal comments (e.g. failing to speak up in another's defence when unfairly accused)

Extent of the Problem

The phenomenon of violence is pervasive throughout society (Choe, 2000; Flannery, 1996). Although recent government statistics in the U.S. and the U.K. have indicated violence on the wane (Beck & Schouten, 2000), it still represents a significant problem in the workplace (Runyan, Zakocs & Zwerling, 2000; Tobin, 2001). The true extent is difficult to establish as a result of many factors, including the lack of a standard definition of violence and the lack of a routine method for recording such incidents at work (Fernandes et al., 1999).

Nevertheless, figures still highlight a considerable problem. In a U.S. study of 598 working people, selected using a random digit telephone method, the proportion who reported being threatened with violence at work in the past year was 7.4%. The proportion reporting an incident at some point in their lifetime was 21.2% (Budd, Arvey & Lawless, 1996). Furthermore, the National Institute for Occupational Safety and Health (NIOSH, 1993; cited in Choe, 2000) ranked WPV as the second leading cause of occupational death, with approximately 1400 people murdered at work each year. Most of these deaths (85%) occur during robberies and may reflect the availability of firearms in the U.S..

Whilst deaths can be devastating to colleagues, family and friends, the vast number of less severe physical assaults, threats of violence, and abusive behaviours that occur each year yield a much greater impact and cost (Warshaw & Messite, 1996). The

yearly incidence of non-fatal injuries caused by WPV in the US was recently estimated at two million (Rosen, 2001).

It was not possible to identify a UK data set that detailed the yearly incidence of deaths at work owing to violence, as the British Crime Survey does not routinely report such statistics. However, a special Home Office study of WPV in 1997, (Home Office, 1997; cited in Carter, 2000) estimated that 1.2 million incidents of WPV took place in England and Wales, with 523,000 involving physical assaults and the remainder threats of violence. A total of 649,000 people would have experienced one form of WPV, representing 2.8% of the total workforce.

Estimates of the prevalence and costs of WPV are made with the acceptance that under-reporting is widespread (Rippon, 2000). Researchers have suggested many reasons for this including: a lack of consensus on definitions of violence; cultural acceptance of violence; lack of interest by employers; lack of any reporting mechanism and the fear of blame or reprisals by the victims (Warshaw & Messite,1996). Whilst these appear rational explanations, no data were presented to support these hypotheses.

However, at least some evidence exists of underreporting. For example, 95/104 (91%) Canadian casualty department staff stated that violence at work was underreported (Fernandes et al., 1999). The researchers found that 21/48 (44%) staff who had been physically assaulted resulting in injury stated that they never or rarely reported it whilst 38/70 (54%) of those assaulted without injury said likewise.

Certain occupations are thought to be at higher risk of exposure to violence than others. Those in day to day contact with the public are particularly exposed, including social service workers and especially healthcare professionals (Choe, 2000). For example, the 2000 British Crime Survey identified nurses as being up to four times more likely to experience work-related violence and aggression than other workers.

This is an international nursing experience with studies in the U.S. (Williams, 1996), Canada (Rippon, 2000), and Australia (O'Connell, Young, Brooks, Hutchings & Lofthouse, 2000) reporting similar findings. For example, 95% of a random sample of Australian nurses had experienced several episodes of verbal aggression in the past year, with 80% actually subjected to a physical assault (O'Connell et al., 2000).

Details of the extent of the problem of violence and aggression within the UK National Health Service were given in a report published recently by the National Audit Office (Bourn et al., 2003). Data from all 282 trust health and safety departments in England indicated 95,501 recorded incidents of violence and aggression towards staff in 2001-2002. This represented an increase of 13% over 2000-2001, which at 84,214 incidents was itself an increase of 30% over 1998-1999. In the most recent survey, violence and aggression accounted for 40% of all health and safety incidents within the health service. The response rate for the 2001-2002 survey was 98.5%.

Studies report a range of findings concerning who perpetrates violence in healthcare settings. This is partly because each asks about different groups of potential perpetrators (Nolan, Dallender, Soares, Thomsen, & Arnetz, 1999; O'Connell et al.,

2000). Most identify patients as the main perpetrators. For example, the proportions of two nurse samples reporting aggression were 84% (O'Connell et al., 2000: verbal) and 96% (Nolan et al., 1999). Other reported perpetrators included patients' visitors or work colleagues.

Summary

Whilst government crime statistics suggest that violence is decreasing within society, studies of the incidence and prevalence of WPV indicate that it still represents a considerable problem. In particular, studies have shown that for healthcare workers, the trend is in the opposite direction. It is important therefore to establish what might be the effects of this violence, particularly on healthcare staff.

Effects of Workplace Violence

A number of studies have looked at the effects of WPV (e.g. Barling, Rogers and Kelloway, 2001). These have identified effects on various groups, including: directly victimised employees, vicariously victimised employees, clients and employers. The latter group, for example, are typically affected by increased costs following violence towards their staff (Hansen, 1996). A recent review of the effects of violence in psychiatric settings (Hatch-Maillette & Scalora, 2002) suggested such costs may be linked with lost work days, decreased productivity, legal liability costs, increased employee turnover and associated recruitment and training costs. The recent National Audit Office report (Bourn et al., 2003), estimated the yearly cost to the NHS of violence-related work absence to be £69 million.

With respect to effects on employees, some studies have investigated samples of healthcare workers (e.g. Anderson, 2002), whilst others have drawn samples from the population of general workers (e.g. Budd, Arvey & Lawless, 1996). This review will be restricted to the former group of studies.

The effects identified by these studies have been grouped into four sections: physical, emotional, behavioural, and psychological effects. However, whilst an attempt has been made to distinguish between these categories, there is inevitable overlap. For example, anxiety is experienced as an emotion, but it is also a psychological construct, measurable using reliable and valid psychological instruments. It is questionable which of these categories it should be put into, therefore.

Physical effects

Included within this category are effects upon the victim's physiology i.e. the body and physical processes. There is some evidence of physical consequences to healthcare staff following workplace aggression. In a study by Williams (1996), 87/345 nurses who experienced physical assaults reported injuries including minor cuts, bruises and pain, with a quarter requiring treatment. The proportion who had actually sustained injuries was not given.

O'Connell et al. (2000) found that 8 % of the victims of aggression (n=199) required medical treatment. However, their definition of aggression included verbal abuse which on its own is unlikely to cause physical injury. If the number of persons requiring treatment for physical violence were divided by the total sample in each of

these two studies, the proportions are actually very similar (Williams – 6.3%; O'Connell et al. – 7.7%).

Hatch-Maillette and Scalora (2002) suggest further physical consequences including tiredness, cardiopulmonary problems, hypertension and susceptibility to illness, although no supporting data were given. Weak evidence for the last effect is provided by Nabb (2000) who highlighted a belief from nurses that feeling run-down after verbal abuse would leave the victim more prone to infections. However, no hard evidence indicated that this actually occurs.

It may be therefore that whilst exposed to considerable amounts of violence, the severity is generally low enough for serious physical consequences to be rare (Wykes & Whittington, 1998).

Emotional effects

Included in this section are outcomes relating directly to emotions experienced by victims of WPV, irrespective of whether they are psychologically mediated. Several emotional consequences have been suggested in the literature, some with supporting evidence (Barling et al., 2001; Williams, 1996), others without (Anderson, 2002). Williams (1996) identified a range of emotional reactions to assault in her nurse participants. Those most frequently recorded emotions included anger, reported by 61.7%, anxiety (45.7%) and shock and disbelief (26.6%). Further emotional reactions were reported by O'Connell et al. (2000). Those participants exposed to verbal aggression (n=163) reported frustration (73%), anger (70%) and hurt (47%) as their most common three emotions. Those exposed to physical aggression (n=160)

reported, in addition to frustration (56%) and anger (55%), fear (39%) as most frequently experienced. Other emotions identified in this study included anxiety, embarrassment, guilt, helplessness and resentment.

Fear has been widely reported as an emotional outcome of violence. In a study of 106 accident and emergency department staff (Fernandes et al., 1999), 73% stated they were afraid of patients as a result of violence in the department. In more detail, 25 (24%) were only afraid of the violent patient, 37 (35%) were afraid of those they thought 'could' be violent, whilst 15 (14%) feared patients in general. In addition, a study by Barling et al. (2001) of 292 female healthcare professionals found that WPV predicted fear of its recurrence in victimised staff.

Other emotions cited as consequences of WPV, but not in conjunction with any supporting evidence included anxiety, cynicism (Hatch-Maillette & Scalora, 2002), discomfort at work and 'feeling bad' (Anderson, 2002).

Some caution should be applied when considering the results of these studies, however. Without exception, they were cross-sectional in design, and participants' self-reports would therefore be subject to memory errors. In addition, they cannot be cited as evidence of a causal link between the aggressive episode and emotional reactions. Although these emotions may have been experienced following the event, they may also have been experienced prior to it. Temporal order could not be established in any of these studies as a result of their design. Furthermore, apart from in the Barling et al. (2001) study, no standardised measures were employed to evaluate the emotions experienced by healthcare staff. Thus we cannot be sure of the

validity or the reliability of the measures used. Finally, most measurement of participant responses took place at only one time point. Little sense could therefore be gained about the duration of the highlighted effects.

However, one prospective study was found that identified emotional reactions to violent incidents (Wykes & Whittington, 1998). The authors assessed the levels of distress of a group of 26 nurses working on a psychiatric intensive care unit. They used a battery of standardised, reliable and valid measures to assess variables including anxiety, anger and depression. Ten of these nurses went on to experience a workplace assault and were subsequently assessed within 10 days of this event. The only factor the nurses were found to differ on, compared to before the event, was in their ability to control their anger, which had significantly reduced. Of course, this study did not assess the full range of emotional reactions found in other studies, which therefore cannot be commented on. Neither did this study continue to take measurements beyond 1 month for further 'before and after' comparison, making identification of any delayed-onset effects impossible. In addition, the small sample size (n=10) means that caution must be employed in generalising the results to other samples.

Behavioural effects

Included in this section are actions or activities that are thought to have occurred following, and as a result of an aggressive episode. Evidence suggests that WPV also affect healthcare workers' subsequent behaviour (Fernandes et al., 1999; Nabb, 2000). For example, a recent review identified altered sleep patterns, appetite changes, poor concentration and decreased interest in activities as possible outcomes (O'Donnell,

Creamer, Bryant, Schnyder & Shalev, 2003). A commonly reported outcome is absence from work (e.g. Calway, 2001; Lanza & Milner, 1989, Nabb, 2000). O'Connell et al., (2000) reported 20% of their participants had taken sick leave following the aggressive incident whilst Fernandes et al. (1999) reported 27%. In a further study of 99 staff assaults, Lanza and Milner (1989) found that 38% resulted in lost work days, 12 % lasting more than a month.

Other behavioural reactions identified by O'Connell et al. (2000) included taking alcohol or drugs (20%) and changing work location (e.g. ward) or employers (9%). It should be added that the majority (96%) remained on duty immediately after the incident, although many felt "burnt out" after such aggressive episodes. The desire to change job location was also found by Fernandes et al. (1999), such that 39/102 (38%) of this sample of accident and emergency staff had considered a different job following the violence. In addition, 49/100 respondents hid their identity from patients through fear.

Another behavioural outcome concerned job performance, which was reported to have been impaired for the rest of the shift by 26/105 (25%). A further 23 participants (24%) reported impaired performance for a week whilst 20 (19%) stated this had continued for even longer.

Caution must also be applied to these studies, however, and for similar reasons. For a behaviour to be identified as an outcome of an event, the absolute minimum it is necessary to do is: first, to reliably and validly establish that it occurred at all; and second that it occurred after the event. There was an over-reliance on non-

standardised self-report measures, which were neither validated nor with established reliability. This calls into question the reported number and length of absences from work. Furthermore, the extent to which these absences were directly and solely attributable to the violent incident is difficult to establish (O'Connell et al., 2000). O'Connell and her colleagues also failed to establish the prior drinking and drug taking of their participants. In the Fernandes study, work performance was not measured in any objective way, before and after the violent incident, to identify subsequent impairments (Fernandes et al., 1999). In addition, it is difficult to establish whether a decision to leave work was solely a result of a particular violent incident in a cross-sectional questionnaire study.

Psychological effects

The reported psychological effects included in this section can be divided into two groups. These are: changes in victims' belief systems, especially how they view aspects of their world; and symptoms and syndromes of psychological distress e.g. PTSD. Of course the latter group of effects are the ones most likely to be brought to the attention of clinical health professionals, and in that sense are more serious. However, the challenge to victims' belief systems represented by exposure to violent incidents can be significant and may be no less important in their lives. For example, these belief changes may mediate the relationship between violent incidents and radical life-changing behaviours, e.g. changing career (Barling, Rogers & Kelloway, 2001). Furthermore, sudden challenges to one's understanding of the world may subsequently lead to psychological distress. This forms the basis of Janoff-Bulman's theory of shattered assumptions (Janoff-Bulman, 1992) for the development of PTSD.

Changes in beliefs

Several psychological effects from the first group are reported from investigations of healthcare workers exposed to aggression. In her study of 345 nurses, Williams (1996) established statistically significant relationships between experiencing physical assault and levels of job satisfaction. Members of the assaulted group were significantly less satisfied with their current job and with their working relationships with medical doctors. They also perceived less support from their employers and less physical job safety. Finally they agreed more strongly that nurses should be able to decide when additional security is needed. Adverse effects on job satisfaction were also reported by 74% of participants in the Fernandes et al. (1999) study.

Other such reported psychological outcomes include a belief that one is weak, and that one has been 'singled out' (Hatch-Maillette & Scalora, 2002). Although these seem understandable responses, no empirical support was offered for either one. However the idea that a victim's sense of vulnerability could be significantly affected by a violent experience is supported by Poster and Ryan's (1989) study. They found that formerly assaulted nurse respondents were significantly more likely to report a belief that one should expect to be assaulted, than previously non-assaulted nurses. Finally, other psychological effects of WPV may include low self-esteem (Anderson, 2002), shame, reduced sense of personal mastery and attachment to others, and a disruption in life-purpose (Flannery, 1996), although little or no evidence was given for these.

Psychological symptoms and disorders

A range of psychological symptoms are possible following exposure to violence. A recent meta-analysis found increased rates of generalised anxiety disorder, substance abuse, phobias and depression following civilian trauma (Brown, Fulton ,Wilkeson & Petty, 2000). Other reported symptoms involve anxiety, anger, grief and depression (Flannery, 1996). Perhaps the more severe and debilitating psychological symptoms that can occur are those associated with Post Traumatic Stress Disorder (PTSD). These include hyper vigilance, intrusive memories, exaggerated startle response, disturbed sleep and avoidance of everyday activities. These symptoms, as well as a full PTSD diagnosis, are regarded as relatively common consequences of traumatic events such as physical assault (Dunmore, Clark & Ehlers, 2001), wherever they might occur. With respect to the workplace, a number of studies and reviews have identified PTSD as a possible consequence of violence at work for psychological healthcare staff (e.g. Anderson, 2002; Caldwell, 1992; Flannery, 1996).

The study by Wykes and Whittington (1998) identified a number of PTSD-related symptoms in nurses working on a PICU and other units. They recruited two groups of nurses, in addition to those mentioned earlier: an 'assault' group (n=39) recently physically assaulted by patients; a control group (n=34), matched for age, gender and nursing experience (no assault for 6 months). Both groups were tested on batteries of general distress and trauma-related outcome measures. Assault group members were assessed within 10 days of the incident.

Only two participants in the assault group (5%) had subscale scores sufficient to be given a diagnosis of PTSD. In addition, 38% of this group scored above the 'case'

level for psychological distress on the GHQ (Goldberg & Williams, 1988), whilst seven people had mild to moderate depression. However, the only difference between the assault and control groups was on GHQ (Goldberg & Williams, 1988) 'caseness', which was higher for the assault group.

When the assault group were followed up after one month, all measures of distress, both general and PTSD-related, had reduced by a statistically significant amount, except state anxiety. The two participants who had been classified as meeting criteria for PTSD no longer did, although two different participants now met the criteria. It should be noted that the persistence of symptoms beyond one month post-trauma is a criterion for PTSD according to *DSM-IV* (American Psychiatric Association, 1994) although the authors did not highlight this.

Another study identified similar PTSD-related symptoms in mental health staff (Caldwell, 1992). Questionnaires were distributed to both clinical and non-clinical staff asking about the incidence and recency of "traumatically stressful events". The overall response rate was 54.9%, although results were reported separately for the two groups. A total of 137/224 (61%)clinical staff reported symptoms of PTSD and 23 of these (10% of total) would have fulfilled the criteria for the *DSM-III-R* (American Psychiatric Association, 1987) diagnosis of PTSD, based on reported number of symptoms. Of the non-clinical staff, 18/76 (24%) had developed PTSD symptoms whilst five (7%) met *DSM-III-R* criteria.

These proportions are consistent with other PTSD studies that have investigated its incidence following traumas not necessarily involving interpersonal violence. For

example, in their national study, Kessler, Sonnega, Bromet, Hughes and Nelson (1995) found that 8.1% of men and 20.8% of women developed the disorder after a traumatic event.

Summary

A range of effects on victims of WPV have been identified. These can be broadly categorised into four groups: physical, emotional, behavioural and psychological effects, although there is some overlap between them. The strength of the evidence for these effects varies, partly owing to the variation in methodological rigour, partly owing to the lack of research into certain outcomes.

The main methodological problems include: the over-reliance on cross-sectional studies with the probability of various biases and other sources or error; the relatively rare use of objective means of measurement; the rare use of standardised instruments to measure effects; and the use of small sample sizes. There is therefore a need for further, more methodologically rigorous research into the effects of this increasingly common behaviour, involving longitudinal designs with measurement at several time points, using standardised, reliable and valid instruments. There is also a need to investigate other possible psychological and emotional effects more systematically.

A second important problem with the body of research into WPV is that it is not guided by any empirically-validated psychological theory. The literature largely consists of practitioner-oriented articles on incidence, prevalence and effects. Although theoretical articles have been published in the organisational behaviour literature (Martinko & Zellars, 1988), few more clinically-relevant theoretical

approaches to the effects of WPV could be found. The majority of theoretically-based articles focussed on theories of violence that accounted for the behaviour of the aggressor, rather than the response of the victim (e.g. Beckham, Moore, & Reynolds, 2000).

However, the identification of effects of WPV would be considerably facilitated through the guidance of one or more psychological theories. These would provide hypotheses for particular avenues to investigate, as well as perhaps those to avoid. The extent to which a particular theoretical approach was adopted might depend upon the amount and quality of empirical support for it already reported in the research literature. However, it may be appropriate to investigate more than one approach.

Other possible research avenues might also be opened up by the identification of sound psychological theoretical explanations for the effects of WPV. For example, it might be possible to identify victims most likely to be faced with enduring symptoms. Whilst many victims of violence recover in the first few months following trauma, research suggests a significant subgroup do not (Riggs, Rothbaum & Foa, 1995). These are the victims of violence most likely to present to clinicians for psychological treatment, perhaps several months after the onset of their symptoms. Ideally, one would be able to predict which persons exposed to violence were at greatest risk of developing persistent symptoms (e.g. of PTSD) and provide interventions for this subgroup. Theoretical explanations for the development and maintenance of such symptoms would provide guidance for both prediction and intervention.

Given the advantages of a theory-based approach, it would seem appropriate to explore theories that have attempted to explain the various effects of WPV.

Theoretical explanations for the effects of workplace violence

Introduction

Psychological theories that have been proposed to explain the effects of WPV fall broadly into two groups: theories accounting for individual effects within an organisational psychology perspective; theories accounting for clinical effects. Given the relative dearth of theoretical approaches in this area, both warrant investigation. As this review comes from a clinical psychology perspective, the organisational approaches will be briefly described first, together with an analysis of what might be usefully applied from them to clinical theory. In addition, a description will be made of what would be needed for these theories to have more clinical utility.

The review will then focus on theories accounting for clinical outcomes. Such theories have really only been applied to those emotional, behavioural and psychological effects associated with PTSD. There have been many proposed theories for the development and maintenance of PTSD (Brewin, Dalgleish & Joseph, 1996; Ehlers & Clark, 2000; Janoff-Bulman, 1992). Whilst none have focussed specifically on WPV as the traumatic event, each theory can be applied to such incidents.

Social Injustice Theory

Steensma (2002) applies social justice theory (Lerner & Whitehead, 1980) to account for certain consequences of workplace aggression. Central to this approach is the hypothesis that a person's reaction to an event, such as an incident of WPV, is influenced by the extent to which they hold a 'just world belief'(JWB). This is the notion that everyone gets what they deserve in life. This belief is threatened by evidence that people are treated unfairly. For example, victims of WPV may pose a significant threat.

Using the example of WPV in a healthcare setting, Steensma argues there is a likely clash between the perspectives of employees and of managers. Employees will perceive a high risk environment where responsibility lies with the others for creating and managing violence. Managers, because of their health and safety responsibilities, will perceive a less hazardous environment, denying the need to take further security measures. If such a clash exists, management procedures taken in response to the violence are likely to be seen as unjust by employee victims of violence.

Steensma focuses on this situation to account for psychological outcomes for victims. He suggests that perceived injustice may result in stress that may affect victims' feelings of commitment to leaders, organisations, and even society. Levels of stress are thought to be affected by the 'amount' of injustice as well as the self-esteem of the victim: the lower the self-esteem, the greater the stress. This stress will in turn negatively affect the health of the victim.

Evidence in support of this theory is scant, involving unpublished studies with extremely small samples. In addition there are many gaps in the theory that would require further explanation to enable clinical applications. For example, it is not clear what factors might contribute to the strength of an individual's just world belief. Furthermore, no evidence has been provided that the strength of a person's JWB covaries with their motivation to eliminate threats to it, nor was sufficient detail given about how hypothesised mechanisms might operate.

Social injustice theory was not, of course, intended to account for the full range of psychological effects of violence at work. It may therefore at best account for quite a narrow group of sub-pathological outcomes that relate to a victim's motivation and their sense of themselves and others in the workplace. This in itself does provide insights into the cognitive processes that may occur in the minds of WPV victims, and may therefore have some clinical utility. However a number of aspects to this theory would need to be more explicit, and the evidence of its validity would need to be more extensive.

Another theoretical model (Barling et al., 2001) attempts to take our understanding of these processes a little further.

A fully mediated model of the effects of workplace violence

This more detailed model was also described within a work psychology framework and was derived from two central observations. First was the idea, consistent with cognitive theory, that two people may experience the same event in a different way. It was proposed that the extent to which victims feared the recurrence of a violent event

predicted two outcomes: negative mood, and the perception of organisational fairness. The second observation was that these two factors might differentially predict personal and behavioural outcomes: employees' cognitive difficulties (e.g. concentration) and commitment were thought to be predicted by mood; work behaviour (performance, neglect) was thought to be predicted by their perception of fairness. These relationships were predicted on the basis of previous research findings (e.g. Adams-Roy & Barling, 1998).

The main evidence for this model is a Canadian study (Barling et al., 2001). The authors recruited 292 female health workers, asking them to complete a battery of self-report questionnaires relating to the factors in the model.

The fully mediated model was found to provide the best and most parsimonious fit to the data. As originally proposed, negative mood ($\beta = .27$, $p<.01$) and perceived fairness (justice) ($\beta = -.13$, $p<.01$) were predicted by fear, whilst cognitive difficulties were only predicted by negative mood ($\beta = .33$, $p<.01$) and job performance only by justice ($\beta = .26$, $p<.01$). Other predictions were only partially correct. For example, whilst justice did predict employee commitment ($\beta = .38$, $p<.01$), so did negative mood ($\beta = -.27$, $p<.01$).

This model does go beyond social justice theory in explaining employee reactions to WPV. The authors have carried out several necessary steps in the generation and validation of sound psychological theory. For example, they proposed a model that accounts for both behavioural and psychological outcomes found in the WPV effects research reviewed above. They have also addressed the need to describe a more

detailed mechanism of how these effects come about. Having proposed an a priori model, at least in part theory-based, they have then been at least partially successful in finding evidence for this mechanism.

However there are a number of issues to highlight. First, the model is unclear about the mechanisms for the relationships between certain factors within it. For example, more details are needed about the relationship between fear and a sense of injustice: why do only certain individuals who experience fear go on to perceive injustice within their organisation? There must be other factors involved in this process, but no suggestions are given about what these might be. This lack of detail applies to nearly all the relationships between factors in the model.

Second, caution must be applied to the results of the Barling et al. (2001) study. Similar methodological problems exist as for other research into WPV, namely: the cross-sectional design; the low response rate (36%); the female-only sample; the use of adapted measures, which were not standardised, validated or tested for reliability; and the inclusion of sexual harassment within the definition of violence. Several of these lead one to question the generalisability of the findings of this study. In addition, further validation of the model is necessary. For example, the mediational role of certain factors has not been adequately established (Baron & Kenny, 1986).

Summary

Whilst theoretical explanations for certain outcomes of WPV have been proposed (Barling et al, 2001; Steensma, 2002), there is still considerable work needed, both in the formulation of more detailed theoretical models and in the empirical validation of

these models. In addition, for these models to have more clinical relevance, there must be more focus on the clinical outcomes, such as the 'negative mood' and 'cognitive difficulties' mentioned in Barling's model (Barling et al, 2001). It would be important to understand how these outcomes come about and why certain individuals are more susceptible to them than others.

One reported outcome of WPV that has been extensively studied is Post Traumatic Stress Disorder. This has not come out of the WPV literature but as PTSD symptoms are commonly experienced by WPV victims, it seems relevant to look at theoretical approaches that attempt to explain them. In addition, the next section provides a good example of how psychological approaches can help in the development of theory.

Theoretical explanations for Post Traumatic Stress Disorder

Definition of PTSD

Post Traumatic Stress Disorder is the name given to a cluster of symptoms that can be experienced by persons exposed to "acute severe stress or continued trauma." (ICD-10: World Health Organisation, 1992). According to *DSM-IV* (American Psychiatric Association, 1994, p.427), it must have been established that the person "experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others". Furthermore, the person's response must have involved either "intense fear, helplessness or horror" (p.428).

In addition, one or more of the following clinical features must have been present for a month or more: 're-experiencing', involuntary intrusion of the traumatic event, e.g. in the form of nightmares or images; 'avoidance' of reminders of the event; a range of symptoms of 'hyperarousal' e.g. hyper vigilance, difficulty concentrating. Other symptoms that can occur include excessive rumination about the event and emotional numbing.

A diagnosis of Acute Stress Disorder (ASD) is given if an individual displays similar symptoms to PTSD in the first four weeks after trauma (DSM-IV: American Psychiatric Association, 1994). However, the individual must also display at least three of the following dissociative symptoms: numbing, reduced awareness, depersonalisation, derealisation and amnesia. This disorder was reportedly identified in response to a concern that PTSD symptoms displayed in the first month post-trauma might represent normal reactions to stress (Brewin, Andrews & Rose, in press). ASD was therefore proposed as a pathological acute response. However, there is much doubt as to its usefulness, given the overlap with PTSD symptoms (Brewin, Andrews & Rose, in press; Harvey & Bryant, 2002).

Theoretical approaches

Theorists have proposed a number of models to account for the symptoms of PTSD. These typically involve either biological or psychological processes but there is no single accepted theory. The importance of biological factors that have been linked to PTSD may in no way be threatened by psychological theories that account for its symptoms. They are not mutually exclusive.

Psychological models of PTSD have in the past involved behavioural theory (e.g. Keane, Zimmering & Caddell, 1985), cognitively-informed approaches (e.g. Foa & Kozak, 1986) or some combination of the two (e.g. Ehlers & Clark, 2000). Charney, Deutch, Krystal Southwick and Davis (1993) have suggested that through classical conditioning, stimuli present during the trauma become associated in the mind of the individual with their own fear responses, and thereby trigger such responses when no danger is present. The person avoids these unpleasant symptoms by steering clear of the triggers, which via a process of operant conditioning becomes negatively reinforced. However, the behaviour actually maintains the problem as avoidance prevents the eradication of the conditioned fear responses.

Other psychological theorists have proposed that cognitive factors play a role in the development and persistence of PTSD symptoms. These highlight the importance of factors such as the person's appraisals of the traumatic event (Horowitz, 1997), appraisals of its sequelae (Foa & Rothbaum, 1998), and the nature of the trauma memories (Foa, Molnar & Cashman, 1995). Other behaviours, including thought suppression and rumination (Dunmore, Clark & Ehlers, 1999) have been found to maintain symptoms.

There have been three recent, very thorough reviews of psychological theories of PTSD (Brewin & Holmes, 2003; Dalgleish, 1999; McIvor, Van Velsen, Lee & Turner, 1997). These initially describe early theories (e.g. Horowitz, 1986; Janoff-Bulman, 1992) then having identified the gaps in these approaches go on to highlight the ways theoreticians have attempted to plug them, thereby building on each other's work.

A detailed repetition of the above reviews would not be appropriate here. However, it seems more relevant to provide a brief outline of the three most recent theories representing the current state of psychological understanding of PTSD. The review by Brewin and Holmes (2003) concludes with a description of these three: dual representation theory (Brewin, Dalgleish & Joseph, 1996); emotional processing theory (Foa & Rothbaum, 1998); and Ehlers & Clark's cognitive model (Ehlers & Clark, 2000). These approaches are all cognitively informed. Although other models have applied alternative theoretical orientations, this focus can be justified as cognitive approaches are more developed and are more successful in accounting for factors found to be relevant to the aetiology of PTSD (Dalgleish, 1999).

At the end of this section, aspects of these approaches that represent appropriate steps in the development of psychological theory will be identified. These will be described with a view to their implementation in the development of a more comprehensive theoretical account of the phenomenology of WPV.

Emotional processing theory

Foa hypothesised that many of the symptoms of PTSD can be accounted for by the development of a fear network in the long-term memory (Foa & Kozak, 1986). This network comprises data: about the traumatic episode; about the individual's physical, behavioural and cognitive reactions to the episode; linking these two types of information together. Activation by cue stimuli of the fear network causes the person to become hypervigilant, resulting in the involuntary introduction of this information

into consciousness. This accounts for both arousal and intrusive memory symptoms. The typical avoidant behaviour symptoms of PTSD are understood as attempts to prevent the activation of the fear network. These result in the 'avoided' factors continuing to act as cues to activate the fear network.

Other factors implicated in the development or maintenance of PTSD have been introduced into this theory including explanations for how information gathered at different time points affect the outcome. For example, individuals with rigid pre-trauma views might have difficulty integrating information from the trauma if it contradicts a positive belief about the self or the world, or if it emphasises a negative belief. Furthermore, Foa and colleagues emphasised the confirmatory effect of the victim's negative appraisals of the episode and its sequelae on their negative schemas relating to self-competence and danger.

Dalgleish (1999) has identified strengths of this approach, including: the provision of a framework within which previous theories (Horowitz, 1986; Janoff-Bulman, 1992) can be incorporated; a comprehensive account of processes underlying PTSD within a cognitive model; the direction it offers to clinicians in treating certain PTSD symptoms. Indeed, there is good evidence of the effectiveness of treatment programmes based on this theory (Foa, Ehlers, Clark, Tolin & Orsillo, 1999).

However, Brewin and Holmes (2003) highlight several inconsistencies in the evidence found for the theory. For example, studies have been equivocal about the importance for therapeutic success of the initial activation of fear and its association with between- and within-session habituation (Van Minnen & Hagenaars, 2002). In

addition, evidence concerning the content of trauma narratives have not always corresponded to theory-based predictions (e.g. Zoellner, Alvarez-Conrad & Foa, 2002). Furthermore, Dalgleish queries whether a single-level memory network is capable of fully representing a person's meaning structures and models of the world. He therefore suggests it might not have sufficient explanatory power to account for the full range of PTSD processes and symptoms.

Dual representation theory

By proposing that there are two levels in memory at which trauma-related information can be represented, Brewin and colleagues (Brewin et al., 1996) have attempted to overcome shortcomings in Foa's single level theory. They proposed that the trauma victim encodes in parallel two different memory representations at the time of the trauma. Their conscious memories of the event are stored in the 'Verbally Accessible Memories' (VAM) system, which also contains information relating to the person's past present and future. VAMs can be purposely retrieved and adjusted. The 'Situationally Accessible Memories' (SAMs), are information representations that can only be accessed by cues from the original traumatic event.

It is suggested that the phenomenology of PTSD is accounted for by these two systems (Dalgleish, 1999). For example, flashbacks would occur by the activation of SAM representations whilst negative emotions are caused by the person's cognitive appraisals of event-related factors accessed from the VAM system.

Brewin also proposed a plausible neural basis for these memory structures (Brewin & Holmes, 2003) with respect to the pathways that transmit trauma information to the amygdala. The VAM system, with its flexibility, but also subject to gaps and disorganisation, is thought to suggest hippocampal activity, whilst SAM encoded image-based memories, experienced as occurring in the present, are thought to suggest a pathway that avoids the hippocampus.

Recovery from flashbacks is thought to occur when VAM memories establish a "retrieval advantage" (Brewin & Holmes, 2003; p359) over SAM memories, such that cues that previously activated SAM-based reactions instead elicit more balanced and healthy VAM-based responses. This advantage is facilitated through cognitive therapy which is also applied to challenge unhelpful post-trauma appraisals.

Brewin's dual representation theory represents a detailed attempt to account for PTSD phenomenology from both information-processing and social-cognitive perspectives, which were less clearly addressed by previous approaches. Brewin has also made a necessary link with neuropsychology by placing the memory systems in this context. There are also implications for therapy, including the importance of employing different approaches to address flashback symptoms to those used to correct post-trauma cognitive appraisals.

However little published evidence has yet been found in support of the theory (Dalgleish, 1999) and there remain many questions to ask of this approach. These are highlighted by Brewin himself (Brewin & Holmes, 2003) and include the lack of attention given to peri-traumatic dissociation, emotional numbing and increased

conditionality. Above all, more research is needed to establish the validity of this approach.

Ehlers & Clark's Cognitive Model

One model, for which there is arguably the most empirical support (Brewin & Holmes, 2003), has been proposed by Ehlers and Clark (2000) and represents a synthesis of models adopting a cognitive approach to PTSD. It is also derived in part from experimental psychological research on the relationship between encoding and memory. They suggested that PTSD may persist for individuals when they process trauma such that they perceive serious on-going threat. This occurs in those who: make excessive negative appraisals of the trauma and its sequelae; experience a disturbance of autobiographical memory characterised by poor elaboration and contextualisation, strong associative memory and strong perceptual priming. Thus those who, during the trauma, engage primarily in surface level, data driven processing will be at greater risk of PTSD than those who elaborate.

Also, inability to establish a self-referential perspective during trauma impedes the integration of memory into the autobiographical memory. These concepts are thought to overlap with dissociation in making memory of the traumatic event problematic, which has been associated with PTSD symptoms. Furthermore, triggers that match some aspect of the trauma memory will act as cues to the perception of current threat. Finally, potentially beneficial changes in the negative appraisals and to the trauma memory are thought to be prevented by a number of maladaptive cognitive and behavioural strategies.

There is established support for various aspects of this model. This is particularly strong concerning the importance of negative appraisals of aspects of the trauma and reactions to it (e.g. Clohessy & Ehlers, 1999). A number of studies have also controlled for the effects of initial symptoms, still finding significant relationships between persistent PTSD symptoms and: negative interpretations of PTSD symptoms (Mayou, Bryant & Ehlers, 2001); avoidance and safety behaviours (Dunmore, et al., 2001). A recent prospective study also demonstrated that peritraumatic cognitive processing is related to the development of disorganised memories and PTSD, whilst on-going dissociation and negative appraisals maintain PTSD symptoms (Halligan, Michael, Clark & Ehlers, in press).

Advantages of this model include: its comprehensiveness in accounting for PTSD phenomena; the expansion of the role of peri-traumatic cognitive processing and post-trauma appraisals in the development and maintenance of the disorder; clear implications for therapeutic treatment approaches, especially the importance of the integration of trauma memories and of developing behavioural strategies as alternatives to avoidance.

Shortcomings include the lack of detail about the way information is represented in memory and potential difficulties in providing evidence for the model. Brewin and Holmes (2003) highlight a problem in identifying a causal link between data driven processing and intrusive symptoms. Attempts to find a link by experimentally manipulating participants' processing method have been unsuccessful (Halligan, Clark & Ehlers, 2002). Furthermore the assessment of factors such as cognitive

processing at a time removed from the moment it occurred is problematic and difficult to validate.

Future development of a theoretical account of workplace violence

The above theories represent attempts to explain one of the more debilitating effects of WPV, PTSD. None of these theories was developed specifically to account for PTSD following WPV. Equally, none of them only applies to a single type of trauma (e.g. motor vehicle accident, sexual assault). In the sense that it is thought to explain more PTSD phenomena than the other theories, Ehlers and Clark's model can be said to be most applicable to victims of WPV experiencing PTSD symptoms.

Similar approaches cannot be found elsewhere in the literature to account for many of the other effects of WPV, such as were described above. It might be beneficial, therefore, to draw on the approaches outlined above as well as on the broader psychological literature (e.g. O'Donnell, et al., 2003), to describe appropriate methods for the generation and development of sound psychological theory. This is done with the aim of facilitating a more detailed theoretical understanding of the full range of outcomes of WPV.

The methods that are important in the development of a psychological model include:

- The use of common operational definitions of terms;
- The comprehensive identification of psychological symptoms

- The identification of risk and, if possible, protective factors for these outcomes;
- The use of standardised instruments to measure variables;
- The generation of an explanatory framework, broad enough to account for all aspects of the phenomenology of the outcome in question and informed by accepted psychological theory;
- The generation of clear mechanistic links between risk factors and outcomes;
- The generation of testable hypotheses based on the model. These should be empirically evaluated to provide evidence of the validity of the theory;
- The model should ideally enable the prediction of outcomes on the basis of pre-occurring factors
- The model should ideally facilitate the development of appropriate psychological interventions. These should then be evaluated, providing evidence of the validity of the model.

Finally, it would be ideal if the theory could be placed within a neuropsychological framework, with clear links between psychological mechanisms and neurological substrates.

Conclusions

This review highlights the fact that violence in the workplace represents a considerable societal problem, nowhere more so than in healthcare settings. Several studies have demonstrated that for victims of such violence a number of deleterious

outcomes may occur, including physical, emotional, behavioural and psychological effects. These effects can be extremely significant. For example, studies have documented former victims with symptoms of serious psychological disorders including depression and PTSD. Such an experience may precipitate radical changes to these individuals' lives, often resulting in extended periods off-work leading to financial hardship and sometimes substance abuse. Furthermore, studies indicate that the incidence of WPV is increasing. As a phenomenon, therefore, it must not be ignored.

It is also clear that there is a need for greater methodological rigour in future research on WPV. For example, the routine use of standardised measures should be encouraged and the more frequent use of longitudinal designs. In addition, the lack of an over-arching theoretical framework to guide WPV research represents an important omission. This can be redressed by the use of tried and tested scientific methods for the generation of testable models from psychological theory.

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Factors predicting persistent PTSD symptoms in Health Service staff exposed to trauma: a longitudinal study.

Daniel C. Salter

Clinical Psychology Unit, University of Sheffield, United Kingdom

Word Count: 7991

44 Carr Lane York YO26 5HX UK Tel. +44 1904 332 494
pcp00dcs@shef.ac.uk

Abstract

A number of psychological response variables were investigated for their involvement in the development of persistent symptoms of PTSD in 99 NHS staff exposed to violence at work. Factors associated with PTSD symptoms at four months post-trauma included: disorganised memory, data-driven processing, state dissociation, self-referent processing, appraisal of PTSD symptoms, trait dissociation and avoidant behaviour. All these factors accounted for significant variance in PTSD symptoms after controlling for pre-trauma and stressor severity factors.

A risk index consisting of 'educational qualification', 'trait dissociation' and 'avoidant behaviour', measured two months post-trauma, discriminated individuals with persistent symptoms at four months post-trauma from those without. This enabled better than chance predictions to be made. Further validation is required. Clinical implications are discussed.

Key words:

PTSD, persistent symptoms, prediction, risk index.

Introduction

Workers in the health care professions are today frequently exposed to traumatic events (Bourn, Maxfield, Terry & Taylor, 2003). This may be through their involvement in emergency teams (Andersen, Christensen & Petersen, 1991; Clohessy & Ehlers, 1999) or more generally through their contact with health service users and their families in hospital (Wykes & Whittington, 1998). Exposure may involve observation, either of actual trauma events or of victims following trauma, or direct experience of victimisation. These may result in various psychological symptoms including depression, anxiety and posttraumatic stress disorder (PTSD) (Caldwell, 1992; Flannery, 1996). Typical symptoms of PTSD include: re-experiencing the traumatic event (e.g. nightmares, intrusive images); avoidance behaviours, excessive rumination about the event, emotional numbing and a range of symptoms of hyperarousal e.g. hyper vigilance, irritability and sleep problems.

Such symptoms can have a debilitating effect, sometimes leading to long absences from work and domestic difficulties (O'Connell, Young, Brooks, Hutchings & Lofthouse, 2000). As well as creating problems for the person's family, such absences cause considerable difficulties for their health service co-workers and management, as gaps may appear in health care provision.

Given these possible outcomes, it would be preferable to minimise the risk of PTSD by providing early interventions to staff victims of trauma. However, not everyone who experiences trauma goes on to develop PTSD. For example, Kessler, Sonnega,

Bromet, Hughes and Nelson (1995) found that only 8.1% of men and 20.8% of women developed the disorder after a traumatic event.

In addition, there are resource implications depending on the nature of the intervention. A one-off post-trauma debrief might represent a short-term, affordable intervention. However, recent reviews have found this approach to be either ineffective (Rose, Bisson & Wessley, 2002; Van Emmerik, Kamphuis, Hulsbosch & Emmelkamp, 2002) or actually that it has a detrimental effect (Bisson, Jenkins, Alexander & Bannister, 1997; Mayou, Ehlers & Hobbs, 2000).

Longer-term (i.e. up to 16 sessions) cognitive behaviour therapy (CBT) seem to be more effective in reducing symptoms than other methods, e.g. self-help and repeated assessments or no treatment (Ehlers & Clark, 2003). However, this is more expensive and might present services with resource difficulties. An added complication is that according to longitudinal studies, many trauma victims who develop PTSD recover without treatment, with a particularly sharp symptom decline in the first year (e.g. Kessler et al., 1995). Clearly, no interests are served when superfluous treatment is provided.

Ideally, it would be possible to predict which persons exposed to trauma were at greatest risk of developing persistent PTSD and deliver appropriate interventions to this subgroup only. Unfortunately no measure is currently available that can be administered immediately post-trauma which has established predictive validity of PTSD.

However, a number of studies have identified factors that influence the risk of a PTSD outcome in persons exposed to trauma. This was the focus of a recent meta-analytic review (Brewin, Andrews & Valentine, 2000). The risk factors have been categorised by Ehlers (2000) into four main groups:

- *Demographic and historical factors*: gender (Kessler et al., 1995), ethnicity (Frueh, Brady & Dearellano, 1998), age (King, King, Foy & Gudanowski, 1996) intelligence (McNally & Shin, 1995), prior trauma (King et al. 1996), pre-existing psychiatric disorder (Breslau, Davis, Andreski & Peterson, 1991) family history of psychiatric disorders (Breslau, Davis, Andreski, Peterson & Schultz, 1997); and family instability (King et al. 1996);

- *Pre-trauma psychological factors*: neuroticism (Breslau et al., 1991), external locus of control (Kushner, Riggs, Foa & Miller, 1993), negative beliefs about self and the world (e.g. Dunmore, Clark & Ehlers, 2001);

- *Stressor variables*: severity of stressor (March, 1993), duration of trauma (Meichenbaum, 1994), type of event (Clohessy & Ehlers, 1999), health problems (Ehlers, Mayou & Bryant, 1998);

- *Peri-traumatic psychological responses*: threat to life (March, 1993), helplessness (Baum, Cohen & Hall, 1993), dissociation (Shalev, Peri, Canetti & Schreiber, 1996), anger or shame/guilt (Andrews, Brewin, Rose & Kirk, 2000), mental defeat (Dunmore Clark & Ehlers, 2001).

In addition, a number of factors have been found to affect individuals' recovery from trauma, and these include:

- *Recovery environment*: social support (King, King, Fairbank, Keane & Adams, 1998), litigation (Ehlers et al., 1998), further stressful events (King et al., 1998).

- *Psychological processes*: initial symptom severity and appraisal of initial symptoms (Ehlers et al., 1998), appraisal of trauma (Dunmore et al., 1999), coping styles (Ehlers et al., 1998), causal attributions, maintaining behaviours (e.g. avoidance, safety behaviours, suppression, rumination) (Dunmore et al., 2001).

Thus, an extensive array of factors have been shown to have some influence on the development of PTSD. However, in order to guide one's thinking regarding which of these factors are likely to be most influential, it is necessary to consider what theories have been proposed to account for the development of the disorder.

Theorists have proposed a number of models. These typically involve either biological or psychological processes but there is no single accepted theory. The importance of biological factors that have been linked to PTSD may in no way be threatened by psychological theories that account for its symptoms. They are not mutually exclusive. A range of psychological models of PTSD have been proposed

with different theoretical orientations, including: cognitive (Brewin, Dalgleish & Joseph, 1996; Dalgleish, 1999; Foa & Rothbaum, 1998), behavioural (Mowrer, 1960; Keane, Zimmering & Caddell, 1985) and psychodynamic approaches (Garland, 1991).

Those theories with the strongest explanatory power and with currently the most evidence emphasise the role that cognitive factors play in the development and persistence of PTSD symptoms (Dalgleish, 1999). These highlight the importance of factors such as the person's appraisals of the traumatic event (Foa & Riggs, 1993; Horowitz, 1997; Janoff-Bulman, 1992), appraisals of its sequelae (Ehlers & Steil, 1995; Foa & Rothbaum, 1998), and the nature of the trauma memories (Van der Kolk & Fisler, 1995; Foa, Molnar & Cashman, 1995).

Perhaps the most developed model (Brewin & Holmes, 2003), and the one for which most evidence exists, has been proposed by Ehlers & Clark (2000). The authors suggested that PTSD symptoms persist for individuals who process their trauma such that they continue to perceive a serious threat long after the event. This occurs in those who: make excessive negative appraisals of the trauma and its sequelae; experience a disturbance of autobiographical memory characterised by poor elaboration and contextualisation, strong associative memory and strong perceptual priming.

In effect, those who engage primarily in surface level, data driven processing during the trauma will be at greater risk of PTSD than those who elaborate. Also, inability to establish a self-referential perspective during trauma impedes the integration of

memory into the autobiographical memory. These concepts are thought to overlap with dissociation in making memory of the traumatic event problematic, which has been associated with PTSD symptoms. Furthermore, potentially beneficial changes in the negative appraisals and to the trauma memory are thought to be prevented by a number of maladaptive cognitive and behavioural strategies.

Evidence has been found for various aspects of this model. A recent prospective study (Halligan, Michael, Ehlers & Clark, in press) of 73 assault victims demonstrated that aspects of peri-traumatic cognitive processing (dissociation, data-driven processing and self-referent processing) are significantly related to the development of disorganised memories and predict concurrent and subsequent PTSD symptoms. Disorganised trauma memories were also found to predict PTSD symptoms concurrently and prospectively. Furthermore, after the effects of assault severity were taken into consideration, accounting for 22% of the variance in PTSD at 6 months, measures of cognitive processing, memory disorganisation and appraisals accounted for a further 49% of the variance. Persistent dissociation, measured within 4 weeks of the traumatic event, accounted for an additional 8 % of the variance.

Further support for the hypothesised role of peri-traumatic cognitive processing is provided by another prospective study (Dunmore et al., 2001). Cognitive factors were assessed in 57 victims of physical and sexual assault at four months post assault. Participants were followed up to establish PTSD symptoms at 6 and 9 months post assault. Significant relationships were found between PTSD severity and peri-traumatic processing style, appraisal of assault sequelae, negative beliefs about the world and maladaptive post-assault behaviour. These authors also found cognitive

factors accounted for significant variance in PTSD severity over and above assault severity at each data collection time point. Other studies that support this model include: Halligan, Clark & Ehlers (2002), whose results provide experimental evidence for the role of data-driven processing in the development of PTSD symptoms; Dunmore et al. (1999), who confirmed relationships between PTSD and appraisal of assault sequelae, dysfunctional strategies and global beliefs in victims of assault; and Murray, Ehlers and Mayou (2002), who found support for the role of dissociation in RTA survivors.

There seems, therefore, to be strong evidence of the validity of this approach when applied to samples drawn from motor vehicle accident survivors or serious physical or sexual assault victims. However, no similar investigations have yet been attempted on victims of trauma in the workplace, specifically, health service employees. It would be of interest, therefore, to establish whether cognitive factors might have a similar relationship with persistent PTSD symptoms, over and above other factors, in a sample drawn from this latter population.

In addition, it would be of some help to staff victims, colleagues and health service managers to identify traumatised individuals who are at greatest risk of experiencing persistent PTSD symptoms, in order to provide them with appropriate and prompt intervention.

There are therefore three main aims to this study:

1. To identify factors that are related to the development and maintenance of persistent PTSD in hospital staff following incidents of assault whilst on duty.

2. To establish whether cognitive factors account for significant variance in the development of persistent PTSD symptoms, over and above other factors.

3. To construct a predictive instrument consisting of a range of measures that, when administered within a month of a traumatic incident in a hospital setting, can discriminate NHS staff who develop persistent PTSD symptoms (at three months) from those who do not. This could be used to assist in the decision making process about the allocation of therapeutic resources to staff following trauma.

Hypotheses

1. A number of factors, relating to the victim and the incident and measured within 1 month of a traumatic incident, will be identified as being associated with PTSD at 1 and 3 months, measured using the PTSD Symptom Scale – Self Report (PSS-SR; Foa, Riggs, Dancu & Rothbaum, 1993). The risk factors will be drawn from four main groupings: demographic variables; pre-trauma factors (prior trauma, pre-existing psychiatric disorder), stressors (severity of trauma), and psychological responses (e.g. memory disorganisation, cognitive appraisal of PTSD symptoms). These will be assessed using instruments described in the *Measures* section below.

2. Factors relating to the 'psychological response' of the staff member to the traumatic incident will account for additional variance in PSS-SR scores after three months, over and above either 'demographic', 'pre-trauma', or 'stressor severity' factors.

3. Those risk factors that account for the most variance in PSS-SR scores at 3 months post-trauma, when combined to form a Risk Index, will significantly discriminate trauma victims whose PTSD symptom scores exceed an appropriate clinical cut-off at three months post trauma, from those whose scores do not.

Method

Design

This study comprised a prospective longitudinal design. Participants were assessed on four cognitive putative risk factors (Time 1) one to three weeks after the incident (mean = 12.86 days; S.D. = 6.3) . The Time 1 assessment factors related to the participant's experience of the incident itself. Assessment was by means of self-report questionnaires. They were then followed up by mail on two more occasions, Time 2 and Time 3. The aim had been for these follow-up assessments to be made one month and three months post-incident respectively. However, various difficulties resulted in the mean period from incident to Time 2 being 58.3 days (S.D. = 12.7) and from

incident to Time 3 being 121.0 days (S.D. = 14.5). The ranges of these time periods did not overlap.

At Time 2, questionnaires were completed relating to the remainder of the putative risk factors (demographics, pre-trauma factors, stressors and post-trauma psychological factors). Data on the outcome variables (PTSD symptoms, depression and anxiety) were also collected. At Time 3, only the outcome variables were assessed.

Participants

Participants were employees of a provincial NHS Trust, who had been exposed to an incident of violence and aggression at work. One hundred and eighty-nine employees were approached by the recruitment team, directly by phone or by note. Of the 136 potential participants actually spoken to, 135 (99%) agreed to participate. However, only 99/136 (73%) completed and returned the first set of questionnaires. On the first follow-up at Time 2, 77/99 (77%) participants returned their data whilst at Time 3, 70/99 (70%) responded. Three of these had not responded to the Time 2 follow-up.

Measures

Data were collected on 20 independent variables, divided into four groups as follows:

1. Demographic variables: *gender, age, ethnicity, household income, highest educational qualification.*

2. Pre-trauma factors: *child abuse (physical, sexual or emotional), other childhood trauma, other adverse events, prior psychiatric/psychological treatment, family psychiatric disorder.*

Demographic and pre-trauma factors were assessed by self-report questionnaire adapted from a semi-structured interview used in previously published studies (e.g. Dunmore et al., 1999). Presence of pre-trauma factors was established by dichotomous response items. Items were added to the questionnaire relating to factors previously associated with PTSD (Brewin, Andrews & Valentine, 2000), but not originally included in the interview.

3. Stressors: *severity of incident, extent to which participant expected they would be harmed and killed.*

These were also assessed items contained within the self-report questionnaire mentioned above. Objective assessment of stressor severity was calculated by summation of standardised scores of the following items: type of aggression, number of aggressors, duration of incident, use of a weapon and the extent of any injuries. Participants' expectations of harm or death were assessed using 0-100% probability scales.

4. Psychological variables: *memory disorganisation, state and trait dissociation, data-driven processing, self-referent processing, cognitive appraisal of PTSD symptoms, coping strategies.*

The following measures were developed in a series of studies (Dunmore et al., 1999, 2001; Halligan et al., in press; Murray et al., 2002). Scales (i), (ii), (iv) and (v) comprised a self-report questionnaire in which participants rated their agreement with items using a 0-4 point Likert scale. All measures are detailed below, with a brief description of their purpose and characteristics:

i) **Unpleasant Memory Questionnaire** – 16 items relating to disorganisation of memories, negative appraisal of disorganisation and intrusion. Disorganisation and intrusion items have been shown to relate to symptoms of PTSD (Halligan et al., in press). Internal consistency in the present sample was alpha = .93.

ii) **State Dissociation Questionnaire** (SDQ; Murray et al., 2002) – 9 item scale relating to dissociation during the incident. This scale has demonstrated good reliability and validity (Halligan et al., 2002). Internal consistency of the current sample was alpha = .95;

iii) **Trait Dissociation Questionnaire** (TDQ; Murray et al., 2002) – 38 item measure assessing the participant's pre-trauma tendency to dissociate. Participants rate their agreement with items on a 0 – 5 point Likert scale. Murray described data supporting its reliability and validity (Murray, et al., 2002). Internal consistency of current sample alpha = .92;

iv) **Data-Driven Processing Scale** – 8 item scale designed to assess participants' peri-traumatic surface-level, perceptual processing. This scale has been shown to relate to symptoms of PTSD (Halligan et al., in press). Internal consistency of current sample alpha = .92;

v) **Self-Referent Processing Scale** – 8 item scale to assess the extent to which participants processed the incident as happening to themselves and integrated the experience with other information that related to them. Internal consistency was adequate (alpha = .89);

vi) **Interpretation of PTSD Symptoms Inventory** (revised version based on Dunmore et al., 1999) – 11 items in which participants indicated their level of agreement with items relating to their appraisal of intrusions and recall. This was measured using a 7 point Likert scale (1: totally agree to 7: totally disagree). This has been shown to correlate with PTSD symptoms (Clohessy & Ehlers, 1999). Internal consistency was adequate (alpha = .89);

vii) **Behaviour after assault** (Dunmore et al., 1999) – 25 items relating to participants' maladaptive control behaviours following the incident. Participants indicate how often they have carried out the behaviour on a four point scale from 'never' to 'always'. Internal consistency was adequate (alpha = .87)

Dependent variables

PTSD Symptom Scale – Self Report (PSS-SR; Foa, Riggs, Dancu & Rothbaum, 1993). This consists of the 17 items relating to PTSD symptoms contained within the

PDS (Foa, Cashman Jaycox & Perry, 1997) and has satisfactory agreement with the Structured Clinical Interview for DSM-IV (Spitzer, Williams, Gibbon & First, 1990). On each occasion, participants were asked to rate their symptoms in the preceding month.

Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) A valid 21 item instrument for assessing anxiety and depression in general medical outpatient populations and for estimating severity.

The above measures have been included in Appendix F.

Procedure

Employees of the NHS trust described above, who have been involved in an incident of violence or aggression at work, are routinely required to complete an Adverse Incident Report System (AIRS) form. A team, comprising members of the department receiving these forms, was trained to recruit staff into the study. On the basis of their answers to four screening items (see Appendix E), the team decided whether to invite the staff member to participate in the study. These four items established that the employee had been the victim of an aggressive incident, or had experienced something they had found "unusually upsetting". Contact was made with these persons one to two days after receipt of their form. Recruitment occurred between October 2002 and March 2003 inclusive.

Participants were sent a pack (Time 1) containing four questionnaires relating to their psychological response to their trauma (measures (i), (ii), (iv) and (v)). They were asked to return their completed forms together with contact details. All subsequent contact was by post. A second pack was sent out at Time 2, containing questionnaires relating to the remaining independent variables and the two outcome measures (PSS-SR and the HADS). At Time 3, a final pack was posted to participants containing just the two outcome measures.

At each stage, participants who had not returned a completed questionnaire after 2 weeks, were sent a follow-up letter and another questionnaire. Participants at Time 1 who did not return either questionnaire at Time 2, were still sent a questionnaire at Time 3. However, no follow-up was sent if no response was received.

Statistical Analysis

Data were analysed using SPSS. Power calculations suggested the participants in the study were sufficient to carry out meaningful statistical analyses and detect any significant findings.

Associations between the independent variables (IVs) and between the IVs and outcome measures (DVs) were calculated using appropriate statistics, depending on the nature of the variable (i.e. dichotomous, ordinal or continuous) and the distribution of scores. (See Table A1 in the Appendix).

Gender comparisons for the outcome variables were conducted using t-tests. The extent of change in these variables from Time 2 to Time 3 was assessed by repeated measures ANOVA.

Regression techniques were employed to establish whether cognitive variables accounted for variance over and above demographic and stressor severity variables. Multiple regression analyses were conducted using the 'enter' procedure such that blocks of variables are entered in a predetermined order.

Regression techniques were also employed, using stepwise entry, to identify factors most predictive of PSS-SR symptoms at three months. Scales measuring these factors were dichotomised and combined to form a risk index for PSS-SR symptoms. A t-test was employed to establish the discrimination of this index for 'moderate' symptoms and above. ROC analysis was performed to establish the cut-off for optimal sensitivity and specificity of the index in predicting PSS-SR symptoms at 3 months post trauma.

Results

Background Characteristics

The sample's background characteristics are detailed in Table 1. The female to male ratio was approximately three to one and the sample was predominantly Caucasian, which is representative of the ethnic characteristics of the region. Educational attainments were weighted towards the upper end of the scale, which is consistent

with the high qualifications necessary for medicine and nursing. Whilst 21% had experienced emotional, physical or sexual abuse as children, 42% reported exposure to other forms of trauma in their lives. Examples of such trauma included suspension from work, physical abuse within marriage and the death of a loved one.

Time Lag in completion and return of forms

Whilst every attempt was made to keep to the study design, various difficulties were encountered in the timing of data collection. These had the effect of shifting the completion of follow-up questionnaires back in time. As a consequence, the follow-up time for Time 2 was reclassified from 1 month to between 1 and 2.75 months post-incident. Time 3 was changed from 3 months to between 3 and 5.5 months post-incident.

Characteristics of the Assault

Of the final sample of 70 participants, 68 were involved in an incident of assault. The remaining two were exposed to other trauma at work, involving risk of HIV infection. Table 2 gives the characteristics of the assaults and, apart from the top line of data, proportions are based on these 68 persons (taking into account missing data).

Nearly twice as many physical assaults as verbal assaults were recorded. Assaults of staff were most likely to occur in acute medical services (41.2%), although this may simply reflect the higher number of staff and public found in these services. Incidents also seem to have been more likely in the morning. The majority lasted only a short time (5 minutes or less) and had a single aggressor (97%). Weapons were rarely used, with 15.3 % of all assault victims being aware of a weapon at the time. Even fewer

Table 1: Background characteristics of final sample (n=70)

Category	Number (%) Unless stated otherwise
Age: mean years (s.d.) (4 missing)	39.2 (10.8)
Gender:	
Male	18 (25.7)
Female	52 (74.3)
Ethnicity: (3 missing)	
Caucasian	64 (95.5)
Non-Caucasian	3 (4.5)
Education: (5 missing)	
Degree or above	24 (36.9)
Above GCSE to A-level equivalent	15 (23.1)
None to GCSE	17 (26.2)
None	9 (13.8)
Household Income: (4 missing)	
Up to £14,999	16 (24.2)
£15,000 to £29,999	27 (41.0)
Over £30,000	23 (34.8)
Prior psychological treatment (4 missing)	12 (18.2)
Abused as child (3 missing)	14 (20.9)
Other trauma (3 missing)	28 (41.8)
Family mental illness (4 missing)	9 (13.6)

Table 2: Assault characteristics of sample (n=70)

Category	Number (%) Unless stated otherwise
Victims of, or witnesses to, assault	68 (97)
Type: (1 missing)	
Verbal assault	23 (34.3)
Physical assault (contact)	44 (65.7)
Location of incident:	
Acute services	28 (41.2)
Elderly care	16 (23.5)
Mental health	16 (23.5)
Other	8 (11.8)
Time of incident: (13 missing)	
Night (22.01 to 7.00)	13 (23.6)
Morning (7.01 to 12.00)	20 (36.4)
Afternoon 12.01 to 17.00)	10 (18.2)
Evening (17.01 to 22.00)	12 (21.8)
Duration of assault: (10missing)	
5 minutes or less	37 (63.8)
6 to 10 minutes	10 (17.2)
11 to 30 minutes	5 (8.6)
31 minutes or more	6 (10.3)
Number of aggressors (10 missing)	
One	56 (96.6)
Two	2 (3.4)
Weapons (9 missing)	
Used	9 (15.3)
Contact made	5 (8.5)
Severity (9 missing)	
Threatened to be harmed	29 (49.2)
Actual injury received	17 (28.9)
Perception of danger	
% sure of serious harm (9 missing): Mean (s.d.)	20.4 (24.7)
% sure of being killed (11 missing): Mean (s.d.)	4.8 (15.6)
Aggressor arrested (9 missing)	5 (8.5)
Police investigation (9 missing)	2 (3.4)
Compensation claimed (9 missing)	0 (0)

victims reported the weapon made physical contact with them (8.5%). Furthermore, whilst nearly 30% of victims received an actual injury, only 1 (1.7%) of these was classified as 'major'. Finally, there seems to have been little official response to these events, with few involving a police arrest (8.5%), investigation (3.4%) or compensation claims (0%).

Severity of symptoms

The mean scores of male and female participants on the three outcome variables (i.e. PTSD symptoms, anxiety and depression) at Times 2 and 3 were calculated (see Table A3 in Appendix G). Males scored higher than the females on each measure at each time point, although none of the differences were statistically significant.

Repeated measures analyses of variance were conducted for PTSD symptoms, anxiety and depression, with time (Time 2 vs Time 3) as the within group variable and gender (male vs female) as the between group factor. There was no main effect for 'time' or 'gender' on any of the outcomes, nor did the interaction between time and gender affect them significantly.

e.g. 'Time' ($F(1,66) = .151$, $p = .70$); 'Gender' ($F(1,66) = 2.9$, $p = .09$),

'Time x Gender' ($F(1,66) = .11$, $p = .74$).

Hypothesis 1:

Correlations between putative predictor factors and PTSD severity

The statistical associations were calculated between PTSD symptom severities at two time points and the four groups of factors, demographic variables, pre-trauma factors, stressors, and psychological responses. The results can be seen in Table 3.

It should be noted that the psychological response variables and the outcome were positively skewed. Therefore a non-parametric statistic of association (Spearman's rho) was calculated to ensure the relationship between these variables was not affected by the distribution of their scores. The correlations were virtually identical in value and significance.

A number of factors were identified as significantly associated with PTSD symptoms at Times 2 and 3. Demographic and pre-trauma factors included 'experiencing trauma other than childhood abuse' and a 'family psychiatric history', which both correlated with PSS-SR scores at Time 2, and age and gender, which correlated with PSS-SR scores at Time 3. With respect to stressor variables, only the participants' 'sureness they would be harmed' was associated with PSS-SR scores at Time 2, whilst 'sureness of harm' and 'sureness of death' correlated with PSS-SR scores at Time 3.

All the psychological response variables correlated with both PTSD symptoms at both time points, most of them strongly (.5 or above) and highly significantly ($p<.001$). Interpretation of PTSD symptoms was the only factor to correlate negatively with the outcome variables, which is due to the direction of the scoring of this factor.

Hypothesis 2

Variance in PSS-SR scores at Time 3 accounted for by psychological response.

Multiple regression analysis was employed to investigate hypothesis 2. First, bivariate scatter plots of residuals, for each psychological variable regressed onto the Time 3 outcome variable, were examined by sight for normality, linearity, and homoscedasticity. The assumptions for conducting regression analysis appeared to be adequately met. Following this, all demographic, pre-trauma and stressor severity variables that correlated significantly with PSS-SR at Time 3 were simultaneously forced into the first block of the regression. Then, each of the seven psychological response variables were entered into separate regressions. This was to maximise the number of participants, owing to missing data. The full results of these regressions demonstrated that all these factors accounted for significant additional variance in outcome. (See Table A5 in the Appendix)

A further regression was run to establish the total variance in Time 3 PTSD symptoms accounted for by psychological variables when entered simultaneously, controlling for the pre-trauma and stressor severity factors. Whilst the pre-trauma and stressor factors accounted for 16% of the outcome variance, the psychological factors together accounted for a further 61% ($F = 15.9$, $p<.001$).

Table 3 shows that all the psychological variables correlated with PTSD symptoms at both time points (2 & 3). Given the significant association between symptoms scores at Times 2 and 3, it is possible that the relationship between the psychological variables and PTSD symptoms at the latter date is simply a function of the association

between Time 2 and Time 3 symptoms. In other words, the psychological variables may not directly predict Time 3 symptoms.

To discount this possibility, partial correlations were calculated between the psychological variables and the PSS-SR scores at Time 3, whilst controlling for PSS-SR scores at Time 2. All of the partial correlations were statistically significant. (See Table A6 in the Appendix)

Hypothesis 3

Identification of persistent PTSD symptoms

The first step in this process was to identify those factors most predictive of PSS-SR scores at Time 3. This was achieved using a stepwise regression. All putative predictive factors were entered using the 'stepwise' command. SPSS applied the following criteria to select the most predictive factors: to enter the model, the F score probability $\leq .05$; for factors to be excluded from the model, F score probability $\geq .10$.

Three factors were identified by this procedure: 'highest educational qualification' (B = -.27, t = -2.14, p = .039), 'trait dissociation score' (B = .39, t = 2.60, p = .013), and 'behaviour after incident' (B = .44, t = 2.87, p = .007). The signs of the standardised beta coefficients indicate that symptoms are more likely if: individuals achieved a lower level of educational qualification; a higher score on trait dissociation and displayed more avoidant behaviours since the incident. Together these factors accounted for 45% of the outcome variance.

The extent to which use of these factors could be made in a clinical setting depends in part on their utility in making accurate outcome predictions. Despite the low rate of symptomatology in this sample and the relatively small sample size, an attempt was made to establish the predictive utility of the factors in two ways. First, it was investigated whether a risk index comprising these factors could discriminate participants who scored above a certain level on the PSS-SR, from those scoring below it. 'Caseness' was set on the PSS-SR (at Time 3) at 11, signifying 'moderate' scores and above, and this variable was reclassified as dichotomous. Participants' scores on the 'highest educational qualification' were reverse coded and z-scores were calculated for this and the other two predictor variables. These were then summed to form the risk index. An independent samples t-test was performed, with the dichotomous outcome as the grouping variable. The risk index scores for participants with 'moderate' and above PSS-SR symptoms were found to be significantly higher than those with scores of 'mild' and below ($t = 6.52$, $df = 62$, $p<.001$).

Second, a ROC analysis was performed. This was to establish whether a person's scores on these factors would predict whether they would have 'moderate' or above PTSD symptoms three months after an incident. Further manipulation of the variables was necessary first, however. A predictive tool that would ideally be used by healthcare staff untrained in statistical procedures (possibly), should not involve the standardisation of variables. Therefore, the three predictor variables were dichotomised and recoded so that for each, approximately half of the sample had scores above and below the cut point. These dichotomised variables were then summed to give a simplified risk index. This was entered as the predictor variable into

the ROC analysis, with the dichotomised PSS-SR at Time 3 as the outcome to be predicted.

The full results can be seen in the Appendix. The area under the curve (AUC) was found to be 0.89 (SE = .048, $p<.0001$), which is generally interpreted as the probability of correctly classifying a randomly selected pair of subjects, where one is 'normal' and one is a 'case'. This can vary between .5 and 1, with unity representing a perfect predictive instrument (Fombonne, 1991).

With regard to the selection of a cut-off score for the index of dichotomised variables, Table 4 represents the choices available. Selecting a score of '1' as the cut-off would mean all eight staff members with moderate and above symptoms of PTSD (i.e. 'cases') would have been correctly identified. However, 20 individuals would have been incorrectly selected as cases. A score of '2' as the cut-off would have had other implications. Whilst only two persons would have been incorrectly selected as cases, four of the eight cases would have been missed.

Table 3: Zero-order correlations with PTSD symptoms at Time 2 and Time 3.

	PSS-SR symptoms at 1-3 months	PSS-SR symptoms at 3-6 months
Background factors:		
Gender	U = 427, Z = -1.3, p = .193	U = 246, Z = -2.6, p = .009
Age	r = .124, p = .284	r = .249, p = .044
Household income	σ = -.135, p = .248	σ = -.172, p = .167
Educational qualifications	σ = -.170, p = .145	σ = -.109, p = .386
Psychiatric treatment	U = 425, Z = -.64, p = .525	U = 277, Z = -.84, p = .399
Childhood abuse	U = 375, Z = -1.5, p = .140	U = 307, Z = -.74, p = .458
Other trauma	U = 475, Z = -2.6, p = .010	U = 490, Z = -.52, p = .607
Other adverse events	U = 209, Z = -.67, p = .503	U = 114, Z = -.34, p = .735
Family psychiatric history	U = 228, Z = -2.3, p = .021	U = 190, Z = -1.3, p = .185
Assault characteristics:		
Incident severity	r = .213, p = .089	r = .029, p = .832
Surety of harm	r = .44, p < .001	r = .439, p = .001
Surety of death	r = .031, p = .806	r = .266, p = .046
Psychological Response variables:		
Memory disorganisation	r = .461, p < .001	r = .749, p < .001
Data driven processing	r = .587, p < .001	r = .69, p < .001
Self referent processing	r = .481, p < .001	r = .479, p < .001
State dissociation	r = .625, p < .001	r = .495, p < .001
Interpretation of PTSD symptoms	r = -.727, p < .001	r = -.541, p < .001
Trait dissociation	r = .643, p < .001	r = .51, p < .001
Behaviour after incident	r = .641, p < .001	r = .525, p < .001
PTSD at 1-3 months		r = .455, p < .001

Table 4: ROC analysis of Risk index by dichotomised PSS-SR scores

Risk Index	Sensitivity	Specificity	True positives	True negatives	False positives	False negatives
-	100.0 %	0.0 %	8	0	56	0
0	100.0 %	23.2 %	8	13	43	0
1	100.0 %	64.3%	8	36	20	0
2	50.0 %	96.4%	4	54	2	4
3	0.0 %	100.0 %	0	56	0	8

Discussion

The discussion will highlight relevant items from each main area of the results, but focussing on the three hypotheses. Advantages and limitations of the study will then be described, followed by clinical implications. Possibilities for future research will be highlighted throughout.

Demographics

The background characteristics of the sample did not appear to hold many surprises. The fact that nearly three times as many females as males participated in the study may simply reflect the gender split in the employee population. Although no data on employee roles were collected systematically, it was clear from participation in the recruitment process that the sample largely consisted of nurses, still a predominantly female profession.

It was unclear how representative the final sample was of all health care staff who experience violence at work. Although 189 consecutive victims of violence were approached, 99 (52.4%) participated at Time 1 and only 70 (37%) continued through to the end of the project. As a result of the study design, data on demographic factors were only collected at Time 2. Therefore it was not possible to identify any demographic differences between those who participated and those who did not.

Assault severity

Nearly twice as many physical assaults as verbal assaults were recorded, which appears counterintuitive. However, this may reflect a tendency in nurses to

underreport events, which has been found in earlier studies (Fernandes et al., 1999). Overall, the severity of incidents was relatively low. For example, only 17/68 received an injury, 16 of which were described as minor cuts or bruises. This confirms the results of the study Noble and Rodger (1989) who found that nurses as a group experience lower severity assaults compared to other groups in the PTSD literature. However, recent research also suggests that nurses experience more assaults than other groups (e.g. British Crime Survey; Home Office, 2000). This raises the question of whether frequent low severity assaults are more or less likely to result in PTSD reactions than one-off higher severity incidents. Wykes and Whittington (1998) found that victims of multiple assaults were more likely than single assault victims to experience either very high or very low symptoms a month after the last incident. This suggests either outcome is possible.

Symptom severity

Symptoms of PTSD in this study were relatively low with only four participants experiencing 'severe' or 'moderate to severe' symptoms at Time 3. These results may support the contention that health professionals downplay their symptoms, as acknowledging them may contradict their professional self-image (Wykes and Whittington, 1998). Alternatively, if these data reflect the reality of working in the health service, one might interpret them as indicating the problem of workplace violence is not such a great one. However, other effects upon staff are possible that have not been measured here. For example, feeling physically unsafe at work is likely to affect one's motivation to continue in such an environment. A steady exodus from health care professions following repeated exposure to violence would represent a

serious problem to the health service. A qualitative investigation of victimised employees' feelings and motivations could explore this subject further.

It was surprising to note that, unlike in other research (Dunmore et al., 2001; Riggs, Rothbaum & Foa, 1995), the severity of symptoms did not decline over the duration of this study. This could be due to the relatively brief data collection period, being only three months rather than six or nine months, allowing less time for symptoms to decline. In addition, the low prevalence of PTSD symptoms meant fewer symptoms to decline from.

Another finding that was contrary to previous evidence was that males were more likely to experience symptoms of PTSD at 3 months than females. It is consistently reported that females are more susceptible to PTSD outcomes than males (Breslau et al., 1997; Kessler et al., 1995). The current results could simply represent a quirk of the data. The number of males was very low (N=18), and this is more likely to produce results that are inconsistent with previous research.

Hypothesis 1

All the cognitive variables that were measured correlated significantly with PSS-SR scores at both Time 2 and Time 3. This confirms findings by earlier studies in which significant relationships were identified between PTSD symptoms and interpretation of symptoms (Halligan et al., in press), avoidance behaviours (Dunmore et al., 2001), state and trait dissociation, data-driven processing, disorganisation of memory (Murray et al., 2002) and a lack of self-referent processing at the time of the assault (Halligan et al., in press).

It was surprising that the objective severity of the trauma incident was not associated with the PTSD outcome, as has been found in previous research (Halligan et al, in press). This finding could reflect an invalid instrument, as neither its validity nor reliability have been established. However, variables designed to reflect subjective severity did correlate with symptom severity at Time 3. Furthermore, other studies have also failed to find a relationship using objective severity measures, whilst subjective scales have yielded significant associations (Dunmore et al., 1999; Murray et al., 2002). These results seem to emphasise the role of the cognitive interpretation of events in the development of symptoms.

It should be acknowledged that for certain 'predictor' factors such as 'trait dissociation' and 'behaviour after incident' there may be an element of conceptual tautology between them and the outcome variable of PTSD symptoms. A small number of items on the predictor questionnaires are similar to items in the questionnaire that measures the outcome. Correlations between these items would therefore be expected and do not reveal a great deal. For example, some of the items in the behaviour after incident questionnaire refer to avoidant behaviour, which is also the focus of two items in the PSS-SR. Similarly, two items in the trait dissociation questionnaire are replicated in the PSS-SR. However, it should be added that these questionnaires contain several other items that refer to many different aspects of the factors they are evaluating, which are conceptually different from the out come variable. The fact that the correlation between them is relatively strong and significant is likely to indicate something more than conceptual tautology.

Hypothesis 2

The results relating to hypothesis 2 provided further confirmation of the importance of psychological responses to trauma over and above that of other factors. It had been predicted that these variables would account for significant variance in PSS-SR scores at three months, having controlled for demographic, pre-trauma, and stressor severity factors. The hypothesis was not specific about which particular variables this would apply to. In fact, all accounted for significant variance. Similar results had been found for all the same factors in previous studies, except trait dissociation (Clohessy & Ehlers, 1999; Dunmore et al., 2001; Halligan et al., in press; Murray et al., 2002).

The finding that cognitive factors, when entered together, accounted for 61% of the variance over and above that accounted for by other factors is consistent with other PTSD studies that have investigated similar predictive factors (Dunmore et al., 2001). These have been noted to exceed by a factor of two the variance accounted for by other models (Halligan et al., in press). Also consistent with a previous study (Dunmore et al., 2001) were the significant partial correlations, discounting the possibility that PSS-SR scores at Time 2 mediated the relationships between the cognitive variables and symptoms at Time 3. This confirms a direct relationship between the cognitive factors and symptoms at Time 3, independent of any symptoms at Time 2.

The findings relating to Hypotheses 1 and 2 represent further support for Ehlers and Clark's (2000) PTSD model. Several factors that are proposed to play an important role in the development of PTSD symptoms have been identified in this study as

being related to symptoms at three months or more post-trauma. This provides evidence of their relevance in the process.

However, there is perhaps enough evidence for correlations between the factors detailed within this model and persistent symptoms of PTSD. It may be an appropriate next step for subsequent research to look for evidence of the proposed mechanistic connections between these factors. For example, could evidence be found for the hypothesised relationship between trauma memory and trauma appraisals, or for the effect of disorganised memories on the frequency of cue driven intrusions? Such research may provide support for the model's proposed mechanisms through which onset and maintenance of PTSD are thought to occur.

Hypothesis 3

As predicted, an index of empirically established factors was found to discriminate participants with 'moderate' PTSD symptoms and above, from those with 'mild' symptoms and below. In addition, the ROC analysis showed that better than chance predictions of persistent PTSD symptoms at a level of moderate and above were possible using this index.

The factors that remained in the regression equation deserve comment. Highest educational qualification was inversely related to severity of symptoms. If this factor was regarded as a proxy variable for intelligence, there is supporting evidence that lower intelligence is a risk factor for PTSD, albeit with combat veterans only (Macklin et al., 1998; McNally & Shin, 1995). Trait, rather than state, dissociation was a surprising contributor to the model especially in the light of a previous finding

of state dissociation affecting PTSD independently of pre-existing dissociative traits (Murray et al., 2002). It should also be highlighted that these factors consist of two pre-trauma characteristics (educational attainments, trait dissociation) and one related to post-trauma behaviour. No factor relating to peri-traumatic cognitive processing contributed to the model.

However, extreme caution should be applied to the results of the ROC analysis. This technique is generally used with samples of several hundred people (Fombonne, 1991) whilst the current analysis was performed on a sample of 64. When an atheoretical approach is taken, as in this case, the results will always be subject to the peculiarities of the sample under investigation. A much larger sample would have reduced the likelihood of quirky data and more confidence could be put in the factors that were left in the regression equation.

In addition, whilst the factors entered in the regression were drawn from other studies identifying risk factors for persistent PTSD, there may have been important factors that were missed out. The final model only accounted for 45% of the variance in symptoms at Time 3.

The choice of where to make the cut in the severity of symptoms scale to classify 'caseness' was made as a compromise between clinical and statistical reasoning. Clinically, it would have been ideal to set caseness at a higher level (e.g. moderate to severe), representing a more urgent requirement for clinical intervention. However, given the distribution of symptom severities, it would have been inappropriate to attempt a ROC analysis with so few cases. Clearly, methodologically speaking, it

would have been better to have a large enough sample with a higher frequency of severe symptoms, and to set caseness for clinical reasons only.

The selection of a cut-off point for the risk index would depend on a number of factors including the prevalence of 'caseness' in the population under consideration, the resources available and the various implications of false positives and false negatives to employees and management (Fombonne, 1991). Low prevalences and low resources tend to push the cut-off higher. Employees subject to assaults would prefer the cut-off to be lower, to ensure all cases were picked up early. Managers, whilst preferring all staff to be available for work, may have financial limits to the psychological support they can provide. Twenty unnecessary interventions may go beyond such limits. They may therefore prefer to provide support for only six staff members even if it means four who are in need of input are missed.

Advantages and limitations:

This research is one of only a handful of studies that have adopted a prospective longitudinal design to investigate factors predictive of persistent PTSD symptoms (Dunmore et al., 2001; Murray et al., 2002; Halligan et al., in press). The main advantage of this approach, when investigating the effect of trauma related factors on a medium to long term outcome, is that the accuracy of the victim's memory is less likely to be a confounding factor. This is particularly pertinent when, as in this study, peri-traumatic processing is under scrutiny. Results are likely to contain more error when participants are asked to recall the nature of their thinking during a traumatic incident that occurred several months before.

This fact influenced the early timing of first data collection, which related almost exclusively to peri-traumatic processing factors. A number of researchers have highlighted the importance of early reactions to traumatic events, particularly the processing of information in the near aftermath (Wykes & Whittington, 1998). Therefore participants were contacted within one or two days of the assault incident and the mean return time of their completed questionnaires was under two weeks.

In addition, no other study was found that went beyond establishing the variance in outcome accounted for by factors under investigation, and assessed their predictive validity. Although the use of ROC analysis may have been premature given the sample size, this approach could be used as a model for future research.

A number of methodological criticisms could be made of this study, however. Perhaps the main one is the low number of participants with moderate to severe symptoms and above of PTSD and the preponderance of individuals with no symptoms. Whilst this may reflect the true situation, there could perhaps have been more stringent entry criteria into the study in terms of threat experienced by the potential participant. This would have provided more normally distributed outcome data. In addition, although this had the largest sample of similar prospective studies, more participants would have probably resulted in a higher number with more serious symptoms. It would therefore have been necessary to lengthen the duration of recruitment.

The duration of data collection could also have been extended. Most studies that purport to investigate persistent symptoms of PTSD do so over 6 months or more. The limit of three months could therefore be criticised.

Furthermore, other cognitive factors that have been found to be significantly related to persistent PTSD symptoms were not included in this study, e.g. mental defeat (Dunmore et al., 2001), rumination (Murray et al., 2002), emotional numbing (detachment) (Halligan et al., in press).

Other methodological criticisms concern the lack of a question relating to post-incident psychological treatment received, the problem of participants exposed to more than one incident during the study, missing data and the lack of an evaluation of the reliable use of recruitment criteria.

Clinical implications:

Implications of the additional evidence for Ehlers and Clark's (2000) model concern which factors to focus on in therapeutic work and which techniques to adopt to overcome their proposed effects. These are described in detail in the paper by Ehlers and Clark (2000).

The current findings represent an initial attempt to provide a clinically useful tool to predict persistent PTSD symptoms. The clinical applications for such a tool have been outlined above and in other papers (Halligan et al., in press). If a line manager was able to give the appropriate measures to employees within a month of an incident, the results could highlight those most need of immediate referral. Victim distress would

be minimised and managers would be able to plan for appropriate cover so that other staff would not suffer the consequences of shortages.

However, further research is clearly necessary. For this particular index to have clinical utility, a validating study would need to be undertaken using a different and much larger sample drawn from the same population of health service workers. If such a study revealed similar results to those detailed above, the index may have some use as a tool to aid clinical predictions.

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Critical Appraisal

Introduction

Several aspects of the current research study are discussed within this section of the thesis. First, a commentary is provided on the research process in chronological order of events, including details of the origins of the project and of obstacles and challenges that were faced throughout the study. This is written from the perspective of the main researcher. In addition, the methodological limitations outlined in the research report are expanded on in this appraisal, together with the clinical implications of the findings. Finally, future research directions are also described.

Origins of the research

The initial idea for this project came from Dr Mark McFetridge, who ultimately became my clinical supervisor on the project. He is a consultant clinical psychologist working in a local hospital and I was speaking to him about the possibility of an elective placement in the unit where he works. One of his specialities is providing EMDR for victims of trauma and he mentioned that he had been asked to contribute to a committee that had been set up in the York Health Services NHS Trust. The staff counselling service had noticed an alarming rise in the number of their clients who had experienced violence and aggression at work. This committee, comprising managers from Occupational Health and Risk Management, a staff counsellor and two clinical psychologists, had been constituted to discuss and implement appropriate organisational and clinical response strategies to violence directed towards staff.

Staff counselling were concerned their resources were not sufficient to respond to the potential demand from victims of violence. One of the hopes of the committee was that it would be possible to flag up staff members who were most at risk of an adverse

reaction to such an incident, so that early intervention could at least occur with these individuals. Dr McFetridge and Geraldine Casswell, the other clinical psychologist, therefore constructed a measurement tool (the 'Posttraumatic Risk Of Disturbance') to assist in the prediction of such cases. I was asked if I would like to be involved in the validation of this tool. I agreed to be involved in the project. However, I was aware it would be important to be part of the design process of any such tool. This would enable the inclusion of factors identified in recent research as predictive of persistent PTSD. It was agreed that an evaluation of the PROD would be performed alongside an assessment of the predictive validity of other risk factors, previously identified in the literature (e.g. Brewin, Andrews & Valentine, 2000).

Supervision

Clearly, it was appropriate for Dr McFetridge to be the clinical supervisor, given his contacts with the Trust and his involvement with the project. Although I had only just met him, Dr McFetridge's knowledge of the subject area and his open, down-to-earth manner meant that I felt happy to work with him.

With regards to my research supervisor, I had not specified a preference, although I was aware more than one course team member had conducted research in this subject area. I was allocated both Prof. Turpin and Dr Rowlands, who were to work in tandem. It was not entirely clear how this was going to work, and in the event, Dr Rowlands' involvement declined relatively rapidly, presumably as a result of other commitments. Interestingly, this was never explicitly addressed by any of us. In future, I think I might be aware of the potential pitfalls of two supervisors and discourage it. I also hope I would address the reality of the situation more explicitly.

Initial literature searches

There is an extremely broad literature relating to posttraumatic stress disorder (PTSD). There was therefore no difficulty in identifying risk factors for this outcome as well as theoretical models from PsychINFO and Medline databases. In addition, Prof. Turpin was forthcoming in providing recent articles. A trainee colleague was a further source of references, as she had previously worked with Professors Ehlers and Clark in Oxford.

Whilst writing my research proposal, I became aware that Ehlers and Clark had recently published a model accounting for much of the phenomenology of PTSD (Ehlers & Clark, 2000). In addition it became apparent that they, or other researchers in conjunction with them, had conducted a number of prospective studies that provided strong support for this model (Dunmore, Clark & Ehlers 1999; 2001; Murray et al., 2002). The results of these studies were clearly pertinent to the predictive study that I was in the process of designing.

I subsequently attended a workshop and research conference at the Institute of Psychiatry, led by the Ehlers and Clark team, at which they described their model in more detail. The amount of variance in PTSD symptoms accounted for by psychological factors implicit in this model led me to consider the investigation of these variables as necessary in this project. The many other risk factors identified from the literature (e.g. Brewin, Andrews & Valentine, 2000; Ehlers, 2000) would also need to be assessed, of course. However, I was aware that this study could

provide additional evidence for the Ehlers and Clark model, using data from a novel sample.

Study design

The most effective way to establish the predictive characteristics of a measure is using a prospective longitudinal design. It was conceived that data collection on predictive factors would occur one week and one month post-trauma whilst outcome data would be collected at one month and three months post-trauma. The split in collection of predictive factors was proposed to avoid overload to participants in the early aftermath of the trauma. State-related factors were addressed at the early time point, whilst trait and historical factors were collected later.

There was concern that the time available would not permit such a design. This would depend on the incidence of aggression over the time of the study and the response rate at each stage of data collection. Postal questionnaires were envisaged, which have notoriously low response rates. However, it was thought the involvement of Trust employees in recruitment might encourage maintenance on the project.

In the event, a pilot study was conducted over two weeks to establish the incidence of violence in the Trust. Over one hundred incidents were recorded each week, many of which involved physical contact including attempted strangulation and blows to the head. This was extremely encouraging. Power analysis had indicated a final sample of 65 was sufficient to identify significant effects. Even a response rate of 50% at each stage would permit an appropriate sample size, over the six months available.

Selection of Measures

Personal contact was made with Anke Ehlers regarding the measures of psychological and behavioural response variables used in prospective studies she had been involved in. These were chosen as published results had consistently demonstrated their applicability to this area of research. Internal consistency had also been found to be at least adequate on all measures. Other risk factors, such as psychiatric history, were typically assessed using dichotomous response items with follow-up detail requested.

Neither test-retest reliability, nor validity had been established for any of the measures of the variables mentioned above. There exists the possibility, therefore, that published significant results simply indicate variance in PTSD symptoms accounted for by these measures, rather than the constructs they are designed to represent.

The PSS-SR (Foa, Riggs, Dancu & Rothbaum, 1993), representing the symptoms scale from the PDS (Foa, Cashman, Jaycox, & Perry, 1997) was selected as the main outcome measure. Incidence of PTSD was expected to be low. It was therefore considered more appropriate to assess severity of symptoms on a continuous scale, rather than attempt to predict a diagnosis of PTSD as a dichotomous variable. In addition, rather than rely on one outcome variable, data on anxiety and depression were collected using the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983).

Research Proposal

I was satisfied that the proposal I submitted represented a clear account of what I intended to achieve. Feedback from the research committee was largely positive,

although I felt a little anxious when one member stated he thought it was an ambitious project. Concern was expressed about the sample size and the exact mechanism of recruitment, which, despite having held meetings with the appropriate department, was not entirely established at this time. There was also concern about how much the project would cost. This is addressed in the 'Funding' section below.

Ethics Committee Application

Owing to the location of the study, application for ethical approval was made to the York Health Services NHS Trust. However, before such an application was made, it was necessary to obtain approval from both the Risk Management Committee and the Health and Safety Committee for the research. This involved making presentations to senior managers from the Chief Executive's Office, Trades Union representatives, Health Service managers and various medical practitioners. Ethical approval was unlikely to be granted without prior backing from these committees. The first of the presentations was fairly daunting but the proposal was greeted with interest and enthusiasm. I noticed my feelings changing from anxiety, to elation, and then back to anxiety again when I realised these managers were invested in the results of my research.

Having been one member of a research team during my previous experience of such applications, I was struck by the thoroughness, attention to detail and sheer volume of work necessary in drawing together an ethics application. Nevertheless, following initial requests by the committee for minor amendments, ethical approval was granted on 30th July, 2002.

Funding

With retrospect, I had been somewhat avoidant about this aspect of the process, concerned as I was about the cost of certain measures. I subsequently made calculations using data from the pilot study and found the project was likely to cost £700 over the allocated budget.

Prof. Turpin had suggested that if additional funding was needed, Trusts sometimes had pots of money for discrete research purposes. I therefore approached a manager in the Occupational Health department and asked if money might be made available for the project. A meeting was arranged with a senior manager, and he agreed to the additional amount of £700. Having felt rather despairing when the reality of my avoidance hit home, I was delighted with the outcome of this process. In fact, obtaining the additional funding was relatively straightforward, and this has given me additional confidence for future funding applications. I was also been reminded that avoidance is seldom a successful long-term strategy.

Data Collection

Staff were trained in the recruitment process in early September, 2002. The aim was to start recruitment the following week. However, other work took priority in the Risk Management department and few calls were made that week. Furthermore, the volume of incidents was radically lower than had been estimated from the pilot. During the next week, only twelve violent incidents occurred.

In addition the recruitment team, who worked normal office hours, experienced problems making contact with victimised staff, especially those working night shifts

or temporary staff. This was handled by sending out compliments slips asking staff to ring the Risk Management department during office hours. Not all staff responded however.

It was important to get participants to fill out and send in their forms as quickly as possible after receiving it. Otherwise there was the risk they would run into the next follow-up period and find themselves filling in forms together that were supposed to be completed one month apart. This was addressed by sending out reminders after 2 weeks.

Considerable difficulties were experienced in managing the recruitment process. Whilst the team had agreed to help, their resources had been cut and other demands held priority. I had no authority to demand extra attention, but recognised that if recruitment were to continue at the same rate, the project would fail. I raised these concerns in telephone conversations and meetings with the team manager, but was never convinced the reality of what I was saying had got through. Approaching Christmas there were only 28 participants and we were already half way through the recruitment period.

I discussed these difficulties with my supervisors and decided to bring it up at the next Steering Group in January. My concerns were given weight by the rest of the group. In addition, I proposed to meet with rest of team, not just the manager. This was a successful meeting at which I gave both positive and negative feedback about the return rates. I wanted them to feel included in the team, to encourage their interest and personal ownership of project. I also decided to come into the hospital each week and

make recruitment calls myself. Typically, this involved me leaving a message or sending a note, and the team fielded the response call. A week later, the response rate had risen again, and maintained a constant flow until the end of the recruitment period. This process involved quite a lesson in managing my own anxiety when the control is not entirely mine, and in recognising when to apply pressure and when to increase my own effort.

Literature review

It had originally been my intention to complete the literature review between January and April. However, three events transpired to shift this process back. First, and most significant, was the borderline failure of an unconnected case study. A failure of the resubmission would result in failure of the whole course. This meant I had to invest a considerable amount of time in rewriting this piece of work, time that had been allocated to the literature review. Second, I became extremely ill with influenza, and then pericarditis, resulting in hospitalisation for a number of days. This took out further potential work time. The third event was considerably more welcomed, the birth of a daughter, but this nevertheless required additional time and energy, which are scarce resources.

These factors contributed to the literature review being written under considerable pressure of time in late May and June, to enable sufficient time to be spent on the research report and data analysis during July.

Data Analysis and Writing up

Given the need to maximise sample size, and the three month period between Time 1 and Time 3 data collection for each participant, it was necessary to collect data until the end of June. This allowed only July for data analysis and write-up. Fortunately, data had been entered as it had been received. In addition, I had learned the main statistical techniques from previous research I had conducted. However, there were times when support in talking through statistical methods would have been appreciated, but both of my supervisors were away for most of July. Fortunately I was able to get support from other quarters. Nevertheless, I felt the pressure keenly at these points.

I was delighted with the way these results turned out. Having conducted research in the past with few results of significance, it was a pleasure to be able to reject the null hypothesis!

Writing up was achieved in twelve days with a maximum of two weeks available. Pressure was also felt during this period. It was particularly challenging to keep to the required word limit. A line by Bernard Shaw rather sums this up. In a letter to a friend he reportedly wrote:

> *"I am sorry this letter is so long, but I didn't have time to write a shorter one."*

Final thoughts on Supervision

My experience was that the split in the roles of the clinical and research supervisors worked well for me. Contact was most consistent with Prof. Turpin although working clinically under the supervision of Dr McFetridge meant that I could speak to him when the need arose. My tendency is somewhat to 'go it alone' but Prof. Turpin did stay sufficiently in touch if he didn't hear from me for a while. Advice was supportive and helpful. Particularly in the latter stages with regards to what to cut from the literature review.

Methodological limitations

The main methodological limitations have been addressed in the research report whilst others have been mentioned in the current section. However, some problems that have been highlighted require a little more detail. For example, the reasons for the time slippage that occurred in data collection have not been described. The main difficulty here was that as a result of staff shortages the Risk Management team were not able to provide me with the exact date of any incident. Within a week of the start of the project, two members of this team left work, one of whom had been responsible for inputting data from AIRS forms, giving details of incidents. I had not included an item on the questionnaire asking for the incident date. Thus, the only option was to use a proxy measure, which was the date the participant filled their first questionnaire in. This assumed they had reported the incident within a day of it occurring, had been approached by the recruitment team shortly after that, and had filled the questionnaire in promptly.

Unfortunately, when the team were able to supply these details, which was after the end of data collection, it became apparent that these were unreasonable expectations to make in many cases. Any further delays in sending out of questionnaires or filling them out exacerbated the time slippage.

One of the dangers with this slippage is that participants become more and more dependent on their memory for how they felt at the time of a distant incident. If, in addition, this was just one of many incidents faced in the course of their duties, they may not even remember which particular violent episode it was. One or two participants wrote on their forms that this was the case.

Perhaps the main danger with slippage is that the study investigates something different to what it was originally designed to do. Rather than measure the relationship between peri-traumatic variables and outcomes at one and three months post-trauma, relationships are identified between predictors at one month and outcomes at 2 and five months post trauma. Different mechanisms may be operating at this distance. In addition, comparisons with other studies become problematic.

What is rather startling is that all this difficulty could have been largely avoided if 'date of incident' had simply been put on the initial questionnaire. It was impossible to foresee staffing difficulties. Nonetheless, time spent thinking through the importance of this date to the follow-up process would have prompted its inclusion on the form.

There were other variables of interest on which data might have been collected but were not. These include marital status, job role, length of time away from work, post-incident social support and post-incident psychological support. The first two represent further demographic details of interest whilst time away from work may have been an interesting predictor of persistent symptoms. The aim had been to include items investigating the support variables with the final questionnaire. It is probable that someone receiving support, especially professional psychological input, would be less likely to demonstrate persistent PTSD symptoms than someone who was not. If they had a significant association with the outcome, these variables should have been controlled in any regression. These questions were not sent out owing to an oversight. In fact, they have been sent out with a fourth questionnaire, following participants up at six months or more post incident.

Finally, there were known to have been people who experienced more than one assault during their time of involvement in the study. Most of these worked on wards with older adults with dementia. Having spoken to some of these participants, they appear to accept these incidents as part of their daily work, and support each other strongly with this issue. However, at least one participant agreed to take part in the study after a relatively minor incident, which was followed by a much more severe one. He was asked if he was willing to start again and complete the questionnaires in relation to the more serious incident, which he did. However, it led me to wonder about the differential effect of multiple versus single events. The fact that data were not collected about this could have contributed to error in the results.

Clinical Implications

The findings relating to hypotheses 2 and 3 have clear clinical implications. Those results that support Ehlers & Clark's (2000) theoretical model have implications for the focus of any therapeutic work conducted. As stated in the research report, I am reluctant to go into great detail about the implications for clinical work of further support for this model as it is clearly expounded within that paper (Ehlers & Clark, 2000).

However in brief, this study highlighted in particular the importance of two types of variable in the development and maintenance of persistent PTSD symptoms: peri-traumatic cognitive processing and post-incident avoidant behaviour. The impact of dissociation, a lack of self-referent processing and a focus on data-driven processing at the time of the event is thought to be that memory for the event is not fully integrated. Surface level trauma memories therefore cue thought intrusions and the person perceives an on-going threat, even when none exists.

Treatment is therefore focussed on helping clients integrate the trauma in to their long-term memory, so that it is clearly a part of their past rather than current experience. This is achieved by reliving the event and at emotional "hot spots" uncovering negative, dysfunctional and irrational thoughts, which are later replaced with more functional ones.

Avoidant behaviour is carried out by the trauma victims as a coping mechanism to prevent feelings of anxiety. By avoiding aspects of life that are known cues of intrusions, the frequency of the intrusions is reduced. However, this also prevents

eradication of the pairing of the cue with the anxious response as the person is not exposed to the disconfirmation of the beliefs underlying their anxiety e.g. the existence of a current threat. Therefore treatment involves clients performing behavioural experiments, in consultation with the therapist, to allow them to evaluate whether in fact there is any current threat.

The results relating to hypothesis 3 suggest that it may be possible to predict, on the basis of information available at around the time of an incident, the likelihood of an individual having persistent symptoms of PTSD. However, it would not be appropriate to base such a prediction on the variables identified from this study. These were "thrown up" from an atheoretical approach and currently can only be said to apply to the current sample. Replication of these results, preferably with a larger sample from the same population (i.e. healthcare workers) would provide stronger evidence that such an approach might be appropriate.

The use of such a predictive tool may shift the nature of psychologists' work in this area. To make full use of the predictive capacity, they would need to be able to be more responsive to incidents so that early predictions could be made. The nature of the work done in early stages may need to be changed also.

There are ethical implications to such a predictive tool, of course. Without 100% sensitivity and 100% specificity, which are extremely unlikely, some individuals are likely to be either offered treatment that is not appropriate whilst others would miss out on a much needed intervention. Also, what are the implications of being a person

classified as not being in need of treatment? However in a health service with limits to its resources, there may be scope for such an approach.

Future research directions

Several suggestions for future research have been made in the research report. Broadly speaking, possibilities come under at least three main headings: further support for theoretical models of persistent PTSD; validation of the predictive characteristics of the risk index; and further research on the effects of workplace violence and aggression on healthcare staff. These are addressed in turn.

Support for theoretical model

It was suggested that the literature may contain enough support for the relationships between key factors in Ehlers & Clark's (2000) model and measures of persistent symptoms. It is perhaps questionable whether this is the case for the full range of trauma types and populations. A number of factors (e.g. mental defeat, rumination, emotional numbing) were not investigated in this study and the extent to which they play a significant role in the psychological outcomes of traumatised healthcare workers is not known. There is therefore scope for further investigation of such factors. In addition, there is certainly a need for new research to investigate the proposed mechanisms within this model. Furthermore, there are other models of PTSD (Brewin, Dalgleish & Joseph, 1996; Dalgleish, 1999; Foa & Kozak, 1986) warranting investigation, that have received little research attention to date.

Validation of the risk index

Methods for the validation of the index have been described above. However, it should also be mentioned that similar indices could be developed and validated for other populations who are exposed to trauma.

Research on the effects of workplace violence on healthcare staff

It was observed in the research report that different healthcare specialities are exposed to varying amounts of violence. Those exposed to more incidents are not necessarily the ones who experience more severe psychological symptoms. It would therefore be of interest to perform a qualitative investigation into the effects of violence on, and coping mechanisms of, different staff groups. Further studies of psychological outcomes other than PTSD, anxiety and depression in staff following violence would also be valuable.

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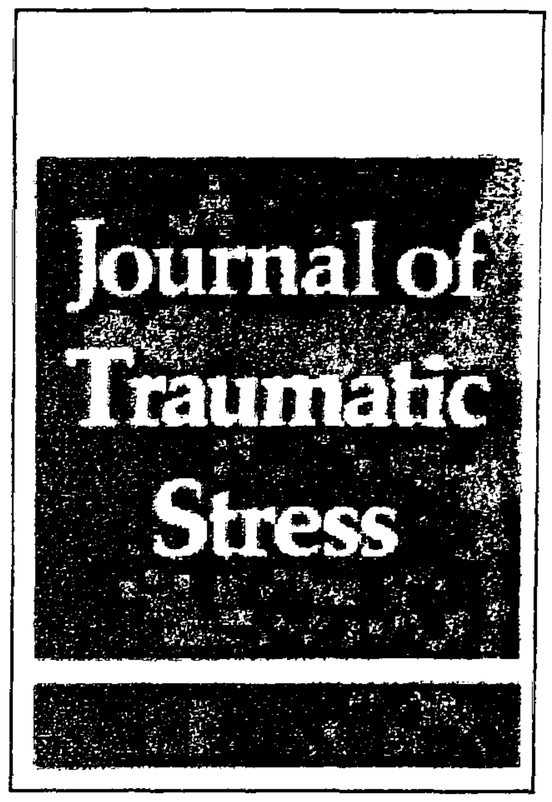
Appendix A

Author instructions for the Journal of Traumatic Stress

1. Manuscripts, in quadruplicate and in English, should be submitted to the Editor:



Regular mail
Dr. Dean G. Kilpatrick
Medical University of South Carolina
National Crime Victims Research and Treatment Center
165 Cannon Street
P.O. Box 250852
Charleston, South Carolina 29425

Tel.: (843) 792-4237

Overnight mail
Dr. Dean G. Kilpatrick
Medical University of South Carolina
National Crime Victims Research and Treatment Center
165 Cannon Street
Third floor, Room OC310
Charleston, South Carolina 29403-5713

To expedite the review process, manuscripts may be submitted to the journal office by electronic transmission. Contributors may send a WordPerfect or Microsoft Word file to the journal e-mail address: journal@musc.edu. All electronic submissions should be formatted for a page size of 8½ × 11 inches and tables and figures should also be formatted correctly for this size page. Authors are requested to contact *JTS* Editorial Office if an acknowledgment of receipt e-mail or letter has not been received in a timely manner.

Authors must submit manuscripts in a form appropriate to blind review (i.e., identifying information should appear *only* on the title page). Manuscripts should use nonsexist language. Three paper formats are accepted. *Regular articles* (no longer than 6,000 words, *including* references, figures, and tables) are theoretical articles, full research studies, and occasionally reviews. Purely descriptive articles are rarely accepted. *Brief reports* (2,500 words, *including* references and tables) are for case studies that cover a new area, preliminary data on a new problem or population, condensed findings from a study that does not merit a full article, or methodologically oriented papers that replicate findings in new populations or report preliminary data on new instruments. *Commentaries* (1,000 words or less) cover responses to previously published articles or, occasionally, essays on a professional or scientific topic of general interest. Response commentaries, submitted no later than 8 weeks after the original article is published (12 weeks if outside the U.S.), must be content-directed and use tactful language. The original author is given the opportunity to respond to accepted commentaries.

2. Submission is a representation that the manuscript has not been published previously and is not currently under consideration for publication elsewhere. A statement transferring copyright from the authors (or their employers, if they hold the copyright) to the International Society for Traumatic Stress Studies will be required before the manuscript can be accepted for publication. The Editor will supply the necessary forms for this transfer. Such a written transfer of copyright, which previously was assumed to be implicit in the act of submitting a manuscript, is necessary under the U.S. Copyright Law in order for the publisher to carry through the dissemination of research results and reviews as widely and effectively as possible.
3. Type double-spaced on one side of 8½ × 11 inch or A4 white paper using generous margins on all sides and a font no smaller than 10-point, and submit the original and four copies (including copies of all illustrations and tables).
4. A title page is to be provided and should include the title of the article, author's name (no degrees), author's affiliation, acknowledgments, and suggested running head. The affiliation should comprise the department, institution (usually university or company), city, and state (or nation) and should be typed as a footnote to the author's name. The suggested running head should be less than 80 characters (including spaces) and should comprise the article title or an abbreviated version thereof. Also include the *word count*, the complete mailing address, telephone and fax numbers, and e-mail address for the corresponding author during the review process, and, if different, a name and address to appear in the article footnotes for correspondence after publication.
5. An abstract is to be provided, no longer than 120 words.
6. A list of 4–5 key words is to be provided directly below the abstract. Key words should express the precise content of the manuscript, as they are used for indexing purposes.
7. Illustrations (photographs, drawings, diagrams, and charts) are to be numbered in one consecutive series of Arabic numerals. The captions for illustrations should be typed on a separate sheet of paper. Photographs should be large, glossy prints, showing high contrast. Drawings should be prepared with india ink. Either the original drawings or good-quality photographic prints are acceptable. Identify figures on the back with author's name and number of the illustration. Electronic artwork submitted on disk should be in the TIFF or EPS format (1200 dpi for line and 300 dpi for half-tones and gray-scale art). Color art should be in the CYMK color space. Artwork should be on a separate disk from the text, and hard copy ***must*** accompany the disk.
8. Tables should be numbered (with Arabic numerals) and referred to by number in the text. Each table should be

typed on a separate sheet of paper. Center the title above the table, and type explanatory footnotes below the table.

9. List references alphabetically at the end of the paper and refer to them in the text by name and year in parentheses. In the text, all authors' names must be given for the first citation (unless six or more authors), while the first author's name, followed by et al., can be used in subsequent citations. References should include (in this order): last names and initials of *all* authors, year published, title of article, name of publication, volume number, and inclusive pages. The style and punctuation of the references should conform to strict APA style — illustrated by the following examples (however, use indentation below):

Journal Article
Friedrich, W. N., Urquiza, A. J., & Beilke, R. L. (1986). Behavior problems in sexually abused young children. *Journal of Pediatric Psychology, 11*, 47--57.

Book
Kelly, J. A. (1983). *Treating child-abusive families: Intervention based on skills-training principles*. New York: Plenum Press.

Contribution to a Book
Feindler, E. L., & Fremouw, W. J. (1983). Stress inoculation training for adolescent anger problems. In D. Meichenbaum & M. E. Jaremko (Eds.), *Stress reduction and prevention* (pp. 451--485). New York: Plenum Press.

10. Footnotes should be avoided. When their use is absolutely necessary, footnotes should be numbered consecutively using Arabic numerals and should be typed at the bottom of the page to which they refer. Place a line above the footnote, so that it is set off from the text. Use the appropriate superscript numeral for citation in the text.
11. **The journal follows the recommendations of the 2001 *Publication Manual* of the American Psychological Association (Fifth Edition)**, and it is suggested that contributors refer to this publication.
12. After a manuscript has been accepted for publication and after all revisions have been incorporated, manuscripts should be submitted to the Editor's Office as hard copy accompanied by electronic files on disk. Label the disk with identifying information — software, journal name, and first author's last name. **The disk *must* be the one from which the accompanying manuscript (finalized version) was printed out**. The Editor's Office cannot accept a disk without its accompanying, matching hard-copy manuscript.
13. **The journal makes no page charges**. Reprints are available to authors, and order forms with the current price schedule are sent with proofs.

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Appendix B

Letter of approval for nominated journal from the Research Sub-Committee

THE UNIVERSITY OF SHEFFIELD
Clinical Psychology Unit
Department of Psychology
Doctor of Clinical Psychology (DClin Psy) Programmes (Pre-registration and post-qualification)
Clinical supervision training and NHS research training and consultancy

Clinical Psychology Unit
Department of Psychology
University of Sheffield
Western Bank
Sheffield S10 2TP UK

Telephone: ++44 (0)114 22 26632
Fax: ++44 (0)114 22 26610
Email: dclinpsy@sheffield.ac.uk

Unit Director: Prof Graham Turpin (26569) Assistant Director : Dr Pauline Slade (26568)
Clinical Practice Director: Ms Joyce Scaife (26574) Course Administrator: Carole Gillespie (26570)

Please reply to: Dr. Gerry Kent Direct Line: 0114 222 6527 e-mail: g.kent@sheffield.ac.uk

15/07/2003
Dan Salter,
Clinical Psychology Unit,
Department of Psychology

Dear Dan,

I am writing to indicate our approval of the journal(s) you have nominated for publishing work contained in your research thesis.

Literature review: Journal of Traumatic Stress

Research report: Journal of Traumatic Stress

Please remember to bind in this letter and a copy of the relevant Instructions to Authors with your thesis.

Yours sincerely,

Gerry Kent
Chair, Research Sub-Committee

Appendix C

Letter of approval from the Ethics Committee of York Health Services NHS Trust

York Health Services
NHS Trust

Research and Development
Bootham Park
York
YO30 7BY

Tel: (01904) 725122

Direct line: (01904) 725125
E-mail: Joanne.Holmes or Barbara Wragg@
EXCHA.YHS-TR.NORTHY.NHS.UK

aniel Salter
sychologist in Clinical Training
[redacted]

0 July 2002

ear Mr Salter

REC REFERENCE: 02/06/008. TITLE: Factors predicting persistent symptoms of Post Traumatic tress Disorder in NHS staff exposed to trauma in the work place

hank you for your letter of 17 July 2002 responding to the issues raised by the Committee. The Chair has considered the nendments submitted in response to the Committee's earlier review of your application on Monday, 24 June 2002 as set it in our letter of 26 June 2002. The documents considered were as follows:

our letter, the Information sheet (version 2, dated 11 July 2002), the Risk Management Team Protocol (version 2, dated 11 ily 2002), the Research Consent Form (version 2, dated 11 July 2002), the Participation letters (version 2, dated 11 July 02).

ubject to two minor amendments, the Chair, acting under delegated authority, is satisfied that these amendments cord with the decision of the committee and has agreed that there is no objection on ethical grounds to the proposed udy. I am therefore happy to give you approval for this project for the York area. Approval is given on condition that you here to the terms set out in the attached document.

ne two minor amendments are to add the contact details on to the Information Sheet for:

1. **The Independent Staff Counselling Network on page 2, paragraph 1.**
2. **The PCT Complaints Officer on page 2, paragraph 6.**

ours sincerely

Jonathan Thow
hair, York Research Ethics Committee

: Professor Graham Turpin

IC

Appendix D

Certificate of Insurance for non-clinical trial

UNIVERSITY OF SHEFFIELD

DEPARTMENT OF FINANCE

To Professor Graham Turpin **Date** 11-Sep-02

Department Department of Psychology

Certificate of Insurances (non clinical trial)

Trial Number 323

Department Department of Psychology

Title of Trial Factors predicting persistent symptoms of PTSD in NHS staff exposed to trauma in the workplace

Name of Investigators Professor Turpin, Dr. A. Rowlands, *Dr. M. McFetridge, Mr. D. Salter,* Mr. F. Riley

Commencement Date Sep-02

The University has in place insurance against liabilities for which it may be legally liable and this cover includes any such liabilities arising out of the above research project/study

.....

C.F. Jackson, Financial Accountant (Insurances)

Please Note

1. If not already provided please forward a copy of the Ethics Committee Approval as soon as possible

2. A record of the names of all participants, copies of signed Consent Forms and G.P.'s approvals should be retained by the Department.

NCT

Appendix E

Recruitment Team Protocol, Information Sheet & Consent Form

Factors predicting persistent PTSD in Hospital Staff

Risk Management Team Protocol

Section A: Inclusion Criteria

The purpose of this project is to establish what factors are predictive of posttraumatic stress symptoms in hospital staff exposed to trauma at work. A wide range of experiences is reported to the Risk Management Team on the Adverse Incident Reporting System (AIRS) forms. Many of the less severe incidents would not need to be followed up for the purpose of this project, and doing so would represent needless extra work for the Risk Management Team. The purpose of this brief questionnaire, therefore, is to set inclusion criteria for potential participants in this study, to filter out such cases. This in no way suggests that such experiences are not unpleasant or worthy of follow-up, but simply that they are not the focus of this particular research project.

This project is interested in contacting staff members who have been subject to either violence or aggression (verbal or physical) or who have been involved in other unusual traumatic episodes in the work place. Please establish the answers to all of the following questions either from the AIRS form or directly from the staff member involved. The questions are written as if you are speaking to the staff member involved in the incident. However the answers to questions '1' and '4' should be clear from the completed AIRS form. If the answer to any of them is 'yes', please follow up by informing the person/people involved in the incident about the research, and inviting them to take part. This includes all staff members involved in the incident who would answer 'yes' to at least one of the questions. Please follow the procedures laid down in Section B attached. If the answers are all 'no', the incident is unlikely to be one that would be relevant to this project. If, however, you are at all unsure, please call Daniel Salter or speak to Harriet Smith who will advise.

1. Did the incident involve any physical violence, threats of violence or other verbal/written aggression aimed at you by a member of the public? Yes No

2. Were you involved in, or did you witness an incident at work that you found to be unusually distressing? Yes No

3. Did the incident you experienced make you fear for your physical safety, even briefly? Yes No

4. Did the incident involve any violence or threats of violence aimed at you by a member of staff? Yes No

Section B: Inviting Staff to participate

If the staff member answered 'yes' to at least one of the four questions above, they can then be invited to participate in this research project. There is a fine line to tread in making such requests. It is possible that persons who experienced trauma may be anxious about this question and it is important to be sensitive to their situation, e.g. not being pushy or talking as if they **should** want to take part in the study. However, the success of the project is at least partly dependent on the number of participants and how they are asked will play an important role in the decision they make.

Below are some suggested statements or phrases that have been designed to inform the staff member of the aims and importance of the research whilst giving them sufficient freedom to decline to take part. Each conversation you have will be different and you will therefore need to be flexible with what you say. Please feel free to adapt the wording of the phrases to fit with what is most natural to you. If the person has questions following your invitation, the answers may be on the information sheet attached. If not and you are not sure of the answer, please make a note of the question and I will follow it up.

Introduction
Hello, this is ... from the Risk Management Team. I am following up an AIRS form that said you were recently involved in an incident at work. Is that correct?

It sounds like what you went through was an upsetting/frightening experience.

Have you spoken to anyone about the incident?

Have you sought any emotional support following the incident? Would you like to?

Do you know what the procedures have been set up for victims of such incidents?

The Research:
It seems that recently the frequency of these incidents has been rising and there is a strong intention that the support given to staff members who go through similar experiences should be of a high quality.

As a result, some research is being conducted that is aimed at helping the Trust and the PCTs to provide the most appropriate and speedy support to those who need it following trauma. For the next few months, therefore, the Risk Management Team is approaching every person who has been involved in a traumatic incident at work, for which an AIRS form has been completed, to tell them about the research and to invite them to take part.

If you decide to take part you will be asked to complete a handful of brief questionnaires on four separate occasions over six months. You will not be required to write anything, only to tick or circle your chosen response.

A psychologist who is completely independent of the York Health Services NHS Trust is carrying out the research. Your involvement and all your responses will be kept completely confidential from your line manager.

This is a research project to find out which factors make it more likely that someone who experiences a traumatic incident will have more persistent negative symptoms. On its own, it is unlikely to be of great clinical benefit to you during your involvement in the research. However, it is hoped it will improve treatment of your colleagues and yourself in the future, should you or they be unfortunate enough to experience further trauma.

If you need treatment of some kind, you should carry on with that as you normally would. The research will not interfere at all with the care you should receive.

Invitation to participate:
Would you be willing to take part in this research?

If you agree, I will give your name to the main researcher, Daniel Salter, and he will write to you and send you the first few questionnaires with a stamped addressed envelope. You are asked to complete them and return them to him as quickly as possible. After that, he will be in touch with you three more times.

Thank you for your time.

Factors Predicting Persistent Symptoms of Posttraumatic Stress Disorder in NHS Staff exposed to trauma in the workplace

Information Sheet

Thank you for considering taking part in this study. The information below gives answers to some questions that many potential participants ask. Please read it to help you decide if you want to take part.

What is the research about?
Many NHS hospital employees are exposed to traumatic events in the course of their jobs. These events are often upsetting and may take some time to get over. It is known that some people recover from these experiences more quickly than others. The aim of the study is to find out which factors are more likely to lead to a slower recovery for hospital staff. This could enable quicker referral to appropriate services, thereby minimising needless suffering. No research like this has ever been conducted with NHS staff.

Why have I been asked to take part?
You have been approached because you were recently involved in an incident at the York Health Services NHS Trust or within the Selby and York PCT, which was reported in an Adverse Incident Reporting System (AIRS) form.

What will be involved if I agree to take part?
If you agree to take part in the study, you will be asked to complete a small number of relatively brief questionnaires on four separate occasions, spread out over a six month period. Answering will **not** involve you writing any sentences, only ticking boxes or circling numbers. The first batch of questionnaires should take 10-15 minutes to complete. You will then be followed up in 1 month's time and asked to complete a further set, which should take approximately 30 minutes. Then two months later, you will be asked to complete two more questionnaires that should take less than 10 minutes. This will be repeated three months after that.

When and where will the study take place?
The questionnaires that have come with this information sheet should be completed as soon as possible, certainly within a week of the reported incident. Most people prefer to take the questionnaires home and complete them in private. Within this pack there is a freepost envelope that you can use to return your completed questionnaires.

In one month, three months' and six months' time, you will be sent the remaining questionnaires either to your home address or if you prefer, to your work place. Freepost envelopes will again be included for your use.

What information will be collected in the study?
Information is being collected relating to factors that have been shown in previous research to play some part in people's recovery from trauma, whether by slowing it down or speeding it up. This includes general information about your life up until the trauma incident, your perceptions of the incident itself and how your life has been since.

Will I get upset through my involvement with the study?
The questionnaires being used in this study have been used in a number of studies on various different groups of people, including victims of road traffic

accidents. The researchers are not aware of any negative effects on these groups. However, should you find that you do get upset, it is important that you do not put yourself under undue strain and that you obtain the support that you need. If necessary you should approach your line manager who is aware of this research and could refer you to Occupational Health, or to the independent Staff Counselling Network, which can be reached by phone on (01904) 725 092. Alternatively, you could approach your GP.

Will there be effects on any subsequent treatment?
Whether you decide to take part in this study or not, no treatment you are currently receiving or may require in the future, will be adversely affected by this research. You are unlikely to benefit immediately from taking part in this research. If in the future you are unlucky enough to experience further traumatic incidents, it is hoped that this research will help improve the quality of the care you receive at that point.

Do I have to take part in the research?
No you do not. It is entirely your decision and there will be **no** negative consequences to you if you decide not to.

Can I change my mind about taking part in the research?
Yes. If you decide to take part in the first part of the research you can still decide not to take part in the follow-up and your answers to the main questionnaire will be withdrawn. You can withdraw at any stage during the research even if you have already filled in part of a questionnaire. No reason is needed to withdraw and there will be no adverse consequences at work.

Will all the information be kept confidential?
The information you give will be confidential and will not be revealed to anyone who is not directly involved in the research project. Neither your name, nor any other factors from which you could be identified will be included in the write-up of this research.

What if I wish to complain about the way the study has been conducted?
If you have any cause to complain about the way you have been approached or treated during the course of thus study, please contact the project co-ordinator (Prof. G. Turpin, Clinical Psychology Unit, University of Sheffield, S10 2TP) in the first instance. If this is not satisfactory, you can also use the normal hospital complaint procedure (Mr S. Pleydell, Bootham Park Hospital, York, YO30 7BY) or approach the Selby & York PCT Complaints Officer, Liz Johnson, 37 Monk Gate. You are not compromised in any way because you have taken part in a research study.

Who is doing the research?
Daniel Salter, a Psychologist in Clinical Training, is conducting the research as part of his doctoral qualification at Sheffield University. The research is independent of the York Health Services NHS Trust or the York or Selby PCTs. However, it is being done with the knowledge and approval of the Risk Management Steering Committee and the Research Ethics Committee of the Trust.

If you have any further questions, please contact Daniel at the below address.

Daniel Salter, [redacted]

RESEARCH CONSENT FORM	
Title of Project: Factors predicting persistent PTSD symptoms in hospital staff exposed to trauma.	
The Participant should complete the whole of this sheet himself/herself	**Please cross out as necessary**
Have you read the Research Information Sheet?	YES / NO
Have you had an opportunity to ask questions and discuss this study?	YES / NO
Have you received satisfactory answers to all of your questions?	YES / NO
Have you received enough information about the study?	YES / NO
Who have you spoken to? Dr/Mr/Mrs/Ms Do you understand that you are free to withdraw from the study: • At any time • Without having to give a reason for withdrawing • Without affecting your future medical care	YES / NO
Do you agree to take part in this study?	YES / NO
Signed…… Date…….. Name in BLOCK LETTERS …… Address to which you would like subsequent questionnaires to be sent: ……	

Appendix F

Questionnaires I, II and III

Confidential

Questionnaire Pack I

Factors predicting persistent PTSD symptoms in NHS staff following exposure to trauma

Please complete this questionnaire as soon as possible after receiving it. It should take around 10 minutes to do.

Unpleasant Memories Scale

The following questions relate to the ways in which people sometimes describe their MEMORIES OF AN UNPLEASANT EVENT. Please rate the extent to which these statements apply to YOUR MEMORIES OF THE EVENT by circling the appropriate number. If the statement is not true for you, please circle 'not at all'. There are no right or wrong answers to these questions.

		Statement applies to me				
		Not at all	**A little**	**Moderately**	**Strongly**	**Very strongly**
1.	I feel that my memory for the event is incomplete	0	1	2	3	4
2.	There are periods of time during the event that I cannot account for	0	1	2	3	4
3.	I have trouble remembering the order in which things happened during the event	0	1	2	3	4
4.	My memory of the event is muddled	0	1	2	3	4
5.	I cannot get what happened during the event straight in my mind	0	1	2	3	4
6.	I find my inability to remember things about the event frustrating/distressing	0	1	2	3	4
7.	If I cannot remember something about the event then I think I must find it unbearable	0	1	2	3	4
8.	If I have a gap in my memory then I think that something happened which I am ashamed of	0	1	2	3	4
9.	Many different things trigger memories of the event	0	1	2	3	4
10.	I experience feelings similar to those I had during the event even when I am not thinking about it	0	1	2	3	4
11.	I am reminded of the event for no apparent reason	0	1	2	3	4
12.	I find myself unexpectedly remembering the event	0	1	2	3	4
13.	My memories of the event consist of vivid images	0	1	2	3	4
14.	I experience strong emotions when remembering the event	0	1	2	3	4
15.	The feelings I had during the event keep coming back to me	0	1	2	3	4
16.	When I remember the event it is like it is happening again, here and now	0	1	2	3	4

E TURN OVER

Data-driven processing scale

In this section we are interested in WHAT WENT THROUGH YOUR MIND during the traumatic event. Please indicate the extent to which the following statements applied to you DURING THE TRAUMATIC EVENT.

During the traumatic event...

		This applied to me				
		Not at all	**A little**	**Moderately**	**Strongly**	**Very strongly**
1.	I couldn't really take it all in	0	1	2	3	4
2.	I did not fully understand what was going on	0	1	2	3	4
3.	It was just like a stream of unconnected impressions following each other	0	1	2	3	4
4.	I could not think clearly	0	1	2	3	4
5.	I was overwhelmed by sensations and couldn't put everything together	0	1	2	3	4
6.	I was confused and could not fully make sense of what was happening	0	1	2	3	4
7.	My mind was fully occupied with what I saw, heard, smelled and felt	0	1	2	3	4
8.	My mind was full of impressions and my reactions to them	0	1	2	3	4

Self-referent processing scale

During the traumatic event...

		This applied to me				
		Not at all	**A little**	**Moderately**	**Strongly**	**Very strongly**
1.	I felt as if the assault was happening to someone else	0	1	2	3	4
2.	It felt like I was a different person from the person I used to be	0	1	2	3	4
3.	I was aware that the assault was happening, but not so much that it was happening to me	0	1	2	3	4
4.	I felt cut off from my past	0	1	2	3	4
5.	I felt cut off from my future	0	1	2	3	4
6.	I couldn't imagine anything beyond this experience	0	1	2	3	4
7.	Things that had been important to me before did not matter any longer	0	1	2	3	4
8.	I felt there was no way back to my normal life after this	0	1	2	3	4

State dissociation questionnaire

During the traumatic event...

		This applied to me				
		Not at all	**A little**	**Moderately**	**Strongly**	**Very strongly**
1.	I felt dazed, unable to take in what was happening	0	1	2	3	4
2.	The world around me seemed strange or unreal	0	1	2	3	4
3.	My body felt as if it was not really mine	0	1	2	3	4
4.	I felt emotionally numb	0	1	2	3	4
5.	I felt as if I was separate to my body and was watching it from outside	0	1	2	3	4
6.	I felt as if time was going faster or slower than it really was	0	1	2	3	4
7.	I felt as if I was living in a dream or a film, rather than in real life	0	1	2	3	4
8.	Things around me seemed too big or too small, or distorted in shape	0	1	2	3	4
9.	I felt distant from my emotions	0	1	2	3	4

I.D. No.

Confidential

Questionnaire Pack II

Factors predicting persistent PTSD symptoms in NHS staff following exposure to trauma

Please complete this questionnaire as soon as possible after receiving it. It should take 30 to 45 minutes to do.

Background factors questionnaire

Please answer the following questions:

1. What is your gender? (please delete as necessary) male / female

2. What was your age on the day the traumatic incident occurred?

..... years ..... Months

3. What bracket does your current yearly household income come within?

Under £10,000	☐	£30,000 - £34,999	☐
£10,000 - £14,999	☐	£35,000 - £39,999	☐
£15,000 – £19,999	☐	£40,000 - £44,999	☐
£20,000 - £24,999	☐	£45,000 - £49,999	☐
£25,000 - £29,999	☐	Over £50,000	☐

4. What was the highest level of educational qualification you achieved?

GCSEs or 'O' levels	☐	Degree level	☐
HNC or equivalent	☐	Post graduate qualification	☐
'A' levels or equivalent	☐	None of the above	☐

5. What is your ethnic group?

White	☐	Afro-Caribbean	☐
Asian	☐	Other minority group (please state)	

PLEASE TURN OVER FOR FURTHER QUESTIONS

6. Prior to this incident, had you ever receive treatment from a counsellor, clinical psychologist, or a psychiatrist? (please delete as necessary)

Yes / No

Why did you seek the treatment/what was the problem?

7. Did you experience any physical, sexual or emotional abuse as a child, or any neglect? (please delete as necessary)

Yes / No

8. Have you experienced any other traumatic experiences in your life, other than child abuse or the most recent traumatic incident? (please delete as necessary)

Yes / No

What happened?

9. Did you experience any other adverse childhood events, not including abuse? (please delete as necessary)

Yes / No

What happened?

10. Is there a history of psychiatric disorder in your family?

What was the disorder?

What relationship are/were you to the person with the disorder?

Incident Severity Questionnaire

Please complete this questionnaire **only if** the traumatic incident reported one month ago in the Adverse Incident Report form involved violence or aggression (physical or verbal) directed at you by another person(s).

1. At approximately what time of day did the incident occur?

   Time .....

2. Was it verbal aggression, a physical assault, or was it also a sexual assault?

   Verbal aggression ☐ Physical assault ☐

   Sexual assault ☐

3. How many people were aggressive towards you (either verbally or physically?

   .....

4. Approximately how long did the incident last?

   5 minutes or less ☐ 31 minutes to 1 hour ☐

   6 to 10 minutes ☐ Over 1 hour ☐

   11 to 30 minutes ☐

5. Did the aggressor(s) have a weapon or did they make you think they had a weapon? (please delete as necessary)

   Yes/No

6. Did the weapon come into contact with your body? (please delete as necessary)

   Yes/No/Not applicable

7. Did the aggressor(s) threaten to harm you in any way? (please delete as necessary)

   Yes/No

PLEASE TURN OVER FOR FURTHER QUESTIONS

8. Did you suffer any injuries as a result of the assault? What were they?

No injuries	☐	Broken bone	☐
Minor cuts/bruises	☐	Head injuries	☐
Major cuts/bruises	☐	Gun shot/stab wound	☐
Burns	☐	Other (please state).....	

9. During the incident, to what extent did you think that you would be seriously injured? (please put a cross to indicate what you thought **at the time**)

|_____|

Not at all 100% sure

10. During the incident, to what extent did you think that you would be killed? (please put a cross to indicate what you thought **at the time**)

|_____|

Not at all 100% sure

11. Were the aggressors arrested after the assault? Did anything happen to them at all? (please delete as necessary)

Yes/No

12. Are you involved in any court proceedings or police investigations following the incident? (please delete as necessary)

Yes/No

13. Are you trying to claim any compensation following the incident? (please delete as necessary)

Yes/No

Interpretation of PTSD symptoms questionnaire

These questions list different thoughts that people may have after a traumatic experience. We are interested in the way that YOU thought, IN THE LAST MONTH, in regard to the traumatic event that you have experienced.

Please read each statement carefully and decide how much you have AGREED or DISAGREED with each statement during the last month.

For each of the thoughts, please show your answer by choosing the number from the scale below which BEST DESCRIBES HOW MUCH YOU AGREE WITH THE STATEMENT and placing the number next to that statement. People react in many different ways; there are no right or wrong answers to these statements.

1	2	3	4	5	6	7
Totally Agree	Agree Very Much	Agree Slightly	Neutral	Disagree Slightly	Disagree Very Much	Totally Disagree

____ 1. My reactions since the event show I must be losing my mind

____ 2. My reactions since the event mean I will never get over it

____ 3. My reactions since the event mean something is seriously wrong with me

____ 4. Anger will make me go off the rails

____ 5. If I feel numb it means I will never be able to be in touch with the world again

____ 6. Something terrible will happen if I do not try to control my thoughts about the event

____ 7. If I cannot control my thoughts about the event I will go crazy

____ 8. If I avoid things after the event it means I am a coward

____ 9. Not being able to overcome my fears means that I am a failure

____ 10. Not being able to control my emotions means I am falling apart

____ 11. My reactions since the event mean I have changed for the worse as a person

Trait dissociation questionnaire

These next questions are concerned with how often people have certain experiences. Please read each question carefully, but do not spend too much time on each one. Please circle ONE response in answer to each question (for example, if you OFTEN find yourself doing things without knowing why, circle the '3' (often) on question 1). Remember, there are no right or wrong answers. We are interested in your personal experience.

		Never	Rarely	Sometimes	Often	Mostly	Always
1	I find myself doing things without knowing why	0	1	2	3	4	5
2	I cannot get angry about the things that should annoy me	0	1	2	3	4	5
3	I do many things which I regret afterwards	0	1	2	3	4	5
4	I feel that I am more than one person	0	1	2	3	4	5
5	I feel as if other people live in a different world	0	1	2	3	4	5
6	I feel that my mind is divided	0	1	2	3	4	5
7	I can't understand why I get so cross and grouchy	0	1	2	3	4	5
8	I feel distant from my emotions	0	1	2	3	4	5
9	I don't know how to stop myself from doing something	0	1	2	3	4	5
10	I have problems remembering important details of stressful events	0	1	2	3	4	5
11	I have conflicting desires	0	1	2	3	4	5
12	I feel as though I am standing next to myself or watching myself do something and I actually see myself as if I were looking at another person	0	1	2	3	4	5
13	I feel unable to think straight	0	1	2	3	4	5
14	I feel emotionally numb (e.g. feel sad but can't cry, unable to have loving feelings)	0	1	2	3	4	5
15	I feel that I am floating beside my body. And watching it from "outside"	0	1	2	3	4	5
16	I feel that my personality is split into distinct parts	0	1	2	3	4	5
17	I find it difficult to feel real emotions, such as pain, happiness, sadness or anger	0	1	2	3	4	5
18	I feel that other people, objects, and the world around me are not real	0	1	2	3	4	5
19	I find it difficult to respond to others in a sympathetic way	0	1	2	3	4	5

Trait dissociation questionnaire

		Never	Rarely	Sometimes	Often	Mostly	Always
20	Things seem to go by faster or slower than they really do	0	1	2	3	4	5
21	I find myself dressed in clothes that I don't remember putting on	0	1	2	3	4	5
22	I find myself in a place and have no idea how I got there	0	1	2	3	4	5
23	I find new things among my belongings that I do not remember buying	0	1	2	3	4	5
24	My moods can really change	0	1	2	3	4	5
25	I find writings, drawings or notes among my belongings that I must have done but cannot remember doing	0	1	2	3	4	5
26	I have no memory for some important events in my life (for example a wedding or graduation)	0	1	2	3	4	5
27	I live in a world of my own where no one can reach me	0	1	2	3	4	5
28	I look at my watch and am surprised at the time it shows	0	1	2	3	4	5
29	My memory of upsetting events is patchy	0	1	2	3	4	5
30	I say things without meaning to	0	1	2	3	4	5
31	I underestimate or overestimate that amount of time that has passed	0	1	2	3	4	5
32	If something upsetting happens, I find it difficult to remember afterwards	0	1	2	3	4	5
33	I feel like I don't belong	0	1	2	3	4	5
34	The world seems unreal or strange	0	1	2	3	4	5
35	I am able to ignore pain	0	1	2	3	4	5
36	I feel that there are two of me	0	1	2	3	4	5
37	I feel distant and cut off from others around	0	1	2	3	4	5
38	I have difficulty concentrating	0	1	2	3	4	5

Behaviour after incident questionnaire

You will find below a list of behaviours and actions which people may engage in following an upsetting incident (e.g. assault, accident). Please circle the word which **BEST DESCRIBES** how **OFTEN YOU DO THE FOLLOWING** (please indicate how often you <u>try</u> to engage in each behaviour <u>even if you were unable to succeed</u>):-

Avoid people who remind you of the incident	NEVER	SOMETIMES	OFTEN	ALWAYS
Avoid everyday things that remind you of the incident	NEVER	SOMETIMES	OFTEN	ALWAYS
Avoid going to the area where the incident occurred	ALWAYS	OFTEN	SOMETIMES	NEVER
Try to avoid sleeping because of nightmares/ or in case of intruders	NEVER	SOMETIMES	OFTEN	ALWAYS
Avoid going out alone after dark	ALWAYS	OFTEN	SOMETIMES	NEVER
Allow yourself to remain numb	ALWAYS	OFTEN	SOMETIMES	NEVER
Avoid telling people about the assault	NEVER	SOMETIMES	OFTEN	ALWAYS
Allow yourself to become detached from what is going on around you	NEVER	SOMETIMES	OFTEN	ALWAYS
Avoid looking at TV or newspaper reports about similar incidents	ALWAYS	OFTEN	SOMETIMES	NEVER
Avoid going out alone in the daytime	ALWAYS	OFTEN	SOMETIMES	NEVER
Avoid being in situations that you cannot completely control	NEVER	SOMETIMES	OFTEN	ALWAYS
Avoid forming new relationships	ALWAYS	OFTEN	SOMETIMES	NEVER
Avoid unfamiliar places or situations	ALWAYS	OFTEN	SOMETIMES	NEVER
Try to distract yourself from distressing thoughts	NEVER	SOMETIMES	OFTEN	ALWAYS
Try hard to keep your thoughts and emotions in control	ALWAYS	OFTEN	SOMETIMES	NEVER
Try to push thoughts about the incident to the back of your mind	NEVER	SOMETIMES	OFTEN	ALWAYS
Put off making decisions	ALWAYS	OFTEN	SOMETIMES	NEVER
Make sure that you are not alone	NEVER	SOMETIMES	OFTEN	ALWAYS
Sleep with a weapon or carry a weapon	NEVER	SOMETIMES	OFTEN	ALWAYS
Check doors and windows are locked	ALWAYS	OFTEN	SOMETIMES	NEVER
Deliberately put on or lose weight	NEVER	SOMETIMES	OFTEN	ALWAYS
Check for an escape route	ALWAYS	OFTEN	SOMETIMES	NEVER
Sleep with the lights / radio on	NEVER	SOMETIMES	OFTEN	ALWAYS
Sit/stand/sleep with your back to the wall	ALWAYS	OFTEN	SOMETIMES	NEVER
Check behind you	ALWAYS	OFTEN	SOMETIMES	NEVER
Overprotect those close to you (i.e. children)	NEVER	SOMETIMES	OFTEN	ALWAYS

Posttraumatic Symptom Severity –Self Report

Below is a list of problems that people sometimes have after experiencing a traumatic event. Read each one carefully and choose the answer (0-3) that best describes how often that problem has bothered you IN THE PAST MONTH. Rate each problem with respect to the traumatic events that currently bother you most.

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

1	Having upsetting thoughts or images about the traumatic event that came into your head when you didn't want them to	0	1	2	3
2	Having bad dreams or nightmares about the traumatic event	0	1	2	3
3	Reliving the traumatic event, acing or feeling as if it were happening again	0	1	2	3
4	Feeling emotionally upset when you were reminded of the traumatic event (e.g. feeling scared, angry, sad, guilty, etc.)	0	1	2	3
5	Experiencing physical reactions when you were reminded of the traumatic event (e.g. break into a sweat, heart beating fast)	0	1	2	3
6	Trying not to think about, talk about or have feelings about the traumatic event	0	1	2	3
7	Trying to avoid activities, people or places that remind you of the traumatic event	0	1	2	3
8	Not being able to remember an important part of the traumatic event	0	1	2	3
9	Having much less interest or participating much less often in important activities	0	1	2	3
10	Feeling distant of cut off from people around you	0	1	2	3
11	Feeling emotionally numb (e.g. being unable to cry or unable to have loving feelings)	0	1	2	3
12	Feeling as if your future plans or hopes will not come true (e.g. you will not have a career, marriage, children or a long life)	0	1	2	3
13	Having trouble staying asleep	0	1	2	3
14	Feeling irritable or having fits of anger	0	1	2	3
15	Having trouble concentrating (e.g. drifting in and out of conversations, losing track of a story on television, forgetting what you read)	0	1	2	3
16	Being overly alert (e.g. checking to see who is around you, being uncomfortable with your back to a door, etc.)	0	1	2	3
17	Being jumpy or easily startled (e.g. when someone walks up behind you)	0	1	2	3

Hospital Anxiety and Depression Scale

Finally, the following questions are to do with your feelings. Please read each item and **underline** the reply which comes closest to how you have been feeling in the past week. Don't take too long over your replies; your immediate reaction to each item will probably be more accurate than a long thought-out response.

I feel tense or 'wound up':

Most of the time

A lot of the time

From time to time, occasionally

Not at all

I still enjoy the things I used to enjoy:

Definitely as much

Not quite so much

Only a little

Hardly at all

I get a sort of frightened feeling as if something awful is about to happen:

Very definitely and quite badly

Yes, but not too badly

A little but it doesn't worry me

Not at all

I can laugh and see the funny side of things:

As much as I always could

Not quite so much now

Definitely not so much now

Not at all

Hospital Anxiety and Depression Scale

Worrying thoughts go through my mind:

A great deal of the time

A lot of the time

From time to time but not too often

Only occasionally

I feel cheerful:

Not at all

Not often

Sometimes

Most of the time

I can sit at ease and feel relaxed:

Definitely

Usually

Not often

Not at all

I feel as if I am slowed down:

Nearly all the time

Very often

Sometimes

Not at all

I get a sort of frightened feeling like 'butterflies in the stomach:

Not at all

Occasionally

Quite often

Very often

I have lost interest in my appearance:

Definitely

I don't take as much care as I should

I may not take quite as much care

I take just as much care as ever

I feel restless as if I have to be on the move:

Very much indeed

Quite a lot

Not very much

Not at all

I look forward with enjoyment to things:

As much as I ever did

Rather less than I used to

Definitely less than I used to

Hardly at all

I get sudden feelings of panic:

Very often indeed

Quite often

Not very often

Not at all

I can enjoy a good book or radio or TV programme:

Often

Sometimes

Not often

Very seldom

Now check that you have answered all the questions, please.

I.D. No.

Confidential

Questionnaire Pack III

Factors predicting persistent PTSD symptoms in NHS staff following exposure to trauma

Please complete this questionnaire as soon as possible after receiving it. It should take 5 to 10 minutes to do.
Please do not remove this cover sheet.

Questionnaire Pack III consisted of the PSS-SR and the Hospital Anxiety and Depression Scale. These can be found on the last four sheets in Questionnaire II.

Appendix G

Additional data analysis not included in the research report

Table A1: Statistic calculated for associations between IVs and DVs

First variable	Second variable	Statistic
Dichotomous	Dichotomous	Phi coefficient
Dichotomous	Ordinal	Spearman's rho
Dichotomous	Continuous	Mann Whitney U, point biserial r for effect size
Ordinal	Ordinal	Spearman's rho
Ordinal	Continuous	Spearman's rho
Continuous	Continuous	Pearson's product moment coefficient

Table A2: Descriptives of the timing of completed questionnaire return

		Days			
	N	**Minimum**	**Maximum**	**Mean**	**S.D.**
Incident to Time 1 questionnaire completion	99	2	26	12.86	6.27
Incident to receiving Time 2 questionnaire	77	28	83	58.34	12.71
Incident to receiving Time 3 questionnaire	70	97	161	120.99	14.52

Table A3: Severity of PTSD symptoms, anxiety and depression at Time 2 and Time 3

	Total sample	Men	Women
PSS-SR score *mean, (s.d.)*			
Time 2 [a]	4.4 (7.0)	6.2 (9.0)	3.8 (6.2)
Time 3 [b]	3.9 (7.6)	6.0 (6.3)	3.2 (7.9)
Anxiety (HADS) score *mean, (s.d.)*			
Time 2 [a]	5.4 (4.2)	6.7 (4.4)	5.0 (4.1)
Time 3 [b]	4.7 (4.4)	5.7 (4.1)	4.4 (4.5)
Depression (HADS) score *mean, (s.d.)*			
Time 2 [a]	2.0 (2.9)	2.6 (3.4)	1.9 (2.7)
Time 3 [b]	1.9 (2.9)	2.9 (3.0)	1.5 (2.8)

[a] N = 77: men, N = 18; women, N = 59

[b] N = 70: men, N = 18; women, N = 52

Table A4: Distribution of PSS-SR scores at Times 2 & 3

	No. of Participants				
	No symptoms 0	Mild (1-10)	Moderate (11-20)	Moderate to severe (21-35)	Severe (36-51)
Time 2	31	35	8	2	1
Time 3	33	28	5	3	1

Table A5: Variance accounted for by cognitive variables over other factors

Cognitive variable	ΔR^2	F-ratio	df	Significance
Disorganised memory	.44	20.3	5, 50	<.001
Data-driven processing	.39	17.0	5, 50	<.001
Self-referent processing	.09	5.5	5, 50	<.001
State dissociation	.10	5.8	5, 50	<.001
Interpretation of PTSD symptoms	.10	4.5	5, 46	.002
Trait dissociation	.13	6.25	5, 49	<.001
Behaviour after incident	.10	5.8	5, 50	<.001

Table A6: Partial correlations between cognitive variables and Time 3 PTSD symptoms, controlling for Time 2 PTSD symptom scores

Cognitive variables	Time 3 PSS-SR scores	
	Pearson's r	Significance
Disorganised memory	.69	p <.001
Data-driven processing	.62	p <.001
Self-referent processing	.32	p <.01
State dissociation	.37	p <.01
Interpretation of PTSD symptoms [a]	.40	p <.01
Trait dissociation [b]	.33	p <.01
Behaviour after incident	.36	p <.01

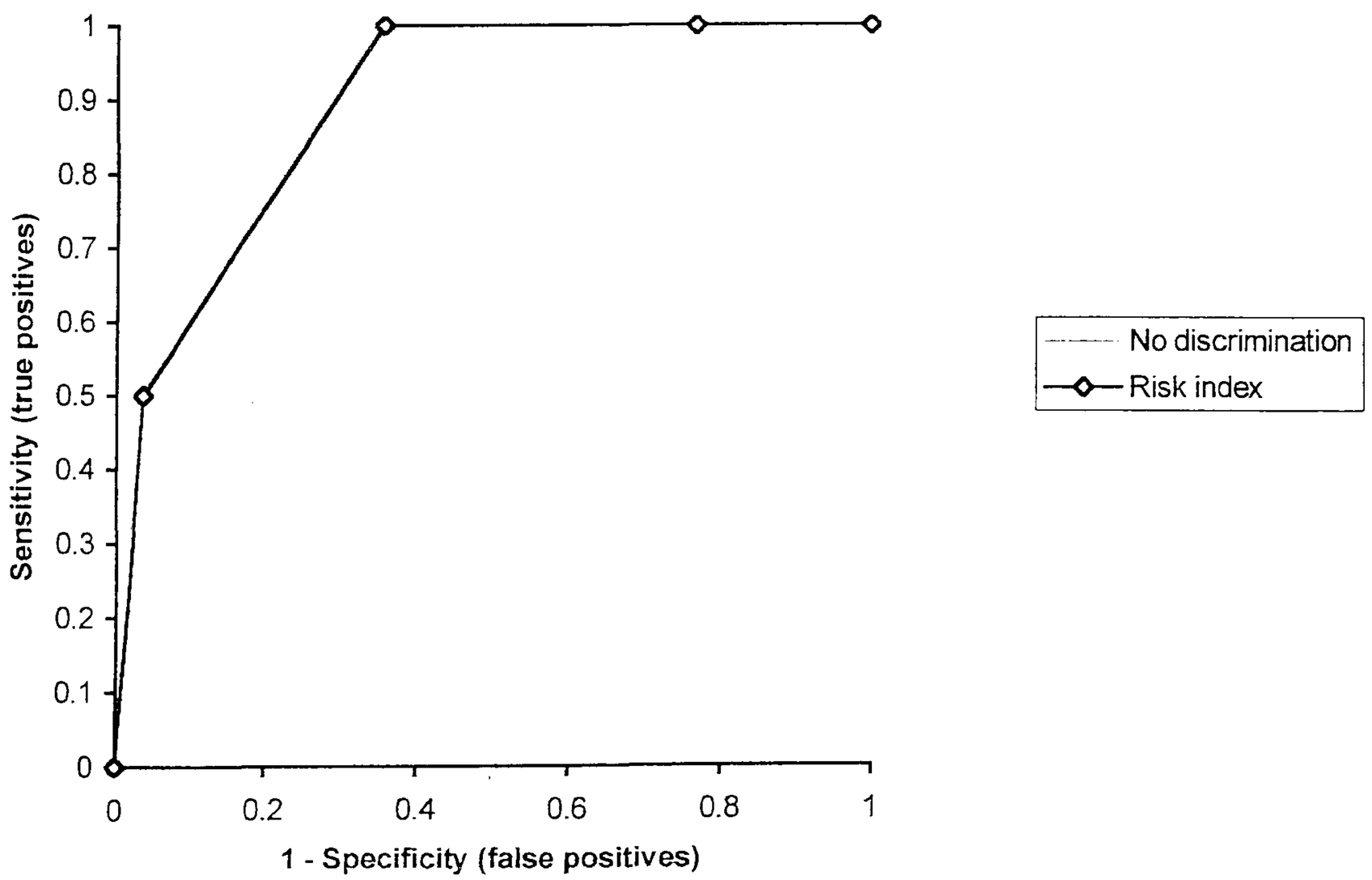
N = 64, unless otherwise stated
[a] N = 59
[b] N = 63

ROC Analysis Results

analysed with: Analyse-it + Clinical Laboratory 1.68

Test	**Receiver Operator Characteristic (ROC) curves**
	Risk index by PDS symptoms - dichotomous
Performed by	Salter
Date	22 July 2003

n	64

PDS symptoms - dichotomous	n
1	56
2	8

Curve	Area	SE	p	95% CI of Area	PDS symptoms - dichotomou
Risk index	0.893	0.0479	<0.0001	0.799 to 0.987	have higher values