

Suicide on the London Underground: Effects on Drivers

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1.0) ABSTRACT

76 London Underground train drivers were interviewed 1 month after a person jumped or fell in front of their train in order to assess the range of responses to these incidents. At this time 13 (17.11%) drivers presented with Post-Traumatic Stress Disorder (PTSD). Diagnoses other than PTSD e.g. neurotic depression and phobic state were present in 24 (31.58%) drivers (including 12 of the 13 PTSD cases who had 1 additional diagnosis). 56 drivers were again interviewed 6 months after the incident. Two drivers were still cases at 6 months (neurotic depression and phobic state). No driver presented with PTSD at 6 months. At 6 months there was a significant drop in symptom scores compared with measures taken at 1 month. At 12 months 2 of the 36 drivers interviewed presented as a case (neurotic depression and phobic state). No driver satisfied the criteria for PTSD at 12 months.

Risk factors influencing the psychological status of drivers following these incidents were also investigated. Three criterion variables were examined: psychiatric caseness as assessed by the Present State Examination (PSE-9); the presence of post-traumatic stress disorder; and sickness absence following the incident. 3 variables relating to incident and driver data were identified as risk factors: the body of the victim was mutilated, the driver belonging to a non-UK ethnic group and the driver's average sickness absence over the 5 years prior to the incident. 2 variables were identified as risk factors following analysis of data extracted from psychometric tests: the use of behavioural disengagement and/or mental disengagement as coping techniques. Though a significant proportion of drivers did experience a severe adverse psychological reaction following these incidents the majority of drivers appeared to have recovered from the effects of these incident within 6 months.

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4.0) INTRODUCTION

Rationale for research

Incidents in which a person is struck by a train have been a feature of the railways since their earliest days. The first recorded fatality occurred on 15 September 1830, when William Huskisson, the Member of Parliament for Liverpool, inadvertently stepped in front of the "Rocket" steam train whilst attending the opening of the Liverpool and Manchester Railway (Trimble, 1981). Fatal incidents continue to be an occupational hazard for train drivers.

In 1989 the management of London Underground Limited (LUL) felt concerned by an apparent increase of persons jumping or falling in front of trains. Apart from the death or injury suffered by the person the incidents present 3 other major problems: 1) Incidents cause severe disruption to normal service, this results in financial loss and damaged customer relations; 2) Drivers are subjected to a psychologically traumatic experience that may cause disruption of both the driver's working and personal life; 3) Following the incident some of the staff involved, primarily train drivers, take prolonged periods of sickness absence. This again results in considerable financial costs to the company.

This research was designed to investigate the psychological effects on drivers of incidents where a person jumped or fell in front of a train on the London Underground. As these incidents constitute a highly traumatic event it was hypothesised that a number of drivers would develop abnormal mood states including post-traumatic stress disorder (PTSD is discussed in detail later).

There were 3 broad objectives of the research: 1)assessment of the frequency and type of adverse reactions experienced by drivers following the incidents; 2)assessment of the duration of the psychological problems experienced by drivers; and 3)the identification of the determinants of an adverse outcome.

The reaction to events was measured in 2 ways, psychometric measurement and behaviour observation. Psychometric measures assessed the presence of psychiatric symptoms and social functioning. Measures of behaviour were sickness absence before and following the incident. Together these measures provided a comprehensive description of the reactions of drivers following the incidents.

Through follow-up interviews it was possible to assess the extent to which mental health problems were still present 6 and 12 months after the incident and to detect any cases of delayed onset of adverse reactions.

An assessment was made of the ability of the psychometric instruments used to detect PTSD or other psychiatric disorders in this sample of drivers. It was thought that an effective screening instrument might enable the identification of drivers in need of intervention.

Some of the analyses were aimed at identifying factors common to those drivers who, following the traumatic event go on to develop serious psychological problems and/or take long periods of sickness absence. Factors investigated included both personal (driver and victim) and incident characteristics. The findings are discussed in relation to the relevant literature on post-traumatic stress disorder.

During the course of this research a review of present interventions employed by London Underground in respect of drivers experiencing railway suicides was undertaken. Additional measures are suggested which aim to improve these interventions and so better prepare drivers for these incidents and improve the assistance offered to drivers following these incidents.

Post-traumatic stress disorder

Post-traumatic stress disorder (PTSD) was first comprehensively described by Horowitz (1976) who investigated the responses of individuals following distressing unexpected life events. Post-traumatic stress disorder first entered official psychiatric terminology in 1980 when it was included in the 3rd edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) [American Psychiatric Association, 1980].

The criteria for PTSD in DSM-III were later revised for the 1987 edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R) [American Psychiatric Association, 1987]. The diagnostic criteria for PTSD currently in use are as follows:

"A. The person has experienced an event that is outside the range of usual human experience and that would be markedly distressing to almost anyone, e.g., serious threat to one's life or physical integrity: serious threat to one's children, spouse or other close relatives and

friends; sudden destruction of one's home or community; or seeing another person who has recently been or is being seriously injured or killed as the result of an accident or physical violence.

B. The traumatic event is persistently reexperienced in a least one of the following ways:

1. recurrent and intrusive distressing recollections of the event (in young children, repetitive play in which themes of the trauma are expressed).
2. recurrent distressing dreams of the event.
3. sudden acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative [flashback] episodes, even those that occur upon awakening or when intoxicated).
4. intense psychological distress at exposure to events that symbolise or resemble an aspect of the traumatic event, including anniversaries of the trauma.

C. Persistent avoidance of stimuli associated with the trauma or numbing of general responsiveness (not present before the trauma) as indicated by at least three of the following:

1. efforts to avoid thoughts and feelings associated with trauma.
2. efforts to avoid activities or situations that arouse recollections of the trauma.
3. inability to recall an important aspect of trauma (psychogenic amnesia).
4. markedly diminished interest in significant activities (in young children, loss of recently acquired developmental skills such as toilet training or language skills).
5. feeling of detachment or estrangement from others.
6. restricted range of affect. e.g. unable to have loving feelings.
7. sense of foreshortened future e.g. does not expect to have a career, marriage, or children, or a long life.

D. Persistent symptoms of increased arousal (not persistent before trauma), as indicated by at least two of the following:

1. difficulty falling or staying asleep.
2. irritability or outbursts of anger.
3. difficulty concentrating.
4. hypervigilance

5. exaggerated startle response.
6. physiological reactivity upon exposure to events that symbolise or resemble an aspect of the traumatic event (e.g. a woman who was raped in an elevator breaks out in a sweat when entering any elevator).

E. Duration of the disturbance (symptoms in B, C and D) of at least one month.

Specify delayed onset if the onset of symptoms was at least six months after the trauma". (American Psychiatric Association [DSM-III-R, 1987])

For a diagnosis of PTSD to be made each of the above 5 conditions has to be satisfied. The fact that the individual has experienced an event outside the range of usual human experience that would be thought to be distressing by almost anyone (Section A) is of primary concern before a diagnosis of PTSD can be made. Incidents where a person jumps or falls in front of a train satisfy this section of the criteria.

To date most research on post-traumatic stress disorder has been concerned with the adverse psychological effects of war, in particular the Vietnam War. However, within the last decade many disasters other than the death and destruction caused by war have occurred in Britain. These including a number of transport disasters (for example: the Zeebrugge ferry disaster [193 dead]; the Marchioness pleasure boat disaster [51 dead]; Clapham rail crash [35 dead] and the King's Cross Underground

station fire [31 dead]). In all these cases the survivors have been investigated for the presence of PTSD (Yule, 1991a; Thompson and Chung, 1991; Burns and Hollins, 1991; Rosser et al., 1991). In addition there has been some research regarding individual personal disasters, such as sexual abuse and torture (Burgess, 1983; Turner, 1991a).

London Underground Limited procedures

London Underground Limited is the largest underground railway system in the world with 10 lines and 408 km of track (Garbutt, 1989). It employs about 2500 drivers, many of whom will have had the misfortune of experiencing several incidents of a person jumping or falling in front of their train during their careers. One driver interviewed during this research had been involved in 6 incidents.

During their initial training all drivers are made aware of these incidents but no detailed instruction as to how to manage them is given. The reason for this is that it is felt that no single procedure could be flexible enough to cover all possible type of incidents. Moreover, it is expected that during their practical training they are likely to experience such incidents (whether first hand or otherwise).

Instruction and training is given in other emergency procedures, many of which are relevant to persons falling or jumping in front of trains (i.e. safety and protection of the driver and train; disconnection of electrical current, who to contact in emergencies) (Personal Communication, - Mr J McHugh, Railway Training Centre, London Underground Limited).

Incidents of both jumping or falling in front of trains, regardless of the victim's motivation, were to be included in this study as it was envisaged all such events would be distressing for drivers. Incidents of persons falling in front of trains are rare - the vast majority of incidents are intentional.

The most common form of incident involves a person on the platform, close to the tunnel entrance from which the train emerges, jumping immediately in front of the train. Incidents where a driver encounters a person prostrate on the track, either in the station or on open sections of track, or walking in the tunnel towards the train account for the remainder of these incidents.

A train normally approaches the station at a speed of about 50 kph. If the station is underground the driver will have a clear view of the platform only just before the cab enters the station (see figure 1). On entering the station the driver applies the brakes. The driver will see passengers standing on the platform, many of them moving towards the platform edge preparing to board the train. There is usually nothing to alert the driver to the fact that one of these persons has decided to jump in front of the train until that individual suddenly jumps from the platform to land either feet first on the track or to slump over the rails in front of the moving train.

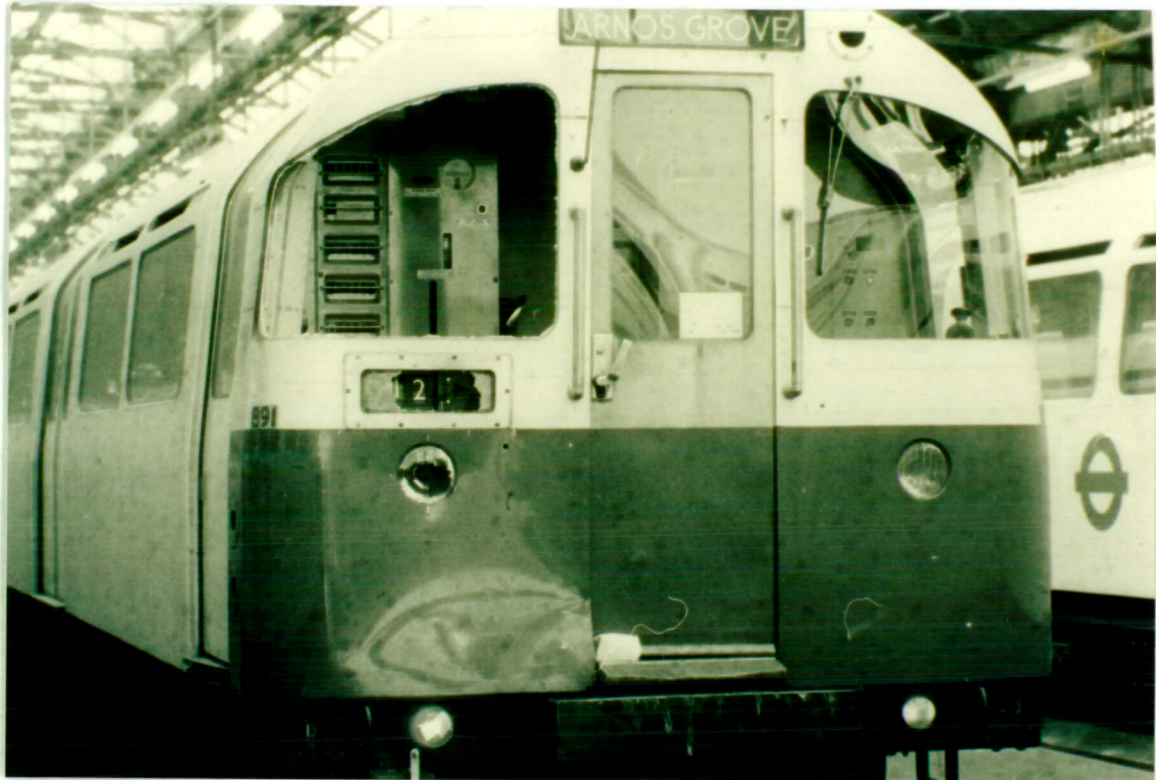
FIGURE 1 VIEW OF PLATFORM FROM TRAIN CAB



The only action open to the driver on seeing a person jump in front of his (there are very few female train drivers) train is to release the driving handle, whereupon the emergency brakes are automatically applied. The emergency stopping distance for a train travelling at 50 kph (31mph) is approximately 40 metres (Trench and Hillman, 1985). It follows that the drivers cannot prevent the train hitting the individual.

When the train strikes the person the driver will often hear a loud bang. If the train runs over the individual the driver will be aware of the cab lifting slightly on one side when the train wheels pass over the body. Figure 2 shows the front of a train following an incident. In this case the front of the cab was severely dented and the cab window was broken.

FIGURE 2 FRONT OF A TRAIN FOLLOWING AN INCIDENT



Except in cases where there is a "suicide pit" in a station (a trench between 1 and 2 metres deep running the length of the track in a station) clearance under trains varies from 7 to 9 inches, this being the distance from the engine parts beneath the train to the ballast on the track. The presence of a "suicide pit" in a station plays a significant role in the outcome of an attempt at suicide (O'Donnell and Farmer, 1992). Although the live current rail carries an electrical current sufficient to kill a person electrocution is rare. This is partly explained by the live rail (in the 4 rail system) being the rail furthest from the platform.

Once the train has come to a stop the driver contacts the London Underground control room to notify them of the incident. The control room discharges the electrical current for that section of track and then contacts the appropriate managers, station

staff and emergency services. The driver waits until assistance arrives. During this time he often looks under the train, from the platform, to try to locate the body, he will inform the passengers that an incident has occurred and attend to the passengers on the platform who may have witnessed the incident. Occasionally drivers go under the train prior to the arrival of the emergency services in order to assess the condition of the person and, if they are alive, to inform them that help is on its way.

On arrival the London Underground managers take over the management of the incident from the driver. The driver is asked to give a description of the incident. Once the emergency services arrive, the ambulance crew will attempt to remove the individual from under the train. The British Transport Police will speak to the driver to investigate the details of the incident.

In some incidents the person under the train is trapped by the wheels or engine parts making removal of the body difficult. In such cases the driver is requested to drive the train a short distance to enable the emergency services to free the body.

Not all incidents result in death or serious injury. Sometimes the individual is removed from under the train with very few injuries. Once the person has come from under the train the driver may talk to the victim, if alive, or in the case of incidents resulting in a fatality or serious injury may witness the mutilated body being removed from the tracks.

After the removal of the body the driver is then formally interviewed by the British Transport Police in order to provide a statement regarding the incident. On completion of this interview the driver is sent home. London Underground Limited (LUL) policy is that the driver should report to his station depot on the following 3 days so as to be available to help British Transport Police with any further enquiries. He is not required to drive a train during these 3 days.

The driver may feel the need to take time off sick following the incident and may not return to work for several weeks. For sickness absence lasting longer than 1 week the company requires a medical certificate from the driver's general practitioner.

In the case of fatal incidents the driver is required to attend a coroner's inquest. This may take place up to 3 months after the incident. At the inquest the driver will be required to describe the incident to the court, often in the presence of the victim's relatives.

5.0) LITERATURE REVIEW

The literature on the effects of railway suicide on train drivers is sparse. Publications on related topics i.e. PTSD is vast, however, in many cases it could be argued that the studies reported are not strictly comparable with the investigation described here. For example, it is difficult to equate the experiences of Vietnam Veterans with those of train drivers. For this reason the available literature on railway suicide is explored in depth and a briefer review of literature on related topics is given.

Railway suicide

Four papers have been published which deal specifically with railway suicide and contain reference to the experiences of the train driver (Cocks, 1989; Lindekilde and Wang, 1985; Myers, 1963; Symonds, 1985). Most refer to the driver as a secondary victim, innocently or unwillingly involved in a suicidal act.

The earliest of these (Myers, 1963) noted that a driver may be involved in a suicide more than once in his career and that some drivers may suffer autonomic dyspraxia or incapacitation following the incident. Symonds (1985) offers several examples of how a train driver may perceive a railway suicide and makes it clear that drivers may suffer severe psychological repercussions. Lindekilde and Wang (1985) suggest that one in four train drivers in Denmark has been involved in a railway suicide and that feelings of guilt may result.

In a survey of 562 suburban train drivers in Australia one-third of the drivers had experienced at least one fatal incident. Anxiety about train fatalities was the prime work-related concern of the train drivers surveyed (Austin and Drummond, 1986).

Cocks (1989) noted that the stress reaction experienced by drivers is comparable to Post-Traumatic Stress Disorder suffered by many Vietnam veterans. He also clarifies the legal situation in that an amendment to the Criminal Justice Act 1988 allows train drivers to apply for financial compensation for their traumatic experience from the Criminal Injuries Compensation Board.

Reactions to railway suicide

Eight unpublished studies have investigated the reactions of train drivers to railway suicides or other related incidents. All of these studies became available after the majority of the field work of this study had been completed.

Two papers by the same team of researchers have investigated the acute and long-term responses to railway suicide. These reported the investigation of 101 Norwegian and Swedish train drivers involved in railway deaths or suicides (Malt et al., 1992; Karlehagen et al., 1992). Both studies used the Impact of Events Scale (IES) [though not using the traditional scoring method], the General Health Questionnaire (GHQ-20) and a 33 item checklist of psychological and physical symptoms associated with traumatic distress. During the 2 year investigation 3-5% of train drivers were involved in an incident.

Acute responses (hours or days after the incident), as assessed by the IES found moderate to high intrusion scores (a score of 9+ in this study) in over half of the sample (mean 11.3). The Impact of Events Scale intrusion scores were higher than the avoidance scores (mean avoidance score 8.8) for this sample (Malt et al., 1992).

All drivers reported some intrusion symptoms during the acute phase, 5 drivers reported no avoidance symptoms during this time. One tenth of drivers reported a clinically significant level of intrusive distress as measured by the IES (score of 20+). The IES item most commonly endorsed, by 88% of drivers, was "pictures of the accident popped into my mind" (Malt et al., 1992).

One third of drivers reported symptoms of acute psychophysiological arousal (heartbeat, tremor, restlessness, shaking/trembling) and these symptoms disappeared within hours of the incident in most cases. The most frequent stress symptom in the 24 hours following the incident was sleep disturbance. Malt et al. (1992) concluded that their findings suggested that drivers should adapt to the traumatic event without any serious problems in the long-term.

The same 101 drivers were later followed up 1 month and 1 year after the incident (Karlehagen et al., 1992). At 1 month 10% of drivers were found to have experienced "distress affecting the quality of life in a significant way" as assessed using the Impact of Events Scale. The same percentage of drivers were similarly classified at 1 year (Karlehagen et al., 1992). Measures of distress gained from the assessment hours or days after the incident (Malt et al., 1992) were found to have significantly reduced at 1 month, a further minor reduction was noted at the 1 year assessment.

At 1 month symptoms of physiological distress were reported infrequently, no such symptom was reported by more than 8 drivers. Physiological distress was reported by even fewer drivers at one year, the most common symptom at this time was sleep disturbance. At 1 month 7 drivers scored above the cut-off for the GHQ-20, at 1 year 5 drivers scored above the cut-off. Distress at 1 month was found to be a better predictor of outcome at 1 year than the acute response (Karlehagen et al., 1992).

Theorell et al, (1991) in a study of Swedish train drivers reported that drivers on the Stockholm subway system may expect to be involved in 1 incident of a person jumping or falling under their train every 30 years. These authors investigated 49 drivers who had experienced a railway suicide together with a matched control group, both groups were assessed at 3 weeks, 3 months and 1 year after the incident. This investigation included the assessment of physiological measures (blood pressure and blood tests), psychological symptoms and the psychosocial work environment. Assessment at 3 weeks found an acute psychophysiological reaction (elevated plasma prolactin levels and increased sleep disturbance) in those drivers who had experienced a railway suicide. Drivers who had experienced a railway suicide reported a continuously (up to the 1 year assessment) deteriorating psychosocial work environment (reflecting levels of social support at work).

Of 69 Danish train drivers who had experienced a railway suicide Beckmann (1991) found that "7 out of 8 of the engine drivers suffering greatest strain developed marked depressive changes in behaviour after the accident". Other reported symptoms included anxiety, sleep problems, low spirits, anger, psychosomatic symptoms and problems at work. At assessment 3 months after the incident the

"psychological stability and life quality of the engine drivers showed considerably increased stability. This tendency was also found at the examination 1 year after the accident". However, at the 1 year follow-up 60% of drivers still reported "diminished well-being in one form or another", predominantly work or marital problems (Beckmann, 1991).

Foss (1991) in a questionnaire survey of 26 Norwegian train drivers who had experienced a railway suicide or related event found that 65% felt that they had "permanent psychic problems due to the incident" and of these 80% reported that anxiety was the primary symptom. Williams et al. (1991) interviewed a number of English train drivers who had experienced a railway suicide. Common symptoms reported by these drivers included intrusive thoughts, recurrent distressing dreams, feeling that the event was about to reoccur, diminished interest in everyday activities, increased startle response, disturbed sleep patterns and avoidance of situations associated with the event.

Counselling, cognitive-behavioural therapy and debriefing have been proposed as having potential value in reducing symptoms and post-incident sickness absence in train drivers experiencing adverse reactions to railway suicides (Foss, 1991; Tang, 1991; Williams et al., 1991).

Foss (1991) suggested that interventions can be provided by railway managers. These managers, trained for the role of safety ombudsmen by the occupational health department, administered "mental first aid" (crisis intervention counselling) to drivers who experienced a railway suicide or related event.

A study of Danish train drivers (Tang, 1991) reported that there are 50 railway suicides per year in Denmark, this suggests that there is a 1 in 8 chance that any one driver will experience a railway suicide in any one year. Tang (1991) presented a case study of one driver who following a railway suicide showed many of the symptoms of PTSD, this driver was successfully treated using behavioural techniques (systematic desensitization).

The author also outlined the approach adopted by the Danish Railway authorities to railway suicides: crisis intervention within 24 hours of the incident; preparation for adverse psychological reactions and an introduction to psychotherapy during the training of all new drivers; introduction to crisis intervention and psychological first aid for managers; and information campaigns regarding railway suicide both within and outside the company.

In England following an increase in the number of railway suicides in one region of British Rail, Williams et al. (1991) suggested a number of psychological interventions for those drivers who experienced railway suicides. These authors initiated instructive workshops for railway managers to enable them to provide debriefing immediately following the event and again at 3, 6 and 12 months after the incident. In addition drivers were accompanied on their first train journey on their return to work. These measures were found to accelerate the drivers return to normal working.

The Dutch railway system has provided interventions aimed at preparing drivers for such incidents and providing appropriate care following incidents since 1976 (Middell, 1991). First level managers attend a three day education course regarding the

possible reactions to railway suicides, how to assess the impact of such events on drivers and how to counsel such drivers. Also drivers are instructed as to the possible effects of such incidents during training and at regular informal meetings.

In a prospective study of 69 Danish train drivers the value of "crisis therapy" was assessed. It was found that this treatment approach was of most benefit for those drivers who were "psychologically more fragile" (Beckmann, 1991).

It should be noted that none of the above treatment studies provided objective measures of symptomatology before and after the interventions or treatments.

Karlehagen et al. (1992) found that train drivers who had experienced 2 or more previous incidents and who prior to the incident had been worried about being involved in an incident (assessed post-incident) reported the highest levels of distress at 1 month and 1 year follow-ups (higher Impact of Events Scale intrusion scores). These authors concluded that their findings point to the importance of "pre-accident (vulnerability) or accident-independent variables in predicting outcome" as apposed to the severity of the incident. Beckmann (1991) however, suggested that the degree of reaction is an effect of the personality of the driver and the characteristics and consequences of the incident. He also found that incidents resulting in death caused a "greater strain impact on the engine drivers immediately after the accident" and that following a railway suicide older drivers were more "psychologically shaken".

Theorell et al. (1991) found that drivers who had experienced a railway suicide reported significantly more sickness absence (self-reported) than the control group during the 3 week period following the incident and during the period between the 3 month and 1 year follow-ups. However, no significant difference was noted for the period between the 3 week follow-up and the 3 month follow-up. 38% of drivers who experienced a railway suicide had at least 1 month of sickness absence during the period 3 months to 1 year compared to 14% of the control group. Long-term sickness (between 3 months and 1 year) was significantly related to serious injury of the person on the track rather than death or mild injury. These authors also found that blood cortisol levels and self-report depression data as assessed 3 weeks after the incident were both independent predictors of long-term sickness absence (predicting 39% of the variance in multiple regression analysis).

Foss (1991) investigated 50 drivers who had experienced a railway suicide and subsequently received "mental first aid" from a safety ombudsman. The timing of the "mental first aid" was found to be important, for those drivers who received "mental first aid" on the same or next day following the incident only 18% were absent from work for 4 days or more, the corresponding figure for those who received "mental first aid" later than 1 week following the incident was 70%.

The study of Swedish and Norwegian drivers (n=101) found only 11 took over 1 week sickness absence following the incident (Karlehagen et al., 1992). For these 11 drivers sickness absence was related to higher IES intrusion and avoidance scores compared to those drivers who had not taken sickness absence (Karlehagen et al., 1992).

History of PTSD

There are a number of historical cases of reactions to trauma that resemble the symptoms of PTSD. Shakespeare's Macbeth tells of suffering "a strange infirmity" (Act III Scene IV) which included visions and ruminating. Samuel Peyps after witnessing the Great Fire of London in 1666 wrote that he occasionally dreamed of his house being attacked by the fire. Charles Dickens suffered severe psychological problems following his involvement in the Staplehurst train crash in 1865. On several occasions during the following years whilst travelling by train he was seen to "suddenly fall into a paroxysm of fear, tremble all over, clutch the arms of the railway carriage, large beads of perspiration standing on his face, and suffering agonies of terror ... he saw nothing for a time but that most awful scene" (Ackroyd, 1990).

One of the earliest descriptions of a syndrome similar to what is now known as PTSD was documented by Erichsen (1875) in relation to persons involved in railway accidents. He found the following symptoms of nervous shock were often seen in persons who had been involved in railway accidents yet had suffered no physical injury: sleep disturbance; nightmares; exhaustion; irritable; poor memory; lack of concentration; hypersensitivity to noise; and loss of libido. Erichsen believed this condition, which he termed "concussion of the spine", was peculiar to railway collisions and he attributed the onset of this syndrome to the suddenness and "frantic terror which often seizes upon the sufferers of railway collisions".

De Costa in treating soldiers of the Crimean War noticed that soldiers often complained of a combination of physical symptoms, phobias, nightmares and nervousness, this condition became known as De Costa's Syndrome (Ramsay, 1990).

Dallessio (1978) in his research into "hyperventilation, the vapours, and effort syndrome" noted the similarities between these historic diagnoses and PTSD. He describes the vapours, a condition of the 19th century, as "a disease of nervous debility, in which a variety of strange images float in the consciousness appearing as if real - hence, hypochondriacal affections, depression of spirit, dejection, spleen, the blues ... [in] contemporary terminology, a chronic anxiety reaction".

During the 1880's and 1890's a number of eminent figures in psychiatry and psychology studied psychological problems following trauma, including Oppenheim, Janet and Freud. Freud went on to develop the concept of traumatic neurosis.

During World War I, the terms "effort syndrome" and "soldier's heart" (De Costa's syndrome) were adopted to describe a condition similar to PTSD. This condition was common amongst front line soldiers, "symptoms included fatigue, chest pain, faintness, inability to catch one's breath, feelings of smothering, inability to exert, and a chronic, pervasive, withering sensation of prolonged and protracted fear" (Dallessio, 1978).

Shell shock, one of the major causes of invalidity in the First World War, was characterised by "anxiety attacks, startle reactions, insomnia and repetitive battle

dreams" (Ramsay, 1990). Interest in trauma neurosis was revived by researchers in the field of psychiatry during the two world wars and the noted association of the experience of combat and neurotic conditions led to the recognition of "war neurosis" (Crocq, 1991).

Initially physical explanations were sought for the symptoms presented by those involved in traumatic incidents, e.g. "concussion of the spine" and "soldier's heart". Later recognition of the psychogenic causes of the presented symptoms led to the terms "war neurosis", "combat neurosis", "accident neurosis" and most recently to "post-traumatic stress disorder" (Duckworth, 1987).

By far the most influential event in the formulation of the clinical concept known as Post-Traumatic Stress Disorder was the Vietnam War. Though this war ended long ago the veterans of Vietnam still provide a large number of readily available subjects with which to carry out research exploring the adverse psychological effects of war on its survivors (McGuire, 1990). Vietnam veterans are the most extensively examined population for PTSD.

In recent history a large number of disasters have occurred in Britain or have effected its citizens, the Zeebrugge ferry disaster, the Kings Cross fire, the Piper Alpha Disaster, the Hungerford massacre, the Hillsborough football stadium disaster, the Bradford Football Club fire, the Enniskillen bombing and the Falklands War. In Britain these disasters have led to increasing recognition and interest on the part of mental health clinicians and researchers regarding Post-Traumatic Stress Disorder.

Methodological problems

Despite the wealth of literature on PTSD there are methodological problems with many of the published papers. One major problem is that the majority of the literature pertains to the DSM-III diagnostic criteria of PTSD, in 1987 the DSM-III-R was introduced with different criteria.

In a review of 2,000 studies Leivesley (1984) identified three main problems in comparing studies of PTSD samples: 1) wide variations in sampling and observation methods and in classifications adopted; 2) variations in the stressors and the societies effected; 3) variations in the interpretations applied (i.e. psychiatrists and sociologists each assessing the effects of a disaster differently).

Many studies do not adequately define the populations affected, the criteria for selection or the characteristics of those investigated. Some studies also fail to identify the time period between the disaster and when victims were investigated (Leivesley, 1984). Many studies include subjects who have experienced wide variations in their degree of exposure to the trauma. There are also a variety of offered classifications as to what constitutes a "disaster" (Smith et al., 1988).

The terminology adopted to describe reactions also varied widely in the studies reviewed by Leivesley. The most commonly used term was depression. Studies using standardised structured research instruments have found lower rates of adverse psychological reaction than studies using in-depth, open-format interviews or self-report measures (Smith et al., 1988). Though it is common for studies to use some

form of "PTSD interview" there is often no evidence of reliability checks in such studies (Duckworth, 1987).

The timing of assessments is likely to decide the nature and intensity of reaction measured. In the studies reviewed by Smith et al. (1988) the time of assessment varied from immediately to five years after the disaster. Few studies have assessed subjects at multiple time points.

Most PTSD studies have investigated Vietnam veterans. This is a very convenient pool of subjects, however, the focus is then on chronic combat-related PTSD. Moreover, within this group a number of additional non-disorder specific problems have been noted including heavy drug consumption and high levels of sickness absence from work (Card, 1987). Within this area of research there is also a reliance on retrospective estimates of pre-morbid measures such as the level of combat exposure. Therefore, to generalise from Vietnam veterans to other acute PTSD sufferers may not be appropriate (Duckworth, 1987).

Controlled or comparative outcome studies from the wealth of proposed interventions are virtually non-existent (Duckworth, 1987). In addition studies of treatment outcome have often used heterogenous samples and subject selection procedures were fraught with questionable reliability and validity (Fairbank and Nicholson, 1987).

Psychopathology/symptomatology

PTSD is a syndrome of behavioural and emotional problems following a severe traumatic experience. Traumatic events found to have precipitated PTSD range from war to large-scale accidents and disasters to smaller more personal disasters e.g. kidnapping (Weisaeth, 1989a), rape (Burgess, 1983) and motor vehicle accidents (Goldberg and Gara, 1990).

One of the major characteristic of PTSD that differentiates it from other diagnoses is that within the DSM-III-R PTSD is one of the few stressor-generic diagnostic categories. This means that an event must have occurred and have triggered the reaction for such a diagnosis to be made.

The stressor criterion for PTSD as outlined in DSM-III-R (American Psychiatric Association, 1987) is required to be "a psychologically distressing event that is outside the range of usual human experience". The stressor "would be markedly distressing to almost anyone, and is usually experienced with intense fear, terror, and helplessness...the most common traumata involve either a serious threat to one's life or physical integrity; a serious threat or harm to one's children, spouse, or other close relatives and friends; sudden destruction of one's home or community; seeing another person who has recently been, or is being, seriously injured or killed as the result of an accident or physical violence...the trauma may be experienced alone ... or in the company of groups of people...Stressors producing this disorder include natural disasters...accidental disasters...or deliberately caused disasters...some stressors frequently produce the disorder (e.g., torture), and others produce it only

occasionally...the disorder is apparently more severe and longer lasting when the stressor is of human design" (American Psychiatric Association, 1987).

Several aspects of the above criterion are fulfilled by the experience of the incidents examined in this research: these incidents are outside the normal range of experience; they would be distressing to most people; there is a sense of helplessness experienced by drivers during these incidents; and many incidents result in serious injury or death.

Following the experience of a traumatic event numerous psychological problems may be presented. These may be both disorder-specific symptoms, namely those symptoms mentioned in the DSM-III-R diagnostic criteria for PTSD, and non-disorder specific symptoms, those symptoms which are commonly found in other psychiatric disorders (McGuire, 1990).

McGuire (1990) gives examples of several non-disorder specific symptoms, not normally associated with PTSD, yet experienced by survivors of combat-related trauma: social isolation, cultural alienation, memory impairment, agitation, anxiety, suicidal urges, hostility and depression.

As well as non-disorder specific symptoms seen in disaster populations many studies have noted that diagnoses other than PTSD are reported by subjects. The Center for Disease Control of Atlanta, USA (1988) in a study of 2490 Vietnam Veterans and 1972 non-Vietnam Veterans found that 4.9% of Vietnam Veterans as opposed to 3.2% of non-Vietnam veterans were suffering from anxiety; 4.5% versus 2.3%

suffered from depression and 13.7% versus 9.2% exhibited alcohol abuse or dependence. Of the 2.2% of Vietnam Veterans currently suffering from PTSD 66% also satisfied the employed criteria for anxiety or depression and 39% met the criteria for alcohol abuse or dependence.

Duckworth (1987) also found depression and anxiety to be commonly reported concurrently with PTSD diagnoses. Factor analysis of a range of 33 symptoms reported by Vietnam veterans found that subjects indicated that a depressive reaction was a major component to their response (Silver and Iacono, 1984).

Though a variety of traumas have been found to produce a reaction that conforms to the PTSD criteria, different stressors have been associated with their own symptom profile i.e. some symptoms are stressor specific (Duckworth, 1987). To incorporate the range of symptoms that may be presented following a traumatic event the criteria for PTSD allows for a wide range of possible symptoms to be presented and still satisfy the diagnostic criteria for PTSD (Duckworth, 1987).

As well as psychological problems a number of social problems may be experienced following a traumatic event. Among those documented are the disruption of family and social relationships and the inability to work. Another important consideration for health workers in this area is that survivors may be reluctant to seek help initially. Moreover, after 3 months victims become increasingly reluctant to seek help despite the continuing presence of problems. Even when the victim has sought help subjects may be non-compliant (Burstein, 1986; Duckworth, 1987).

Prevalence/Incidence

A number of large studies have reported prevalence of PTSD in Vietnam veterans to be between 15% and 30%.

Of 2490 Vietnam Veterans 15% reported that they had experienced combat-related post-traumatic stress disorder at some point, since or during their tour of duty in Vietnam. Of the 2490 Vietnam veterans 2.2% met the criteria for combat-related post-traumatic stress disorder during the month prior to examination. However, this study took place 15-20 years after the subject's military service (Center for Disease Control, 1988). Card (1978) studying 1,500 Vietnam-era veterans and non-veterans found 19% of all veterans reported having PTSD. Of 202 Vietnam Veterans 33% were clinically depressed as assessed by the Beck's Depression Inventory when assessed 28 months after their return from Vietnam (Nace et al., 1977).

In the study by Card (1978) it was also found that prevalence was increased in those veterans who had experienced heavy combat. Prevalence of PTSD in this group was 27%.

An American study of lifetime prevalence of PTSD (n=2985) found 1.3% had had PTSD in their lifetime and 0.4% reported having had PTSD in the last 6 months. Previous studies of lifetime prevalence of PTSD have reported rates of 1.0-2.6% (Davidson et al., 1991).

Within studies not investigating Vietnam war veterans a wider variation in rates of incidence have been reported. Tables 1a and 1b present the rates of prevalence/incidence following a variety of traumatic events. Table 1a presents a selection of studies that have reported prevalence rates for post-traumatic stress disorder in the studied populations. Table 1b presents prevalence rates of disorders or classifications other than post-traumatic stress disorder.

TABLE 1a PREVALENCE/INCIDENCE OF PSYCHOLOGICAL MORBIDITY
FOLLOWING TRAUMATIC EVENTS

Event	Interval to assessment	No of subjects	Disorder (Criteria)	Percent affected with disorder	Source
Children kidnapped from school bus	4-5 years	25	PTSD (DSM-III)	100	Terr (1983)
Survivors of "Herald of Free Enterprise" sinking	6-9 months	45	Recognisable disorders (predominantly PTSD (DSM-III) and depression)	95	Yule (1991b)
Kidnap and torture of a ships crew	4 weeks	13	PTSD (DSM-III-R)	46	Weisaeth (1989a)
Explosion in paint factory	7 months	66	PTSD (DSM-III)	37	Weisaeth (1984)
Police involved in Bradford Football Club fire	1 month	234	PTSD (DSM-III) Caseness on GHQ-60	35 24	Duckworth (1986)
Civil violence in Northern Ireland	Various	499	PTSD (DSM-III)	23	Loughrey et al (1988)
Firefighters involved in bush fire	8 months	50	PTSD (DSM-III)	22	McFarlane (1988a)
Referrals for assessment following involvement in motor vehicle accident	Various	30	PTSD (DSM-III)	100	Kuch et al (1985)
Referrals for assessment following involvement in motor vehicle accident	Average of 15 months	55	PTSD (DSM-III-R) Depression	15 43	Goldberg & Gara (1990)

TABLE 1b PREVALENCE/INCIDENCE OF PSYCHOLOGICAL MORBIDITY
FOLLOWING TRAUMATIC EVENTS

Event	Interval to assessment	No of subjects	Disorder	Percent affected with disorder	Source
Buffalo Creek dam break and flood	2 years	654	Traumatic neurosis	80	Titchner & Kapp (1976)
	4-5 years	654	Disabling psychiatric symptoms	33	Gleser et al (1981)
Cyclone in Sri Lanka	1-2 months	79	Psychological dysfunction	77	Patrick & Patrick (1981)
Cyclone in Fiji	2 months	75	Caseness on GHQ-28	65	Fairley et al (1986)
Coconut Grove night club fire	2-3 weeks	46	Nervousness and anxiety	54	Alder (1943)
	9 months	46	Nervousness and anxiety	28	
Train crash	6-14 years	150	Needed psychological counselling or support	37	Lundin (1991)
Capsize of Alexander L. Kielland oil rig	1 year	73	General morbidity	32	Holen (1990)
Firefighters involved in hotel fire	2 weeks	58	Stress reaction of clinical significance	10	Hytten & Hasle (1989)

It appears that in man-made disasters the prevalence rate of psychological morbidity is between 20-50% (Weisaeth, 1991). Raphael (1986) suggests the rate is generally over 30% in the shorter-term with psychological morbidity at 1 year of 30-40%.

Raphael (1986) proposed that in the first week following most disasters stress reactions are seen in 20-70% of the affected population dependent on their exposure to the stressor. "Levels may remain high in the early weeks, at least for general reactions. Then by ten weeks, there is usually a significant drop, with a gradual ongoing decrease over the first year" (Raphael, 1986). However, Quarantelli (1985) argued that "while there are immediate widespread effects, much of the reaction is surface, non-persistent, of short duration, not behaviourally dysfunctional...".

Evidence of this marked drop in symptoms over time has been offered by some researchers and can be seen in several of the studies in Tables 1a and 1b. Of the 75 victims of a cyclone in Fiji (Fairley et al., 1986) found 65% of subjects were classified as a case by the General Health Questionnaire (GHQ-28) when assessed 2 months after the cyclone. However, at 3 months the number of "cases" on the GHQ-28 did not differ significantly from the number in the unexposed control group. Feinstein and Dolan (1991) in study of 48 persons who had experienced a physical trauma noted that "without intervention the natural history of these sequelae was towards improvement over time with less than a quarter remaining cases by 6 months".

Several researchers most notably Weisaeth (1984) propose that prevalence is primarily an effect of the nature of the stressor and the degree of exposure to the

stressor. However, Weisaeth (1984; 1989) and Smith et al. (1988) noted that other factors may influence prevalence rates i.e. instruments used, time between trauma and interview, subject selection procedures and response rates.

Stress and Coping

In examining post-traumatic stress reactions it is useful to look at stress in the broader sense.

Stress and anxiety as concept within health research first started with the advent of World War II where stress/anxiety were seen to be the effects of combat. Most of the later research in this area investigated the performance of stress inducing tasks (mostly laboratory research). Stress was found to be not simply the effect of the level of stressful stimuli, psychological processes were found to be influential in the variance in reactions/performance. During the 1950's personal factors or processes such as motivation, cognitive appraisal and coping were recognised as important in mediating between stress in the environment and the short term emotional and performance outcome (Lazarus and Folkman, 1984).

Lazarus and Folkman proposed that different stimuli will elicit different behavioural and psychological responses depending on what is measured and the environment and resources available at time of exposure. Moreover, the vulnerability of the subject to the stressor is also important. They proposed that it is the person-environment relationship that determines the reaction to a stressor.

Though Lazarus and Folkman suggest that under extreme environmental conditions nearly everyone will experience stress they emphasize that one must not overlook the great variations in human response to so-called universal stressors. Moreover, in the case of milder stressors the variability of response is seen to increase. What is stressful for some is not for others. Therefore one cannot define stress as purely an effect of environmental conditions, it is also necessary to consider the characteristics of the person. It is important to identify those variables and processes that underlie the relationship between the stressor and the reaction, especially vulnerability or coping processes that may inadequately manage stress (Lazarus and Folkman, 1984). The Lazarus and Folkman model of stress can be seen to be the interaction of personal resources and environmental demand.

Aetiological theories for PTSD

There are 3 main aetiological theories proposed to explain occurrence and processes in PTSD: Psychodynamic; Behavioural; and Biochemical.

Psychodynamic approach

Most of the work in this area has been done by Horowitz and much of this work was done prior to the inclusion of PTSD within the DSM-III. Aetiological theories within this framework view PTSD as a manifestation of information overload (Horowitz and Kaltreider, 1980) with deficiencies within the individual's defence mechanisms playing an important role.

Information overload in this context is where the individual cannot reconcile the information regarding the traumatic event with existing schemata (concepts of self and the world). Emotional reactions to the trauma are an affect of the discrepancies between the internal and external information. Such emotions cause the individual to adopt mental processes of defence and control in order to protect himself from these distressing emotions (Horowitz and Kaltreider, 1980).

The two major symptom categories, intrusion and denial (as defined by Horowitz and Kaltreider [1980]) are the result of maladaptive processing by the individual's defence mechanisms. Intrusive symptoms result due to a failure or lack of control on the part of the individual's defence mechanisms, whereas denial is the result of defensive over control. On assessment these two phases may be found to coexist or alternate (Fairbank and Nicholson, 1987).

Within this model Horowitz proposes that the individual needs to work through the processing of the experience. The new information needs to be incorporated into the individuals schema whether through adaptation or assimilation.

Behavioural approach

A behavioural learning approach to explain the acquisition of PTSD was put forward by Keane et al. (1985). In this model the development of PTSD parallels the classical conditioning of the physiological fear response in animals.

The traumatic event in acts as an aversive unconditioned stimulus (UCS) that elicits extreme levels of autonomic distress in the individual. Due to the experienced autonomic distress at this time previously neutral stimuli which accompany the exposure to a traumatic UCS may also function as conditioned stimuli (CS). Therefore later exposure to either the traumatic unconditioned stimuli or the conditioned stimuli will be capable of eliciting psychological and physiological distress.

The avoidance behaviours of PTSD are explained through the operation of instrumental conditioning. When the individual escapes from or avoids the conditioned stimuli they experience a reduction in psychological and physiological distress. Therefore through instrumental conditioning avoidance behaviours are reinforced by arousal reduction and the subject will in future avoid exposure to conditioned cues (Fairbank and Nicholson, 1987). Within this framework subsequent exposure to trauma (conditioned stimuli) should bring about anxiety reduction (extinction), provided complete exposure (exposure lasts long enough for the subject to experience a reduction in arousal) is ensured (Keane, Zimmering and Caddell, 1985).

Most of the evidence offered in support of this model to date is in the form of animal laboratory studies (McGuire, 1990). However, recently the findings of a number of researchers investigating psychophysiological measures in PTSD sufferers and the cognitive responses of Vietnam veterans to combat stimuli (e.g., Blanchard et al., 1982; Malloy et al., 1983) offer tentative support for the behavioural model (Keane et al., 1985).

The main concern of critics of the behavioural model is that it fails to account for the effects that personal cognitive processing might have in shaping the individual's response to the trauma. In the behavioural model the type and duration of the trauma is more important than the individual's perception of the trauma (Scrignar, 1988).

Biochemical approach

A biochemical model to explain PTSD has been put forward by Van der Kolk et al. (1985). As was the case for the behavioural approach this model draws on the findings of animal laboratory research. Van der Kolk et al., (1985) noted the parallels between the psychological reactions in humans and the learned helplessness brought about in animals following exposure to inescapable shock.

According to this model exposure to traumatic events and related stimuli may cause biochemical changes leading to the presentation of PTSD symptoms. Van der Kolk (1985) suggest that exposure to trauma may result in profound catecholamine depletion in humans similar to the norepinephrine depletion in animals exposed to inescapable shock. This biochemical depletion may account for symptoms such as loss of motivation and occupational instability. Further, endorphin release in humans, being the equivalent to stress-induced analgesia in animals is proposed to explain the symptoms of anxiety and increased arousal in PTSD sufferers. During exposure to the traumatic event there will be a release of endorphin in the human subject, however after the trauma the subject will experience symptoms similar to opiate withdrawal e.g. physiological hyperactivity, anxiety, sleep disturbance.

Treatment

Psychodynamic approach

The aim of all psychodynamic treatments of PTSD is the integration of the traumatic experience. This is usually attempted by means of "revivification" (i.e., reliving the trauma). Horowitz et al. (1979) suggested that along with this ultimate aim, treatment strategies should take into account the subject's present symptom state. When the sufferer experiences severe predominantly intrusive reexperiences the therapy should be supportive or "covering", in effect supporting the individual through these distressing experiences and helping them to therapeutically control or repress these intrusive thoughts or images. "Uncovering" techniques should be used when the individual is in denial phases in order to bring to the surface relevant thoughts and memories. In this situation the aim is to reduce the level of imposed control and to promote the integration and catharsis of the traumatic memories.

Research assessing the efficacy of the psychodynamic treatment approach are scarce, moreover, those that do exist often have methodological flaws. Fairbank and Nicholson (1987) cite two studies in particular (Horowitz, 1984; Lindy et al., 1983) as incorporating serious methodological problems making it necessary that their significant results be treated with caution. The two main problems with these treatment studies being high drop-out rates and the heterogeneity of included subjects.



30 survivors of the Beverley Hills Supper Club fire were treated for after 6-12 weeks using psychodynamic psychotherapy. Only 10 (33%) subjects achieved a significant symptom reduction. In addition this study lacked a control group (Lindy et al., 1983). Horowitz et al., (1984) reported favourable outcomes in terms of before-after effect measures following treatment using dynamic psychotherapy of 52 individuals suffering bereavement reactions. This study lacked a control group and only 14 of the 52 subjects were actually diagnosed under DSM-III PTSD criteria, most were diagnosed as having adjustment disorder. Regarding the above study by Horowitz et al., it has been noted (Fairbank and Nicholson, 1987) that other researchers have in a meta-analysis of psychotherapy outcome gained almost identical before-after effect sizes for both psychotherapy and control groups.

There is clearly a need for more controlled studies before any conclusions can be reached regarding the efficacy of psychodynamic treatment methods.

Behavioural approach

The behavioural treatment approaches fall into two main categories, exposure based therapies and stress management techniques. Exposure based therapies include systematic desensitisation and imaginal flooding. Both techniques aim to reduce arousal to cues of the traumatic conditioning experience/memories by means of controlled imaginal exposure to the traumatic event or by in vivo exposure to stimuli associated with the event. Stress management procedures aim to provide strategies for coping with symptoms and trauma related problems (Fairbank and Nicholson, 1987).

Efficacy studies so far have tended to deal solely with combat-related PTSD (Vietnam veterans) and have usually been single-case studies. Those studies that are available however, have reported encouraging outcomes (e.g. Keane et al., 1985). Richards (1990) treating PTSD sufferers other than Vietnam Veterans used systematic desensitisation and imaginal flooding (1 hour per week for 8 weeks) and achieved a 60-80% reduction in PTSD symptoms. However, most studies of behavioural treatments for PTSD report that a mixture of the two treatment approaches (exposure and stress management) was used (McGuire, 1990).

Again more evidence is required in the form of group outcome studies before being able to confidently assess the success of behavioural treatment approaches. However, the results so far are promising.

Biochemical approach

The biochemical approach to explain PTSD proposed by Van der Kolk et al., (1985) relies on the evidence of animal research into the effects of exposure to inescapable shock. Therefore, the proposed treatment for human sufferers of PTSD parallels the treatment procedure used to reverse the effects of inescapable shock in animals. This requires the human subject to experience forced exposure to escapable shock (Fairbank and Nicholson, 1987). The biochemical treatment approach proposed by Van der Kolk can be seen to be similar to the behavioural approach to treatment.

However to date most biochemical interventions have been symptomatic pharmacotherapy i.e. anti-depressants for depression, anxiolytics for anxiety and neuroleptics for flashback episodes (Fairbank and Nicholson, 1987; McGuire, 1990).

Reviewing the literature on the treatment of PTSD using biochemical interventions McGuire (1990) noted that several types of medication had been used with varying levels of success. A number of studies treating PTSD using tricyclic anti-depressants (e.g. imipramine) and monoamine oxidase inhibitors (e.g. phenelzine) have reported successes. However most of these were uncontrolled and occasionally medication was used in combination with other therapeutic methods. Moreover, not all studies have been supportive of the use of anti-depressants in the treatment of PTSD. Low doses of lithium carbonate have also been found to reduce mainly non-specific symptoms.

McGuire (1990) concluded that one reason for the inconclusive results from drug trials so far may be the heterogeneity of PTSD patients. Again more controlled studies are needed in this area.

Other treatment approaches

Other treatment approaches have been used that do not easily fit into any of the above categories. Duckworth, D. H., (1986) used a counselling/psychotherapy approach which included a blend of rational-emotive therapy, cognitive therapy and problem solving theory. Duckworth reported a high level of success with this approach, in most cases only 3 sessions were necessary. In support of this type of

intervention McGuire (1990) noted that combinations of approaches are suggested by the literature to be more effective than the individual approaches used on their own.

Frontline treatment, similar to crisis intervention, has been used in a number of combat situations to treat combat stress in order to prevent potential PTSD (Duckworth, 1987). Duckworth lists many other possible interventions in the treatment of PTSD: explanation-education, muscle relaxation training, hypnosis and self-hypnosis, abreaction, cognitive restructuring, medication, systematic desensitisation, family conferences, assertiveness training, problem-solving, exercise and nutritional changes and group treatment.

Debriefing has been suggested as effective especially in relation to occupational groups involved in traumas. This intervention is an organised approach to the management of stress following a traumatic or critical incident, it aims to educate the individual about: the normal stress responses; specific skills useful in coping with stress; and how to provide support for each other. It is often implemented in group meetings as this provides peer support and is less expensive in time and money. (National Institute of Mental Health, 1987).

Risk/protective factors

As many disasters cannot be prevented or predicted it is important to identify possible risk factors amongst disaster populations so as to assist mental health practitioners in targeting their interventions towards those in greatest need of assistance.

In a review of the literature relating to risk factors for PTSD, Smith et al. (1988) identified 3 risk categories: individual, situational and agent-related. Among the proposed individual risk factors were having a pre-school child; less adequate social support; and being of lower education or socioeconomic status. However, due to methodological inconsistencies and design variations within the literature Smith et al. concluded that there is generally little consistency regarding personal risk factors. The only consistent finding being whether the subject had pre-existent psychiatric history. The only relevant situational risk factor identified appears to be the degree of involvement with the trauma (Smith et al., 1988). Regarding agent-related factors Smith et al. argued that it is difficult to identify risk factors between the characteristics of different types of traumas as other variables such as suddenness of impact, severity, predictability, duration and frequency may affect the same type of traumas to a large degree and may also affect different subjects experience of the same trauma. Regarding agent-related risk factors Smith et al. concluded that the severity of the trauma may supersede the individuals predisposition in determining the outcome to the trauma.

Other researchers have proposed that the severity of the traumatic experience and pre-existing psychopathology are the predominant risk factors for persons involved in traumatic incidents. In a well designed and controlled study of 125 survivors of an industrial disaster Weisaeth (1984) found subsequent psychological morbidity to be significantly related to exposure to the incident (proximity to the explosion). Pre-existing psychopathology was proposed as an important risk factor which may predispose the individual to develop PTSD following a traumatic event (Duckworth, 1987). This suggestion was supported by Weisaeth (1991) who found that one third of those subjects who were diagnosed as suffering from PTSD in his study had a previous psychiatric history.

Research involving Vietnam Veterans has suggested a number of factors which may influencing the rates of prevalence. Higher rates of symptomatology were found in veterans no longer serving in the forces compared to those still serving. This finding was attributed to Veterans who were still serving receiving more social support from their peers (Stretch 1985). The ethnic origin of individuals has also been found to be a risk factor in a number of studies involving armed forces personnel. More stress symptoms were reported by Black veterans who participated in war atrocities than their White colleagues who participated in the same atrocities, (Yager et al., 1984). Hispanic veterans have also been found to presented higher rates of PTSD compared to white veterans (Escobar et al., 1983). Jones (1985) found that of 225 US Air Force personnel involved in the recovery of human remains psychological problems were significantly more common in black personnel.

Stretch (1985) and McGuire (1990) suggested that the varying levels of psychological morbidity in Vietnam Veterans and in particular between white and non-white service personnel may be due to the following factors: low morale, anti-war sentiment at home, low socioeconomic status, racism in the military, racial upheavals in the United States during the time of the Vietnam war and varying rates and quality of social supports. Fairbank and Nicholson (1987) and Singh and Raphael (1981) have also noted the relationship between social support and psychological adjustment in both Vietnam Veterans and the survivors and bereaved following a train disaster.

Duckworth (1987) suggested factors other than the severity of exposure to the traumatic incident may be important in subsequent post-traumatic morbidity. As the processing of the event is influenced by the characteristics of the individual and the recovery environment where there are pre-existing problems in either of these areas such problems are likely to increase vulnerability. A less severe experience may then induce a higher level of symptoms.

Coping styles and the meaning of the event to the individual may also influence the processing of the trauma (Duckworth, 1987). Evidence of coping strategies effecting post-traumatic morbidity has been provided by several studies. In a study of 50 firefighters, avoidance of discussing the trauma with others was associated with increased PTSD symptomatology (McFarlane, 1988a). A study of prisoners of war found that those subjects suffering from PTSD were more likely to use maladaptive coping techniques, whilst those without PTSD tended to use adaptive coping strategies (Fairbank and Nicholson, 1987). In an investigation of 43 Vietnam Veterans, those with PTSD or severe adjustment problems reported that they used

less adaptive coping strategies compared to those Veterans who were classified as well adjusted (Nezu and Carnevale, 1987). These findings are supported by the finding that persons under stress or with poor mental health tend to use less adaptive coping strategies (Aldwin and Revenson, 1987).

Feinstein and Dolan (1991) investigated whether the severity of the stressor was the primary cause of PTSD in a study of 48 persons who suffered physical trauma necessitating surgery for fractured limbs. The nature of the stressor, the perceived stressfulness of the stressor and pre-morbid personality traits were not found to be significant discriminating variables with respect to outcome. Feinstein and Dolan concluded that "The DSM-III-R concept of the stressor assuming aetiological primacy is not supported. Rather, it is suggested that the way an individual initially assimilates and deals with a traumatic event ultimately has the greatest influence in determining outcome".

McFarlane (1988b) likewise found that the severity of exposure or loss regarding the trauma was not the best predictor of psychiatric impairment (as measured by the GHQ-12) but rather the level of distress following the disaster, as measured by the Impact of Events Scale.

Regarding research with train drivers who have experienced a railway suicide a number of risk factors have been suggested. As noted earlier Beckmann (1991) suggested that the post-traumatic reaction is an effect of both the personality of the driver and the characteristics of the incident. Karlehagen et al. (1992) found that having experienced 2 or more previous incidents of railway suicide (or related

incidents) and/or being concerned about being involved in an incident prior to the incident was a risk factor regarding subsequent psychological morbidity in train drivers. These authors also found that a high level of distress, as assessed by the Impact of Events Scale was a risk factor regarding increased sickness absence following these incidents. Theorell et al. (1991) found long-term sickness (1 year) of train drivers following railway suicides to be significantly related to serious injury of the person on the track rather than death or mild injury.

Risk factors identified as increasing the risk of psychological morbidity may also vary in respect of the population under investigation. In a study of Vietnam Veterans, as well as the intensity of combat exposure, perceptions of homecoming experiences was predictive of those veterans diagnosed as suffering PTSD (Solkoff et al., 1986). In comparing ambulance workers and police body handlers Thompson (1991) suggested that in occupational settings the approach of management to their workers was important in the subsequent responses of workers. Kolb (1989) found "that an acute onset or re-arousal of symptoms can occur following some emotional disturbing event such as a bereavement or witnessing violence". In this respect some occupational groups, for example armed service personnel, police officers, ambulance personnel and train drivers, may due to the nature of their work put themselves in a position to experience traumatic experiences similar to the index event.

It appears that there is conflicting evidence as to the primary risk factor regarding post-traumatic morbidity. However, as noted by Feinstein and Dolan (1991) the evidence to date suggests that risk factors relevant to less extreme stressors may

lose their significance as stressors increase in severity. For severe stressors the influence of factors such as coping strategies and social support may be of reduced importance compared to the severity of exposure.

Legal Issues

Provision for compensation for personal injury or harm to a person's mental condition as a result of the offence of trespass on a railway was made in 1988 (Criminal Justice Act 1988, Cm 42, Part VII, Paragraph 107). However, implementation of this act did not take effect until 1 February 1990.

For injuries occurring on or after 1 February 1990 the lower limit of compensation is £750, applicable where injuries are minor and where the injuries have not necessitated more than 3-4 weeks absence from work. Though shock and emotional disturbance are taken into account, compensation is not normally awarded for temporary shock, distress or emotional upset alone if these are thought to be no more than the inevitable reaction to unpleasant experience. Successful applicants may receive two awards, general damages for the injuries (physical and psychological) and special damages for financial loss (Criminal Injuries Compensation Scheme, 1990).

Main findings of literature review

The review of the literature showed that railway suicide is a worldwide phenomenon and that the experience of a railway suicide by a train driver may cause a severe psychological reaction.

Acute responses to these incidents may include high levels of intrusive symptomatology (Impact of Events Scale) and acute psychophysiological arousal. A common acute and long-term symptom of stress in these samples was sleep disturbance.

At 1 month and at 1 year 10% of drivers were found to be suffering a significant level of distress (Karlehagen et al., 1992). Levels of distress at 1 month were found to be a better predictor of long-term distress than acute reactions. Marked reductions in the level of distress were noted at follow-up assessments at various time intervals (1, 3 and 12 months). However, up to 1 year after these incidents many drivers did still report psychosocial problems.

A number of treatment interventions including counselling, cognitive-behavioural therapy and debriefing were suggested to be of value in reducing symptoms and sickness absence. As well as therapeutic interventions other measures were advocated which aim to prepare drivers for these incidents and to educate managers as to the possible effects of these incidents. However, due to the poor methodological design of most of these studies no one treatment can be said to be superior for this subject group.

Suggested predictors of long-term levels of distress included the driver having experienced 2 or more previous incidents, the driver having concerns about being involved in an incident prior to the incident, the outcome (dead/alive) of the incident and the personality of the driver. Predictors of subsequent sickness absence included serious injury of the person on the track rather than death or mild injury, blood cortisol levels and the level of self-reported depressive symptoms.

A review of the history of PTSD found that remarkably similar conditions have been documented as early as the late 1800's.

It was noted that research into PTSD is laden with methodological problems: variations in sampling; varying degrees of exposure to the trauma within samples; differing classification and observation techniques; and that most of the existing studies rely on a dated diagnostic criteria of PTSD (DSM-III).

PTSD was noted to be a stressor-generic diagnostic category in that PTSD symptoms without an identifiable precursor stressor do not satisfy the diagnostic criteria for PTSD. The symptoms of PTSD fall into three categories: intrusive recollections; avoidance symptoms; and increased arousal. As well as these disorder specific symptoms a number of non-disorder specific symptoms have been reported by PTSD sufferers. Following the experience of a traumatic incident diagnoses other than PTSD are common, especially depression and anxiety. These may be the only diagnosis or may be diagnosed concurrently with PTSD. A number of researchers have suggested that differing traumas lead to the presentation of differing symptom profiles. As well as the many psychological problem that may follow the experience

of a traumatic event it appears that survivors may also suffer a number of social problems especially in their relationships with others.

Prevalence of PTSD in Vietnam Veterans was found to be between 15-30%. For traumas other than war a wide variation (10-100%) in prevalence was found. The prevalence rate for man-made traumas is generally between 20-50%. The natural history of post-traumatic symptoms was suggested to be between 20-70% in the immediate aftermath of the trauma but that a significant decrease in symptoms occurs between 2 and 6 months after the trauma.

Three aetiological theories were discussed. The psychodynamic approach proposes that PTSD develops due to an overload of information that cannot be easily incorporated within the individuals existing schemata (concepts of the self and the world). The behavioural approach holds that PTSD is the result of classical conditioning, with conditioned stimuli causing the symptoms seen in PTSD. The biochemical approach likens PTSD in humans to learned helplessness in animals exposed to inescapable shock.

The three theoretical approaches suggest differing approaches to treatment: Psychodynamic - integration of traumatic event through therapeutic revivification; Behavioural - exposure to traumatic event through flooding, desensitisation or in vivo exposure; Biochemical - forced exposure to escapable shock. However there is a common theme present in all three treatment strategies, all three suggest that treatment should involve some form of controlled exposure to the distressing stimuli. Exposure being central to behavioural theory has led some researchers to the

opinion that the behavioural approach provides the most probable aetiological theory for PTSD at this time.

Regarding risk factors for post-traumatic morbidity a number of variables have been suggested: higher levels of exposure to trauma; pre-existing psychiatric history; race; maladaptive coping strategies; and poor social support. It appears that risk factors may vary according to the nature and severity of the traumatic incident.

6.0) METHODOLOGY

Study design

This thesis reports the findings of a 3 year longitudinal cohort study which began in September 1989 and aimed to assess the effects on drivers of incidents where a person jumped or fell in front of a train on the London Underground.

The purpose of the study was to establish what factors affect the development of measurable psychological morbidity amongst drivers who had the experience of an incident. It was not designed to investigate the factors that might affect involvement in an incident, as these were clearly beyond the control of the driver. It follows that a "control" group of drivers not involved in an incident would not have added to the study. Therefore no external control group was used. It was hypothesised that subjects would vary in respect of their response to the traumatic incident therefore comparisons were made between sub-groups within the driver sample.

Pilot study

The preparatory and pilot phase of the project was between September 1989 and June 1990. During this time the author gained insights into the working conditions of drivers, this included travelling in the front cab of several trains on 2 lines of the system.

As train drivers involved in fatal incidents are required to attend a coroner's inquest as witnesses, the author attended a number of inquests. This enabled the author to see first hand what the driver experiences when giving evidence to the court.

The Personal Welfare Advisory Service (PWAS) provides a counselling group open to all train drivers and other London Regional Transport employees who experience a traumatic incident or have psychological problems. As well as drivers experiencing an incident, other attenders of this group might be suffering from a wide variety of problems i.e. assaults in the workplace, alcohol problems. Contact was made with the PWAS who provided the author with information regarding the effects of these incidents on drivers (i.e. predominant symptoms encountered by PWAS counsellors).

Initially it was intended that the author should attend both the incidents themselves and the subsequent interview of the drivers by the British Transport Police (BTP). Following discussion with representatives of the BTP responsible for the London Underground (L Division) the author was allowed to attend the BTP interviews of drivers. However a number of conditions were imposed: that the driver was agreeable; that the author did not interview the driver before the police did; interviews could not be attended if the incidents was likely to be the subject of a criminal investigation; that the author should not ask questions during the interview or in any other way obstruct the police constable in interviewing the driver.

From January 1990 all incidents were to be attended as soon as possible. When an incident occurs the London Underground control room notifies the British Transport Police and appropriate LUL managers requesting them to attend the station

concerned. The control room were requested to also notify the author (via a message pager) allowing the author to attend immediately.

On attending the incident the author visited the scene of the incident. The author then sat in on the BTP interview of the driver. At this stage the author gained a first hand account of the incident from the driver's viewpoint. During this period and whilst observing the driver in the incident station the author attempted to assess the drivers initial reactions to the incident.

Attendance of the incidents and the subsequent BTP interview provided the author with first hand experience of the aftermath of an incident. Also credibility was afforded to the research, drivers could see that the author was willing to experience the generally disturbing atmosphere of these incidents.

During the pilot phase 10 drivers were interviewed to evaluate the design and content of the interview and to see how drivers responded to the adopted self-report questionnaires. Interviewed drivers were a random sample of drivers involved in incidents during the 5 month pilot phase.

In June 1990 the pilot study was terminated as all of its aims had been realised. Most important the interview arrangements and the interview structure had been finalised, the self-reports had been decided and the inter-rater reliability between the author and another rater (trained in the use of the PSE-9) using the clinical interviews during the pilot study had been found to be satisfactory. During the pilot study 15 incidents were attended and 10 driver interviews were conducted.

The value of attending incidents and attempting an initial assessment were evaluated at the end of the pilot phase. Problems included: late notification of incidents (often up to 30 minutes after the incident had occurred); it was not possible to attend all incidents (and the BTP interviews of the driver), only those taking the longest time to deal with were attended due to the time taken to reach the scene; prior to the police interview it was difficult to assess the driver when merely sitting quietly waiting to be interviewed; as the author was not allowed to ask questions of the driver this also made it difficult to be confident of ratings of initial reactions. Due to these problems the attendance of incidents and the BTP interview was not continued after the pilot study.

Cross checks

Although incidents were not routinely attended during the substantive study it was vital that the author was notified of all incidents in order that the drivers could then be invited to an interview. Following the pilot study it was clear that a small number of incidents would be missed if notification of these incidents relied on the message pager system alone. Therefore 2 backup systems were employed to ensure no incident was missed:

- 1) weekly summary sheets of all failures and delays (over 2 minutes duration) were sent to the author by the appropriate LUL department;
- 2) regular visits were made to the Coroner's Officer in the British Transport Police, this police officer is sent the details of all relevant incidents on the London Underground.

These two methods of cross checks did lead to the discovery of a small number of incidents not otherwise notified.

Contact with the British Transport Police also allowed the author access to the statements of the driver and other witnesses given to the BTP after incidents. This allowed the author to filter out all incidents that did not fit the operational criteria for this study.

Inclusion criteria

The inclusion criteria for the study were all incidents involving passengers or staff, killed or injured by a moving train where the train had struck and/or run over the victim on the track whether in or between stations.

These criteria were adopted in order to restrict the investigation to incidents in which the driver might be expected to have found the incident distressing.

Interview procedure

From July 1990 until December 1991 all drivers who experienced an incident were invited to attend an interview at the Charing Cross and Westminster Medical School.

As soon as possible after the incident, usually the same day, a letter was sent to the driver at his depot. A delay of up to a week was incurred in cases where the author was not immediately informed of the incident.

The letter sent to drivers (Appendix 1) briefly outlined the aims of the research project, informed the driver that the study was supported by their trade union and emphasised the need to interview as many drivers as possible so as to gain a complete picture of the situation. Drivers were also requested to sign and return a consent slip indicating their willingness to participate in this study.

If a driver could not attend the arranged appointment there was an option to defer the appointment to the earliest convenient date.

The first interview (1 month after the incident) took about 3.5 hours to complete therefore it was ensured that the surroundings were likely to facilitate a frank and yet relaxed interview. Drivers were released from duties on full pay on the day of the interview if they decided to attend.

The timing of the first interview one month after the incident was chosen for two reasons:- i.the diagnosis of PTSD requires that the symptoms are present for at least one month; ii.the Present State Examination (PSE-9) is concerned with the individual's mental state over the month preceding interview.

The author carried out all interviews. The author had previously attended a training course in psychiatric interviewing enabling him to administer the Present State Examination (PSE-9).

All interviews included the following:-

- i. a semi-structured interview (Appendix 2);
- ii. a partially standardised clinical interview - the Present State Examination (PSE-9) (Appendix 3);
- iii. a checklist of the criteria for PTSD administered in the form of a semi-structured interview (Appendix 4);
- iv. the completion of nine self-report schedules (Appendix 5).

The semi-structured interview sought to elicit subjective qualitative information regarding the incident and the victim together with the personal demographic details, career history and medical and psychiatric history of the driver (Appendix 2).

Sickness absence both pre-incident and post-incident were obtained from the company's personnel records. The number of working days was used, in preference to the number of days away from work, as this gave a more accurate figure given the shift rotations worked by drivers.

Interviews and self-report tests

2 clinical interviews and 9 self-report scales (Appendices 3-5) were used in this study. The self-report scales were chosen for: a) their proven reliability and validity; b) to allow comparison with other studies using the same schedules; c) to test proposed theories within the post-traumatic stress literature and; d) to compare their effectiveness as screening instruments.

Present State Examination

The Present State Examination (PSE-9, Wing et al., 1974) allows the present mental state of the subject to be assessed. It is a partially standardised "clinical" interview which explores the presence of 140 psychiatric symptoms during the preceding month. Among the indices produced are: symptom profile; syndrome profile (i.e. "situational anxiety", "simple depression"), a total score and the subjects position on an Index of Definition (ID). The Index of Definition gives 8 levels of confidence that the symptoms reported represent a clinically diagnosable psychiatric disorder. Levels 5-8 are indicative of psychiatric caseness are accompanied by a "tentative diagnosis". The PSE-9 has been used in the assessment of both community and psychiatric in- and out-patient samples (Wing et al., 1978). The PSE-9 was used in this study to establish where applicable a clinical classification and to allow use of the other indices for comparative purposes. As the PSE-9 classifications are based on the International Classification of Diseases [ICD-9] (World Health Organisation, 1977) which does not include PTSD it was of interest to see what ICD-9 classification was given to subjects who otherwise satisfied the PTSD criteria.

Post-traumatic Stress Disorder checklist

A PTSD checklist was derived from the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R; American Psychiatric Association, 1987) criteria for post-traumatic stress disorder. It formed the basis of an interview designed to assess the presence and persistence of the 17 symptoms (Appendix 4) and establish whether the subject satisfied the DSM-III-R criteria for PTSD. Comparison was also

possible between the PTSD interview and self-report scales which aim to detect the presence of PTSD.

Scaled version of the General Health Questionnaire

The scaled version of the General Health Questionnaire (GHQ-28, Goldberg and Hillier, 1979) was derived through factor analysis of the GHQ-60. This 28 item self-report questionnaire allows the assessment in respect of four sub-scales (a) somatic symptoms, (b) anxiety/insomnia, (c) social dysfunction and (d) severe depression. As well as providing a symptom profile for subjects as reflected by the separate scores (0-7) for each of the sub-scales, the total score (0-28) may be used as a screening tool in the detection of neurotic psychiatric disorders. Subjects scoring a total score ≥ 5 being possible neurotic psychiatric cases. The GHQ-28 has been used in community surveys and primary care settings (Banks, 1983; Catalan et al. 1984; Von Korff et al. 1987). Comparing the GHQ-12, GHQ-28 and the GHQ-30 Banks (1983) using the Present State Examination to identify psychiatric caseness found the GHQ-28 provided the optimum sensitivity, specificity and misclassification rates. The reasons for using the GHQ-28 in this study were: to provide supportive evidence of psychiatric caseness in addition to the PSE-9, increased scores on the GHQ-28 have been found to be significantly associated with an increased probability of an independent diagnosis of psychiatric disorder being made by a psychiatrist (Goldberg and Hillier, 1979). In addition, the GHQ-28 was used to test the proposed ability of sub-scale "b" to identify PTSD cases (Ramsay, 1990; Fairley et al. 1986) and to allow comparisons with other PTSD research using the GHQ-28. The "GHQ method" (Goldberg and Williams, 1988) was used in scoring.

Impact of Events Scale

The Impact of Events Scale (IES, Horowitz et al., 1979) assesses the level of subjective stress experienced by subjects during the 7 days preceding interview by measuring the frequency of occurrence of 15 items associated with a stress reaction. 3 scores are produced, a total score (range 0-75) and two sub-scales - symptoms of intrusion (range 0-35) and symptoms of avoidance (range 0-40). Although most studies have reported the IES sub-scale scores only the total score shall also be reported here as in a previous study (Farmer et al, 1992) the total score was found to identify more PTSD cases than either the intrusion or avoidance sub-scales. The IES may be used as a screening tool as well as providing a profile of stress symptoms. Scores above thresholds (≥ 20) on either of the 2 sub-scales indicates that the subject is experiencing a clinically significant stress reaction. A threshold of ≥ 40 was adopted for the total score in this study, arrived at by the addition of the cut-off values for the two sub-scales. The IES was used to assess its ability to identify PTSD cases in comparison to other scales and to compare the IES results gained from drivers to other samples experiencing other traumatic events.

Post-Traumatic Symptom Scale

The Post-Traumatic Symptom Scale (PTSS-10, Holen et al., 1983; Holen, 1990; Raphael et al., 1989) assesses the occurrence of 10 symptoms associated with a traumatic stress reaction during the preceding 7 days. It was developed as a screening instrument and a score ≥ 6 (range 0-10) suggests psychiatric caseness. The PTSS-10 was used in this study to assess its ability to identify psychiatric and/or

PTSD cases and to allow comparison between this and other scales as to their efficacy as a screening instrument.

Recent Difficulties/Events

The Recent Difficulties/Events scale (Raphael et al., 1989; Singh et al., 1987) assesses whether any of 6 specified negative life events have occurred during the 6 months preceding interview (death of family member or close friend; sickness; separation from a family member or close friend; financial difficulties; marital difficulties; and any other serious or distressing problem or event). This life events scale was used to investigate whether negative life events were a risk factor regarding psychological morbidity in this sample. A short negative life events inventory was used as such methods have been found effective and as shorter scales are preferable where longer, complex life event inventories are not practical (Brugha et al., 1985; Brugha and Cragg, 1990).

The Perceived Stress Scale

The Perceived Stress Scale (PSS, Cohen et al., 1983) assesses the degree to which, during the month preceding interview, situations in the drivers life have been perceived as stressful. Given that personal and contextual factors may mediate in an event being perceived as stressful it is important to measure these variables. The PSS as well as measuring current stress assesses the degree to which subjects find situations in their lives unpredictable, uncontrollable and overloaded, these three factors being important in the appraisal of an event being stressful (Cohen and

Williams, 1988). Though measures on the PSS have been found to be correlated to levels of symptomatology the PSS measures items other than those typical of psychiatric symptomatology. Kuiper et al. (1986) found that of a sample of subjects who had experienced a large number of negative life events higher scores on Beck's Depression Inventory (BDI) were significantly associated with higher scores on the PSS. Cohen and Williamson (1988) found that subjects (n=2355) who had experienced personal or emotional problems during the last year to the extent that they had considered seeking psychological help (whether or not they got help) scored significantly higher PSS scores than those who had not thought about getting help for any problems. This scale was used to investigate whether a subjective assessment of ability to control or cope with life-stresses, following the incident, had any predictive value regarding subsequent psychological morbidity.

The Eysenck Personality Questionnaire

The Eysenck Personality Questionnaire (Eysenck and Eysenck, 1975) assesses an individual in respect of 4 independent personality traits as measured by the following sub-scales: psychoticism; extroversion/introversion; neuroticism; and lie or dissimulation. Higher scores on the four sub-scales indicates a more marked presence of that trait. This questionnaire was used to investigate whether any of the sub-scales were useful predictors of psychological morbidity following the incident.

The Social Provisions Scale

The Social Provisions Scale (SPS, Russell and Cutrona, 1984) assesses the degree of supportive social relationships under seven headings of social support: attachment; social integration; reassurance of worth; reliable alliance; guidance; belonging; and tangible support. Higher scores indicate higher levels of support. The SPS has been demonstrated to provide a reliable measure of the above dimensions of social relationships (Cutrona and Russell, 1987). The SPS has also been found to be correlated with measures of depression (Beck Depression Inventory) though to measure constructs which are not unduly biased by symptomatology and personality (Cutrona and Russell, 1987). The SPS was used in this study to investigate whether the level of perceived social support was a risk or protective factors regarding psychological ill health following the incident.

The COPE scale

The COPE scale (Carver et al., 1989) is designed to assess the utilisation of 13 different coping methods. 5 sub-scales cover different facets of problem-focused coping: active coping; planning; suppression of competing activities; restraint coping; seeking instrumental social support. 5 sub-scales cover emotional-focused coping: seeking emotional social support; positive reinterpretation; acceptance; denial; religion. 3 sub-scales cover less useful/maladaptive coping techniques: focus and venting of emotions; mental disengagement; behavioural disengagement. Higher scores indicate greater use of the coping method. This scale was used to assess the role of coping strategies regarding psychological morbidity following the incident.

Social Adjustment Scale

The modified Social Adjustment Scale (SAS-M; Cooper et al., 1982) examines the functioning of the subject in 6 role areas: functioning at work; social and leisure activities; relationships within the extended family; marital relationships; functioning as a parent; and functioning in the family unit. The SAS-M has been shown to be sensitive to changes in the mental state of depressed subjects. Weissman et al. (1978) also found the Social Adjustment Scale to differentiate between depressed, schizophrenic, alcoholic and normal subjects. Scores on the SAS-M have distinguished between GHQ cases and GHQ non-cases and SAS-M scores were significantly correlated with scores on the Present State Examination (Cooper et al., 1982; Catalan et al., 1984). The main reason for using an assessment of social functioning is to provide a more comprehensive assessment the global impact of the incident on drivers and to gain measures of the adverse effects of the incident on the drivers working, home and social life.

Follow-up interviews

To assess the duration of problems following the incidents 2 follow-up interviews were arranged. The first follow-up interview took place 6 months after the incident and the second 12 months after the incident.

The 6 and 12 month interviews took approximately 2.5 hours to complete. The first section of the follow-up interviews (covering incident, victim and driver details) was

very much shorter for the follow-up interviews as most of these details had previously been collected at the first (1 month) interview. Clinical interviews and self-report schedules were again administered at both follow-up interviews.

The second interview was timed at 6 months after the incident as this seemed an obvious mid-term assessment point between the 1 month and 12 month interviews and as research using the Present State Examination had found that initial scores on this interview were a good predictor of outcome at the end of a similar time period (Gath and Catalan, 1986).

12 months was decided as the time of the third and final interview as it was felt that this would incorporate a sufficient number of appropriately long-term follow-up interviews and due to the suggestion in the PTSD literature that a resurgence of adverse reactions can occur on the anniversary of traumatic events.

Statistical analysis

Two computer software packages were used in the statistical analyses, CSS:Statistica (Statsoft Inc.) and SAS (SAS Institute Inc.). Non-parametric statistics were used in all analyses as in most cases the data were not normally distributed and/or continuous and therefore did not meet the requirements of parametric statistical analysis.

Below a brief outline and rationale for the use of two statistical tests used in this study is given:

Analysis of Variance: Kruskal-Wallis analysis of variance is the method of choice in comparing more than two groups where the data do not fulfil the requirements of parametric statistics. Kruskal-Wallis was also used in the comparison of two groups. Although other statistical methods may have been used to compare two groups Kruskal-Wallis was used to allow all such analyses (of 3 and 2 groups) to be displayed meaningfully in one table using the same statistic. Alternative statistical methods comparing two group (Mann-Whitney or Wilcoxon tests) are related to Kruskal-Wallis analysis of variance in their method of analysis therefore results using any of these methods would be similar and the use of analysis of variance does not result in a loss of statistical power.

Logistic regression was used to identify the determinants of an adverse outcome. 3 classifications of an adverse outcome (dependent variables) were used in these analyses. 2 were obtained from psychometric measures, the Present State Examination; and the PTSD checklist interview. The third classification of an adverse outcome was a behavioural measure of post-incident outcome, the number of days sickness absence following the incident.

Logistic regression rather than linear regression was used for several reasons. Neither the PSE-9 total scores nor the Index of Definition scores nor PTSD interview scores yielded data of a continuous distribution. Moreover, data from the 2 interviews and the number of days sickness absence following the incident were found to be not normally distributed, even following logarithmic transformation.

It follows that linear regression, which assumes that the data are normally distributed and continuous, could not be used. It was therefore decided to convert the PSE-9 data (Index of Definition score ≥ 5) and PTSD interview data (satisfaction of the DSM-III-R criteria) into binary variables denoting caseness. The number of days sickness absence following the incident was likewise converted into a binary variable denoting sickness absence following the incident of 21 days or more (21 being the upper quartile of the post-incident sickness absence data).

Logistic regression is recognised as "the statistical method of choice for analysing the effects of independent variables on a binary dependent variable in terms of the probability of being in one of its two categories vs the other" (Fleiss et al., 1986).

Two groups of possible determinants (independent variables) were analyzed to examine whether they significantly influenced the drivers responses:

1) The first group were variables present before the event or a characteristic of the event (or its immediate aftermath). These included:

Incident	- type of incident, outcome of incident, injuries to victim;
Victim	- sex and age;
Driver	- age, ethnic group, practised religion, marital status, experience of previous incidents of this type, prior psychiatric history, average annual sickness absence prior to the incident..

Sex of the driver was not included as all drivers investigated were male. A full list of the incident and victim variables and the driver variables is given in Appendices 6 and 7 respectively.

2)The second group of variables were derived from three self-report scales. These variables assessed the psychological and social resources of the driver (psychosocial variables):

- Personality - Eysenck Personality Questionnaire (EPQ)
- Social support - Social Provisions Scale (SPS)
- Coping strategies - COPE scale

All independent variables were dichotomous. This policy was adopted as in most cases this was the natural form (i.e. mutilated/not mutilated, psychiatric history/no psychiatric history). Three incident, victim and driver variables were not naturally dichotomous, age of driver, age of victim and pre-incident average annual sickness absence. The age of the driver and the age of the victim were both divided into three age range groups, each age group being a dichotomous variable (see Appendices 6 and 7). Average pre-incident annual sickness absence was converted to a binary variable, a value of 1 given to sickness absence of 20 or more (20 being the upper quartile for these data). An additional reason for conversion of data to dichotomous variables was that when all variables within a final logistic regression model are dichotomous the results are more easily interpreted.

All psychosocial variables (self-report scale scores) were converted to dichotomous/binary variables. Scores were coded 1 if they fell in the upper quartile range of scores for that measure, all other scores were coded 0. This method was chosen as the upper quartile would identify an appropriate number of subjects and represented those subjects with the highest scores on these scales.

As there were only 76 subjects it was not possible to use all incident, victim and driver variables into the logistic regression together. The number of independent variables should not exceed a third of the number of cases otherwise results are likely to be erroneous. Therefore it was necessary to filter out those variables that were clearly not significantly associated to dependent variables:

The correlation between each of the independent variables and each of the outcome (dependent) variables was tested using Chi-squared. Where there was a significant correlation with the dependent variable, the independent variable was included.

Some variables, although not significant in the above analysis were included because previous research has suggested that they might be risk factors for post-traumatic morbidity, or because intuitively they were thought to be of special interest.

Missing data

Data from the Eysenck Personality Questionnaire was not available for all drivers. Therefore analyses regarding the EPQ are based on the following numbers: initial 1 month analysis - 61 of the 76 drivers provided EPQ data; analysis comparing 1

month and 6 months - 43 of the 56 drivers provided EPQ data at 1 month, all drivers provided EPQ data at 6 month.

For the 1 month analysis (n=76) 1 driver did not complete the self-report schedules, therefore data on these questionnaires are based on 75 drivers. This driver was included in the initial 1 month analysis as he did complete the PSE-9 and PTSD interviews. This driver was a case on both interviews at 1 month and was highly distressed (this partly explains why he did not complete the self-reports). Despite repeated requests this driver would not attend the 6 month follow-up interview and so is not included in the follow-up analyses.

Due to missing data the number of drivers included in the logistic regression analysis models varies. Data regarding pre-incident sickness absence could not be entered for 1 driver as he had only been driving for 1 week. Therefore all regression models where this variable is present include 75 of the 76 drivers. Data was not available for one driver on the COPE scale and for 15 drivers on the EPQ, therefore in regression analysis where COPE and EPQ variables were included the number of drivers is reduced to 60. In the final models where incident, victim and driver variables and self-report variables are combined, due to the missing data for one case on pre-incident sickness absence and for 16 cases on the COPE and EPQ the number of drivers is further reduced to 59.

7.0) RESULTS

The results of data analyses are presented as follows:

- Occurrence of incidents
- Attendance of interviews
- Inter-rater reliability
- 1 month diagnoses
- Analysis of variance
- Non-attenders
- PSE-9 analyses
- PTSD analyses
- Sickness absence analyses
- Social functioning
- Drivers above thresholds on self-reports
- Follow-up results
- Determinants of an adverse outcome

Occurrence of incidents

The number of drivers employed by London Underground in 1989 was 2556. For the 10 year period 1980-1989 there was an average of 90 incidents (Farmer et al., 1992). It follows that there is a 1 in 28 (3.6%) chance that any one driver will be involved in an incident each year.

Attendance of interviews

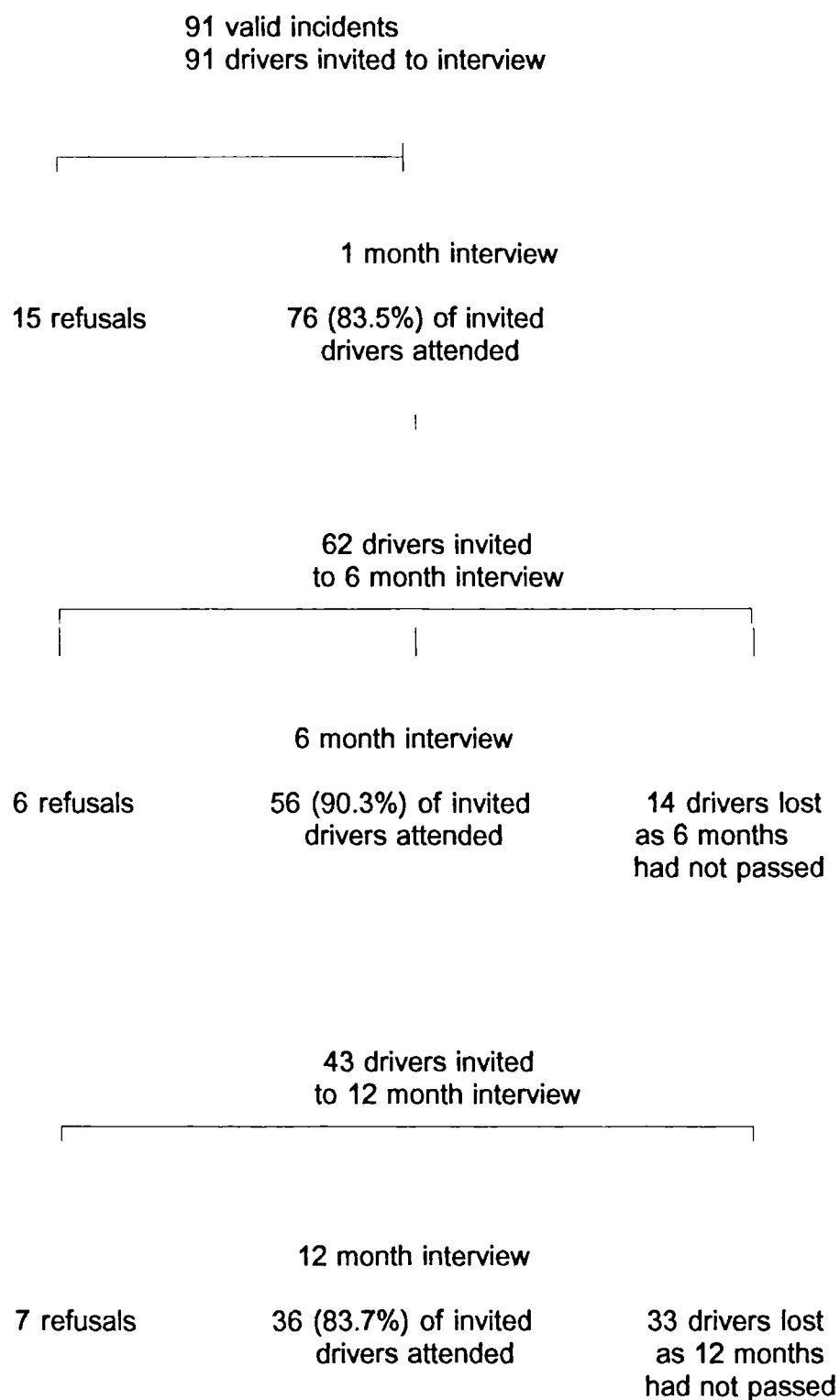
Between June 1990 and December 1991 there were 91 incidents that satisfied the inclusion criteria for this study. 76 (83.52%) of the drivers involved attended the 1 month interview.

Though all drivers were interviewed as close to one month after the incident as possible occasionally extended sickness, communication problems or annual leave caused the interview to take place later than one month. The initial interviews took place between one and four months following an incident (the median time between incident and interview being 5.0 weeks). The mean age of drivers at the time of the incident was 38.46 years (SD=11.28, range 20-63). 15 drivers refused, or were unable, to participate in the study.

Of the 76 drivers who attended the 1 month interview 62 were invited to attend a 6 month interview. 56 (90.32% of invited drivers, 73.68% of original 76 drivers) attended this interview, 6 refused. As less than 6 months had passed between the incident and the date when all interviews were terminated (January 1992) 14 of the 76 drivers were not invited to attend the 6 month interview (Figure 3).

43 of the 76 drivers who attended the 1 month interview were invited to attend a 12 month interview. 36 attended (83.72% of invited drivers, 47.37% of original 76 drivers), 7 refused. Again as less than 12 months had passed between the incident and the date when interviewing was terminated 33 of the 76 drivers were not invited to attend the 12 month interview. These 36 drivers attended all 3 interviews.

FIGURE 3 ATTENDANCE OF INTERVIEWS



A satisfactory response rate was achieved. In total (excluding the 10 pilot study interviews) 168 interviews were completed.

Inter-rater reliability

Inter-rater reliability was assessed to ensure that the author administered the Present State Examination and post-traumatic stress disorder checklist in a consistent and appropriate manner. The ratings of the author and another rater (also trained in the use of the PSE-9) who both jointly interviewed all drivers during the pilot study were assessed.

Reliability was assessed using the Kappa statistic (Fleiss, 1981). A kappa value of 1.0 indicates perfect agreement, a value of 0 indicates the level of agreement that would be gained by chance. The kappa results for this reliability analysis were: Present State Examination $k=0.863$ ($se(k)=0.037$); Post-Traumatic Stress Disorder Checklist $k=0.955$ ($se(k)=0.070$) [Tranah and Farmer, 1992]. These results indicate satisfactory inter-rater reliability.

Diagnoses

Of the 76 drivers interviewed 1 month after the incident 24 (31.58%) were classified as a case by the PSE-9. 13 (17.11%) drivers satisfied the DSM-III-R criteria for PTSD using the PTSD checklist interview. 12 of the 13 PTSD cases were classified as a case by the PSE-9. 51 (67.11%) drivers were not diagnosed on either index.

From the results of the 2 clinical interviews (PSE-9 and PTSD checklist interview) 3 sub-groups emerged from the sample of drivers:

Group A - drivers who satisfied the criteria for PTSD (all but one were classified as a case on the PSE-9).

Group B - drivers classified as a case only on the PSE-9 and did not satisfy the criteria for PTSD.

Group C - drivers not classified as a case by either interview.

The diagnostic classifications of those drivers who reached caseness on the PSE-9 are given in Table 2. Of the 76 drivers interviewed 1 month after the incident 12 had a tentative diagnosis of a neurotic depression, 2 of manic-depressive psychosis (depressed type), 9 of phobic state and one of schizophrenia, paranoid type. The predominant diagnosis for Group A (PTSD) drivers was neurotic depression and the predominant diagnosis for Group B (PSE-9 only) drivers was phobic state.

TABLE 2 DIAGNOSES OF DRIVERS INTERVIEWED ONE MONTH AFTER
THE INCIDENT

Caseness	Number (N=76)	Percent
PTSD cases	13*	17.11
PSE-9 diagnoses		
neurotic depression	8	
phobic state	2	
manic-depressive psychosis, depressed	1	
schizophrenic psychosis, paranoid type	1	
PSE-9 cases only	12	15.79
PSE-9 diagnoses		
phobic states	7	
neurotic depression	4	
manic-depressive psychosis, depressed	1	
Non-PTSD and non-PSE-9 cases	51	67.11

* 1 PTSD case was not a case on the PSE-9

Analysis of Variance

To investigate whether scores of the 3 diagnostic groups (PTSD, PSE-9 only and no diagnosis) were significantly different Kruskal-Wallis analysis of variance by ranks was completed. This analysis investigated whether or not the driver sample consisted of a number of significantly distinct groups. When the complete sample (n=76) were analyzed a significant difference within the sample of drivers was found on all indices except the Recent Difficulties/Events scale and the Psychoticism, Extraversion and Lie scales of the EPQ. Analysis of variance was then completed to identify significant differences between the groups : Group A was compared to Group B; Group A was compared to Group C and; Group B was compared to Group C (Table 3).

TABLE 3 KRUSKAL-WALLIS ANALYSIS OF VARIANCE BY RANKS
COMPARING MEAN SCORES OF THE 3 GROUPS AT 1 MONTH
(N=76)

KRUSKAL-WALLIS ANALYSIS OF VARIANCE BY RANKS						
	GROUPS A & B		GROUPS A & C		GROUPS B & C	
INTERVIEW OR MEASURE	H	sig. level	H	sig. level	H	sig. level
Present State Examination:						
PSE-9 total score	8.2	**	30.4	***	26.6	***
PSE-9 Index of Definition	0.2	NS	31.8	***	30.8	***
PTSD Interview:						
Section b - reexperience	6.8	**	18.7	***	3.0	NS
Section c - avoidance	17.3	***	32.9	***	9.09	**
Section d - increased arousal	10.1	**	17.6	***	0.5	NS
PTSD total score	17.0	***	27.6	***	5.3	*
Sickness absence	2.8	NS	23.1	***	6.1	*
General Health Questionnaire:						
Somatic subscale	1.1	NS	15.9	***	8.1	**
Anxiety/Insomnia subscale	0.8	NS	31.0	***	29.1	***
Social dysfunction subscale	2.2	NS	26.3	***	15.0	***
Severe depression subscale	0.4	NS	22.7	***	17.6	***
GHQ-28 total score	2.0	NS	26.3	***	23.5	***
Impact of Events Scale:						
Intrusion score	3.6	NS	17.9	***	9.2	**
Avoidance score	6.7	**	16.3	***	3.4	NS
Total score	7.2	**	18.7	***	6.3	*
Post-Traumatic Symptom Scale	1.3	NS	22.3	***	17.1	***
Recent Difficulties/Events	0.2	NS	0.08	NS	0.9	NS
Perceived Stress	0.0	NS	11.6	***	6.9	**
Eysenck Personality Questionnaire:						
Psychoticism	2.8	NS	0.0	NS	3.6	NS
Extroversion	2.2	NS	0.4	NS	4.4	NS
Neuroticism	1.4	NS	11.0	***	9.9	**
Lie	2.7	NS	1.30	NS	0.7	NS

Significance levels are for a two-tailed test. *** = $p < .001$, ** = $p < .01$, * = $p < .05$. NS = results not significant.

In comparisons between Groups A and B differences between the means of these two groups were significant on 7 of the 22 assessed measures. Analysis of variance between these two groups was not significant on: PSE-9 Index of Definition score; all 5 scores gained from the GHQ; intrusion score of the IES; PTSS-10; Recent Difficulties/Events; Perceived Stress scale; all scores gained from the EPQ; and the number of days sickness absence following the incident.

Analysis of variance results comparing Groups A and C were significant on nearly all measures. Indices for which no significant difference was found were: Recent Difficulties/Events; and the Psychoticism, Extraversion and Lie scales of the EPQ.

Comparisons between Group B and Group C drivers were significant on 15 of the 22 measures. Results were not significant for: Section b (reexperience) and Section d (increased arousal) of the PTSD interview; avoidance sub-scale of the IES; Recent Difficulties/Events; and the Psychoticism, Extraversion and Lie scales of the EPQ.

Non-attenders

15 drivers refused to attend an interview 1 month after the incident. The only data available which afforded an indication of the response of this group of drivers to the incident was the number of days sickness absence taken by these drivers following the incident. 11 (73.33%) of the 15 drivers took some time off sick following the incident, the mean number of working days sickness absence for all 15 drivers was 25.80 days (median=21.00, SD=24.56, range 0-68).

The number of days sickness absence for non-attenders and for the 3 diagnostic groups of drivers were compared using the Mann-Whitney test. Sickness absence for non-attenders was not significantly different from Group A drivers ($Z=-1.36$, $p=.18$) or Group B drivers ($Z=-.27$, $p=.79$) but was significantly different from Group C drivers ($Z=-2.33$, $p=.02$).

PSE-9 total scores

The mean scores and standard deviations of the above 3 groups on interviews and self-report scales are given in Table 4. The mean PSE-9 total score for all drivers ($n=76$) was 8.20 ($SD=8.10$, median=6.0, range=0-37).

TABLE 4 SUMMARY STATISTICS FOR INTERVIEWS AND SELF-REPORT SCHEDULES

SUMMARY STATISTICS FOR THREE DIAGNOSTIC GROUPS									
INTERVIEWS AND SELF-REPORTS	GROUP A			GROUP B			GROUP C		
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
PSE-9 total score	21.15	7.66	10-37	13.33	4.72	9-23	3.69	3.22	0-12
PSE-9 Index of Definition	5.31	0.78	4-7	5.17	0.41	5-6	2.61	1.03	1-4
PTSD reexperience	2.85	0.94	1-4	1.58	1.22	0-3	0.94	1.20	0-3
PTSD avoidance	3.54	0.81	3-5	1.50	0.94	0-3	0.65	0.75	0-3
PTSD arousal	4.08	1.44	2-6	2.00	1.26	0-4	1.71	1.36	0-5
PTSD total score	10.46	2.35	7-14	5.08	1.69	2-7	3.29	2.70	0-9
Sickness absence	42.23	32.94	12-119	23.67	26.58	0-97	8.00	10.48	0-44
GHQ sub-scale a	3.08	2.50	0-7	2.08	2.16	0-6	0.71	1.49	0-6
GHQ sub-scale b	4.42	1.96	2-7	3.67	1.50	1-6	0.55	1.17	0-5
GHQ sub-scale c	3.92	2.94	0-7	2.25	2.52	0-7	0.24	0.59	0-3
GHQ sub-scale d	1.00	1.54	0-5	0.58	0.94	0-3	0.02	0.14	0-1
GHQ total score	12.42	7.20	2-22	8.58	4.97	1-16	1.51	2.61	0-10
IES intrusion	20.92	6.32	11-29	15.58	7.26	2-31	8.04	8.07	0-27
IES avoidance	22.83	6.88	11-31	14.75	5.67	5-26	9.92	8.94	0-27
IES total score	43.75	11.56	22-55	30.33	9.92	14-46	17.96	15.92	0-54
PTSS-10	5.75	2.48	3-10	4.58	2.16	1-8	1.49	1.77	0-7
Recent difficulties/events	0.83	1.40	0-4	0.75	0.90	0-3	0.53	0.74	0-3
Perceived stress scale	24.42	6.11	10-33	25.42	9.43	12-42	18.10	5.38	3-29

* All standard deviations include Bessel's correction.

Distribution of PSE-9 total scores

In a previous paper (Farmer et al., 1992) the distribution of PSE-9 total scores of the drivers (n=43) was compared to those of a general population sample and a sample of psychiatric in-patients and out-patients. This analysis was repeated for the larger sample of drivers (n=76). Again the distribution of scores amongst the drivers was shifted to the right of the general population and to the left of the psychiatric population (Table 5). This data is also presented in graphic form in Figure 4). The Wilcoxon test for location was used to compare the driver PSE-9 total scores and hypothesised medians of the in- and out-Patient group and the General Populations samples. In both comparisons the distribution of the driver sample was significantly different (Driver sample/General population sample, $Z = 3.7$, $p < 0.001$; Driver/In- and out-patient sample $Z = 7.1$, $p < 0.001$).

TABLE 5 DISTRIBUTION OF PRESENT STATE EXAMINATION (PSE-9) TOTAL SCORES

Subjects	Total symptom score				
	0-5	6-10	11-15	16-20	≥21
Drivers	48.7	22.4	11.8	5.3	11.8
In- and out-patients*	2.0	7.0	9.0	21.0	60.0
General population sample*	73.0	14.0	7.0	3.0	2.0

* Data from Wing et al. (1978).

FIGURE 4 DISTRIBUTION OF PRESENT STATE EXAMINATION (PSE-9) TOTAL SCORES

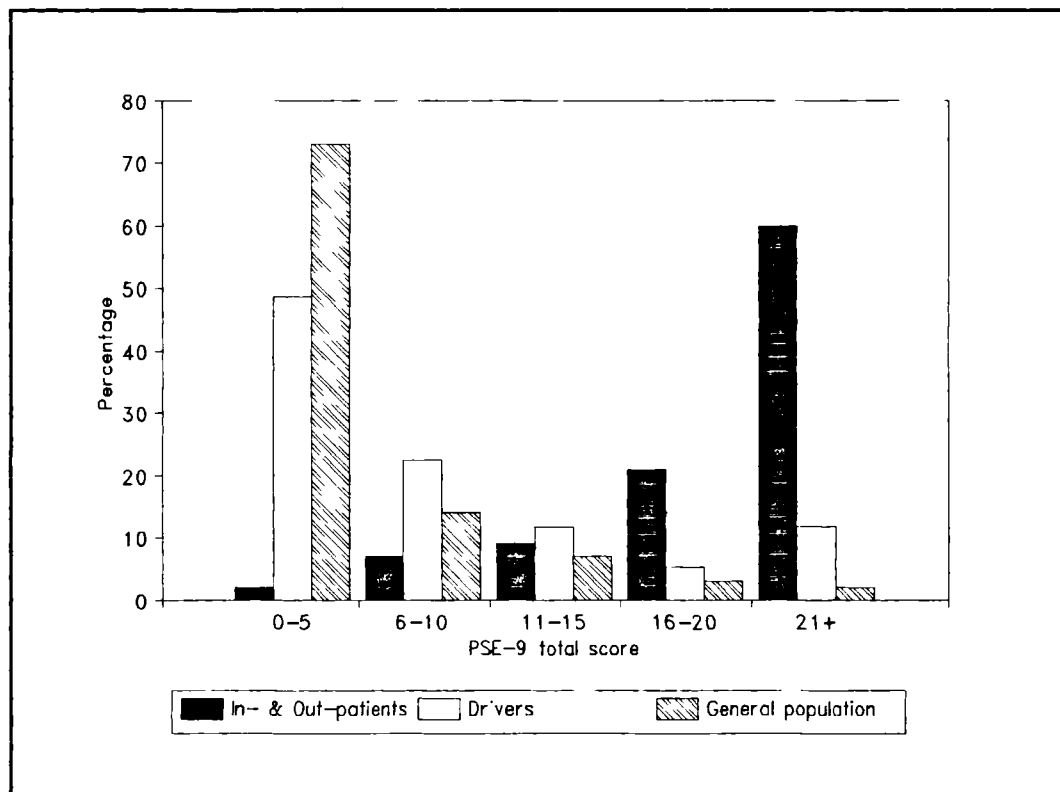


Table 6 shows the PSE-9 syndromes most commonly reported by drivers at 1 month (n=76) and syndromes reported by a community sample.

TABLE 6 PSE-9 SYNDROMES REPORTED AT 1 MONTH

PERCENTAGE REPORTING SYNDROME AT 1 MONTH						
	Community sample*		All drivers (n=76)	Group A drivers (n=13)	Group B drivers (n=12)	Group C drivers (n=51)
PSE-9 SYNDROMES						
Worrying etc.	36.9		59.21	100.0	100.0	39.2
Tension	28.8		44.74	92.3	75.0	25.5
Irritability	21.1		39.47	84.6	83.3	17.6
Situational anxiety	17.4		72.37	100.0	75.0	64.7
Social unease	16.3		31.6	61.5	100.0	7.8
Other symptoms of depression	11.3		32.9	84.6	33.3	19.6
Obsessional syndrome	10.8		13.2	38.5	16.7	5.9
Simple depression	10.0		38.2	92.3	75.0	15.7
Ideas of reference	9.3		10.5	30.8	25.0	2.0
Loss of interest and concentration	9.0		39.5	92.3	83.3	15.7
Lack of energy	7.8		26.3	84.6	41.7	7.8
General anxiety	6.9		9.2	15.4	41.7	-
Hypochondriasis	6.6		1.3	-	-	2.0
Special features of depression	6.6		10.5	53.8	-	2.0

* Prevalence estimates for community sample (Sturt, 1981)

The distribution of PSE-9 Index of Definition scores for the driver sample was compared to those for psychiatric patients and general population samples (Table 7).

TABLE 7 DISTRIBUTION OF PRESENT STATE EXAMINATION (PSE-9) INDEX
OF DEFINITION SCORES

	In-patients*	Out-patients*	Drivers	General population*
	% (n=118)	%(n=30)	% (n=76)	% (n=237)
ID 1 no symptoms	-	-	14.5	31.6
ID 2 nonspecific symptoms	-	-	9.2	33.8
ID 3 " "	-	10.0	31.6	9.7
ID 4 specific symptoms	0.8	6.7	13.2	12.7
ID 5 borderline disorders	11.0	20.0	23.7	9.7
ID 6 definite disorders	28.8	43.3	6.6	2.5
ID 7 " "	28.0	10.0	1.3	-
ID 8 " "	31.4	10.0	-	-
ID 5-8	99.2	83.3	31.6	12.2

* Data from Wing (1976), general population sample were female.

PTSD symptom scores

For drivers who satisfied the DSM-III-R criteria for PTSD (Group A) the mean number of PTSD symptoms reported was 10.46 (SD=2.35, range=7-14) [Table 4]; the mean for non-PTSD cases (Groups B and C)[n=63] was 3.63 (SD=2.61).

PTSD score distribution

The distribution of PTSD symptoms reported by the 3 groups was little changed from that reported earlier (Farmer et al., 1992). There was little difference between the proportions of each group giving a positive response to items C3, C7, D4 and D6 of the PTSD criteria. The greatest differences in the proportion with a positive response were in items C1, C2, C4, D1, and D2 (Table 8).

For 2 symptoms the proportions within each group were not as marked as that seen in Farmer et al. (1992). In the earlier paper there was little difference in the proportions of each group reporting symptom C6, reanalysis (n=76) found the range of proportions to be more marked. Also in the earlier paper the difference in the proportions of drivers within the 3 groups reporting symptom D5 was marked this was not now the case.

TABLE 8 DISTRIBUTION OF PTSD SYMPTOMS

		All drivers (n=76)		Group A		Group B		Group C	
	DSM-III-R CRITERIA FOR PTSD	n	%	n	%	n	%	n	%
B1	Recurrent and intrusive distressing recollections of the event	30	39.47	11	84.62	7	58.33	12	23.53
B2	Recurrent distressing dreams of the event	11	14.47	7	53.85	1	8.33	3	5.88
B3	Suddenly acting or feeling as if the traumatic event was recurring	36	47.37	11	84.62	6	50.00	19	37.25
B4	Intense psychological distress at exposure to events that symbolize or resemble an aspect of the traumatic event	27	35.53	8	61.54	5	41.67	14	27.45
C1	Efforts to avoid thoughts and feelings associated with the trauma	41	53.95	13	100.00	7	58.33	21	41.18
C2	Efforts to avoid activities or situations that arouse recollections of the trauma	22	28.95	11	84.62	6	50.00	5	9.80
C3	Inability to recall an important aspect of the trauma	0	0.00	0	0.00	0	0.00	0	0.00
C4	Markedly diminished interest in significant activities	15	19.74	11	84.62	3	25.00	1	1.96
C5	Feeling of detachment or estrangement from others	9	11.84	6	46.15	0	0.00	3	5.88
C6	Restricted range of affect	9	11.84	5	38.46	1	8.33	3	5.88
C7	Sense of foreshortened future	1	1.32	0	0.00	1	8.33	0	0.00
D1	Difficulty in staying or falling asleep	22	28.95	12	92.31	4	33.33	6	11.76
D2	Irritability or outbursts of anger	22	28.95	10	76.92	4	33.33	8	15.69
D3	Difficulty in concentrating	12	15.79	6	46.15	2	16.67	4	7.84
D4	Hypervigilance	43	56.58	9	69.23	8	66.67	26	50.98
D5	Exaggerated startle response	30	39.47	9	69.23	4	33.33	17	33.33
D6	Physiologic reactivity on exposure to events that resemble an aspect of the traumatic event	35	46.05	7	53.85	2	16.67	26	50.98

Sickness absence

Sickness absence for drivers in different categories is shown in Table 4. 49 (64.47%) of the 76 drivers took some time off sick following the incident (mean number of working days for all drivers=16.33, median=10.00, SD=22.86).

All Group A drivers took some time off work following the incident (mean=42.23 days; SD=32.94; median=28.00; range 12-119). Nine (75.0%) of the 12 non-PTSD cases who were classified as "cases" by PSE-9 took some time off work (mean=23.67 days; SD=26.58; median=19.00; range 0-97). 27 (52.94%) of the 51 non-PTSD and non-PSE-9 cases took sick leave (mean=8.00 days; SD=10.48; median=3.00; range 0-44).

Social Functioning

Social functioning of the drivers was assessed using the Social Adjustment Scale (SAS-M). At one month all SAS-M sub-scale were significantly correlated (Spearman rank order correlations) with the PSE-9 total score and the PTSD interview total scores. 3 of the SAS-M sub-scales were significantly correlated with sickness absence following the incident: Work outside the home ($R=.61$, $p<.001$); Marital relationship ($R=.26$, $p<.05$); and the SAS-M overall score ($R=.28$, $p<.05$).

For the 56 drivers seen at both 1 and 6 months Wilcoxon matched pairs test analysis was completed on the reported SAS-M scores at 1 and 6 months. A significant difference was observed for 3 of the SAS-M sub-scales: Work outside the home

(n=54, T=128.5, $p<.001$); Social and leisure (n=56, T=360.0, $p<.05$); and the SAS-M overall score (n=56, T=471.0, $p<.05$).

Drivers above thresholds on self-report schedules

One Group A driver did not complete the self-report questionnaires so the following analyses include only 12 of the Group A drivers. 10 (83.33%) drivers scored above the threshold (≥ 5) on the GHQ-28. Six (50.0%) were above the cut-off for the PTSS-10 (≥ 6), nine (75.0%) scored above the cut-off for the IES total score (≥ 40), six (50.0%) scored above the IES intrusion scale cut-off and nine (75.0%) scored above the IES avoidance sub-scale cut-off (for both sub-scales cut-off ≥ 20).

Of the 12 Group B drivers (being a case only on the PSE-9) 10 (83.33%) scored "caseness" on the GHQ-28, three (25.0%) drivers were above the cut-off for the PTSS-10, two (16.67%) scored above the threshold for the IES total score, two (16.67%) scored above the IES intrusion scale cut-off and two (16.67%) scored above the IES avoidance sub-scale cut-off.

Of the Group C (non-case drivers) 6 (11.76%) scored "caseness" on the GHQ-28, one (2.00%) driver was above the cut-off for the PTSS-10, seven (13.73%) scored above the cut-off for the IES total score, six (11.76%) scored above the IES intrusion scale cut-off and nine (17.65%) scored above the IES avoidance sub-scale cut-off.

Table 9 shows the sensitivity (percentage of true cases detected by the test) and specificity (percentage of true cases excluded by the test) for the psychometric

self-report tests used. The GHQ-28 sub-scale 'b' (cut-off ≥ 2) is also included in this table due to its suggested ability to detect PTSD (Ramsay, 1990).

TABLE 9 SENSITIVITY AND SPECIFICITY FOR SELF-REPORTS USING RECOMMENDED CUT-OFFS (N=75)

	Present State Examination		Post-Traumatic Stress Disorder	
	sensitivity	specificity	sensitivity	specificity
General Health Questionnaire				
Total score	79.2	86.5	83.3	77.8
Sub-scale b	NA	NA	100.0	71.4
Impact of Events Scale				
Total score	NA	NA	75.0	87.3
Intrusion sub-scale	NA	NA	50.0	87.3
Avoidance sub-scale	NA	NA	75.0	82.5
Post-Traumatic Stress Scale	39.1	98.1	50.0	93.4

NA - analysis not completed as self-report not designed to detect psychiatric morbidity in general.

Follow-up results

56 of the 76 drivers were again interviewed 6 months after the incident. At this time only 2 drivers were still cases. One of these drivers at 1 month had been a case on the PTSD interview and on the PSE-9 (neurotic depression). At 6 months he was solely a case on the PSE-9, again the tentative diagnosis was neurotic depression.

The second driver at 1 month had been a case on the PSE-9 only (neurotic depression). At 6 months this driver was again a case on the PSE-9 but the tentative diagnosis was phobic state. At 6 months there were no cases of delayed onset of PTSD and the two diagnoses present were felt to be continuations of the initial reactions.

Regarding the previous morbidity of the 56 drivers seen at 6 months: 7 (12.50%) were from Group A; 10 (17.86%) from Group B; and 39 (69.64%) from Group C; and so represented a reasonable cross section of the sample of 76 drivers seen at 1 month.

A Kruskal-Wallis analysis of variance was again completed to investigate whether those drivers seen both at 1 and 6 months reflected the same pattern of results at 1 month (in respect of their membership of the 3 diagnostic groups) as that found in the larger sample of 76 drivers at 1 month.

A small number of differences were found. In the sample of 56 drivers at 1 month in the Group A and Group B comparisons only 1 difference was found, in the smaller sample (n=56) comparison of mean scores for the Psychoticism scale was significant, it was not in the sample of 76 drivers.

There were no differences in Groups A and Group C comparisons when analysis of variance results of those drivers seen both at 1 and 6 months were compared with the same results for the sample of 76 drivers at 1 month.

Comparisons between Groups B and C for the 56 drivers seen at 1 month found significant differences on Section b (reexperience) of the PTSD interview, the avoidance sub-scale of the IES interview and the Psychoticism and Extraversion scales of the EPQ. The same analysis for the 76 drivers had found no significant difference between Groups B and C on these scales. Analysis of variance regarding the number of days off sick for Groups B and C was not found to be significant in the sample of 56 drivers whereas it was significant in the sample of 76 drivers.

Analysis of variance was finally carried out for the scores of the 56 drivers at 6 months to see if a significant difference between the 3 groups remained 6 months after the incident. At 6 months, analysis of variance including all 3 groups (n=56), still found a significant difference on 16 of the 21 measures included in this stage of the analysis (number of days off sick not included). No significant difference was found for: Section c (avoidance) of the PTSD interview; Recent Difficulties/Events; and the Psychoticism, Extraversion and Lie scales of the EPQ.

TABLE 10 KRUSKAL-WALLIS ANALYSIS OF VARIANCE BY RANKS ON
SCORES AT SIX MONTHS FOR THOSE DRIVERS WHO ATTENDED
BOTH 1 AND 6 MONTH INTERVIEWS (n=56)

KRUSKAL-WALLIS ANALYSIS OF VARIANCE BY RANKS						
	Groups A & B		Groups A & C		Groups B & C	
INTERVIEW OR MEASURE	H	sig. level	H	sig. level	H	sig. level
Present State Examination:						
PSE-9 total score	0.16	NS	3.59	0.058	5.84	*
PSE-9 Index of Definition	0.20	NS	2.12	NS	6.25	*
PTSD Interview:						
Section b - reexperience	0.01	NS	2.27	NS	3.87	*
Section c - avoidance	0.03	NS	2.55	NS	3.01	NS
Section d - increased arousal	0.06	NS	1.63	NS	4.14	*
PTSD total score	0.16	NS	3.10	0.078	5.87	*
General Health Questionnaire:						
Somatic subscale	0.05	NS	12.28	***	16.78	***
Anxiety/Insomnia subscale	3.71	NS	0.74	NS	17.51	***
Social dysfunction subscale	1.60	NS	2.43	NS	10.88	***
Severe depression subscale	0.16	NS	11.39	***	7.96	**
GHQ-28 total score	0.71	NS	12.70	***	20.31	***
Impact of Events Scale:						
Intrusion score	0.00	NS	8.27	**	10.16	***
Avoidance score	0.04	NS	8.46	**	7.86	**
IES total score	0.00	NS	9.67	**	9.81	**
Post-Traumatic Symptom Scale	1.72	NS	3.30	0.069	14.89	**
Recent Difficulties/Events	0.47	NS	0.08	NS	0.52	NS
Perceived Stress	0.54	NS	1.11	NS	4.35	*
Eysenck Personality Questionnaire						
Psychoticism	0.42	NS	0.25	NS	2.55	NS
Extroversion	0.15	NS	0.26	NS	1.35	NS
Neuroticism	0.06	NS	2.66	NS	4.43	*
Lie	0.02	NS	0.00	NS	0.00	NS

At 6 months analysis of variance results comparing Groups A and B were not significant on any scale. Comparisons between Groups A and C were significant for: Somatic and Severe depression sub-scales; total score of the GHQ-28; and all 3 IES scores. Results were close to the level of significance ($p < .05$) for the PSE-9 total score, the PTSD total score and the PTSS-10 (all analysis of variance results are two-tailed).

Analysis of variance results comparing Groups B and C were significant on nearly all scales, except: Section c (avoidance) of the PTSD interview; Recent Difficulties/Events; and Psychoticism, Extraversion and Lie scales of the EPQ.

Examination of the mean scores for the 3 diagnostic groups for those drivers seen both at 1 and 6 months ($n=56$), found that at 1 month Group A drivers scored highest on all symptom measures (all interviews and all scales/sub-scales except the Perceived Stress scale, Recent Difficulties/Events scale and Psychoticism and Neuroticism scales of the EPQ) [Table 11].

However, at 6 months Group B drivers had the highest mean score on 10 of the 15 symptom measures (not including the Recent Difficulties/Events scale, the Perceived Stress Scale and the EPQ). The 5 exceptions were the 3 scores derived from the IES, the Severe Depression scale of the GHQ on which Group A had a higher mean score and on Section b (reexperience) of the PTSD interview where the mean score for Groups A and B were equal.

TABLE 11 MEAN SCORES (STANDARD DEVIATION) FOR GROUPS A, B AND C AT 1 AND 6 MONTHS (N=56)

	1 MONTH			6 MONTHS		
INTERVIEWS AND SCHEDULES	Group A (n=7)	Group B (n=10)	Group C (n=39)	Group A (n=7)	Group B (n=10)	Group C (n=39)
Present State Examination						
PSE-9 total score	20.9 (6.7)	13.6 (5.2)	3.6 (3.2)	4.4 (4.3)	7.3 (7.8)	1.6 (2.1)
PSE-9 Index of Definition	5.3 (0.8)	5.2 (0.4)	2.6 (1.0)	2.7 (1.6)	3.0 (1.4)	1.9 (0.9)
PTSD Interview						
Section b-reexperience	2.9 (1.0)	1.6 (1.3)	0.9 (1.1)	1.0 (1.3)	1.0 (1.0)	0.4 (0.8)
Section c-avoidance	3.4 (0.9)	1.4 (1.0)	0.5 (0.8)	0.4 (0.6)	0.5 (0.8)	0.2 (0.5)
Section d-increased arousal	4.0 (1.5)	2.0 (1.4)	1.8 (1.4)	2.0 (1.9)	2.3 (1.9)	1.2 (1.2)
PTSD total score	10.3 (2.6)	5.0 (1.9)	3.2 (2.6)	3.4 (2.9)	3.8 (2.6)	1.8 (1.9)
General Health Questionnaire						
Somatic subscale	2.9 (2.6)	1.8 (1.9)	0.6 (1.3)	1.0 (1.7)	1.1 (1.7)	0.03 (0.2)
Anxiety/Insomnia subscale	3.7 (1.7)	3.8 (1.6)	0.4 (1.1)	0.1 (0.4)	1.6 (2.2)	0.1 (0.4)
Social Dysfunction subscale	3.0 (2.7)	2.0 (2.7)	0.2 (0.6)	0.3 (0.5)	1.9 (2.5)	0.2 (0.8)
Severe Depression subscale	1.0 (2.0)	0.7 (1.0)	0.0 (0.0)	1.0 (1.9)	0.7 (2.0)	0.0 (0.0)
GHQ-28 total score	10.6 (6.6)	8.1 (5.0)	1.2 (2.3)	2.4 (2.7)	5.3 (7.3)	0.3 (0.9)
Impact of Events Scale						
Intrusion score	20.7 (6.9)	15.6 (8.1)	7.9 (7.6)	8.6 (8.6)	8.0 (6.2)	2.9 (4.9)
Avoidance score	22.6 (6.9)	14.9 (6.3)	9.5 (9.0)	14.4 (10.4)	12.2 (7.4)	4.8 (6.9)
IES total score	43.3 (11.2)	30.5 (11.1)	17.4 (15.7)	23.0 (17.1)	20.2 (12.0)	7.6 (10.7)
Post Traumatic Symptom Scale	5.4 (2.6)	4.7 (2.4)	1.4 (1.5)	2.0 (1.8)	3.1 (1.6)	0.9 (1.3)
Recent Difficulties/Events	0.7 (1.2)	0.8 (1.0)	0.5 (0.8)	1.0 (1.7)	0.5 (1.0)	0.6 (0.9)
Perceived Stress Scale	22.1 (6.8)	26.4 (9.8)	18.5 (5.1)	19.0 (7.3)	23.3 (11.2)	16.3 (5.9)
Eysenck Personality Questionnaire						
Psychoticism	1.5 (1.5)	4.7 (2.2)	2.0 (1.6)	3.0 (3.1)	3.8 (2.9)	2.4 (2.1)
Extroversion	11.8 (6.7)	8.7 (5.6)	13.6 (4.7)	12.3 (5.4)	11.0 (6.2)	13.4 (4.6)
Neuroticism	12.5 (2.8)	14.5 (4.5)	5.9 (3.8)	8.6 (4.7)	10.4 (7.1)	6.0 (5.1)
Lie	10.5 (7.8)	8.3 (4.0)	10.2 (5.1)	9.1 (5.0)	9.5 (4.7)	9.9 (5.5)

At 6 months a number of drivers within each group scored above the cut-offs on 3 of the self-reports. 2 Group A drivers were "cases" according to the GHQ-28 and 1 driver scored above the cut-off on the 3 IES scores. 4 Group B drivers scored above the cut-off for the GHQ-28, 2 scored above the cut-off on the avoidance sub-scale of the IES and 1 on the PTSS-10. 1 Group C driver scored above the cut-offs on the GHQ-28 and on the 3 IES scores.

Having shown that analysis of variance between groups was significant the Wilcoxon matched pairs test was used to compare the 1 month and 6 month scores for all drivers and for each of the 3 groups separately on all scales (Table 12). The scores for all drivers at 1 month showed a significant decrease at 6 months on all scales except: Severe Depression sub-scales of the General Health Questionnaire; Recent Difficulties/Events scale and; the Psychoticism, Extraversion and Lie scales of the EPQ.

TABLE 12 WILCOXON MATCHED PAIRS TEST RESULTS ON 1 MONTH AND
6 MONTH SCORES (n=56)

Interviews and Scales	All drivers		Group A		Group B		Group C	
	T	Sig. level	T	Sig. level	T	Sig. level	T	sig. level
Present State Examination:								
PSE-9 total score	113.00	***	0.00	*	7.00	*	67.50	***
PSE-9 Index of Definition	33.00	***	0.00	*	0.00	**	26.50	***
PTSD Interview:								
Section b - reexperience	121.00	***	0.00	*	14.00	NS	40.50	*
Section c - avoidance	10.50	***	0.00	*	0.00	*	8.00	**
Section d - increased arousal	166.00	**	2.00	*	14.50	NS	35.00	**
PTSD total score	97.50	***	0.00	*	19.50	NS	21.50	***
General Health Questionnaire:								
Somatic subscale	37.00	**	4.50	NS	8.50	NS	1.50	*
Anxiety/Insomnia subscale	35.00	***	0.00	*	7.50	0.08	8.00	0.09
Social Dysfunction subscale	61.00	0.06	0.00	*	10.00	NS	17.00	NS
Severe Depression subscale	15.00	NS	4.00	NS	4.00	NS	-	-
GHQ-28 total score	73.00	***	0.00	*	14.50	NS	18.50	*
Impact of Events Scale:								
Intrusion score	36.00	***	0.00	*	4.00	*	18.00	***
Avoidance score	130.00	***	3.00	0.06	15.00	NS	43.00	***
IES total score	64.00	***	1.00	*	6.50	*	25.50	***
Post-Traumatic Symptom Scale	103.50	***	0.00	*	2.00	*	70.50	*
Recent Difficulties/Events	145.50	NS	-	-	7.50	NS	64.00	NS
Perceived Stress Scale	349.50	**	5.50	NS	9.00	NS	190.00	*
Eysenck Personality Questionnaire:								
Psychoticism	206.00	NS	0.00	NS	3.50	NS	115.50	NS
Extroversion	231.00	NS	2.00	NS	3.00	NS	151.00	NS
Neuroticism	134.50	**	-	-	1.50	NS	102.00	0.06
Lie	312.50	NS	0.00	NS	10.00	NS	197.50	NS

Significance levels are for a two-tailed test: ***=p<.001; **=p<.01; *=p<.05
NS=results not significant even at one-tailed test critical values.

Group A drivers showed a significant decrease in scores at 6 months on all scales except: Somatic and Severe Depression sub-scales of the General Health Questionnaire; the Perceived Stress Scale; and the Psychoticism, Extraversion and Lie scales of the EPQ. For 2 scales, the Recent Difficulties/Events scale and the Neuroticism scale of the EPQ calculation of the T value and significance level was not possible due to the number of differences being less than 3. However given this finding one can reasonably assume that no significant decrease in scores at 6 months occurred.

Analysis of the 1 and 6 month scores of Group B drivers found a significant decrease in scores at 6 months on only 7 scales. Scales on which a significant decrease in scores at 6 months did not occur were as follows: General Health Questionnaire - Somatic sub-scale, Social Dysfunction sub-scale, Severe Depression sub-scale and total score; Section b (reexperience), Section d (increased arousal) and the total score of the PTSD interview; the Avoidance sub-scale of the IES; the Recent Difficulties/Events scale, the Perceived Stress scale; and all EPQ scales.

Group C drivers demonstrated a significant decrease in scores on all scales except the Social Dysfunction sub-scale of the GHQ, the Recent Difficulties/Events scale and all EPQ scales. The two-tailed result for the Neuroticism scale did not reach significance. This result is given in Table 12 merely to explain the significant result found for all drivers on this scale at 6 months. On 1 scale, the Severe Depression sub-scale of the GHQ, calculation of the T value and significance was not possible again due to the number of differences being less than 3 (all 39 drivers scored zero on this sub-scale both at 1 and 6 months).

At 12 months 2 drivers were classified as cases on the PSE. The mean scores and standard deviations on all symptom measures for those drivers seen at 1, 6 and 12 months (n=36) are given in Table 13.

TABLE 13 MEAN SCORES FOR ALL DRIVERS SEEN AT 1, 6 AND 12 MONTHS
(N=36)

Interviews and self-reports	1 month		6 month		12 month	
	mean	sd	mean	sd	mean	sd
Present State Examination:						
PSE-9 cases (%)	0.44	0.51	0.06	0.24	0.06	0.24
PSE-9 total score	10.08	8.07	3.75	5.16	3.28	4.31
Post-traumatic Stress Disorder Interview:						
PTSD cases (%)	0.17	0.38	0.00	0.00	0.00	0.00
Section b - reexperience	1.47	1.36	0.56	0.92	0.42	0.78
Section c - avoidance	1.25	1.34	0.31	0.58	0.17	0.62
Section d - arousal symptoms	1.97	1.62	1.58	1.54	1.33	1.21
PTSD total score	4.69	3.62	2.44	2.37	1.92	1.85
General Health Questionnaire:						
Somatic subscale	1.42	1.88	0.39	1.01	0.36	0.97
Anxiety & insomnia subscale	1.97	2.08	0.53	1.32	0.28	0.83
Social dysfunction subscale	1.31	2.10	0.78	1.65	0.47	1.22
Depression subscale	0.36	1.00	0.39	1.29	0.14	0.49
GHQ-28 total score	5.06	5.69	2.08	4.37	1.25	2.71
Impact of Events Scale:						
Intrusion symptoms	11.17	9.54	5.39	6.81	3.75	5.91
Avoidance symptoms	12.03	10.15	8.03	8.95	5.94	8.55
IES total score	23.19	18.66	13.42	14.80	9.69	13.55
Post-Traumatic Symptom Score	3.11	2.65	1.58	1.69	1.72	2.41

Determinants of an adverse outcome

The numbers and percentage of drivers who fell into each of the incident, victim and driver categories are given in Appendices 6 and 7. Chi-square analysis was completed on all incident, victim and driver variables to decide which variables were to be used in the logistic regression models. Results of the chi-square analysis against the 3 outcome variables (PTSD caseness, PSE-9 caseness and sickness absence ≥ 21 days) are given in Tables 14a and 14b.

TABLE 14a CHI-SQUARE ANALYSIS OF INCIDENT AND VICTIM VARIABLES

SIGNIFICANCE OF CHI-SQUARE ANALYSIS (CHI-SQUARE VALUE)			
INCIDENT AND VICTIM VARIABLES	PSE-9 CASE	PTSD CASE	SICKNESS ABSENCE ≥ 21 DAYS
Victim jumped in front of train	ns	ns	ns
Victim prostrate on track in station	na	na	na
Victim confronted as walking on track	na	na	na
Victim not seen prior to contact	na	na	na
Victim died	ns	ns	ns
Body of victim mutilated	.031 (4.54)	ns	.014 (6.01)
Body of victim not mutilated	.031 (4.54)	ns	.014 (6.01)
Victim seen after incident, mutilated	ns	na	ns
Victim seen after incident, not mutilated	.031 (4.54)	na	ns
Victim not seen after incident	ns	ns	ns
Victim seen after incident, dead and mutilated	na	na	na
Victim seen after incident, alive and mutilated	na	na	na
Victim seen after incident, dead and not mutilated	na	na	na
Victim seen after incident, alive and not mutilated	ns	na	ns
Victim female	ns	ns	ns
Age of victim:			
17-28 years	ns	na	ns
29-40 years	ns	na	ns
41-86 years	ns	ns	ns

na = chi-square not applicable as less than 5 in one cell of 2x2 table, ns = not significant

TABLE 14b CHI-SQUARE ANALYSIS OF DRIVER VARIABLES

SIGNIFICANCE OF CHI-SQUARE ANALYSIS (CHI-SQUARE VALUE)			
DRIVER VARIABLES	PSE-9 CASE	PTSD CASE	SICKNESS ABSENCE ≥21 DAYS
Driver had prior psychiatric history	na	na	na
Driver had experienced previous incident/s	ns	na	ns
Average pre-incident annual sickness absence ≥20 days	ns	.006 (7.74)	.005 (8.12)
United Kingdom ethnic group	ns	.035 (4.37)	.047 (3.85)
Non-United Kingdom ethnic group	ns	.035 (4.37)	.047 (3.85)
Asian ethnic group	ns	.039 (4.18)	ns
Afro/Caribbean ethnic group	na	na	ns
Irish ethnic group	na	na	na
Driver married	ns	ns	ns
Driver not married	ns	ns	ns
Driver cohabiting	ns	ns	ns
Driver single	ns	na	ns
Driver separated	na	na	na
Driver divorced	na	na	na
Driver Protestant	na	na	ns
Driver Catholic	na	na	na
Driver Muslim	na	na	na
Driver Hindu	na	na	na
No religious conviction	ns	ns	ns
Age of driver:			
20-31 years	ns	ns	ns
32-44 years	ns	na	na
45-63 years	ns	na	ns

na = chi-square not applicable as less than 5 in one cell of 2x2 table; ns = not significant

In a few cases more than one variable from same category was significant (e.g. both "body mutilated" and "body not mutilated" were significant, though in different directions). In such cases the risk rather than the protective variable was chosen as the primary interest of this study was to identify which factors contributed to psychiatric morbidity. In such cases it was also the minority group that was usually chosen as these were of more interest (e.g. analysis of ethnic group data found both UK and non-UK to be significant).

To investigate whether there was a high correlation between the sub-scales of the 3 self-reports a correlation matrix for each was produced. There was significant intercorrelation between the sub-scales of one of the self-report scales. All 7 sub-scales of the Social Provisions Scale (SPS) were intercorrelated with at least 5 other scales. It was decided to use the tangible support sub-scale only as this scale was significantly intercorrelated with all other SPS sub-scales and so afforded a good overall measure of social support.

In the case of the EPQ this problem was avoided as only the neuroticism scale was significant in chi-square and/or single logistic regression analysis. The same was true for the sub-scales of the COPE scale. Only 3 of the 13 sub-scales were significant in chi-square analysis and there was no significant intercorrelations between these 3 scales.

A final list of variables was arrived at, these variables were included in all initial analyses.

Incident, victim and driver variables:

Driver had a history of psychiatric care;

Driver had experienced previous incidents;

Driver was of non-UK ethnic group;

Body of victim was mutilated;

Driver's average annual sickness absence - during the 5 years prior to the incident ≥ 20 days (number of working days).

Psychosocial variables:

Focus and venting of emotions (sub-scale of the COPE);

Mental disengagement (sub-scale of the COPE);

Behavioural disengagement (sub-scale of the COPE);

Tangible social support (sub-scale of the Social Provisions Scale);

Neuroticism scale (sub-scale of the Eysenck Personality Questionnaire).

3 other variables were also significant in chi-square analyses but were not entered into logistic regression analyses: driver of UK ethnic group; driver of Asian ethnic group; body of victim not mutilated; victim seen after the incident and was not mutilated.

As both driver of UK ethnic group and driver of non-UK ethnic group were both significant it was decided to use driver of non-UK ethnic group as this was the smaller of the 2 groups (non-UK ethnic group n=25) and because it was the risk variable. Driver of UK ethnic group was found from the simple logistic regression analysis to be a protective variable (parameter estimate = -1.72277, relative risk = .1786). Driver of Asian ethnic group was also omitted from the logistic regression analysis as this group was contained within the non-UK group and was less significant than the non-UK ethnic group in chi-square analysis.

Body of victim not mutilated was omitted from the logistic regression analysis as this was the protective rather than the risk factor - body of victim mutilated (parameter estimate for body of victim not mutilated in simple logistic regression against PSE-9

= -1.08261, relative risk = .3387; parameter estimate for simple logistic regression against sickness absence ≥ 21 days = -1.32176, relative risk = .2666). Victim seen after the incident, not mutilated was also omitted as this was likewise the opposite to body of victim was mutilated and was a protective rather than a risk factor (parameter estimate = -1.08261, relative risk = .3387).

When all incident, victim and driver variables were used in logistic regression analysis with the criterion variable PSE-9 caseness, 2 variables were included in the final model (Table 15), body of victim was mutilated and driver of non-UK ethnic group. Both variables had a positive coefficient meaning that for a given level of other variables their presence increases the risk of psychiatric caseness as assessed by the PSE-9.

TABLE 15 MULTIPLE LOGISTIC REGRESSION MODEL FOR CRITERION
VARIABLE PSE-9 CASENESS AND INCIDENT, VICTIM AND DRIVER
INDEPENDENT VARIABLES (N=75)

Prognostic variable	Estimated logistic coefficient	Standard Error	Significance	Estimated relative risk	95% confidence limits for relative risk
Body of Victim Mutilated	1.0427	0.534	ns	2.84	1.00-8.09
Driver in Non-UK Ethnic Group	1.0866	0.541	*	2.96	1.03-8.56
Intercept	-1.6988				

*significance level $p < .05$

Though not significant, body of victim mutilated ($p < .051$) does make a significant contribution to this model as measured by the LR test and is therefore also included in the final model.

The predicted log odds for an incident where the body of the victim was mutilated and the driver was of non-UK ethnic group was:

$$= -1.6988 + 1.0427(1) + 1.0866(1) = 0.4305$$

the estimated relative risk for this model being

$$\exp(0.4305) = 1.5380$$

Therefore drivers who are involved in incidents as described above are 1½ times more likely to be classified as a case on the PSE-9 than those drivers who were involved in incidents where the body of the victim was not mutilated and the driver was of the UK ethnic group.

After logistic regression analysis for the incident, victim and driver variables and the criterion variable PTSD caseness, 2 variables were in the final model (Table 16): driver of non-UK ethnic group and pre-incident average annual sickness absence. Both variables had a positive coefficient, indicating that the presence of these variables increases the risk of PTSD caseness.

TABLE 16 MULTIPLE LOGISTIC REGRESSION MODEL FOR CRITERION VARIABLE PTSD CASENESS AND INCIDENT, VICTIM AND DRIVER INDEPENDENT VARIABLES (N=75)

Prognostic variable	Estimated logistic coefficient	Standard Error	Significance	Estimated relative risk	95% confidence limits for relative risk
Driver In Non-UK Ethnic Group	1.5293	0.692	*	4.61	1.19-17.91
Pre-Incident Sickness Absence ≥20 days	1.8999	0.692	**	6.69	1.72-25.93
Intercept	-2.9621				

*significant levels $P < .05$; **significance level $p < .01$

Where drivers pre-incident sickness absence was ≥ 20 days and the driver was in the non-UK ethnic group the model was

$$= -2.9621 + 1.5293(1) + 1.8999(1) = 0.4671$$

the estimated relative risk for this model being

$$\exp(0.4671) = 1.5954$$

Therefore where both these variables are present the driver is 1½ times more likely to be a PTSD case.

For the criterion variable post-incident sickness absence 2 variables were included in this final model (Table 17). Driver of non-UK ethnic group and pre-incident average annual sickness absence ≥20 days. Both variables had a positive coefficient.

TABLE 17 MULTIPLE LOGISTIC REGRESSION MODEL FOR CRITERION VARIABLE POST-INCIDENT SICKNESS ABSENCE ≥21 DAYS AND INCIDENT, VICTIM AND DRIVER INDEPENDENT VARIABLES (N=75)

Prognostic variable	Estimated logistic coefficient	Standard Error	Significance	Estimated relative risk	95% confidence limits for relative risk
Body of Victim Mutilated	1.0991	0.603	ns	3.00	0.92-9.79
Driver in Non-UK Ethnic Group	1.1492	0.599	ns	3.16	0.98-10.21
Pre-Incident Sickness Absence ≥20 days	1.5482	0.613	*	4.70	1.41-15.64
Intercept	-2.4906				

*significance level $p < .05$

Where both variables were present the predicted log odds was:

$$= -1.9644 + 1.2345(1) + 1.6973(1) = 0.9674$$

the estimated relative risk for this model being

$$\exp(0.9674) = 2.6311$$

The presence of both these variables means that the driver is approximately 2½ times more likely to take ≥21 days sickness absence following the incident.

Psychosocial variables in the final model for PSE-9 caseness were, mental disengagement and behavioural disengagement, both are sub-scales of the COPE (Table 18). Mental and behavioural disengagement both had positive coefficients indicating that those drivers who use this coping technique to a higher degree were more likely to be classified as a PSE-9 case.

TABLE 18 MULTIPLE LOGISTIC REGRESSION MODEL FOR CRITERION VARIABLE PSE-9 CASENESS AND SELF-REPORT SUB-SCALE INDEPENDENT VARIABLES (N=60)

Prognostic variable	Estimated logistic coefficient	Standard Error	Significance	Estimated relative risk	95% confidence limits for relative risk
Mental Disengagement	1.9445	0.729	**	6.99	1.67-29.19
Behavioural Disengagement	1.5801	0.712	*	4.86	1.20-19.62
Intercept	-2.4394				

*significance level $p < .05$; **significance level $p < .01$

The predicted log odds for the model where both variables were present (driver scored ≥ 10 on the mental disengagement sub-scale and scored ≥ 6 on the behavioural disengagement sub-scale) was as follows:

$$= -2.4394 + 1.9445(1) + 1.5801(1) = 1.0852$$

the estimated relative risk for this model being

$$\exp(1.0852) = 2.9600$$

Where all variables are present the driver 3 times more likely to be a PSE-9 case than drivers who scored ≤ 9 on the mental disengagement sub-scale and scored ≤ 5 on the behavioural disengagement sub-scale.

Only 1 psychosocial variable was included in the final model for PTSD caseness: mental disengagement (COPE) [Table 19]. The coefficient for this variable was positive indicating that those drivers who use this coping technique to a higher degree were more likely to be classified as a PTSD case. The relative risk for this variable was 5.12.

TABLE 19 MULTIPLE LOGISTIC REGRESSION MODEL FOR CRITERION
VARIABLE PTSD CASENESS AND SELF-REPORT SUB-SCALE
INDEPENDENT VARIABLES (N=60)

Prognostic variable	Estimated logistic coefficient	Standard Error	Significance	Estimated relative risk	95% confidence limits for relative risk
Mental Disengagement	1.6341	0.758	*	5.12	1.16-22.64
Intercept	-2.3273				

*significance level $p < .05$

Of the psychosocial variables used only 1 variable was included in the final model explaining high levels of post-incident sickness absence, mental disengagement (COPE) [Table 20]. As was the case for the incident variables the same variables were included in the final models for both PTSD caseness and post-incident sickness absence ≥ 21 days. Again the coefficient was positive meaning those drivers who use this coping method to a higher degree are more likely to be away from work for 21 or more days following the incident. The relative risk for this variable was 4.33.

TABLE 20 MULTIPLE LOGISTIC REGRESSION MODEL FOR CRITERION VARIABLE POST-INCIDENT SICKNESS ABSENCE ≥ 21 DAYS AND SELF-REPORT SUB-SCALE INDEPENDENT VARIABLES (N=60)

Prognostic variable	Estimated logistic coefficient	Standard Error	Significance	Estimated relative risk	95% confidence limits for relative risk
Mental Disengagement	1.4663	0.686	*	4.33	1.13-16.61
Intercept	-1.8718				

*significance level $p < .05$

All variables ($n=10$) [incident, victim, driver and self-report sub-scales variables] were then used in logistic regression analysis against the criterion variable PSE-9 caseness. 2 variables were included in the final model (Table 21), mental and behavioural disengagement, sub-scales from the COPE self-report scale. No incident, victim or driver variables were included in this final model, when all variables were included incident, victim or driver variables do not appear to make a significant contribution, in comparison to psychosocial variables, towards the prediction of PSE-9 caseness. The coefficients for both variables included in the final model were positive.

TABLE 21 MULTIPLE LOGISTIC REGRESSION MODEL FOR CRITERION
VARIABLE PSE-9 CASENESS AND INCIDENT, VICTIM, DRIVER
AND SELF-REPORT SUB-SCALE INDEPENDENT VARIABLES
(N=59)

Prognostic variable	Estimated logistic coefficient	Standard Error	Significance	Estimated relative risk	95% confidence limits for relative risk
Mental Disengagement	1.9289	0.729	**	6.88	1.65-28.72
Behavioural Disengagement	1.5604	0.712	*	4.76	1.18-19.22
Intercept	-2.4130				

*significance level $p < .05$; **significance level $p < .01$

Predicted log odds for this model when driver scored ≥ 10 on the mental disengagement sub-scale and scored ≥ 6 on the behavioural disengagement sub-scale was:

$$= -2.4130 + 1.9289(1) + 1.5604(1) = 1.0763$$

the estimated relative risk for this model being

$$\exp(1.0763) = 2.9338$$

Therefore, where these coping techniques are used by the driver to a high degree the driver is 3 times more likely to be a PSE-9 case.

The combined model for PTSD caseness contained 2 variables, 1 driver variable and 1 self-report variable (Table 22). The coefficients for pre-incident sickness absence of ≥ 20 days and mental disengagement were both positive. Pre-incident sickness absence of ≥ 20 days was significant but mental disengagement ($p < .079$) was not.

TABLE 22 MULTIPLE LOGISTIC REGRESSION MODEL FOR CRITERION VARIABLE PTSD CASENESS AND INCIDENT, VICTIM, DRIVER AND SELF-REPORT SUB-SCALE INDEPENDENT VARIABLES (N=59)

Prognostic variable	Estimated logistic coefficient	Standard Error	Significance	Estimated relative risk	95% confidence limits for relative risk
Pre-Incident Sickness Absence ≥ 20 days	2.4482	0.857	**	11.57	2.16-62.05
Mental Disengagement	1.5170	0.864	ns	4.81	0.88-26.17
Intercept	-3.1914				

*significance level $p < .05$; **significance level $p < .01$

The predicted log odds for this model when both variables are present:

$$= -3.1914 + 2.4482(1) + 1.5170(1) = 0.7738$$

the estimated relative risk for this model being

$$\exp(0.7738) = 2.1680$$

Where both these variables are present the driver is twice as likely to be classified as a PTSD case.

The combined model for post-incident sickness ≥ 21 days contained the same 2 variables as those in the PTSD caseness model, pre-incident sickness absence of ≥ 20 days and mental disengagement. Again the coefficients for both were positive and pre-incident sickness absence was significant but mental disengagement ($p < .072$) was not (Table 23).

TABLE 23 MULTIPLE LOGISTIC REGRESSION MODEL FOR CRITERION VARIABLE POST-INCIDENT SICKNESS ABSENCE ≥ 21 DAYS AND INCIDENT, VICTIM, DRIVER AND SELF-REPORT SUB-SCALE INDEPENDENT VARIABLES (N=59)

Prognostic variable	Estimated logistic coefficient	Standard Error	Significance	Estimated relative risk	95% confidence limits for relative risk
Pre-Incident Sickness Absence ≥ 20 days	1.6342	0.738	*	5.13	1.21-21.77
Mental Disengagement	1.3131	0.729	ns	3.72	0.89-15.52
Intercept	-2.2991				

*significance level $p < .05$

Predicted log odds for this model:

$$= -2.2991 + 1.6342(1) + 1.3131(1) = 0.6482$$

the estimated relative risk for this model being

$$\exp(0.6482) = 1.9121$$

Where both these variables are present the driver is twice as likely to take sickness absence following the incident of 21 or more days.

8.0) THREE REPRESENTATIVE CASE STUDIES

Case 1

Driver A was a 41 year old Asian male. He had been employed as a driver on the London Underground for 5 years, during which time he had not previously experienced a railway suicide.

The incident involved an 86 year old man who jumped from a crowded platform during the morning rush hour. He had attempted to jump in front of the previous two trains but had been physically restrained by another passenger. On his third attempt he managed to push his way to the platform edge and jump. He was removed alive from under the train but died of his multiple injuries before he was taken from the station.

When interviewed 1 month after the incident Driver A had not returned to work. His tentative diagnosis according to PSE-9 was neurotic depression. Many of the characteristic features of PTSD were present - flashbacks of the event, marked sleep disturbance, hypervigilance, increased irritability, psychological and physiological distress when confronted with reminders of the incident, and avoidance of activities that resembled the incident.

Driver A's interview scores are shown in Table 24. At 1 month he scored above the thresholds on the GHQ, the IES and the PTSS. At the follow-up interview 6 months after the incident Driver A had returned to work. His total sickness absence was 41

working days. The sickness certificate provided by his general practitioner stated that he was suffering from "depression and anxiety". At the follow-up interview this driver was neither suffering from PTSD nor a case on PSE-9. There was a large decrease in his scores on all self-report and interview measures. The scores on the IES and PTSS-10 were not clinically significant. At 6 months the driver did not score above the thresholds on any self-report measure.

Case 2

Driver B was a 35 year old English born white male. He had been employed as a driver on the London Underground for 14 years. He had experienced 2 previous incidents, a suicide attempt in 1982 and a suicide in 1984.

This incident involved an 50 year old female who lay between the rails. Despite application of the emergency brakes the train passed over the woman. When the train stopped the driver got out of the cab and could hear the woman shouting from under the train. The suicide attempter was removed from the tracks by station staff. She had sustained lacerations to her back and arm. Both the driver and the suicide attempter awaited the arrival of the British Transport Police in the station supervisor's office. They did not converse.

1 month after the incident Driver B had not returned to work. His tentative diagnosis according to PSE-9 was phobic state. Although several of the characteristic features of PTSD were present (flashbacks and psychological and physiological distress when confronted with reminders of the incident) the number of symptoms persistently

present was not sufficient to diagnose PTSD. Driver B's interview scores are shown in Table 24.

When seen at the 6 month follow-up interview Driver B had returned to work. His total sickness absence was 27 working days. At the follow-up interview the PTSD symptoms had declined in severity and he was no longer a PSE case. There was a decrease in his scores on all self-report and interview measures. No scores were clinically significant at this stage.

Case 3

Driver C was a 49 year old white English born male. He had been employed as a driver on the London Underground for 16 years. He had never experienced an incident of this type.

The incident occurred at 23.30 hours. As the driver entered the station he saw a 43 year old male standing in a shallow "suicide pit". The train struck the man as he attempted to crouched down into the pit and allowed the train to pass over him. The driver secured his train, alerted station staff and then climbed under the train himself and brought the male who was not seriously injured up to the platform.

When seen 1 month after the incident Driver C reported that he had returned to work immediately after the incident. He reported no symptoms on either the PSE-9 or the PTSD interview. Driver C's interview scores are shown in Table 24.

Again at the follow-up interview this driver did not present sufficient symptoms to score caseness on the PTSD or PSE-9 interviews. Scores at six months on all measures were again low.

TABLE 24 INTERVIEW AND SELF-REPORT SCORES (6 MONTH RESULTS IN PARENTHESES) FOR 3 CASE STUDIES

INTERVIEWS AND SCHEDULES	DRIVER A	DRIVER B	DRIVER C
PSE-9 total score	28 (3)	9 (2)	0 (0)
PSE-9 Index of Definition	6 (3)	5 (3)	1 (1)
PTSD reexperience symptoms	4 (3)	2 (0)	0 (0)
PTSD avoidance symptoms	3 (1)	0 (0)	0 (0)
PTSD arousal symptoms	5 (4)	3 (3)	0 (0)
PTSD total score	12 (8)	5 (3)	0 (0)
GHQ somatic sub-scale	5 (0)	0 (0)	0 (0)
GHQ anxiety/insomnia sub-scale	3 (0)	4 (1)	0 (0)
GHQ social dysfunction sub-scale	2 (0)	0 (0)	1 (0)
GHQ severe depression sub-scale	0 (0)	1 (0)	0 (0)
GHQ total score	10 (0)	5 (1)	1 (0)
IES intrusion sub-scale	29 (6)	12 (3)	4 (1)
IES avoidance sub-scale	19 (6)	5 (0)	18 (5)
IES total score	48 (12)	17 (3)	22 (6)
Post-Traumatic Symptom Scale	6 (3)	5 (3)	0 (0)

9.0) DISCUSSION

Non-attenders

15 of the 91 drivers involved in incidents which fulfilled the operational criteria for inclusion were not interviewed. 11 (73.33%) of these 15 drivers took some time off sick following the incident. The mean number of working days sickness absence following the incident for all non-attending drivers was 25.80 days (median=21.00, SD=24.56, range 0-68).

Examining the post-incident sickness absence amongst the 76 interviewed drivers there were significant differences between the sickness absence for 3 identified groups (Table 3). The post-incident sickness absence record of the non-attenders was found to be most similar to that of Group B drivers (PSE-9 cases). 73.3% of non-attenders took time off following the incident, 75.0% of Group B drivers took some time off work. Mean number of days sickness absence for non-attenders was 25.8 days, mean for Group B drivers was 23.7 days (Table 4). Mann-Whitney test analyses found the sickness absence of non-attenders to be least significantly different from that of Group B driver and to be significantly different from Group C drivers.

These figures suggest that those drivers who refused to attend the 1 month interview might have been more likely to be a psychiatric case as assessed by the PSE-9 than those drivers who did attend the interview.

Diagnoses at 1 month

Analysis of the results recorded 1 month after the incident (n=76) identified 3 groups (Table 2). Group A (17.11%) drivers had PTSD and 12 of the 13 also presented with an additional diagnosis as recorded by the PSE-9. Group B (15.79%) drivers did not have PTSD but did score a PSE-9 diagnosis. Group C (67.11%) drivers were not cases. 32.89% of drivers presented at least 1 diagnosis when interviewed 1 month after the incident. This is consistent with the hypothesis that these drivers experienced an adverse reaction following the incident.

The PSE-9 tentative diagnoses were predominantly of a depressive type for drivers in Group A and phobic state for Group B drivers (Table 2). Of the 76 drivers interviewed 1 month after the incident 12 (15.79%) were diagnosed as neurotic depression; 9 (11.84%) as phobic state; 2 (2.63%) as manic-depressive psychosis (depressed type); and 1 (1.32%) as schizophrenic psychosis, paranoid type. There appeared to be an association between PTSD and a PSE-9 diagnosis of a depressive type, whereas in those drivers who did not have PTSD yet still experienced a severe adverse reaction the predominant PSE-9 diagnosis was phobic state. 9 (69.2%) of Group A drivers had a PSE-9 "diagnosis" of a depressive type. Although 4 non-PTSD cases had a diagnosis of "neurotic depression", seven (58.3%) of the 12 Group B subjects were diagnosed as "phobic states", an anxiety disorder.

An association between depression and PTSD has been found by other researchers. Assessment using the 90 item Symptom Checklist (SCL-90, Derogatis et al., 1973) of 66 subjects being treated for pathological stress responses found subjects

reported higher scores on the depression sub-scale than on any of the other included sub-scales (eg. anxiety and phobic anxiety sub-scales)[Horowitz et al. 1980]. Of a sample of in-patients diagnosed as suffering from PTSD, depression was the most common overlapping diagnosis in those patients with any concurrent diagnosis (Green et al., 1985a).

Other researchers have found that patients diagnosed as suffering from PTSD also met the diagnostic criteria for an additional diagnosis, notably depressive disorders (Malt, 1988; Goldberg and Gara, 1990). Of 25 Vietnam veterans with a diagnosis of PTSD 21 (84%) had at least at least one additional diagnosis and 18 (72%) gave a history that suggested that they had previously been clinically depressed (Sierles et al., 1983). Moreover, a number of clinicians have reported successes in treating PTSD using antidepressants (both tricyclics and monoamine oxidase inhibitors)[McGuire, 1990].

This association is not so surprising given that many of the behavioural and cognitive symptoms characterising depression appear in the criteria for PTSD, especially in sections C and D of the criteria.

A number of explanations for our findings and the findings of others regarding the association between PTSD and depression are possible: a) PTSD cases may also present an independent depressive illness, b) the presentation of the PTSD symptoms of numbing/avoidance and increased arousal lead to a parallel misdiagnosis of a depressive type, c) an "atypical depressive illness" causes the presentation of symptoms labelled as PTSD.

Two concurrent diagnoses of PTSD and depression disorders would appear to be the most likely explanation, this is supported by other researchers having gained similar findings (Malt, 1988; Goldberg and Gara, 1990; Horowitz et al., 1980; Green et al., 1985a). That a misdiagnosis of depression was gained is unlikely given the validity of the PSE-9. The final explanation that PTSD is in fact an atypical depressive illness requires proof that PTSD is not a valid diagnostic category. The debate regarding the validity of PTSD as a distinct diagnosis will be discussed later.

Of the 12 Group B drivers 4 narrowly missed a diagnoses of PTSD by lacking 1 symptom in only one of the sections (B, C or D) of the PTSD criteria. 5 Group B drivers reporting 6 or more PTSD symptoms, (Group mean=5.1, SD=1.7). That a number of subject may narrowly miss a diagnosis of PTSD has been noted by other researchers (Ramsey 1990). 30 (39.5%) of all drivers (n=76) scored ≥ 6 PTSD symptoms.

Interpretation of scores

Mean scores for the 3 groups at 1 month (Table 4) reflected the hierarchal divisions adopted in this study. Group A drivers scored the highest mean scores followed by Group B and then Group C.

Although no Group 3 drivers gained a diagnosis this does not necessarily mean that they were unaffected by the incident. Several drivers within Group C narrowly missed diagnosis on the PTSD interview and/or the PSE-9. The high standard deviations for a number of Group C mean scores (Table 4) and that a number of drivers in this

group scored above the cut-offs on self-report scales suggests that a number of Group C drivers were adversely affected by this trauma.

Table 5 and Figure 4 presents PSE-9 total symptom score data. For the driver sample the PSE-9 total scores are distributed in a bimodal fashion. In comparison with the general population sample the distribution of scores for the driver sample are shifted to the right. The psychiatric patients and the general population sample both have continuous distribution of scores, whereas that for the drivers appears to be discontinuous with a high proportion scoring a total PSE-9 score ≥ 20 .

Results from the driver sample were significantly different from the general population and the in- and out-patient samples. Although the in- and out-patient sample consisted of neurotic patients of both sexes (age range 16-64) and the general population sample consisted of women only (age range 18-65) and so there are limitations in drawing comparisons it is still of interest to compare the respective patterns of score distributions.

12% of the general population sample scored a total PSE-9 score ≥ 11 and only 2% scored ≥ 21 (Wing et al., 1978). Whereas 22 (28.9%) drivers scored ≥ 11 and 9 (11.8%) scored ≥ 21 . The same researchers found that 90% of in- and out-patients scored a total PSE-9 score ≥ 11 and 60.0% scored ≥ 21 . The results of the driver sample appear to lie between these two groups. This would suggest that the driver sample consists of two distinct groups, those measurably adversely affected and those not measurably adversely affected.

The relationship between the driver sample and the general population and psychiatric patient samples is again illustrated in figure 1. This figure would suggest that the PSE-9 total scores of the driver sample as a whole are closer to those of the general population than to those of the psychiatric patient sample.

Analysis of social functioning as assessed by the Social Adjustment Scale (SAS-M) found that all sub-scales were significantly correlated with the PSE-9 and the PTSD interview total scores, suggesting that the SAS-M provides a measure of social functioning that is also associated with the mental state of subjects. In comparisons of 1 month and 6 month scores (n=56) the Wilcoxon matched pairs test found that on only 3 sub-scales was there a significant decrease at 6 months. However, it may be argued that these 3 sub-scales (work, social and leisure and total score) were the three most likely to be affected if a reduction of psychological symptoms had taken place. By 6 months with an reduction in symptoms one would expect the driver to have returned to normal working and to have again become involved in normal social and leisure activities. The total score is measuring the overall improvement in the drivers' scores at 6 months.

Other sub-scales do not appear to be as sensitive to such change in this sample. The mean scores at 1 and 6 months for the remaining sub-scales suggest little change in the drivers functioning in the remaining role areas (relations with extended family - 1 month=1.69, 6 months=1.79; marital relations - 1 month=1.95, 6 months=1.93; relations within the family unit - 1 month=1.42, 6 months=1.32).

It is also of interest to compare the mean SAS-M scores for the 3 groups of drivers at 1 month (n=75) with those of other samples (depressed females [n=27] and normal population [n=40]; Weissman et al., 1978): Work outside the home - Group A=3.79, Group B=2.32, Group C=1.69, depressed=2.78, normal=1.33; Social and leisure activities - Group A=2.20, Group B=2.35, Group C=1.75, depressed=2.66, normal=1.85; Extended family relationships - Group A=1.91, Group B=1.93, Group C=1.63, depressed=1.94, normal=1.48; Marital relationships - Group A=2.18, Group B=2.14, Group C=1.82, depressed=2.31, normal=1.72; Family unit relationships - Group A=1.75, Group B=1.91, Group C=1.21, depressed=2.51, normal=1.52; Overall adjustment score -Group A=2.20, Group B=2.14, Group C=1.61, depressed=2.44, normal=1.61. Scores for drivers in groups A and B appear to be close to those scores gained from a sample of depressed patients whereas scores for Group C drivers are closer to those of the normal population sample.

The number of drivers scoring above the cut-offs on 3 of the self-report schedules at 1 month followed the pattern expected given the diagnostic basis for division into groups. On measures of general psychological morbidity (GHQ and PTSS-10) more Group A and Group B drivers scored caseness than Group C drivers. On the IES scales, measuring PTSD symptoms, more Group A drivers scored caseness than in either of the other two groups.

Comparison of the ability of self-report scales to identify PTSD cases found that of the three IES scales (total score, intrusion sub-scale and avoidance sub-scale) the IES total score (sensitivity 75.0%, specificity 87.3%) was the best predictor of PTSD caseness. The next best predictor was the IES avoidance sub-scale and finally the

IES intrusion scale (Table 9). This finding was surprising as the IES intrusion sub-scale is commonly felt to be a good predictor of PTSD caseness (Feinstein and Dolan, 1991).

The GHQ-28 sub-scale 'b' (anxiety/insomnia) using a cut off ≥ 2 , was the best predictor of PTSD cases (sensitivity 100.0%, specificity 71.4%). The GHQ-28 total score, using a cut-off of ≥ 5 , was also a good a predictor of PTSD caseness (sensitivity 83.3%, specificity 77.8%) .

Comparison of self-report scales designed to predict general psychiatric morbidity (GHQ-28 total score and the PTSS-10) regarding their ability to identifying general caseness (whether PTSD or PSE-9) the GHQ-28 total score was superior (sensitivity 79.2%, specificity 86.5%).

The GHQ-28 was the best predictor both of PTSD cases and general psychiatric cases and so would be the preferred screening instrument for this population. Although the IES and PTSS-10 did not prove as efficient in predicting caseness they did have the advantage of providing specific information regarding the experience of PTSD symptoms and therefore are of value in this respect.

The percentage of drivers scoring above the thresholds on the IES in Groups B and C were extremely close: Intrusion scale - 2 (16.67%) Group B drivers scored caseness, 6 (11.74%) Group C drivers scored caseness; Avoidance scale -2 (16.67%) Group B drivers, 9 (17.65%) Group C drivers; total score - 2 (16.67%) Group B drivers scored caseness, 7 (13.73%) Group C drivers scored caseness.

Diagnoses at follow-up interviews

Of the 56 drivers interviewed for a second time 6 months after the incident only 2 were still cases. Both were cases on the PSE-9 (neurotic depression and phobic state). At 6 months no driver presented an appropriate pattern of symptoms to be diagnosed as suffering from PTSD whether as a continuation of an earlier diagnosis of PTSD or as a case of delayed onset. The two diagnoses presented at 6 months were considered to be a continuation of the initial reaction.

The driver diagnosed as suffering from neurotic depression at 6 months had been diagnosed as having PTSD and neurotic depression at 1 month. The driver diagnosed as phobic state at 6 months had been diagnosed as having neurotic depression at 1 month. For this driver at the 1 month interview situational anxiety was not a serious problem as the driver was not back to work. However at 6 months the driver had returned to work and though depressive symptoms persisted the most distressing problem at this time was situational anxiety accounting for the change in diagnosis. Once drivers return to work they have to encounter the stretch of track where their incident took place on a daily basis and for this driver this encounter continued to cause distress.

At 12 months 2 drivers presented as a case on the PSE-9, the two tentative diagnoses at 12 months were neurotic depression and phobic state. Both drivers had been classified as a case when interviewed 1 month after the incident (diagnoses were neurotic depression and phobic state respectively) but neither had been a case at 6 months. At 12 months both drivers gained Impact of Event Scale total scores (35

and 28 respectively) and both drivers, though not PTSD cases, reported several PTSD symptoms as measured by PTSD interview total scores (6 and 5 respectively). For one of these driver caseness (phobic state) at 12 months was felt to be related to the index incident. For the other driver events other than the incident were felt to have triggered the caseness at 12 months.

No driver satisfied the criteria for PTSD at 12 months. As no cases of delayed onset PTSD were presented at the 6 month interviews or at the 12 month interviews, delayed onset of PTSD would not appear to be a concern for this sample of drivers.

Differentiation between groups at 1 month

Kruskal-Wallis analysis of variances was used to analyze the 1 month scores (n=76). When all drivers were entered in to the analysis a significant difference was found on nearly all self-report schedules. Analysis of variance results were not significant on 4 indices: Recent Difficulties/Events and on 3 of the EPQ scores.

It would appear that the number of adverse life-events experienced by this sample in the previous 6 months was not an important aetiological factor regarding psychiatric morbidity in drivers as assessed 1 month after the incident. Likewise the 3 groups did not significantly differ in their scores on the psychoticism, extraversion and lie sub-scales of the EPQ. The drivers did not appear to differ in their possession of these 3 personality traits as measured by the EPQ. These measures would not appear to be of value in predicting psychological morbidity in this subject group.

Analysis of variance was used to compare Group A to Groups B and C separately and to compare Group B to Group C (Table 3). In the comparison between Groups A and B a pattern emerged which reflected the diagnostic distinction between these two groups. On measures specific to PTSD (i.e. PTSD interview and the avoidance and total score sub-scales of the IES) significant results were obtained.

On only 1 measure of general psychiatric morbidity, the PSE-9 total score, was a significant analysis of variance results obtained in the Group A and Group B comparison (Table 3). This may be due to the PSE-9 interview being more comprehensive than either the GHQ or the PTSS-10 and so detecting characteristics of the reaction that differentiate Group A drivers from Group B drivers. The PSE-9 total score has been suggested by some researchers to be a useful measure of the severity of psychiatric problems (Tarnopolsky et al., 1979; Sturt, 1981). It may be the case that the severity of psychiatric distress following the incident, as measured by the PSE-9, is an important determinant of PTSD in this population. This view is supported to some extent in that Group A drivers scored a higher mean score at 1 month than Group B drivers on all measures of psychiatric symptomatology, whether they measured general psychiatric morbidity or more specific post-traumatic stress disorder.

However, on other outcome measures of general morbidity no significant difference was found between Groups A and B (i.e. PSE-9 index of definition score, all GHQ-28 scales, sickness absence and the PTSS-10). These results question whether the diagnostic division of these two groups is valid. Although both groups experience a high level of distress, differences between these 2 groups were only found in

measures designed to detect PTSD. There is a degree of circularity in this finding. The only evidence that drivers with PTSD are significantly different from drivers without a PTSD diagnosis but with a PSE-9 diagnosis is provided by measures designed to detect PTSD. Moreover, one measure that might also be taken as a measure of the level of distress, the number of days sickness absence, did not show a significant difference between these 2 groups.

For convincing evidence of a true division between Groups A and B it would be expected that self-reports other than those used to impose the division would detect a significant difference between these 2 groups. Overall, this was not the case. The only evidence of this kind was provided by the significant difference in the PSE-9 total scores for Groups A and B (Table 3).

Considering the above results in conjunction with earlier findings (the GHQ-28 being the best measure in detecting caseness whether PTSD or general psychiatric morbidity and that several Group B drivers narrowly missed a diagnosis of PTSD) overall the evidence is not convincing that a marked significant difference existed between these two groups.

The analysis of variance between Groups A and C found a significant difference between these two groups. These results indicate that Group A drivers were significantly more affected, as assessed by symptom measures, than Group C drivers. Analysis of variance results for comparisons between the scores of Group B and Group C indicated that Group B drivers were more distressed at 1 month than Group C drivers on measures of general psychological morbidity (i.e. PSE-9, GHQ,

PTSS-10), however, on measures reflecting PTSD symptoms this distinction was not so clear.

Regarding the neuroticism sub-scale, analysis of variance comparisons between Groups A and C and between Groups B and C were significant. Drivers within Groups A and B reported neurotic traits to a larger degree than drivers in Group C. This result supports the hypothesis that persons who report more neurotic traits as measured by the EPQ are more likely to present neurotic symptoms following exposure to adverse stimuli.

Differentiation between groups at 6 months

Analysis of variance by ranks to investigate whether those drivers seen both at 1 and 6 months (n=56) produced the same pattern of results as the analysis of variance for all drivers seen at 1 month (n=76) found, although a small number of differences were noted, that both groups seen at 1 months (n=56 and n=76) demonstrated a similar pattern of results.

Analysis of variance regarding the scores of all drivers seen at 6 months (n=56) indicated that a significant variance in the scores on a large number of measures existed within the complete sample. In comparison between Groups A and B results were not significant on any measure (Table 10). This result suggests that by 6 months the difference in mean scores for Groups A and B were not sufficiently different to be classified as two distinct groups. Comparing the analysis of variance results for Groups A and C against Group B and C found that results were

significantly different on more measures in the comparison between Groups B and C than was the case in comparisons between Groups A and C at this time.

Analysis of variance on the 6 month scores for the 3 groups was not significant in any comparisons for the Recent Difficulties/Events, the Psychoticism, Extraversion and Lie scales of the EPQ and Section c of the PTSD interview. For the Recent Difficulties/Events scale and the EPQ these findings match those for the 76 drivers at 1 month. That the scores for all sections of the PTSD interview were not significant at 6 months in comparison between Groups A and B suggests that between the 1 month and 6 month interviews Group A and B drivers experienced a reduction in symptoms, as measured by this scale, whereby at 6 months they were indistinguishable. Of Groups A and B only Group B drivers demonstrated a marked difference in comparisons to Group C drivers at 6 months.

Comparison of mean scores at 1 and 6 months (n=56) demonstrated a marked generalised decrease in scores (Table 11). This would indicate that the majority of the adverse effects reported at 1 month did not persist until 6 months.

A decrease was not noted for the Severe Depression sub-scale (GHQ-28), Recent Difficulties/Events scale, and on 3 of the EPQ scales, Psychoticism, Extraversion and Lie. The Severe Depression sub-scale mean scores at 1 month for all groups were low so a marked decrease was not possible. Results for the Recent Difficulties/Events scale again emphasise that all groups reported a low number of adverse events at 1 month and that no increase in adverse events occurred between the 1 and 6 month interviews. This finding is reassuring in that those symptoms still reported at 6

months were most likely precipitated by the index incident and not by other negative life events occurring between interviews.

The mean EPQ scores at 1 and 6 months (Table 11) suggest that Group B drivers presented the least preferable EPQ scores. At 1 and 6 months Group C drivers, except for an elevated Lie score, presented scores were equal to or preferable to those given for a normal (male) sample: Psychoticism 3.78 (SD=3.09); Extraversion 13.19 (SD=4.91); Neuroticism 9.83 (SD=5.18); Lie 6.80 (SD=4.14) (Eysenck and Eysenck, 1975). Mean scores for Group A at 1 month were low (11.75) on the Extraversion scale (indicating introversion) and were elevated for the Neuroticism score (12.50), at 6 months Group A scores were more in line with that of the normal sample on all scales. Group B mean scores at both 1 month and 6 months were above those of the normal sample on the Psychoticism score (1 month=4.67; 6 months=3.80), were the lowest Extraversion scores (1 month=8.67; 6 months=11.00), and were the highest mean Neuroticism scores (1 month=14.50; 6 months=10.40). That the Lie score was elevated in all groups may be explained by the fact that this result is found in most psychiatric groups samples (Eysenck and Eysenck, 1975).

When using the EPQ which includes the Lie or dissimulation scale, it is possible to examine the subjects tendency to "fake good". In situations where the subject does feel motivated to "fake good" the correlation between scores on the Neuroticism and Lie scale are high (Eysenck and Eysenck, 1975). In our sample this correlation was poor (Spearman $R = -.15$, $p < .23$) which indicates there was little motivation for dissimulation amongst this sample whilst completing questionnaires.

Prognosis of the three groups

A number of findings suggest that in comparison to Group A drivers the Group B drivers made a less marked recovery by 6 months. The mean scores on interviews and self-reports for the 56 drivers at 6 months demonstrate a larger reduction in mean scores for Group A than Group B drivers at 6 months. Group A mean scores were closer to those of Group C than Group B mean scores, as suggested by the analysis of variance findings at 6 months.

Though at 1 month Group A drivers scored a higher mean score on all symptom measures at 6 months Group B drivers gained the highest mean score on 10 of the 15 symptom measures. Exceptions were chiefly on measures of PTSD symptoms as assessed by the IES, where Group A scored higher mean scores, on Section b of the PTSD interview where mean scores were equal and on the Severe Depression subscale of the GHQ. Moreover, at 6 months 4 of the 12 Group B drivers still scored above the cut-off for the GHQ. Group B drivers appeared to experience more psychological problems at this time in comparison to Group A driver.

For all groups symptoms of increased arousal (Section d of the PTSD interview) were the most persistent PTSD symptoms. At 6 months Section d mean scores were higher than the mean scores of Sections b and c for all groups.

Wilcoxon test analysis including all drivers demonstrated that there was a significant decrease in the number of reported symptoms between the 1 month and 6 month interviews (Table 12). Wilcoxon matched pairs test analyses were also completed for

each of the 3 groups separately to ascertain which groups accounted for the general decrease in scores. It can be seen from Table 12 that of the 3 groups, Group B reported the least number of significant differences in their 1 and 6 month symptom scores.

This again supports the view that Group B drivers experienced a pattern of symptoms that predicts a poorer prognosis in the longer term. That Group B drivers scored higher mean scores at 6 months on most symptom measures was due to the larger decrease in symptom scores reported by Group A drivers compared to Group B drivers.

The reason for Group B drivers presenting a poorer recovery than Group A drivers is most likely explained by the traumatic incident being an occupational trauma. The predominant diagnosis at 1 month for Group B drivers was phobic state relating to their work environment. For drivers suffering from a phobic state to be continually confronted by the subject of their phobia in a untherapeutic manner may account for their relatively delayed recovery. This might also explain why symptoms of increased arousal (Section d of the PTSD criteria) were the most persistent PTSD symptoms for all groups of drivers.

Comparisons with other samples

It is useful to compare the results of drivers on a number of the self-report scale to those of other trauma samples. At one month the driver's mean scores (n=75) for the Impact of Events Scale total score was 24.1, the mean GHQ-28 total score at this

time was 4.4. For a sample of ambulance workers (n=40) after working their usual day the mean IES total score was 25.9 and the mean GHQ-28 total score was 6.75 (Thompson, 1991). However, for a sample of police body handlers involved in the Lockerbie plane crash and the Marchioness pleasure boat disaster the mean IES total score was 12.3 and the mean GHQ-28 total score was 1.9 (Thompson, 1991).

These results from three different occupational samples who have, in the course of their work, encountered death and mutilation show wide variation. The results of the train drivers are closest to those of the ambulance workers. The most likely explanation for the differences in these mean scores is the level of follow-up care or debriefing offered to these three occupational groups. The police body handlers received regular and systematic debriefings throughout the course of their involvement in the Lockerbie and Marchioness disasters (Thompson, 1991).

A number of studies have provided data on the Impact of Events Scale and the GHQ-28 at around 6 months after the traumatic event. Adult survivors of the Jupiter cruise ship disaster (n=21) when assessed between 3 and 8 months reported a mean IES total score of 32.3 and a mean GHQ-28 total score of 12.6 (Joseph et al., 1992). Survivors of the Marchioness disaster (n=27), assessed at 4 or 5 months reported a mean IES total score of 46.4 and a mean GHQ-28 total score of 15.44 (Thompson and Chung, 1991). For the 56 drivers seen at 6 months the mean IES total score was 11.8 and the mean GHQ-28 total score was 1.4. The marked difference between these data emphasises the extent to which following a railway suicide the adverse effects appear to be time limited, whereas following other types of traumatic incidents the adverse psychological impact may be reported for a considerably longer period.

At 12 months there were a similar proportion of PSE cases (6%) as observed at 6 months (4%). This finding together with the close similarity of scores at 6 and 12 months (Table 13) suggests that these measures are the baseline for this sample. This suggests that at six months after the incident most drivers were back to their normal selves, results at this time probably being a close representation of their normal mental states.

Validity of PTSD as a diagnostic category

Given many of the findings discussed previously it is important to discuss the argument as to whether or not PTSD is a valid diagnostic label.

The most outright criticism of the diagnostic validity of PTSD was made by Breslau and Davis (1987). Though their criticisms were aimed at PTSD as outlined in the DSM-III (1980) criteria many of their arguments still hold. They criticised the DSM-III criteria on all aspects of clinical validity - face validity, descriptive validity, predictive validity and construct validity. They held that evidence for face and descriptive validity alone was insufficient to warrant recognition as a valid diagnosis, as neither satisfies the basic validity of a diagnosis necessary in the clinical practice setting. Of relevance to our findings Breslau and Davis (1989) argue that the evidence for the descriptive validity of PTSD is flawed as PTSD only differentiates patients with the disorder from those without by using the criteria for that disorder. Other evidence derived from etiology, course or response to treatment is necessary to support a valid diagnosis.

In particular Breslau and Davis (1987) aim their criticisms at the linking of an "extraordinary stressor" (DSM-III) with the symptomatology of PTSD. The descriptive validity of a PTSD diagnosis is especially linked to the question of what is an appropriate stressor.

Breslau and Davis do not feel there is sufficient evidence to warrant a distinction between types of stressors. The quantity of the stressor differentiates PTSD from other diagnoses especially adjustment disorder. The inclusion within the criteria for PTSD that the stressor has to be of sufficient severity suggests that in the case of severe stressors as apposed to moderate stressors the characteristics of the individual and the environment are not of major importance in the manifestation of PTSD symptoms, an extreme stressor will cause symptoms in almost anyone. Breslau and Davis (1987) felt that there was little empirical support for this view. They also point out that previous attempts to link symptoms to events in the DSM "have failed to show etiological specificity" (reactive depression and postpartum psychosis).

Another criticism is that stressors cannot be classified according to their magnitude alone, subjective meaning of stressors will play an important part. This point is also made by supporters of PTSD as a valid diagnosis (Horowitz et al., 1987). Horowitz (1983) debated whether the stressor need be uncommon and severe as PTSD was diagnosed in subjects involved in car accidents which did not result in injury to the subject.

Two aspects of the criteria for PTSD are said to not overlap with other diagnoses - the experience of a severe stressor and the reexperience symptoms. However, a stressor, though not specified as extreme is also a feature of adjustment disorder. Therefore if it is not warranted to differentiate between severe and moderate stressors the distinction between these two diagnoses becomes less clear. Within the most recent International Classification of Diseases (ICD-10, World Health Organisation, 1992) "Adjustment disorder" is described as "states of subjective distress and emotional disturbance...arising in the period of adaptation to a significant life change or to the consequence of a stressful life event". Adjustment disorder is a residual disorder, a diagnosis applied when the individual has experienced a stressor yet symptoms do not meet other diagnoses.

McFarlane (1988b) also finds fault with the stressor criterion "the hypothesis that the exposure to the trauma, rather than the relatively unimportant role of predisposing vulnerability factors, was the major aetiological agent, was one of the major justifications for proposing that PTSD is an independent diagnostic category". McFarlane (1989) later investigated the determinants of post-traumatic morbidity in 469 firefighters and concluded that the severity of exposure to a trauma or the loss endured as a result were not major determinants of PTSD morbidity. Rather pre-morbid factors (past psychiatric history and neuroticism) were the best predictors of post-traumatic morbidity.

Though the inclusion of reexperience as a diagnostic criteria is unique to PTSD it cannot be excluded as a symptom of adjustment disorder as is a residual category which might include any symptoms. Also the symptoms of reexperience are

heterogeneous, from the reexperience of thoughts to acting as if the event were reoccurring (Breslau and Davis, 1987).

Breslau and Davis also contested that reliance on symptoms of reexperience to differentiate PTSD from other diagnoses was unwarranted as patients who had not experienced a stressor have satisfied this section of the criteria (e.g. Horowitz, 1979).

A major criticism of the inclusion of the stressor criterion in PTSD is that there is no operational criteria to decide when a stressor is severe enough to be distressing to almost anyone. A disorder which presents all the symptoms of PTSD yet was preceded by a stressor that does not satisfy the DSM-III-R criteria would need to be classified as an adjustment disorder (Breslau and Davis, 1987). PTSD is an anomaly in that it is one of a few disorders dependant on etiology "the symptoms without the presence of a highly stressful event are not seen to constitute the disorder, yet the definition of a 'recognizable stressor' is not yet agreed upon" (Green et al., 1985a).

Breslau and Davis (1987) conclude "there is as yet no direct support for the validity of the DSM-III distinction between extraordinary stressors that would fulfil PTSD requirements and more ordinary stressors...as the assumptions that underlie the stressor criterion in PTSD are unsupported, it is questionable whether future research will demonstrate other kinds of validity beyond the face validity that provisionally supports the DSM-III diagnosis of PTSD".

The problems of making a confident diagnosis of PTSD within a clinical setting has been highlighted. Raphael and Middleton (1988) noted that it is often difficult to be

certain in a diagnosis of PTSD "especially when the symptoms are not clear cut and are complicated by time, experience, failure of interpersonal relationships, litigation, or the presence of other conditions such as depression...". Kolb (1989) points out that "diagnostic insensitivity" is a feature of PTSD diagnoses, often being confused with other anxiety disorders, depressive disorders or alcoholism. Moreover, Sierles et al. (1983) noted that the symptoms of PTSD (DSM-III) "mimic other disorders, including...depressive states" and that whenever two or more diagnoses are present the stress disorder is usually considered the primary disorder.

That symptoms vary depending on the time of assessment and the stressor was made clear in a study of 251 Vietnam veterans. Laufer et al. (1985a) found that different patterns of symptoms were produced by different types of stressors and that there was an interaction between the stressor and time in that individuals exposed to the same stressor will experience varying symptomatology over time. Green et al., (1985a) also presented similar findings. Other researchers have noted that PTSD symptomatology may vary according to the timing of assessment, "meeting the diagnostic criteria at some times and not at others" (Turner, 1991b). Symptom presentation may also be influenced by different cultural and racial groups (Eldridge, 1991).

Whether reactions to extreme stressors that do satisfy the criteria for PTSD are adequately similar to be considered presentations of the same diagnosis has also been questioned. Following assessment of cases of combat-related PTSD and civilian-related PTSD (McCaffrey et al., 1989), using the Minnesota Multiphasic Personality Inventory [MMPI], substantial differences were found between these 2

groups in their MMPI profiles, McCaffrey et al. (1989) concluded that "a growing literature indicates that the assessment procedures and diagnostic rules developed on Vietnam combat veterans with PTSD may have limited application to civilian-related forms of PTSD". However, only 26 civilian PTSD cases were assessed in this study and the authors were using the DSM-III criteria.

The DSM-III criteria for PTSD came under attack by other researchers who though satisfied that PTSD was an important diagnosis demanded a reorganisation of the criteria (Brett and Ostroff, 1985). Further, Laufer et al. (1985b) criticised the DSM-III criteria and proposed a "two-dimensional model composed of reexperiencing and denial axes".

Following a survey of 448 psychiatrists and psychologists as to what symptoms they look for in making a diagnosis of PTSD it was found that evidence of exposure to a traumatic event and symptoms of reexperiencing the trauma alone was sufficient for most clinicians to diagnose PTSD. The researchers concluded that many such diagnosis of PTSD would not satisfy the DSM-III-R criteria for PTSD and that their results indicated that a reorganisation of the criteria is required (McFall et al., 1991).

Eldridge (1991) criticised the PTSD criteria as being "vague and unquantified...they contain little indication of what constitutes sufficient frequency, severity, or distressfulness of symptoms to discriminate between a normal process of recovery and PTSD" this may explain why "rates of PTSD diagnosed in different VA [Veterans Administration] hospitals range from 1% to 30%" .

That PTSD shares symptoms with other disorders is clear and those diagnosed as PTSD are often diagnosed with a concurrent diagnosis, notably depressive disorders. In view of this it is useful to look at the diagnostic guidelines of those diagnoses that might be said to have preceded PTSD and other related diagnoses.

McFarlane (1989) noted that previous stress disorders in the DSM-I (gross stress reaction) and DSM-II (transient situational disturbance and anxiety neurosis) described these disorders as "acute, time-limited phenomena that diminishes unless some pre-existing character pathology was present". DSM-III however emphasises the role of the traumatic event in the aetiology of PTSD and reduces the importance of pre-morbid factors.

Neurotic depression within the ICD-9 (World Health Organization, 1977) is "characterised by disproportionate depression which has usually recognizably ensued on a distressing experience ... there is often preoccupation with the psychic trauma which preceded the illness". Therefore the differentiation between the diagnoses of PTSD and neurotic depression seen in Group A drivers is very much reliant on the debate as to whether or not one can rightly distinguish between the severity of stressors. Given the diagnosis guidelines above for neurotic depression it can be seen why so many drivers who satisfied the criteria for PTSD also gained a diagnosis of neurotic depression.

In the ICD-10 PTSD is described as a stressful event or situation that is exceptionally threatening or catastrophic, likely to cause pervasive distress in anyone. In the "diagnostic guidelines" emphasis is on symptoms in section B of the DSM-III-R

criteria. Avoidance symptoms and numbing "not essential for diagnosis", autonomic disturbances "contribute to the diagnosis but are not of prime importance". Predisposing factors (e.g. personality traits and prior psychiatric history) "may lower the threshold for the development of the syndrome or aggravate its course, but they are neither necessary nor sufficient to explain its occurrence". Therefore the most recent diagnostic guidelines for PTSD are still insistent on the severity of the stressor being crucial for diagnosis. However, these diagnostic guidelines would satisfy a number of researchers previously critical of the DSM-III-R criteria (McFall et al., 1991)

The ICD-10 diagnostic guidelines for adjustment disorder specify that "individual predisposition or vulnerability play a greater role in the risk of occurrence and manifestations of this diagnosis than in PTSD but it is assumed that the condition would not have arisen without the stressor. Symptoms include depressed mood, anxiety, worry (or a mixture of these), a feeling of an inability to cope, plan ahead, or continue the present situation, and some degree of disability in the performance of daily routine...none of the symptoms is of sufficient severity or prominence in its own right to justify a more specific diagnosis... duration of symptoms does not usually exceed 6 months".

This above description of adjustment disorder could be said to apply to this driver sample. No driver still presented PTSD at 6 months. Moreover, individual characteristics have been found to influence the manifestation of PTSD. Green et al. (1985b) though emphasising the role of the stressor acknowledged the importance of the characteristics of the victim and the recovery environment. Severity of

exposure and loss incurred were not significant in the outcome of 469 firefighters except in their immediate responses (McFarlane, 1989). Reviewing the literature, McFarlane (1989) concluded that the longitudinal outcome of psychological morbidity following exposure to an extreme stressor "is better predicted by pre-disaster variables than the nature of the victims' exposure or losses" and so questioned the hypothesised aetiological process in PTSD.

Evidence for PTSD being a valid diagnosis must include the decision of the DSM-III "taskforce", who decided to include PTSD in the 1980 edition. Prior to this a number of clinicians and researchers had pressed for the recognition of this syndrome. However, as is the case with many new diagnoses such a decision has to be based more on clinical data than on empirical evidence.

Many of criticisms of Breslau and Davis (1987) have been refuted by other researchers who feel that the descriptive, predictive and construct validity of PTSD is supported by much empirical evidence (Ursano, 1987; Horowitz et al., 1987; Weisaeth, 1989c).

Weisaeth (1989c) refuted the accusations of Breslau and Davis (1987) pointing to research findings that he felt supported the face, descriptive and construct validity of PTSD. A stressor may be aetiologically specific in that the stressor determines the type of disorder developed. Alternatively, the stressor may be aetiologically non-specific, whereby the stressor may only influence the timing of onset of the disorder. Weisaeth feels that the evidence points to extreme stressors being aetiologically specific and so supporting the DSM-III-R position that such stressors produce a

consistent "core of psychopathology".

From the results of his study of 125 survivors of an industrial accident Weisaeth (1989c) points to evidence that the syndrome presented by these survivors was that described in the DSM-III-R criteria and recognised by clinicians as those of PTSD (face validity). Also, the symptoms were also different from those exhibited by victims of violence who often received psychiatric diagnoses other than PTSD (descriptive validity).

Further, Weisaeth (1989c) argued that the inclusion of the stressor criterion increased the descriptive validity of PTSD, in that persons not exposed to severe trauma within the accident situation rarely exhibited a stress reaction of sufficient severity to satisfy the criteria for PTSD. Regarding construct validity, that developed theoretical models explain the development and manifestation of PTSD are supported by the data, Weisaeth puts forward the view that the degree of danger experienced and the internalisation of this danger account for the symptoms that make up PTSD (especially symptoms of reexperiencing the trauma). However, Weisaeth (1989c) acknowledges that the face validity could be improved on by less emphasis on psychic numbing and constriction of affect, as is the case in the ICD-10 criteria for PTSD.

Other authors have noted that the problems of misdiagnosis, the threshold for diagnosis, and of many of the other problems relating to the face validity of PTSD cited by Breslau and Davis (1987) are not unique to PTSD (Horowitz et al., 1987). These authors also argue that evidence does exist of the descriptive validity (those

closest to the stressor are more severely affected), predictive validity (a severe denial phase predicts a later intrusion phase) and construct validity (evidence supporting their own theoretical model).

Lindy et al. (1987) argued that there is a consensus as to what defines a traumatic stressor - sudden onset, lack of preparation, threat to life, violence, traumatic loss and exposure to the grotesque. However, they conceded that the wording of the criteria in this respect implied "that a large complex event...is uniform for all who experience it, which is certainly not objectively the case". These authors also criticised Breslau and Davis (1987) for underestimating the evidence linking psychopathology to degree of exposure and for the intensity of long term reactions. They also disagreed with Breslau and Davis regarding their view that the PTSD criteria presupposes a simple cause and effect relationship between the stressor and psychopathology which denies the possible effects of mediating factors.

Lindy et al. (1987) concluded that PTSD does have descriptive validity, that the symptoms of reexperience are distinctive in their presentation to PTSD especially regarding their link to the stressor. Though these symptoms may be heterogeneous this does not mean a core of PTSD symptoms does not exist.

Evidence of a more objective nature supporting the validity of PTSD has been put forward by some researchers. Jackson (1991) states that "tests of biological responses to specific stimuli can accurately differentiate PTSD from other anxiety syndromes, depression, and pathological grief". Keane et al. (1985) likewise found that biological responses to taped combat sounds differentiated Vietnam veterans

with PTSD from well adjusted Vietnam veterans. Moreover, other researchers have found that PTSD sufferers present a unique pattern of biological abnormalities (e.g. noradrenaline activity) that can be detected by appropriate diagnostic techniques and can differentiate PTSD from major depressive and panic disorders. However, to date such findings are few therefore more research in this area is needed before confidence in such findings is warranted (Friedman, 1991).

Keane, Wolfe and Taylor (1987) in reviewing the evidence for the validity of PTSD applied a previously established method for testing the validity of diagnostic categories. They concluded that an identifiable post-traumatic syndrome does exist. McGuire (1990) likewise concluded that PTSD is a valid diagnosis encompassing the reactions to trauma.

In criticising the validity of PTSD this is not to deny the suffering experienced by persons involved in traumatic events. It is only through constructive criticism of the criteria that improvements in the criteria will be achieved and the diagnostic validity of this diagnosis be increased. However, as PTSD as a diagnostic category is only 12 years old perhaps it is too early to expect an accurate natural history or for it to have achieved its final composition.

Risk factors

Studies of the post-traumatic reactions have found that similar events may produce different dimensions of experience in different individuals (Raphael, 1986; Smith et al., 1988). To explain why subjects, following exposure to the same trauma, may

present widely varying levels of psychological morbidity a number of researchers have attempted to identify risk and protective factors regarding post-traumatic responses. Among the suggested risk factors are: lower socioeconomic status; past psychiatric history; helplessness in trauma situation; and the post-traumatic disruption of social life. Age of victim has also been suggested as a risk factor, however, different studies have proposed both younger and older victims as risk groups.

Factors found to be protective are higher social class, higher/professional occupational status and past disaster experience (Raphael, 1986; Green et al., 1985b; Weisaeth, 1984). There are also a number of psychosocial factors that are thought to mediate the responses of victims. However, these may be either risk or protective factors dependent on the form and/or adequacy of their presentation - personality, coping strategies and social support (Raphael, 1986; McFarlane, 1989). The nature of the traumatic experience and the intensity and duration of the traumatic experience are also seen as important factors in influencing the post-traumatic response.

Green et al., (1985a), summarised the popular view, that the post-traumatic response is the result of an interaction between the nature and severity of the stressor, personal characteristics and the recovery environment, suggesting that the former, nature and severity of the stressor, is of primary importance. McFarlane (1989), however, emphasised the importance of pre-morbid factors, suggesting that neuroticism and a personal and family history of psychological problems are better predictors of post-traumatic stress than the severity of the disaster.

In many studies the victims come from a wide range of social backgrounds and their experience of the same trauma may vary considerably. An advantage of the study reported here is that many of the variables mentioned above (socioeconomic status; helplessness in trauma situation; social class; occupational status; duration of the traumatic experience) are relatively constant for all subjects. Therefore in this situation one is able to more accurately assess the effect, if any, of other important variables. Of those variables found in previous studies to be associated with post-trauma responses, no relevant variables would appear to be excluded from this study.

Following analyses by chi-square tests and single logistic regressions a number of variables were not used in the initial stage of the multiple logistic regression analyses as they were found to not significantly associated with the criterion variables. A number of these variables along with some of those eliminated at subsequent stages of the regression analysis are noteworthy.

It appears that the type of incident whether the person jumped in front of the train, was prostrate on the line as the train entered or when the victim was not seen prior to contact does not contribute significantly to the outcome as measured by the 3 criterion variables. Though mutilation was seen to be an important variable in respect of PSE-9 caseness, the more broad categorisation of outcome of dead or alive was not important. Also whether the mutilated body was seen after the incident (seen mutilated/seen but no mutilation) was not as important as the variable body was mutilated alone.

A study by Singh and Raphael (1981) similarly dealing with the effects of a train disaster found that relatives who saw the body of the deceased family member after the disaster reported a better outcome than those who did not. Laufer et al. (1985a) found that Vietnam veterans who participated in violence demonstrated a more severe psychological reaction compared to veterans who were exposed to violence but did not participate in these acts. It would appear that witnessing a mutilated body need not be seriously traumatising. It is more likely that having played a role in a death resulting in mutilation is the important factor irrespective of whether the body is seen.

The possibility that the age and sex of the victim might have some bearing on the reaction of drivers (i.e. young and/or female) was explored. However, this was not the case. 26 (34.21%) of the 76 victims were female, 36.0% of drivers classified as cases (PSE-9 and/or PTSD) were involved in incidents where the victim was female and 33.33% of non-case drivers were in incidents where the victim was female. The mean age for all victims was 38.46 years, mean for cases was 42.08 years and for non-cases 35.47. It can be seen that there was not a predominance of females in the incidents where the drivers were later classified as cases, nor was the age of the victims lower in the case incidents.

A number of variables have been suggested in the literature as possible risk factors concerning PTSD. Among them the age and psychiatric history of the person involved in the traumatic incident and whether the person had previous experience of traumatic incidents. None of these variables were significant in the analyses reported here. The mean age of drivers in the case group (PSE-9 and/or PTSD) was

37.84 years and for the non-case group 38.76 years. 9 drivers reported having a history of psychiatric care. Of those drivers classified as a case 4 (16.0%) had a psychiatric history, of the non-cases 5 (9.8%) had a psychiatric history. Though a higher percentage of drivers in the case group did have a psychiatric history this variable was not significant in any stage of the analyses.

Regarding drivers who had experienced previous incidents of this kind, 5 (20.0%) drivers who were classified as a case had experienced previous incidents and 20 (39.22%) of the non-cases had been involved in previous incidents. This variable was not found to be a significant in any analyses, however the fact that 20 of the 51 non-cases had experienced previous incidents suggests that involvement in more than one incident does not automatically predict that the driver is more at risk in respect of the criterion variables investigated here.

3 incident, victim or driver variables were included in the 3 final models explaining caseness or post-incident sickness absence: body of victim was mutilated, driver of non-UK ethnic group and pre-incident average annual sickness absence ≥ 20 days. 1 of these 3 variables, non-UK ethnic group was included in all final models at this stage of the analysis (Tables 15,16 & 17).

The operational definition of mutilation in this study was injuries causing the loss or visible destruction of limbs or other essential parts of the body. Whether or not mutilation had taken place was assessed by the driver's answers to relevant questions 1 month after the incident, therefore mutilation was attributed to the incident only when the driver was aware of such injuries having occurred. If it was

known to the author that in fact mutilation had occurred yet the driver was not aware of this then a negative response was recorded. It was felt that if the variable mutilation was a risk factor regarding the subsequent psychological morbidity of the driver it would be necessary that he was aware that mutilation had occurred.

The presence of mutilation in the final model for PSE-9 caseness when incident, victim and driver variables only were used is in agreement with theories suggesting that the severity of the trauma is crucial in influencing the post-traumatic response. However, as mentioned above, other measures of the severity of the incident were assessed (i.e. whether or not the body was seen after the incident, dead/alive) yet were not found to be significant or not as significant as mutilation alone.

However, mutilation was not included in the final model for PTSD caseness. This is surprising given the importance of the severity of the trauma in the development of PTSD. It would appear that though the severity of the traumatic event as measured by the degree of mutilation does influence the post-traumatic response in general, it is not an important factor regarding the development of PTSD. Pre-morbid factors would appear to be of primary importance regarding the development of PTSD in this sample.

The ethnic group of the driver was seen to be an important variable in all 3 models where incident, victim and driver variables alone were used.

Of the 76 drivers the majority, 51 (67.11%), were of the UK ethnic group. Of the non-UK drivers, 12 (15.79%) were Asian, 10 (13.16%) were Afro-Caribbean and 3

(3.95%) Irish. A number of studies have found Afro-Caribbeans and Irish immigrants to report higher levels of various psychiatric diagnoses than British natives (Cochrane, 1977; Harrison et al., 1988; Glover, 1991).

That Asian drivers are more vulnerable than drivers in the UK ethnic group is of particular interest given the general finding that British Asians present lower rates of mental illness than the indigenous population (Cochrane and Stopes-Roe, 1981; Ineichen, 1990) though Phelan (1990) points out that there are wide variations in the reporting of both neurotic and psychotic symptoms by different national groups within the Asian community. However, regarding studies investigating PTSD in Vietnam veterans researchers have noted that membership of minority racial groups (American blacks and Hispanic Vietnam Veterans) led to higher rates of post-traumatic pathology (Laufer et al., 1985a; McGuire, 1990). Another factor that may account for the suggested vulnerability of Asians following these incidents may be related to the religious and philosophical views of Indians towards suicide "it is not uncommon for some (probably the predisposed) to develop severe neurotic or even psychotic reactions either after seeing the body of the suicide...or even by frequenting the places where suicides have occurred" (Farberow, 1975).

The 4 psychosocial variables in final models were all classified as binary variables, scores in the upper quartile of all scores on the sub-scale classified as 1. For those variables included in final models the upper quartiles were as follows: tangible social support (SPS) = ≥ 12 ; mental disengagement (COPE) = ≥ 10 ; behavioural disengagement (COPE) = ≥ 6 ; neuroticism (EPQ) = ≥ 11 .

Carver et al. (1989) included three coping categories within the COPE:

- 1) Problem-focused coping are techniques usually employed in stressful situations where it is thought possible to eradicate or reduce the effect the source of the stress;
- 2) Emotion-focused coping is most often used in stressful situations where no method of removing the stressor is apparent and so efforts are aimed more at the reduction of experienced stress;
- 3) Potentially maladaptive coping strategies, these may be effective if used in the short term, however if employed in the long term may prevent adaptive coping.

Following analysis to decide which of the 13 COPE sub-scales to use only 3 sub-scales were found to be significant: Focus and venting of emotions, mental disengagement and behavioural disengagement. Mental and behavioural disengagement were included in all models where self-report sub-scales only were used (Tables 18, 19 & 20) and in models when all variables were used (Tables 21, 22 & 23).

Behavioural disengagement is primarily maladaptive coping strategy which involves the subject reducing his efforts to deal with the stressor or in attaining a goal with which the stressor is interfering. Behavioural disengagement is particularly associated with situations which cause a feeling of helplessness (Carver et al., 1989). Behavioural disengagement was included in the final models for PSE-9 caseness. Behavioural disengagement's association with helplessness suggests that one would expect this coping strategy used by drivers who were experiencing depressive or phobic disorders. This is felt to be the most likely reason that this coping strategy was important in the prediction of PSE-9 cases but not for PTSD caseness or high

post-incident sickness.

Mental disengagement is also a maladaptive coping strategy. Mental disengagement "is a variation of behavioural disengagement, postulated to occur when conditions prevent behavioural disengagement" (Carver et al., 1989). Use of this coping strategy aims to distract the individual's thoughts away from the stressor itself or from thinking about the behavioural dimension or goal with which the stressor is interfering. In this situation one can suggest that the driver is seeking to distract himself regarding thoughts of the incident, his return to work and/or his psychological problems that have developed since the incident. The driver may use a variety of alternative activities to distract his thoughts from the problem, i.e. daydreaming, sleep, television. This variable can be seen to be relevant to all 3 of the criterion variables. In particular mental disengagement can be seen to be relevant to PTSD cases, the driver seeking to distract himself from intrusive thoughts regarding the incident.

1 of these 2 coping strategies were included in all final models. Mental disengagement was included in final models for PTSD caseness and post-incident sickness absence and behavioural disengagement was included in the final model for PSE-9 caseness. These 2 variables may be viewed as related to both depressive and post-traumatic symptomatology. Other researchers have found the coping strategies used by depressed psychiatric patients to be predictive of functioning (Billings and Moos, 1984). Mental and behavioural disengagement if used in a maladaptive manner might be seen as a precursor to many depressive or phobic symptoms (depressive type and phobic state diagnoses accounted for 23 of the 24 PSE-9 diagnoses). Both these variables are also described in section C of the criteria

for PTSD (American Psychiatric Association, 1987) this section listing symptoms of avoidance, both mental and behavioural, of stimuli associated with the trauma.

The particular coping method employed by drivers, whether mental and/or behavioural disengagement, appears to play an important role in influencing the post-traumatic response of drivers. Those drivers utilising behavioural disengagement being more likely to be classified as a PSE-9 case, drivers reliant on mental disengagement were more likely to be diagnosed as either a PSE-9 and/or PTSD case and to take sickness absence ≥ 21 days following the incident.

It is interesting that no positive coping strategy was found in the initial analysis to be of significant importance. Both mental disengagement and behavioural disengagement are in this context maladaptive coping strategies. Positive coping strategies, as measured by the COPE, do not play a preventative role in enabling the driver to avoid caseness, whether PTSD or PSE-9. However, use of maladaptive coping strategies do increased the risk of the driver experiencing an adverse post-traumatic response.

These findings indicate that psychiatric caseness and sickness absence following the incident were associated with maladaptive coping strategies. Though, given the suggestion of other researchers that the use of coping strategies may be context specific (Folkman et al., 1986) one cannot be certain as to whether the choice of maladaptive coping strategies was dictated by pre-morbid coping preferences, the incident not being amenable to change or as a consequence of the psychological reactions to the incident. However, other researchers have also found an association

between maladaptive coping techniques and PTSD and/or adjustment problems (Fairbank and Nicholson, 1987; Nezu and Carnevale, 1987; Aldwin and Revenson, 1987). Therefore, whatever brings about their use some form of link would appear to exist between maladaptive coping strategies and problems in adjustment following adverse life events.

Though the coping strategies used by drivers has been seen to be important variables regarding our criterion variables the 2 other psychosocial variables personality and social support were not included in any final model.

The Social Provisions Scale sub-scale included in analyses was tangible social support. Tangible support is the availability to the driver of financial and practical help. That this variable was not included in any of the models was surprising as social support has been suggested to be an important factor regarding depression (Billings et al., 1983) and post-trauma responses (Green et al., 1985a; Fairbank and Nicholson, 1987; Smith et al., 1988).

Likewise the neuroticism scale of the EPQ did not appear in any final models. This personality trait has also been suggested as an important factor regarding post-traumatic morbidity.

Neuroticism and tangible social supports do not appear to be of significant importance in influencing the level of sickness absence or the development of PTSD or PSE-9 caseness in this subject group. However, though important it may be that these variables were overshadowed by superior predictors (coping strategies) for our

criterion variables. Also a relationship between neuroticism and coping strategies cannot be ruled out. It may be that an individual's preferred coping strategies are influenced by their personality or that the choice of coping strategies used are influenced by social supports available.

Regarding those variables included in final models for post-incident sickness absence ≥ 21 days, all final models were identical to those for PTSD caseness. As demonstrated earlier PTSD cases did have the highest post-incident sickness absence. Given this association similar final models for these 2 variables were expected.

Two variables would appear to be of obvious importance in these analyses, driver of non-UK ethnic group and mental disengagement. The variable driver of non-UK ethnic group was included in final models for all three criterion variables when incident, victim and driver variables were used alone. When psychosocial variables alone were used and when all variables were used mental disengagement was included in final models for all 3 criterion variables.

Regression analysis was completed as resulting models are of value in shaping educational and preventative measures regarding driver's reactions to these incidents. Also such models are useful in targeting high risk groups following such incidents. The incident, victim and driver variables were analyzed alone initially as the resulting final models can be of use following an incident to identify drivers at potentially higher risk by the characteristics of the incident and the driver.

Additionally, though many variables have been suggested as important in determining the post-traumatic response it was of interest to separate those variables relating to the incident, the victim, the driver and psychosocial factors and to separately investigate their relative importance in predicting the post-traumatic response of drivers. From our analyses pre-morbid factors (coping strategies and pre-incident sickness absence) would appear to be of primary importance overall. Also, if one is to compare the value of the models obtained from incident, victim and driver variables alone against those gained from psychosocial variables alone the latter appear to be superior. The 2 models for PSE-9 and PTSD caseness arrived from incident, victim and driver variables in comparison to the 2 models for these criterion variables gained from psychosocial variables appear to be weaker in that the estimated relative risks for the 2 incident, victim and driver variable models were lower (1.54 and 1.60 compared to 2.69 and 4.33 respectively).

It may be possible to influence some of the above variables. For instance Ostell (1991) has suggested models by which appropriate changes in coping techniques can be achieved, enabling individuals to improve their ability to cope with stressors. However, others variables found to be important cannot easily be changed or influenced i.e. ethnicity and pre-incident sickness absence.

An important point raised by McFarlane (1989) is that variables found to be the best predictor of outcome at time 1 may not be the best predictors of outcome at time 2. Following the interview at 1 month drivers were followed up at 6 and 12 months. Initially it was planned to repeat the above analyses in order to identify risk factors for psychiatric status at 6 and 12 months. However, following the follow-up interviews

it was found that very few drivers still presented as a case at follow-up interviews. Of those drivers seen at 1 month and again at 6 months only 2 drivers still presented as a case. These 2 drivers were a case on the PSE-9, no driver reported sufficient symptoms at 6 months to be diagnosed as suffering PTSD. At 12 months again 2 drivers were classified as a case on the PSE-9. Given the small number of cases at follow-up it would be meaningless to use these data in a logistic regression analysis as the results would be unreliable in attempting to measure so small an effect and the value of such results is also questionable.

Our findings would appear to fall in between the two views of Green et al. (1985a), who suggested that the nature and severity of the stressor, is of primary importance and McFarlane (1989) who emphasised the importance of pre-morbid factors. Both types of variables were seen to be important at different stages of our analyses. However, overall the pre-morbid variables, coping strategies and pre-incident sickness, were most important.

In summary the following variables were found to indicate a poor prognosis - being classified as PSE-9 or PTSD case or high sickness absence following the incident: body of victim was mutilated; driver of non-UK ethnic group; pre-incident average annual sickness absence ≥ 20 days; high scores on the COPE sub-scales mental disengagement and behavioural disengagement.

10.0) PREVENTATIVE MEASURES

The average number of days sickness absence for drivers experiencing a person jumping or falling in front of their train was 16.3 days. If there are approximately 95 incidents per year this results in 1548 working days per year lost due to these incidents. The cost of any preventative strategies have to be considered in view of this considerable cost to the company.

It is envisaged that the preventative strategies discussed below are likely to be useful in helping drivers who experience problems following a person jumping or falling in front of their train. In addition these measures may provide additional benefits including financial savings from a reduction in man hours lost through sickness and an improvement in driver morale.

Preventative measures regarding drivers are discussed under the following headings:

1. Preparation for the incident
2. The Incident Coordinator
3. Procedures during an incident
4. Short term response
5. Medium term response
6. Long term response
7. Suggested procedural changes

Preparation for the incident

The PWAS, during the induction training for all drivers, guards and station staff, should discuss the possible adverse affects following exposure to a suicide or attempted suicide. These training sessions might include a talk from a driver who has experienced problems following an incident. The discussion should emphasise that should any employee experience problems following such an incident, a confidential consultation with the PWAS is always available.

It may be useful to have a presentation from a clinical psychologist to explain the dimensions of the problems experienced by drivers following these incidents. This intervention might be of particular value in respect of managers. An expert presentation would be a useful way of clarifying any doubts which some managers may have about the validity of the adverse reactions suffered by some drivers.

Incident Coordinator (IC)

It is recommended that two members of the PWAS receive specialised training and are responsible for the welfare of all drivers involved in incidents of suicide or attempted suicide. Specialist training in the techniques of cognitive-behavioural therapy would probably be most appropriate as this treatment approach would be appropriate for most of the diagnoses reported by drivers in this study. Moreover, treatment studies using such techniques in the treatment of train drivers following railway suicides and other trauma groups have reported successful results (Tang, 1991; Richards, 1990).

These PWAS employees might also train a number of persons at depot or station level for the role of Incident Coordinator (IC). This training should include counselling and interviewing skills and the symptomatology and treatment of work related trauma. The IC should be trained to recognise drivers who require more specialised care. In such cases these drivers should be referred to the PWAS. It is envisaged that most drivers might be successfully counselled by the IC with a minority of drivers needing more specialised input from the PWAS.

The Line Controller who is responsible for contacting the emergency services when an incident occurs should also contact the IC. The on-call IC should make his or her way to the scene of the incident as quickly as possible.

Procedures during an incident

Written guidelines describing procedures in the event of a suicide or attempted suicide should be provided to all drivers during their basic training.

Once the driver has secured his train and station staff and managers have arrived at the scene of an incident, the driver is no longer required to participate further until the train is ready to be moved. The driver should be removed to the Station Supervisors office for the duration of the incident. Ideally the IC will have arrived at the scene by this stage and should remain with the driver and/or guard at this time, to offer support and to answer any questions.

The advantages of this measure are that the driver is removed from the scene of an often gruesome incident, has immediate access to a sympathetic colleague and can be easily located by any personnel who need to speak to him.

It is London Underground policy for the driver to move the train when necessary during the course of the incident. This might include reversing the train clear of the body on the track or driving the train to the depot. It is recommended that whenever possible an employee other than the driver involved in the incident complete this procedure. If no alternative driver is available the driver should be accompanied in the cab during such manoeuvres, preferably by the IC.

As soon as possible after the incident, usually within the hour, the British Transport Police (BTP) interview the driver. Many drivers find the BTP interview an anxiety provoking experience. The driver should be accompanied to this interview by the IC. All drivers are required to later provide a statement/accident report to London Underground. The IC should prepare this report using the information obtained during the BTP interview to reduce the number of times the driver is required to recount the incident before being allowed home.

After the BTP interview and before the driver is sent home the IC should describe the typical reactions that drivers might experience following these incidents. It needs to be emphasised that all these reactions are "normal" reactions to a traumatic event, in that they might be expected in any individual who experienced such an event, and that in many cases there will be a gradual reduction over the following few days in the severity and frequency of these symptoms. It should also be made clear that in

some cases these "normal" symptoms will be more severe and may persist and in such cases the driver should seek help from the IC or the PWAS.

As well as answering any questions the driver may have, at this time the IC should give the driver an information pack. This pack, discussed more fully later, will contain information about post-traumatic stress responses, the functions of the coroner's inquest, the name and telephone of the responsible IC.

After these discussions the IC should offer the driver the option of a taxi home and offer to telephone the driver's partner to tell them what has occurred.

Short term response

The short term response is concerned with the 72 hours following the incident. At present the driver is "stood down" for the three days following an incident. The purpose of this policy is to ensure that the driver is available to the British Transport police should they need to question him further. In reality this very rarely occurs and the driver will usually spend the next three days sitting in the depot canteen until such time that he is told to go home by the Station Supervisor. This time could be used more beneficially. Every driver who experiences a "person under train" should arrange to meet during this period with the IC, who will be able to identify any problems, offer appropriate advice or counselling and recognise cases where immediate referral to the PWAS would be appropriate.

The day following the "person under train" incident the only requirement for the driver, if he feels unable to report to work, should be to contact the IC and arrange an appointment at a time and place (work or home) which is mutually convenient, preferably within 2 days of the incident. Drivers who feel that they have experienced no adverse effects after the incident may be allowed to resume their normal duties.

Medium term response

The medium term time period will vary as it is concerned with the interval between the third day after the incident and the coroner's inquest. On average inquests take place around 6-8 weeks after the incident so by this stage most drivers will have returned to work. The IC should accompany the driver in the cab on first journey after the incident. Drivers may be more willing to return to work if they are confident that they will have some support in coping with the initial journey through the station or stretch of track where the incident took place.

During the medium term the IC should continue to monitor the driver's welfare and work pattern. Indications other than sickness absence that problems may be present are: lateness (sleep disturbances), irritability, absence from duty (as opposed to sickness), mistakes at work (concentration difficulties).

Should the driver have returned to work and then taken time off sick this might indicate that problems related to the incident are present and that the driver is having difficulties coping with them on his own. In such cases the IC should make contact with the driver at home.

In the case of drivers who are off sick from the day of the incident until the inquest the IC should establish and maintained contact with the driver as soon as possible following the incident. As well as assessing the drivers well-being and offering appropriate help and advice, the IC should also give information regarding the Coroner's inquest and offer to escort the driver to the inquest.

Long term response

The long term may be considered as the 6 months following the incident. Contact between the IC and the driver should be maintained throughout this period. The frequency of contact will depend on the drivers condition.

Procedural changes

It is essential that the IC is notified immediately after the occurrence of a "person under train". This can be easily accomplished by the Line Controllers contacting the IC in the same way that the author was notified of incidents (message pager). The IC will also need to be notified of the dates of relevant Coroner's Inquests. This can be achieved by maintaining regular contact with the Coroners' Liaison Officer of the BTP, who attends all inquests which relate to LUL deaths.

The three days "stood down" appear to be of little value either to the BTP or to the driver. However, if this arrangement is removed it is important that a constructive substitute replaces it, otherwise drivers and their unions are likely to feel aggrieved and possibly refuse to participate in the new system.

The replacement strategy should include the following:

- 1) The option of an immediate (next day) return to work should be available. Some drivers are capable and willing to return to work the next day.
- 2) All drivers should be offered the option of being accompanied on their first journey following the incident. Alternatively, before returning to work a driver may wish to accompany a fellow driver, who is also a friend, along the stretch of line on which he had a "person under train". Such a "trial run" may facilitate the drivers return to work sooner than would otherwise be the case.
- 3) The driver may wish to return to work but not feel ready to drive a train. In such cases an appropriate temporary posting might be made available.

Information packs which may be distributed during training or following an incident should be produced. The contents of these packs will vary slightly, depending on the staff group at which they are aimed.

Managers information pack

This should contain educational material concerning the problems commonly experienced by drivers following a "person under train". It should explain the procedures and policies relevant to "person under train" drivers, including inquest procedure, sickness and pay policy.

An objective of such information should be to attempt to change negative attitudes towards those suffering problems following a railway suicide (case studies may be

useful). The information pack should also describe the facilities available for drivers, explain the role of the IC and supply contacts for managers who wish to seek further advice on any matter.

Drivers information pack

This should contain educational material concerning the problems that are commonly experienced by drivers following a railway suicide, including possibly unexpected side effects of these problems such as problems at home and in relationships. Again, case studies may be useful. The emphasis must be that adverse stress reactions following a "person under train" are not uncommon and that it in no way means that the driver is "mad". Procedures and policies relevant to "person under train" drivers, including inquest procedure, sickness and pay policy must be explained. The facilities available for drivers and the role of the IC and PWAS should be discussed. Contact names and phone numbers for drivers wish to seek further advice or help should be included.

11.0) CONCLUSION

In summary it was found that one third of drivers suffered a severe reaction following incidents of persons jumping or falling in front of their trains. Predominant diagnoses were neurotic depression, post-traumatic stress disorder and phobic states. 3 groups were identified: A) drivers suffering from PTSD and in most cases an additional PSE-9 diagnosis; B) drivers who received a PSE-9 diagnosis only C) drivers who had no diagnosis. Though groups A and B were significantly distinct from group C on most measures, significant differences between groups A and B were generally found only in those measures which assessed the presence of PTSD.

All but one of the drivers who satisfied the diagnostic criteria for PTSD at one month received an additional diagnosis when assessed using the Present State Examination, diagnoses were predominantly of a depressive disorder. No driver satisfied the diagnostic criteria for PTSD at 6 or 12 months suggesting that PTSD in this sample is a time limited disorder.

6 months after the incident only 2 drivers had sufficient symptoms to be diagnosed as psychiatric cases. Generally a significant decrease in symptoms had occurred. Results at 6 months found that those drivers diagnosed as suffering from PTSD at 1 month reported a more marked decrease in symptoms than drivers who were predominantly diagnosed as phobic states at 1 month. Again at 12 months 2 drivers received a tentative diagnosis on the PSE.

Factors influencing the psychological reaction of drivers following these incidents were investigated using logistic regression. Psychiatric caseness as assessed by the Present State Examination (PSE-9) was associated with the body of the victim being mutilated, the driver being of non-uk ethnic origin and the use of mental and behavioural disengagement as coping strategies. Satisfaction of the diagnostic criteria for post-traumatic stress disorder was associated with the ethnic group of the driver, the annual average number of days sickness absence during the 5 years preceding the incident and the use of mental disengagement as a coping technique. Sickness absence following the incident was associated with the body of the victim being mutilated, the driver being of non-uk ethnic origin, the annual average number of days sickness absence during the 5 years preceding the incident and the use of mental disengagement as a coping technique.

The validity of the diagnostic criteria for PTSD was discussed. PTSD does appear to be describe a syndrome often reported by victims of disaster that is characterised by a number of disorder-specific symptoms. However, problems with the diagnostic criteria do exist, in particular the insufficient definition of the stressor criterion. It is hoped that future diagnostic manuals will pay attention to this issue.

Our results indicate that not all drivers are affected by these incidents but the proportion who are is significant and the symptoms reported are often incapacitating.

12.0) APPENDICES

APPENDIX 1) EXAMPLE OF LETTER SENT TO DRIVERS INVITING THEM TO THE ONE MONTH INTERVIEW

Train Operator J Smith
Pimlico Depot
District Line

10 February 1992

Dear Mr Smith

As you are aware a research team from Westminster Hospital is currently studying the effects of "one unders" on London Underground staff, particularly drivers. We have met with the union representatives for train staff who agree with the investigation and full support this study.

All drivers participating in this survey will remain strictly anonymous. No mention of any staff names or numbers will appear in any of our reports.

We would be much obliged if you would assist us by meeting with me at **9.30am on 22 March 1992 in Room 308, Charing Cross and Westminster Medical School.** On arrival at the Medical School take the lift to the second floor, turn right and follow the corridor round to the Department of Community Medicine.

The management of London Underground Ltd has agreed that all such interviews shall take place during your normal working day and your Train Crew Manager has been requested to relieve you from duty so that you may attend the above appointment.

We are aware that not all drivers appear to be affected by "one unders". However, in order to gain a complete picture it is essential that we interview all drivers. We hope we can rely on your support. Please find enclosed an envelope for your reply. We would be obliged if you would reply through the internal mail as soon as possible. We look forward to hearing from you.

Yours sincerely

Troy Tranah

APPENDIX 2) SEMI-STRUCTURED DRIVER INTERVIEW

SECTION I. INCIDENT DETAILS

- 1)NAME OF DRIVER
- 2)DRIVER NUMBER
- 3)DEPOT ADDRESS
- 4)INCIDENT DATE
- 5)TIME OF INCIDENT
- 6)STATION
- 7)LINE
- 8)AGE AND TYPE OF STOCK

- 9)OUTCOME
 - 1) Died on track
 - 2) Died before leaving station
 - 3) Dead on arrival at hospital
 - 4) Died in hospital
 - 5) Alive, not seriously injured
 - 6) Alive, seriously injured
 - 7) Other

- 10)LOCATION OF INCIDENT ON LINE
 - 1) Entrance to station, ie first 50 feet
 - 2) Exit of station, ie last 50 feet
 - 3) Mid-platform
 - 4) Between stations
 - 5) Other

- 11)PASSENGERS IN CAB
- 12)GUARD ON TRAIN
- 13)HEADLIGHTS ON AT TIME OF INCIDENT
- 14)CABLIGHTS ON

15)WAS THE PLATFORM CROWDED

- 1) Very
- 2) Moderately
- 3) Not crowded

16)NATURE OF INCIDENT

- 1)Jumped in front of train
- 2)Confronted train but not seen to jump
- 3)Fell in front of train
- 4)Pushed in front of train
- 5)Prostrate on line within station
- 6)Wandering on line between stations
- 7)Did not see victim prior to contact
- 8)Train stopped short, but saw victim

17)WAS THE VICTIM SEEN BEFORE CONTACT WAS MADE

18)DID DRIVER HAVE EYE TO EYE CONTACT WITH VICTIM

19)INJURIES TO VICTIM

- 1) Body divided into parts
- 2) Body mutilated but whole
- 3) Body whole,little or no mutilation

20)DID DRIVER SEE VICTIM AFTER THE INCIDENT

- 1) Not seen
- 2) Seen dead little or no mutilation
- 3) Seen dead and mutilated
- 4) Seen alive little or no mutilation
- 5) Seen alive and mutilated

21)AGE OF VICTIM

22)SEX OF VICTIM

23)OTHER PERSONAL DETAILS OF VICTIM KNOWN TO DRIVER

24)INCIDENT KNOWN TO DRIVER TO BE A SUICIDE ATTEMPT

25)VICTIM KNOWN TO DRIVER TO BE DRUNK AT TIME OF INCIDENT

26)DRIVER'S ACTIONS AFTER REPORTING THE INCIDENT

- 1) Left the platform area
- 2) Stayed in cab/train
- 3) Remained on platform, observing
- 4) Remained on platform, helping

27)WAS ANYONE IMMEDIATELY AVAILABLE ON SITE TO ASSIST THE DRIVER
ie platform staff, off duty staff on train, guard not included

28)DID DRIVER TAKE TRAIN ON TO DEPOT AFTER INCIDENT

- 1) Took train on to depot escorted
- 2) Took train on to depot alone
- 3) Did not take train on to depot

29)DRIVER'S DESCRIPTION OF INCIDENT

30)VICTIM ALIVE OR DEAD

SECTION II. INQUEST DETAILS

40)DATE OF INQUEST

41)DID DRIVER ATTEND

- 0)Did not attend
- 1)Attended alone
- 2)Attended accompanied by representative of LUL/LRT.
- 3)Attended accompanied by guard or other railwayman
- 4)Attended accompanied by guard and/or other railwayman and a representative of LUL/LRT.

42)DID VICTIM'S RELATIVES ATTEND INQUEST

- 0)No relatives attended
- 1)Relative/s did attend but not known if they spoke to the driver
- 2)Relative/s did attend but did not speak to the driver
- 3)Relative/s did attend and spoke to the driver in a positive manner
- 4)Relative/s did attend and spoke to the driver in a negative manner

43)VERDICT OF CORONER'S COURT

- 0)Suicide
- 1)Open
- 2)Misadventure
- 3)Accident
- 4)Unlawful killing

44)ANY OTHER INFORMATION ARISING FROM INQUEST THOUGHT RELEVANT

SECTION III. DEMOGRAPHIC DETAILS

51)DRIVER'S DATE OF BIRTH

52)AGE OF DRIVER

53)SEX OF DRIVER

54)DRIVER'S ADDRESS

55)ETHNIC GROUP (BIRTHPLACE)

- 1)UK
- 2)Irish
- 3)European
- 4)Afro/Carib
- 5)Asian
- 6)Other

56)RELIGION

- 1) Protestant
- 2) Catholic
- 3) Jewish
- 4) Muslim
- 5) Hinduism
- 6) No religious beliefs

57)IF A MEMBER OF ANY RELIGION ARE YOU A PRACTISING MEMBER

58)MARITAL STATUS

- 1)Single
- 2)Married
- 3)Cohabiting
- 4)Separated
- 5)Divorced
- 6)Widowed

59)IF YOU LIVE WITH A PARTNER DOES YOUR PARTNER WORK

60)HOW MANY CHILDREN DO YOU HAVE STILL LIVING AT HOME

61)ACCOMMODATION

- 1) None
- 2) Bedsit/Hotel/Hostel
- 3) Flat
- 4) House
- 5) Other

62)HOW MANY TIMES, IN THE LAST MONTH, HAVE YOU DISCUSSED THE
INCIDENT WITH ANY CLOSE FRIENDS OR RELATIVES

63)SCHOOL LEAVING AGE

SECTION IV. OCCUPATIONAL DETAILS RELEVANT TO INCIDENT

100)LENGTH OF TIME YOU HAVE BEEN DRIVING

101)THIS ROUTE

102)THIS SHIFT

103)TIME BASED AT PRESENT DEPOT

104)PREVIOUS INCIDENTS

105)HOW MANY

106)HOW LONG AGO

107)DETAILS OF PREVIOUS INCIDENT

108)HOW MANY DAYS OFF FOLLOWING PREVIOUS INCIDENT

109)ANY CONTINUING PROBLEMS DUE TO THIS PREVIOUS EXPERIENCE

110)HAD COLLEAGUES PREVIOUSLY TOLD YOU ABOUT SUCH INCIDENTS

111)HOW DID THE REALITY OF THIS INCIDENT DIFFER FROM WHAT YOU
EXPECTED SUCH AN INCIDENT WOULD BE LIKE

1)As I had imagined

2)Worse/more traumatic

3)Less traumatic

4)I had not previously imagined what it would be like

112)HAVE FELLOW EMPLOYEES DISCUSSED THE INCIDENT WITH YOU

113)IF SO, PLEASE ESTIMATE HOW MANY TIMES IN THE LAST MONTH

114)POSITIONS OF THESE EMPLOYEES

115)WERE SUCH DISCUSSIONS CONSIDERED HELPFUL

116)DO YOU FEEL THAT THE L.U.L. TRAINING PROGRAMME YOU
UNDERWENT MIGHT BE IMPROVED TO BETTER PREPARE DRIVERS
FOR SUCH INCIDENTS, IF SO HOW

SECTION V. GENERAL HEALTH AND ABSENCE DETAILS

- 150)AFTER THREE DAYS STOOD DOWN WAS SUBSEQUENT SICK LEAVE TAKEN
- 151)HOW LONG IN DAYS
- 152)REASON GIVEN BY DRIVER FOR SUBSEQUENT LEAVE
- 153)MEDICAL DIAGNOSIS FOR SUBSEQUENT LEAVE
- 154)ANY CONTINUING PROBLEMS FELT TO HAVE BEEN BROUGHT ON BY THIS INCIDENT
- 155)DOES THE DRIVER FEEL THAT THE THREE DAYS STOOD DOWN ARE OF ANY BENEFIT IN GETTING OVER SUCH AN INCIDENT, IF SO HOW
- 156)DOES THE DRIVER HAVE ANY SUGGESTIONS AS TO HOW THESE THREE DAYS MIGHT BE BETTER USED IN ORDER TO HELP DRIVERS WHO DO EXPERIENCE PROBLEMS FOLLOWING SUCH AN INCIDENTS
- 157)ESTIMATED AVERAGE ANNUAL SICK LEAVE PRIOR TO INCIDENT, IN DAYS
- 158)DOES THE DRIVER DRINK ALCOHOL
- 159)ALCOHOL CONSUMPTION PER WEEK, PRIOR TO INCIDENT, IN UNITS PER WEEK
- 160)ANY INCREASE SINCE THE INCIDENT, INCREASE IN UNITS PER WEEK
- 161)DOES THE DRIVER SMOKE CIGARETTES/TOBACCO
- 162)CIGARETTE CONSUMPTION, PER DAY, PRIOR TO INCIDENT
- 163)ANY INCREASE SINCE THE INCIDENT, INCREASE IN NUMBER PER DAY
- 164)HAS THE DRIVER HEARD OF THE L.R.T. COUNSELLING FACILITIES THE "PERSONAL WELFARE ADVISORY SERVICE"
- 165)HAVE THE P.W.A.S. CONTACTED THE DRIVER
- 166)HOW LONG AFTER THE INCIDENT, IN DAYS
- 167)HAS THE DRIVER CONTACTED THE P.W.A.S.
- 168)HOW LONG AFTER THE INCIDENT, IN DAYS
- 169)HOW WOULD THE DRIVER FEEL IF FOLLOWING "ONE UNDERS" ALL DRIVERS AUTOMATICALLY HAD TO REPORT TO THE P.W.A.S. FOR A BRIEF INTERVIEW DURING THEIR THREE DAYS STOOD DOWN
- 174)OPINIONS OF COUNSELLING

SECTION VI. MEDICAL AND PSYCHIATRIC DETAILS

200)MEDICAL HISTORY - ANY LONG TERM MEDICAL PROBLEMS

201)DETAILS, INCLUDING MEDICATION

202)PSYCHIATRIC HISTORY - EVER TREATED AS AN INPATIENT

203)DETAILS INCLUDING DIAGNOSIS, LENGTH OF STAY, MEDICATION, ETC

204)EVER TREATED AS A PSYCHIATRIC OUTPATIENT

205)DETAILS INCLUDING PERIOD AT AN OUT PATIENT, DIAGNOSIS,
MEDICATION, ETC

206)ANY OTHER FORMS OF TREATMENT FOR PSYCHIATRIC OR NERVOUS
COMPLAINTS ie. through your own GP

207)DETAILS, INCLUDING TREATMENT, DIAGNOSIS (IF KNOWN), HOW LONG
YOU HAVE BEEN SUFFERING FROM THIS COMPLAINT

208)FAMILY HISTORY OF PSYCHIATRIC ILLNESS, BLOOD RELATIVES ONLY

0) No family history of psychiatric illness

1) Inpatient

2) Outpatient

3) Other

4) Would rather not say

209)TYPE OF RELATIVE AND DETAILS

215)DO YOU HAVE ANY SUGGESTIONS AS TO HOW THE NUMBER OF "ONE
UNDERS" MIGHT BE REDUCED

220)HAVE YOU ANY SUGGESTIONS AS TO HOW DRIVERS WHO DO
EXPERIENCE PROBLEMS FOLLOWING A "ONE UNDER" MIGHT BE HELPED

225)ANY OTHER INFORMATION THOUGHT RELEVANT BUT NOT COVERED
ELSEWHERE

APPENDIX 3) COPY OF PRESENT STATE EXAMINATION (PSE-9)

PRESENT STATE EXAMINATION (P.S.E.)
Ninth Edition (May 1973)

(C) MRC.1974

PROJECT:-

No:-

1	2
---	---

SUBJECT:-

No:-

3	4	5
---	---	---

INTERVIEWER:

CARD NO:

6	7
---	---

INTERVIEWED AT:

DATE & TIME OF INTERVIEW:

THIS SCHEDULE RATED BY :-

DATE OF RATING:

LIVE:

AUDIO:

VIDEO:

	8
	9
	10
	11
	12
	13
	14
	15
	16
	17
	18
	19

Extra Nottingham questions: see additional code sheets:-

a). Ten short questions

Cols.20 - 29.

b). Subjective worries

Cols.30 - 42.

PSE-9 symptoms start

Col. 43 onwards.

MRC Social Psychiatry Unit,
Institute of Psychiatry,
LONDON
SE5 8AF.

University of Nottingham, Dept., of Psychiatry,
Mapperton Hospital,
Parncliffe Road,
NOTTINGHAM.

Interviewer should offer to shake hands, introduce himself briefly and explain the purpose of any recording equipment. The purpose of the introductory section is to gain an overall picture of recent symptomatology in the subject's own words. When the subject is settled, the interview should start as follows:

- ** I SHOULD LIKE TO GET SOME IDEA OF HOW YOU HAVE BEEN GETTING ALONG DURING THE PAST MONTH - HOW YOUR GENERAL HEALTH HAS BEEN AND HOW YOU HAVE BEEN FEELING ABOUT THINGS. SOME OF THE THINGS I SHALL ASK MAY NOT APPLY TO YOU BUT I AM JUST MAKING SURE THAT EVERYTHING HAS BEEN MENTIONED. MOST PEOPLE HAVE SOME SORT OF WORRY OR TROUBLE FROM TIME TO TIME. WHAT SORT OF THINGS DO YOU WORRY ABOUT?

Record the main problems spontaneously mentioned, and the first sentence of the subject's reply verbatim:-

Card 1.

Rate subject's unprovoked response:

0 - No worries or troubles.

1 - Some worries or troubles.

2 - "A worrier". Worries about everything.

(30)

DO YOU SPECIALLY WORRY ABOUT:

Money

Housing

Children

Work

Workmates or people you work with

Relationship with spouse

Relationship with relatives or friends

Relationship with neighbours

Own health - physical

Own health - mental

Health of others

Other worries (specify):

(31)

(32)

(33)

(34)

(35)

(36)

(37)

(38)

(39)

(40)

(41)

(42)

2.

WORRY

If any indication of worry, use further probes:-

- ** WHAT IS IT LIKE WHEN YOU WORRY?

(What sort of state of mind do you get into?)

(Do unpleasant thoughts constantly go round and round in your mind?)

(Can you stop them by turning your attention to something else?)

Rate worrying: A round of painful thought which cannot be stopped and is out of proportion to the subject worried about.

1 - Symptom definitely present during the past month, but of moderate clinical intensity, or intense < 50% of the time.

2 - Symptom clinically intense more than 50% of past month.

(43)

HEALTH AND TENSION

Part 1.

IS YOUR PHYSICAL HEALTH GOOD?

(Does your body function normally?)

DO YOU FEEL YOU ARE PHYSICALLY ILL IN ANY WAY?

(What is that like? How serious is it?)

Rate subject's own subjective evaluation of present physical health (irrespective of whether physical disease is present)

- 0 = Feels physically very fit.
- 1 = No particular physical complaint but does not say positively feels fit.
- 2 = Feels unwell but not seriously incapacitated.
- 3 = Feels seriously incapacitated by physical illness.

~~Observe: Rate 0, cut off and proceed to next item if rated 0 or 1; use cut off only if rated 2 or 3.~~

☐ (44)

DO YOU TEND TO WORRY OVER YOUR PHYSICAL HEALTH?

Rate hypochondriasis: i.e. Overconcern with possibility of death, disease or malformation. Rate at end of interview if subject constantly reverts to hypochondriacal preoccupation. Consider ratings of symptoms (19) and (22) in rating symptom.

- 1 = Symptom present during past month, but not (2)
- 2 = Subject constantly reverts to hypochondriacal preoccupations during interview.

☐ (45)

WHAT DOES YOUR DOCTOR SAY IS WRONG?

(Have you had a physical illness recently - cold, flu, etc.?)

Rate presence of physical illness or handicap, taking results of recent investigations and present state examinations into account.

- 0 = No physical illness or handicap present.
- 1 = Mild but significant physical illness or handicap (e.g. influenza or limp).
- 2 = More serious physical illness or handicap present but not incapacitating or threatening to life (e.g. deafness or duodenal ulcer).
- 3 = Physical illness or handicap present which is incapacitating or threatening to life (e.g. blindness or carcinoma).

Specify illness, disabilities and duration:-

☐ (46)

HAVE YOU HAD HEADACHES, OR OTHER AGES OR PAINS, DURING THE PAST MONTH?

(What kind?)

Rate only tension pains, e.g. "band round head", "pressure", "tightness in scalp", "ache in back of neck", etc. and not migraines.

- 1 = Symptom definitely present during past month, but of moderate clinical intensity, or intense (50% of the time).
- 2 = Symptom clinically intense more than 50% of past month.

☐ (47)

HAVE YOU BEEN GETTING EXHAUSTED AND WORN OUT DURING THE DAY OR EVENING, EVEN WHEN YOU HAVEN'T BEEN WORKING VERY HARD?

Rate tiredness or exhaustion: Do not include tiredness due to flu etc. = 9

- 1 = Only moderate form of symptom (tiredness) present; or intense form (exhaustion) (<50% of the time).
- 2 = Intense form of symptom (exhaustion) present 50% of past month.

☐ (48)

HAVE YOU HAD DIFFICULTY IN RELAXING DURING THE PAST MONTH?

(Do your muscles feel tensed up?)

Rate muscular tension: Do not include a subjective feeling of nervous tension, which is rated later

- 1 = Symptom definitely present during past month, but of moderate clinical intensity, or intense (>50% of the time).
- 2 = Symptom clinically intense more than 50% of past month.

Card 1:



(49)

HAVE YOU BEEN SO FIDGETY AND RESTLESS THAT YOU COULDN'T SIT STILL?

(Do you have to keep pacing up and down?)

Rate restlessness

- 1 = Only moderate form of symptom (fidgety, restless) present; or intense form (pacing, can't sit down) (<50% of the time).
- 2 = Intense form of symptom (pacing, etc.) present more than 50% of past month.



(50)

DO YOU OFTEN FEEL ON EDGE OR IRRED UP OR MENTALLY TENSE OR STRAINED?

(Do you generally suffer with your nerves?)

(Do you suffer from nervous exhaustion?)

Rate subjective feeling of "nervous tension": There is no need for autonomic accompaniments for this symptom to be rated present.

- 1 = Symptom definitely present during past month, but of moderate intensity, or intense (>50% of the time).
- 2 = Intense form of symptom present more than 50% of the past month.



(51)

DO YOU FIND THAT A LOT OF NOISE UPSETS YOU?

(Do noises sometimes seem to penetrate, or go through your head?)

Rate hypersensitivity to noise

- 1 = Moderate degree during month.
- 2 = Severe degree during month.



(52)

3.

AUTONOMIC ANXIETY

In this section, rate only subjective anxiety with autonomic accompaniments, either free-floating or situational. Do not include worrying or nervous tension. Do not include anxiety due to e.g. persecutory delusions, except in the special item (no. 17)

(CHECKLIST of autonomic accompaniments:

- | | | |
|---------------------------|-----------|--------------|
| Blushing | Dizziness | Palpitations |
| Butterflies in stomach | Dry mouth | Sweating |
| Choking | Giddiness | Trembling |
| Difficulty getting breath | | |

HAVE THERE BEEN TIMES LATELY WHEN YOU HAVE BEEN VERY ANXIOUS OR FRIGHTENED?

(What was this like?)

(Did your heart beat fast?) Ask for other autonomic symptoms

(How often in the past month?)

Rate free-floating autonomic anxiety: Exclude if due to delusions. Exclude if purely situational.

- 1 = Symptom definitely present, with autonomic accompaniment, during past month but of moderate clinical intensity, or intense (>50% of the time).
- 2 = Symptom clinically intense (>50% of the time).



(53)

(That some disaster might occur but you are not sure what
like illness or death or ruination?)

(Have you been anxious about getting up in the morning because
you are afraid to face the day?)

(What did it feel like?)

Rate anxious foreboding with autonomic accompaniment

1 = Symptom definitely present, with autonomic
accompaniment, during past month but of
moderate clinical intensity, or intense
<50% of the time

2 = Symptom clinically intense >50% of the time

Rate autonomic anxiety due to delusions etc.

ARE THERE ANY SPECIAL SITUATIONS THAT MAKE YOU ANXIOUS?

For more evidence of anxiety to be used on subsequent pages

CUT-OFF BEGINS

HAVE YOU HAD TIMES WHEN YOU FELT SHAKY, OR YOUR HEART POUNDED, OR YOU FELT
SWEATY, AND YOU SIMPLY HAD TO DO SOMETHING ABOUT IT?

(What was it like?)

(What was happening at the time?)

(How often during the past month?)

Rate panic attacks with autonomic symptoms: A panic attack is intolerable
anxiety leading to some action to end it, e.g. leaving a bus, phoning
husband at work, going in to see a neighbour, etc.

1 = 1-4 panic attacks during month

2 = Panic attacks 5 times or more

DO YOU TEND TO GET ANXIOUS IN CERTAIN SITUATIONS, SUCH AS TRAVELLING, OR
BEING ALONE, OR BEING IN A LIFT OR TUBE TRAIN?

(What situations? How often in past month?)

(CHECKLIST: Can be presented on separate card and each item rated
separately, if needed)

Crowds (shop, street, theatre, cinema, church)

Going out alone; being at home alone

Enclosed spaces (hairdresser, phone booth, tunnel)

Open spaces; bridges

Travelling (buses, cars, trains)

Rate situational autonomic anxiety

1 = (1a = Has not been in such situations during the past month but
aware that moderate anxiety would have been present if
the situation had occurred

(1b = Has not been in such situations during the past month but
aware that severe anxiety would have been present if the
situation had occurred

(2a = Situation has occurred during past month and patient
did feel moderately anxious because of it

2 = (2b = Situation has occurred during past month and patient
did feel severely anxious because of it

(Scoring: 1a or 1b = 1; 2a or 2b = 2)

(CHECKLIST: Present card if needed: Speaking to an audience. Eating, drinking or writing in front of other people. Parties)

Rate autonomic anxiety on meeting people

- (1a = Has not been in such situations during the past month but aware that moderate anxiety would have been present if the situation had occurred
- 1 = (1b = Has not been in such situations during the past month but aware that severe anxiety would have been present if the situation had occurred
- (2a = Situation has occurred during past month and patient did feel moderately anxious because of it
- 2 = (2b = Situation has occurred during past month and patient did feel severely anxious because of it
- (Scoring: 1a or 1b = 1, 2a or 2b = 2)

☐ (57)

DO YOU HAVE ANY SPECIAL FEARS, LIKE SOME PEOPLE ARE SCARED OF FEATHERS OR CATS OR SPIDERS OR BEES?

(CHECKLIST: Present card if necessary. Heights, thunder storms, darkness, animals or insects of any kind. Dentists, injections, blood, injury)

Rate only specific phobias, not general situational anxiety

- (1a = Has not been in such situations during the past month but aware that moderate anxiety would have been present if the situation had occurred
- 1 = (1b = Has not been in such situations during the past month but aware that severe anxiety would have been present if the situation had occurred
- (2a = Situation has occurred during past month and patient did feel moderately anxious because of it
- 2 = (2b = Situation has occurred during past month and patient did feel severely anxious because of it
- (Scoring: 1a or 1b = 1, 2a or 2b = 2)

☐ (58)

DO YOU AVOID ANY OF THESE SITUATIONS (SPECIFY AS APPROPRIATE) BECAUSE YOU KNOW YOU WILL GET ANXIOUS?

(How much does it affect your life?)

Rate avoidance of anxiety - provoking situations

- 1 = Subject tends to avoid such situations whenever possible
- 2 = Marked generalization of avoidance has occurred during past month e.g. subject has not dared leave the house or has gone out only if accompanied

☐ (59)

Describe anxiety symptoms and list phobias:

CUT-OFF END

THINKING. CONCENTRATION. INTERESTS.

 CAN YOU THINK CLEARLY OR IS THERE ANY INTERFERENCE WITH YOUR THOUGHTS?

DO YOUR THOUGHTS TEND TO BE MUDDLED OR SLOW?

(Can you make up your mind about simple things quite easily?
Make decisions about everyday matters?)

Rate subjectively inefficient thinking: If due to intrusion of alien thoughts, rate 9.

- 1 = Symptom definitely present during past month, but of moderate clinical intensity, or intense less than 50% of the time.
- 2 = Symptom clinically intense more than 50% of the past month.

☐ (5)

•• WHAT HAS YOUR CONCENTRATION BEEN LIKE RECENTLY?

(Can you read an article in the paper or watch a TV programme right through?)

(Do your thoughts drift off so that you don't take things in?)

Rate poor concentration

- 1 = Only moderate form of symptom present in past month (e.g., can read a short article, can concentrate if tries hard); or intense < 50% of the time.
- 2 = Symptom clinically intense (cannot attempt to read or concentrate) more than 50% of the past month.

☐ (6)

•• DO YOU TEND TO BROOD ON THINGS?

(So much that you even neglect your work?)

Rate neglect due to brooding

- 1 = Symptom has caused moderate impairment to work or social relationships.
- 2 = Marked impairment.

☐ (4)

•• WHAT ABOUT YOUR INTERESTS, HAVE THEY CHANGED AT ALL?

(Have you lost interest in work, or hobbies or recreations?)

(Have you let your appearance go?)

Rate loss of interest continuing during past month

- 1 = Symptom definitely present during past month, but of moderate clinical severity or severe less than 50% of the time.
- 2 = Symptom clinically severe more than 50% of the past month.

☐ (6)

•• HAVE YOU BECOME INTERESTED IN NEW THINGS AT ALL?

If evidence of expansive mood or ideas → Section 9.

If odd ideas, explore further. Proceed to Section 15, if appropriate.

•• HAVE YOU SUFFERED ANY LAPSSES OF MEMORY RECENTLY?

(Probe only)

If evidence of dissociation or organic memory loss → Section 16.

Answers to these questions may suggest that other types of thought disorder are present. If not, cut off → Section 5.

If any evidence of thought disorder:

ARE YOU IN FULL CONTROL OF YOUR THOUGHTS?

CAN PEOPLE READ YOUR MIND?

IS ANYTHING LIKE HYPNOTISM OR TELEPATHY GOING ON?

If necessary, proceed to Section 17.

5. DEPRESSION 7000

-- DO YOU KEEP REASONABLY CHEERFUL OR HAVE YOU BEEN VERY DEPRESSED OR LOW-SPIRITED RECENTLY?

-- HAVE YOU GRIEVED AT ALL?
(When did you last really enjoy doing anything?)

Rate depressed mood: N.B. When rating clinical severity of depression remember that deeply depressed people may not necessarily cry. See definition in glossary.

- 1 - Only moderately depressed during past month, or deep depression for less than 50% of the time and tending to vary in intensity
- 2 - Deeply depressed for more than 50% of the past month, and tending to be unvarying in intensity

-- HOW DO YOU SEE THE FUTURE?

(Has life seemed quite hopeless?)

(Can you see any future?)

(Have you given up or does there still seem some reason for trying?)

. Rate hopelessness: On subject's subjective view at present

- 1 - Hopelessness of moderate intensity but still has some degree of hope for the future (irrespective of time during month)
- 2 - Intense form of symptom (patient has given up hope altogether)

Use judgement about wording of the following:-

-- HAVE YOU FELT THAT LIFE WASN'T WORTH LIVING??

(Did you ever feel like ending it all?)

(What did you think you might do?)

(Did you actually try?)

Rate suicidal plans or acts

- 1 - Deliberately considered suicide (not just a fleeting thought) but made no attempt
- 2 - Suicidal attempt but subject's life never likely to be in serious danger, except unintentionally
- 3 - Suicidal attempt apparently designed to end in death (i.e. accidental discovery or inefficient means)

(N.B. Examiner should judge clinically whether there was intent to end life or not. If in doubt, assume not.)

Describe any attempt.

Evidence of both depression and anxiety

Rate anxiety or depression primary (see definition in glossary)

- 0 - Anxiety primary
- 1 - Neither primary
- 2 - Depression primary

IS THE DEPRESSION WORSE AT ANY PARTICULAR TIME OF DAY?

Rate morning depression (particularly on waking)

- 0 - No depression
- 1 - Not specially marked in mornings
- 2 - Specially marked in mornings

6.

SELF AND OTHERS

Card 1.

HAVE YOU WANTED TO STAY AWAY FROM OTHER PEOPLE?

(Why?)

(Have you been suspicious of their intentions? Of actual harm?)

Rate social withdrawal

- 1 - Only passive form of symptom, i.e. subject does not seek company, but does not refuse it if offered; or if active withdrawal, less than 50% of the month
- 2 - Actively avoids company (refuses it if offered). Actively withdraws in this way for more than 50% of the month

(71)

•• WHAT IS YOUR OPINION OF YOURSELF COMPARED TO OTHER PEOPLE?

(Do you feel better, or not as good, or about the same as most?)

(Do you feel inferior or even worthless?)

Rate self-depreciation

- 1 - Some inferiority, not amounting to feeling of worthlessness. If subject considers self to be worthless, this intense form of the symptom is present < 50% of the time
- 2 - Subject considers self to be completely worthless. Symptom present > 50% of the month

(72)

•• HOW CONFIDENT DO YOU FEEL IN YOURSELF?

(For example in talking to others, or in managing with other people?)

Rate lack of self-confidence with other people: Consider only competence in social relationships, not competence in mechanical work, etc.

- 1 - Moderate lack of self-confidence, or intense lack < 50% of the month
- 2 - Intense lack of self-confidence > 50% of the month

(73)

•• ARE YOU SELF-CONSCIOUS IN PUBLIC?

(Do you get the feeling that other people are taking notice of you in the street or a bus or the restaurant?)

(Do they ever seem to laugh at you or talk about you critically?)

(Do you consider people really are looking at you, or is it perhaps the way you feel about it?)

Rate simple ideas of reference (not delusions)

- 1 - Marked self-consciousness only (irrespective of time during month)
- 2 - Feels that people are criticizing or laughing at self but can be reassured

(74)

If no evidence of misinterpretations, delusions of reference or persecution proceed to Sections 15B, 15C.

CUT-OFF BEHINDS

If evidence of guilt:

DO YOU HAVE THE FEELING THAT YOU ARE BEING BLAMED FOR SOMETHING, OR EVEN ACCUSED? WHAT ABOUT?

Rate guilty ideas of reference. Do not include justifiable blame or accusation. Exclude delusions of guilt.

- 1 - Subject feels blamed but not accused (irrespective of time during month)
- 2 - Subject feels accused of some sin or misdemeanor. Not delusional

(75)

If delusions of reference may be present → Section 153.

DO YOU TEND TO BLAME YOURSELF AT ALL?

(If people are critical, do you think you deserve it?)

Rate pathological guilt only.

- 1 - Subject feels over-guilty about some peccadillo (irrespective of time during month).
- 2 - Subject feels to blame for everything that has gone wrong even when not his fault, but not delusional.

☐ (76)

→ If delusions of guilt may be present → Section 153.

DO YOU BLAME ANYONE ELSE FOR YOUR TROUBLES?

If delusions of persecution → Section 153.

CUT OFF ENDS

Card 2.

APPETITE. SLEEP. RETARDATION. LISTING.

WHAT HAS YOUR APPETITE BEEN LIKE RECENTLY?

(Have you lost any weight during the past 3 months?)

Rate loss of weight due to poor appetite. Do not include changes due to physical illness.

- 1 - Less than 7 lb. (15kg)
- 2 - 7lb. (15kg) or more.

☐ (21)

-- HAVE YOU HAD ANY TROUBLE GETTING OFF TO SLEEP DURING THE PAST MONTH?

(How long did you lie awake?)

(What happens if you take sleeping tablets?)

(How often does it happen?)

Rate delayed sleep

- 1 - One hour or more delay (irrespective of sleeping tablets)
 - 2 - Two hours or more delay (irrespective of sleeping tablets)
- (In either case, 10 or more nights during month).

☐ (22)

DO YOU SEEM TO BE SLOWED DOWN IN YOUR MOVEMENTS, OR TO HAVE LITTLE ENERGY RECENTLY? HOW MUCH HAS IT AFFECTED YOU?

(Do things seem to be moving too fast for you?)

Rate subjective anergia and retardation

- 1 - Marked subjective listlessness and lack of energy
- 2 - Marked retardation and underactivity (irrespective of time during month)

(23)

If sleep disturbance or depression:

DO YOU WAKE EARLY IN THE MORNING?

Rate early waking: (1 hour before usual)

- 1 - One hour hour or more before ordinary time
- 2 - Two hours hours or more before ordinary time
- (In either case, 10 or more nights during month)

(24)

HAS THERE BEEN ANY CHANGE IN YOUR INTEREST IN SEX? (Use discretion whether to ask this)

Rate loss of libido within present episode of illness and persisting during past month

- 1 - Marked loss of interest and performance
- 2 - Almost total loss of libido

(25)

DOES THE DEPRESSION OR TENSION GET WORSE JUST BEFORE THE START OF THE MONTHLY PERIOD?

Rate premenstrual exacerbation

- 0 - No definite exacerbation
- 1 - Marked exacerbation

(26)

8. IRRITABILITY
HAVE YOU BEEN VERY MUCH MORE IRRITABLE THAN USUAL RECENTLY?

(How do you show it?)

(Do you keep it to yourself, or shout, or even hit people?)

Rate irritability

- 1 - Keeps irritation to himself
- 2 - Shows anger by shouting or quarrelling
- 3 - Shows anger by hitting people, throwing or breaking things

(27)

9. EXPANSIVE MOOD AND IDEATION

HAVE YOU SOMETIMES FELT PARTICULARLY CHEERFUL AND ON TOP OF THE WORLD, WITHOUT ANY REASON?

(Too cheerful to be healthy?)

(How long does it last?)

Rate expansive mood: Not ordinary high spirits

- 1 - Moderately expansive mood (euphoria with marked element of inappropriateness or exuberance, whether recognized by patient or not), present during past month, and persistent for hours at a time. Do not include transient high spirits. Not necessarily described by subject.
- 2 - Intense form of symptom (elation or exaltation) definitely present during past month and persistent for hours at a time. Described by subject.

(28)

- (Do things seem to go too slowly for you?)
- (Do you need less sleep than usual?)
- (Do you find yourself extremely active but not getting tired?)
- (Have you developed new interests recently?)

Rate subjective ideation pressure

- 1 = Subjective equivalent of flight and ideas. Images and ideas flash through the mind, each suggesting others, at a faster rate than usual. State persists for hours at a time.
- 2 = As (1) but accompanied by very high energy output and activity which does not seem to make subject tired at the time. Definitely occurred during past month and persisted for hours at a time.

If evidence of expansive mood and ideation:

HAVE YOU SEEMED SUPER-EFFICIENT AT WORK, OR AS THOUGH YOU HAD SPECIAL POWERS OR TALENTS QUITE OUT OF THE ORDINARY?

- (Have you felt specially healthy?)
- (Have you been buying any interesting things recently?)

Rate grandiose ideas and actions

- 1 = Subjective feeling of superb health, exceptionally high intelligence, extraordinary abilities, etc. Persistent for hours at a time. Symptom occurred at some time during month.
- 2 = Grandiose ideas have been translated into action during the month, e.g. oversteering, gambling, etc. under the influence of grandiose ideas and expansive affect. Do not include cumulative gambling unless clearly of this type.

IS THERE ANYTHING SPECIAL ABOUT YOU?

- (Is there a special purpose or mission to your life?)
- (Are you specially clever or inventive?)
- (Are you a very prominent person?)
- (How do you explain this?)

If grandiose - delusions (46) - (48) may be present, → section 15D.

OBSESSIONAL SYMPTOMS

(These symptoms must be experienced as counting against conscious resistance)

DO YOU FIND THAT YOU HAVE TO KEEP ON CARRYING THINGS THAT YOU KNOW YOU HAVE ALREADY DONE?

- (Like gas taps, doors, switches, etc.)
- (Do you have to touch or count things many times to repeat the same action over and over again?)
- (What happens when you try to stop?)

Rate obsessional checking and repetition

- 1 = Symptom of moderate intensity, or if severe, present <50% of the time
- 2 = Symptom present in severe degree >50% of the past month

16. DO YOU SPEND A LOT OF TIME ON PERSONAL CLEANLINESS, LIKE WASHING OVER AND OVER YOUR HANDS BECAUSE YOU DON'T FEEL CLEAN? WHAT ABOUT TOILETING?

(Do you get worried by contamination with germs?)

(Do you have other rituals?)

(What happens when you try to stop?)

Rate obsessional cleanliness and similar rituals

1 = Symptom of moderate intensity or, if severe, present <50% of the time

2 = Symptom present in intense degree >50% of the past month

4 (33)

17. DO YOU FIND IT DIFFICULT TO MAKE DECISIONS EVEN ABOUT TRIVIAL THINGS?

(Do you constantly have to question the meaning of the universe?)

(Do you get awful thoughts coming into your mind even when you try to keep them out?)

(What happens when you try to stop?)

Rate obsessional ideas and rumination

1 = Symptom of moderate intensity or, if severe, present <50% of the time

2 = Symptom present in intense degree >50% of the past month

4 (34)

18.

DEPERSONALIZATION AND DEREALIZATION

19. HAVE YOU HAD THE FEELING RECENTLY THAT THINGS AROUND YOU WERE UNREAL?

(As though everything was an imitation of reality, like a stage set, with people acting instead of being themselves?)

(What is it like? How do you explain it?)

Rate derealization

1 = Moderately intense form of symptom definitely occurred during past month, and persisted for hours at a time. Things appear colorless and artificial, people appear lifeless and seem to act rather than being themselves.

2 = Intense form of symptom occurred during month and persisted for hours at a time, e.g. whole world appears like a gigantic stage-set, with imitation instead of real objects and puppets instead of people.

4 (35)

20. HAVE YOU YOURSELF FEEL UNREAL, THAT YOU WERE NOT A PERSON, BUT IN THE LIVING WORLD?

(Or that you were outside yourself, looking at yourself from outside?)

(Or that you look unreal in the mirror?)

(Or that some part of your body did not belong to you?)

(How do you explain it?)

Rate depersonalization

1 = Moderately intense form of the symptom definitely occurred during past month and persisted for hours at a time. Patient feels himself unreal, a sham, a shadow.

2 = Intense form of symptom definitely occurred during past month and persisted for hours at a time. Patient feels he is dead, not a person, living in a parallel existence, a hollow shell, even that he does not exist.

4 (36)

17.

OTHER PERCEPTUAL DISORDERS (NOT HALLUCINATIONS)

DO YOU EVER GET THE FEELING THAT SOMETHING odd IS GOING ON WHICH YOU CAN'T EXPLAIN?
(Or that familiar surroundings seem strange? How do you explain it?)

Rate Delusional Mood: The subject feels that his familiar environment has changed in a way which puzzles him and which he may not be able to describe clearly. The feeling often accompanies delusion formation.

- 1 - Symptom definitely present. No delusions have actually been formulated, though patient may feel that various delusional explanations are possible.
- 2 - Full delusional elaboration has occurred.

DOES YOUR IMAGINATION SOMETIMES PLAY TRICKS ON YOU?

IS THERE ANYTHING UNUSUAL ABOUT THE WAY THINGS LOOK OR SOUND, OR SMELL OR TASTE?
(Does your body function normally?)
(Is your own appearance normal?)

Continue below cut-off if necessary, even if (20) not present.

Rate Delusional Mood: The subject feels that his familiar environment has changed in a way which puzzles him and which he may not be able to describe clearly. The feeling often accompanies delusion formation.

CUT OFF POINT

If there is any hint of perceptual abnormality, continue beyond cut-off point and also consider later sections.
Rate only basic experience, not delusional elaboration.

IN WHAT WAY? DO SOUNDS SEEM UNNATURALLY CLEAR OR LOUD, OR THINGS LOOK VIVIDLY COLOURED OR DETAILLED?
(How do you explain this?)

Rate heightened perception: e.g., subject intensely aware of cracks in a wall, details of a wallpaper pattern, colours in a picture. Sounds heard with exceptional clarity, music appears particularly beautiful.

- 1 - Subject unable to describe the symptom precisely, but examiner thinks it is likely to have been present at some time during the past month.
- 2 - Subject describes symptom. Definitely present at some time (even if only briefly) during the past month.

DO THINGS SEEM DARK OR GREY OR COLOURLESS?
(How do you explain it?)

Rate dulled perception: The reverse of symptom (21).
Things look, sound and taste dull, flat, colourless and uninteresting.

- 1 - Subject unable to describe the symptom precisely, but examiner thinks it is likely to have been present at some time during the past month.
- 2 - Subject describes symptom. Definitely present at some time (even if only briefly) during the past month.

DOES THE APPEARANCE OF THINGS OR PEOPLE CHANGE IN A PUZZLING WAY: e.g., DISTORTED SHAPES OR SIZE OR COLOUR?
(How do you explain it?)

Rate changed perception:

- 1 - Subject unable to describe the symptom precisely, but examiner thinks it is likely to have been present at some time during the past month.
- 2 - Subject describes symptom. Definitely present at some time (even if only briefly) during the past month.

DO YOU THINK YOUR OWN APPEARANCE IS NORMAL?

(Conviction that nose is too large, teeth misshapen, body crooked, etc., - Ask questions here if convenient but rate symptom (6u).)

DOES YOUR EXPERIENCE OF TIME SEEM TO HAVE CHANGED?

(Does it go too fast or too slowly, or do you seem to live through experiences exactly as you have had them before?)

Rate changed perception of time. (including Deja Vu.

- 1 - Subject unable to describe the symptom precisely, but examiner thinks it is likely to have been present at some time during the past month.
- 2 - Subject describes symptom. Definitely present at some time (even if only briefly) during the past month.

☐ (74)
DO YOU FEEL YOU HAVE LOST YOUR EMOTIONS IN SOME WAY?

(That you are empty of all feeling, incapable of reacting emotionally?).

(Is this a definite change, or have you always been like that?)

(How do you explain it?)

Rate lost emotions: Rate only subjective loss of affect, i.e., subject can remember being able to react emotionally, though this might have been months or even years ago.

- 1 - Symptom definitely present during the past month but less than 50% of the time.
- 2 - Symptom present more than 50% during the past month.

☐ (25)

CUT OFF ENDS

13. THOUGHT READING. INSERTION. FORCE. BROADCAST.

If question has not been covered in Section 4 ask:

CAN YOU THINK QUITE CLEARLY OR IS THERE ANY INTERFERENCE WITH YOUR THOUGHTS?

(Are you in full control of your thoughts?)

(Can people read your mind?)

(Is anything like hypnosis or telepathy going on?)

Rating evidence on thought reading, insertion, force, broadcast, Section 4

CUT OFF BEGINS

If any evidence, ask questions below:

(These symptoms are often recorded as false positives. The examiner must be satisfied that the subject is not simply assenting to a question he does not understand, but genuinely recognizes the experience and can describe it so that the examiner recognizes it). It is particularly important to know the relevant sections of the Instruction Manual well before rating these symptoms.

ARE THOUGHTS PUT INTO YOUR HEAD WHICH YOU KNOW ARE NOT YOUR OWN?

(How do you know they are not your own?)

(Where do they come from?)

Rate thought insertion: Include only thoughts recognized as alien. Do not include delusional elaboration, only basic experience. (Exclude hallucinations).

- 1 - Symptom described clearly, but subject thinks it may be due to 'own unconscious thoughts' etc., i.e., not certainly alien.
- 2 - Symptom described clearly and thoughts described as alien, i.e., inserted into mind from elsewhere (even if subject does not know from where). Not hallucinations.

☐ (26)

DO YOU EVER SEEM TO HEAR YOUR OWN THOUGHTS SPOKEN ALOUD IN YOUR HEAD, SO THAT SOMEONE STANDING NEAR MIGHT BE ABLE TO HEAR THEM?

(Are your thoughts broadcast, so that other people know what you are thinking?)
(How do you explain it?)

Rate thought broadcast.

- 1 - Hears own thoughts 'spoken' aloud but not broadcast. Subject must really hear them aloud in his head. If in doubt rate (2) or (3).
- 2 - Thoughts transferred or broadcast so that others can share subject's thoughts even when they are not in the same room. (Do not include 'thoughts being read' unless this is an explanation of thought broadcast. The subject must actually experience his thoughts being available to others).

☐ (27)

DO YOU EVER SEEM TO HEAR YOUR OWN THOUGHTS REPEATED OR ECHOED?

(What is that like? How do you explain it?)
(Where does it come from?)

Rate thought echo or commentary.

- 1 - Thought echo. If any doubt, rate (2) or (0).
- 2 - Subject experiences alien thoughts related to his own thoughts, i.e., associations or comments on his own thoughts. Not hallucinations.

☐ (25)

DO YOU EVER EXPERIENCE YOUR THOUGHTS STOPPING SUDDENLY SO THAT THERE ARE NONE LEFT IN YOUR MIND, EVEN WHEN YOUR THOUGHTS WERE FLOWING FREELY BEFORE?
(What is that like?)
(How often does it occur? What is it due to?)

DO YOUR THOUGHTS EVER SEEM TO BE TAKEN OUT OF YOUR HEAD, AS THOUGH SOME EXTERNAL PERSON OR FORCE WERE REMOVING THEM?

(Can you give an example?)
(How do you explain it?)

Rate thought block or withdrawal.

- 1 - Thought block. Do not include if due to anxiety or lack of concentration: only if it occurs totally unexpectedly when thoughts are flowing freely. One single occasion is not sufficient for rating. Be very critical in rating this symptom.
- 2 - Delusional explanation that thoughts are withdrawn.

☐ (29)

CAN ANYONE READ YOUR THOUGHTS?

(How do you know? How do you explain it?)

Rate delusion of thoughts being read: Only if subject does not seem that people can infer his thoughts from his actions. (Do not include subject reading thoughts of other people → 47).

- 1 - 'Partial' delusion. Subject entertains the possibility that thoughts might be read but is not certain about it. Exclude if subcultural explanation.
- 2 - Full delusion. Exclude if subcultural explanation. The term 'thoughts reading' is commonly used to mean the ability to tell what someone is thinking from the way they behave - this should be excluded.

☐ (30)

CUT OFF ENDS

HALLUCINATIONS

Card 3.

Use instrument about wording.

I SHOULD LIKE TO ASK YOU A ROUTINE QUESTION WHICH WE ASK OF EVERYBODY. DO YOU EVER SEEM TO HEAR NOISES OR VOICES WHEN THERE IS NO ONE ABOUT, AND NOTHING ELSE TO EXPLAIN IT?

(Do you ever seem to hear your name being called?)

- ** IS THAT TRUE OF VISIONS OR OTHER UNUSUAL EXPERIENCES, WHICH SOME PEOPLE HAVE? (Touch, taste, smell, temperature, pain, etc.)

~~Remove this section if the subject has no sense of hearing. Cut off Section 14.7~~

CUT OFF BEGING

If evidence for non-auditory hallucinations only →

Subsections 14.5 and 14.7

14.1.

AUDITORY HALLUCINATIONS

Is any evidence that auditory hallucinations might be present:

DO YOU HEAR NOISES LIKE TAPPING, OR MUSIC? (What is it like?)

DOES IT SOUND LIKE MUTTERING OR WHISPERING?

CAN YOU MAKE OUT THE WORDS?

Rate non-verbal auditory hallucinations.

- 1 = Music, tapping, car engines etc. Do not include tinnitus.
- 2 = Muttering, whispering but subject cannot make out any words at all.

☐ (31)

WHAT DOES THE VOICE SAY?

(Write down examples of typical verbal hallucinations.)

(If accusatory: DO YOU THINK THAT IT IS JUSTIFIED? DO YOU DESERVE IT?)

DO YOU HEAR YOUR NAME BEING CALLED?

Rate verbal hallucinations based on depression or elation or voice calling subject.

Content is congruent with mood: e.g. 'He's dirty', in context of depression, or 'Go to Westminster', in elated subject who thinks he is Prime Minister. Includes voice calling subject (e.g., calling name) or saying single words only. Be careful to distinguish from delusions of reference in which people whom the subject can see are thought to be talking about him.

Record examples.

- 1 = Voice calling name, or single words only.
- 2 = Other verbal hallucinations; congruent with depressed mood.
- 3 = Other verbal hallucinations; congruent with elated mood.

☐ (32)

DO YOU HEAR SEVERAL VOICES TALKING ABOUT YOU?

DO THEY REFER TO YOU AS 'HE' (SHE)?

(What do they say?)

(Do they seem to comment on what you are thinking, or reading, or doing?)

Rate voice(s) discussing subject in third person or commenting on thoughts or actions (not based on depression or elation).

Do not include muttering or whispering if subject cannot make out words. Exclude 'disassociative' hallucinations (symptom 35). Do not include voice calling name or affectively based verbal hallucinations (symptom 32). There may be once voice commenting on subject's thoughts or actions, or several voices discussing the subject in the third person.

Record examples.

- 1 = Hear a voice or voices commenting on thoughts or actions in third person (e.g., 'Now he's going to go to bed' or 'Why would he think a thing like that?'). (2) not present.
- 2 = Hear voices talking about him/her in third person (e.g., 'I think

☐ (33)

DO THEY SPEAK DIRECTLY TO YOU?
(Are they threatening or unpleasant?)
(Do they call you names?)

DO THEY GIVE ORDERS? (Do you obey?)

Rate voice(s) speaking to subject (not based on depression or elation)
Include voice(s) speaking directly to subject, whether accusing, threatening, giving orders or giving information. Exclude voice(s) calling name or based on depression or elation (symptom 32), or commenting on subject's thoughts or actions (symptom 33). Exclude 'dissociative' hallucinations (symptom 35).

Record examples.

- 1 = Pleasant, supportive or neutral voice(s), not based on affect.
No hostile voices.
- 2 = Hostile, threatening or accusing voice(s), thought to be undeserved and not based on affect.
- N.B. If single isolated words, even with neutral affect, include under 32(1).

☐ (34)

CAN YOU CARRY ON A TWO-WAY CONVERSATION WITH — ?

(You can reply, and then — replies to you, and you reply again, just as in an ordinary conversation?)

(Do you see anything, or smell anything at the same time as you hear the voice?)

(Who is it you are talking to?)

(What is the explanation?)

(Do you know anyone else who has this kind of experience?)

Rate 'Dissociative' hallucinations (verbal and/or other)

The subject can hold a two-way conversation with a presence (variously described as a person, ghost, spirit, god, etc.) which may also be sensed in other ways, e.g., visually or by touch or smell. Often connected with people with whom the subject has had strong affective ties. Visual hallucinations can occur alone. There is usually a strong subcultural colouring, e.g., the subject belongs to a religious sect or to a subcultural group which sanctions hallucinatory experiences, or the subject has been under the influence of someone who is involved with such practices. Exclude hypnagogic hallucinations.

Record examples.

- 1 = 'Dissociative' hallucinations present. Subject belongs to subcultural group or sect in which such experiences are sanctioned.
- 2 = 'Dissociative' hallucinations present. Subject does not belong to subcultural group as in (1). If not known, rate (1).

☐ (35)

ARE THESE VOICES IN YOUR MIND OR CAN YOU HEAR THEM THROUGH YOUR EARS?

Scoring:

- 1 = Subject hears both pseudo-hallucinations (within mind) and true hallucinations (through ears).
- 2 = Subject hears pseudo-hallucinations only.
- 3 = Subject hears true hallucinations only.

☐ (36)

HOW DO YOU EXPLAIN THE VOICES?

Record explanation.

CUT OFF END

VISUAL HALLUCINATIONS

If question has not been covered in Section 12 or 14A ask:

HAVE YOU HAD VISIONS, OR SEEN THINGS OTHER PEOPLE COULDN'T SEE?

If no evidence, here or elsewhere, for visual hallucinations cut off → Section 15

CUT OFF BEGINS

If any evidence of visual hallucinations:

WITH YOUR EYES OR IN YOUR MIND?

WHAT DID YOU SEE?

WERE YOU HALF ASLEEP AT THE TIME?

HAS IT OCCURRED WHEN YOU WERE FULLY AWAKE?

DID YOU REALIZE YOU WERE 'SEEING THINGS'?

DID THE VISION SEEM TO ARISE OUT OF A PATTERN ON THE WALLPAPER OR A SHADOW?

HOW DO YOU EXPLAIN IT?

Rate visual hallucinations: in clear consciousness including pseudo-hallucinations. Exclude 'dissociative' visual hallucinations (symptom 35).

- 1 - Formless visual hallucinations - flashes of light, shadows etc.
- 2 - Formed visual hallucinations - people, objects like a 'fiery cross', faces, etc.

Rate Delusional visual hallucinations.

☐ (37)

☐ (38)

CUT OFF ENDS

14C.

OTHER HALLUCINATIONS

If questions have not been covered in previous sections:

- IS THERE ANYTHING UNUSUAL ABOUT THE WAY THINGS FEEL, OR TASTE, OR SMELL?
- DOES YOUR BODY FUNCTION NORMALLY?

If no evidence for other hallucinations cut off → Section 16.

CUT OFF BEGINS

If any evidence for other hallucinations:

DO YOU SOMETIMES NOTICE STRANGE SMELLS THAT OTHER PEOPLE DON'T NOTICE?

(What sort of thing?)

(How do you explain it?)

Rate Olfactory hallucinations: Exclude delusion that patient himself smells.

- 1 - Simple olfactory hallucination. Not delusionally elaborated. Subject smells oranges, death, a burnt smell, scent, etc. which other people cannot smell. Can offer no explanation.
- 2 - Delusional elaboration in addition, e.g., gas being put into room.

☐ (39)

DO YOU SEEM TO THINK THAT YOU YOURSELF GIVE OFF A SMELL WHICH IS NOTICED?

(What is the explanation?)

Rate delusion that subject smells: Do not include simple preoccupation with body odour, e.g., in anxious subject who sweats a lot.

- 1 - Subject irrationally thinks he gives off a smell but is not certain. Not sure that others have noticed it but thinks it possible.
- 2 - Subject sure that he gives off a smell and that others have noticed it and react accordingly.

☐ (40)

DO YOU EVER FEEL THAT SOMEONE IS TOUCHING YOU, BUT WHEN YOU LOOK THERE IS NOBODY THERE?

(Have you noticed that food or drink seems to have an unusual taste recently?)

Rate other hallucinations and delusional elaborations:

Exclude hypochondriacal and nihilistic delusions rated in (61) and (62).

- 1 - Sensation of touch, food tastes burnt, etc., but subject puzzled by the experience. No delusional elaboration.
- 2 - Delusional elaborations in addition, e.g., fantasy lover, food poisoned, etc.

(41)

CUT OFF BEGINS

15.

DELUSIONS.

DEFINITION.

Delusions may be of two kinds, primary and secondary. Both kinds are rated together in the following symptoms except where specified. For example, primary delusions are specifically rated in symptom (53). They are defined here for convenience.

Primary delusions are based upon experiences in which a subject suddenly becomes convinced that a particular set of events has a special meaning (e.g., a subject undergoing a liver biopsy suddenly felt he had been chosen by God). The delusion cannot be explained and it is not shared by other members of the subject's cultural or social group.

Secondary delusions are delusional elaborations of primary delusions or other basic phenomena such as derealisation, depersonalisation, perceptual distortions, hallucinations, thought echo, mood changes, etc.

Above cut-off questions, likely to elicit delusions if present, are included in many of the preceding sections. There may also be evidence in the case-record or in the subject's spontaneous account.

~~If no evidence at all that delusions are present, cut-off in Section 16.~~

Record if any psychotic phenomena present, other than delusions, use judgement as to whether to proceed beyond cut-off.

CUT OFF BEGINS

If any evidence for delusions, ask all questions not in brackets, and any further questions which seem indicated.

Rating of partial and full delusions.

In general, all delusions are rated as follows:

- 1 - Partial delusions, which are expressed with doubt, or as possibilities which the subject entertains but is not certain about. This rating should not be used if it is clear that full delusions have been present during the month, or if the subject has acted as if fully deluded.
- 2 - Full delusions have been present at some time during the month. Fully convinced. No insight.

A useful question to elucidate the difference between partial and full delusions is as follows:

EVEN WHEN YOU SEEM TO BE MOST CONVINCED, DO YOU REALLY FEEL IN THE BACK OF YOUR MIND THAT IT MIGHT WELL NOT BE TRUE, THAT IT MIGHT BE IMAGINATION?

15A.

DELUSIONS OF CONTROL.Definition.

The subject's will is replaced by that of some external agency. - A simple statement that the radio is controlling the subject is not sufficient. (This statement, alone, should be rated 5). The subject must describe a replacement of will by some other force.

Do not include feeling that life is planned and directed by fate, or that the future is present already in embryo, or that subject is not very strong-willed, or that voices give subject orders. Do not include simple identification with God or being under God's direction. Do not include subcultural or hysterical possession states or multiple personality (→ 71).

DO YOU FEEL UNDER THE CONTROL OF SOME FORCE OR POWER OTHER THAN YOURSELF?

(As though you were a robot or a machine without a will of your own?)

(As though you were possessed by someone or something else?)

(What is that like?)

(Does this force make your movements for you without your willing it, or use your voice, or your handwriting? Does it replace your personality? What is the explanation?)

Rate delusions of control.

1 = Partial delusions.

2 = Full delusions.

☐ (42)
15B. MISINTERPRETATIONS, MISIDENTIFICATION AND DELUSIONS OF REFERENCE.Definition.

Delusions of reference: Do not include simple self-consciousness or feeling that subject attracts comment, even if critical. These are rated under symptom 74. There must be elaboration; e.g., someone crosses his knees in order to indicate that the subject is homosexual; or the whole neighbourhood is gossiping.

Delusional misinterpretations, etc. This is an extension of the delusion of reference, so that not only do people seem to refer to subject, but situations appear to be deliberately created to test him (exclude situations of medical treatment), or objects appear to have special meanings.

DO PEOPLE SEEM TO DROP HINTS ABOUT YOU OR SAY THINGS WITH A DOUBLE MEANING, OR DO THINGS IN A SPECIAL WAY SO AS TO CONVEY A MEANING?

DOES EVERYONE SEEM TO Gossip ABOUT YOU?

(Do people follow you about or check up on you or record your movements?)

(How do they do it? Why?)

(Are there people about who are not what they seem to be?)

Rate delusions of reference.

1 = Partial delusions.

2 = Full delusions.

☐ (43)

DO THINGS SEEM TO BE SPECIALLY ARRANGED?

(Is an experiment going on, to test you out?)

(Do you see any reference to yourself on TV or in the papers?)

(Do you ever seem to see special meanings in advertisements, or shop windows, or in the way things are arranged?). (How do you explain this?).

Rate delusional misinterpretation and misidentification.

1 = Partial delusions.

2 = Full delusions.

☐ (44)

15C.

DELUSIONS OF PERSECUTION.

IS ANYONE DELIBERATELY TRYING TO HARM YOU, e.g., TRYING TO POISON YOU OR KILL YOU?

(How? Is there an organisation like the Mafia behind it?)

(Is there any other kind of persecution? How do you explain this?)

Rate delusions of persecution.

1 = Partial delusions

2 = Full delusions.

☐ (45)

151.

EXPANSIVE DELUSIONS.

DO YOU THINK THAT PEOPLE ARE ORGANISING THINGS SPECIALLY TO HELP YOU?

Rate delusions of assistance

1 - Partial delusions

2 - Full delusions.

(46)

IS THERE ANYTHING SPECIAL ABOUT YOU? DO YOU HAVE SPECIAL ABILITIES OR POWERS?

(Can you read people's thoughts?)

(Is there a special purpose or mission to your life?)

(Are you especially clever or inventive? How do you explain this?)

Rate delusions of grandiose abilities.

1 - Partial delusions

2 - Full delusions

(47)

ARE YOU A VERY PROMINENT PERSON OR RELATED TO SOMEONE PROMINENT, LIKE ROYALTY?

(Are you very rich or famous?)

(How do you explain this?)

Rate delusions of grandiose identity: (Includes religious identification).

1 - Partial delusions

2 - Full delusions

(48)

152.

DELUSIONS CONCERNING VARIOUS TYPES OF INFLUENCE
AND PRIMARY DELUSIONS.

ARE YOU A VERY RELIGIOUS PERSON?

(Specially close to Christ or God?)

(Can God communicate with you? How?)

(Are you yourself a saint?)

(How do you explain this?)

Rate religious delusions: Including delusional religious explanations of other experiences. Exclude intense religious belief or purely subcultural beliefs.

1 - Partial delusions

2 - Full delusions.

(49)

HOW DO YOU EXPLAIN THE THINGS THAT HAVE BEEN HAPPENING? (SPECIFY)

IS THERE ANYTHING LIKE HYPNOTISM, TELEPATHY, OR THE OCCULT GOING ON?

(What is the explanation?)

Include delusional explanations in terms of paranormal phenomena:

e.g., hypnotism, telepathy, magic, witchcraft, etc.

Exclude purely subcultural beliefs, → 54.

1 - Partial delusions

2 - Full delusions.

(50)

IS ANYTHING LIKE ELECTRICITY, OR X-RAYS, OR RADIO-WAVES AFFECTING YOU?

(In what way? What is the explanation?)

Include delusional explanations in terms of physical forces:

e.g., radio, television, X-rays, electricity, transmitters, microphones, machines of various kinds.

1 - Partial delusions

2 - Full delusions

(51)

Delusions of alien forces penetrating or controlling mind (or body)

Include any delusion, whether rated elsewhere or not, which involves an external force penetrating the subject's mind or body, e.g., rays turn liver to gold, alien thoughts pierce skull or are inserted into mind, hypnotism makes patient levitate, a spirit speaks with subject's voice, a radio transmitter has been implanted into brain and broadcasts thoughts or controls actions, etc.

1 - Partial delusions

2 - Full delusions

(52)

Choose a likely delusion, and ask:

HOW DID IT COME INTO YOUR MIND THAT THIS WAS THE EXPLANATION?

(Did it happen suddenly? How did it begin?)

Rate trigger delusions: Based upon experiences in which subject suddenly becomes convinced that a particular set of events has a special meaning. (See definition on page 19). Not based on good or explanation of other abnormal experiences.

1 - Partial delusions

2 - Full delusions.

(53)

OTHER DELUSIONS.

(Examiner should question as appropriate).

Rate subculturally influenced delusions: Include only subjects who belong to small groups with definitely idiosyncratic beliefs; small sects, tribes, 'secret societies', etc.

- 0 - No significant subcultural influence. For example, an English subject believing he is influenced by TV would be rated (0) since, although the delusion depends on TV being available in England, it is not in any way specific to a small subcultural group.
- 1 - One or more of the 'delusions' rated earlier could easily be no more than a belief shared by other members of the subject's subcultural group, e.g., the Pentecostal church with the gift of tongues. Voodoo, witchcraft, communicating with God, are other examples of beliefs which may be taken quite literally by groups of people who are not clinically deluded. Rate (1) if subject holds such beliefs without elaborating them further.
- 2 - As (1), but because of excitement, expansiveness, depression, confusion, intellectual retardation, etc., the subject holds the beliefs with exceptional fervour and conviction, or elaborates them further. Such a subject might well be regarded as abnormal by other members of his own sect or group.
- 3 - More specific delusional states, e.g., Koro, Witigo, etc.

☐ (54)

DO YOU HAVE ANY REASON TO BE JEALOUS OF ANYBODY?

Pathic Jealousy.

- 1 - Partial delusions 2 - Full delusions

☐ (55)Delusion of Pregnancy.

- 1 - Partial delusions 2 - Full delusions

☐ (56)

Sexual Delusions: Any delusion with sexual content, e.g., fantasy lover, sex changing, etc. Do not include an untrue claim that a subject is married or has children.

- 1 - Partial delusions 2 - Full delusions

☐ (57)

HAVE YOU HAD ANY UNUSUAL EXPERIENCE OR ADVENTURES RECENTLY?

Rate fantastic delusions, delusional memories, delusional confabulations, fantastic delusions:

Confabulations: Subject makes up delusions on the spot. Very rare.
Delusional memories: Subject seems to be describing actual memories. Describes the same delusions time and again. Not confabulations. Rare, e.g., 'I came down to earth on a silver star'. Fantastic delusions: The commonest of the three, e.g., England's coast belting.

- 1 - Partial delusions 2 - Full delusions.

☐ (58)155. SINGLE DELUSIONS BASED ON GUILT, DEPERSONALISATION, HYPOCHONDRIASIS, ETC.Definition

These symptoms often appear to be based on a depressed mood and are relatively consistent and unelaborated. Do not include more bizarre elaborations of any of them, e.g., having a metal nose - symptom 53, not 60. Having been turned into another specified person - possibly symptom 47, not 61. Liver turned to lead by X-rays - symptom 51 and 52, not 62. England's coast belting - symptom 56, not 63.

DO YOU FEEL YOU HAVE COMMITTED A CRIME, OR SINNED GREATLY, OR DESERVE PUNISHMENT?
 (Have you felt that your presence might contaminate or ruin other people?)

Rate delusions of guilt.

- 1 - Subject has brought ruin to family by being in present condition, or thinks that symptoms are a punishment for not doing better, etc. Does not elaborate as in (2).
- 2 - Subject says has sinned greatly or committed some terrible crime or brought ruin upon the world. May feel deserving of punishment, even of death or hell-fire, because of it.

☐ (59)

DO YOU THINK YOUR APPEARANCE IS NORMAL?

Rate simple delusions concerning appearance:

(Nose too large, teeth misshapen, body crooked, etc.)

- 1 - Strong feeling that there is something wrong with appearance: subject looks old or ugly or dead, skin cracked, teeth misshapen, nose too large, body crooked, etc. Can be reassured temporarily. There may be only one limited preoccupation.
- 2 - Subject acts accordingly (plastic operations, etc.)

☐ (60)

IS ANYTHING THE MATTER WITH YOUR BRAIN?

Rate delusions of depersonalization: Subject has no head, does not exist, hollow instead of a brain, etc.

- 1 - Unable to think, no thoughts in head, feels as though he has no brain or as though it does not function at all.
- 2 - Symptom more intense. Subject has no head, no brain, does not exist.

☐ (61)

IS ANYTHING THE MATTER WITH YOUR BODY?

Rate hypochondriacal delusions: Subject has incurable cancer, bowels are stopped up, insides are rotting, etc.

- 1 - Subject feels body is unhealthy, rotten, diseased, but without the force of (2).
- 2 - Subject has incurable cancer, bowels are stopped up or rotting away etc.

☐ (62)

DO YOU HAVE THE FEELING THAT SOMETHING TERRIBLE IS GOING TO HAPPEN? WHAT?

Rate delusions of catastrophe: World is about to end, some catastrophe has happened or will occur, everything is evil and will be destroyed.

- 1 - Subject feels sense of impending doom; something awful will happen. Non-specific but out of proportion to circumstances.
- 2 - Delusional conviction that world is about to end or some other enormous catastrophe is about to occur or has occurred. World is dirty, decayed, rotten: i.e., further delusional elaboration of (1)

☐ (63)

15H. GENERAL RATINGS OF DELUSIONS AND HALLUCINATIONS.

(Include both partial and full delusions)

Consider both delusions and hallucinations in following ratings.

Rate systematization of delusions.

Scoring:

- 0 - No delusions or hallucinations.
- 1 - Delusions and hallucinations not elaborated into a general system affecting much of the subject's experience. Include unelaborated delusions or isolated hallucinations.
- 2 - Some systematic elaboration, but substantial areas of the subject's experiences are not affected.
- 3 - Subject interprets practically all his experience in delusional terms.

☐ (64)

Rate evasiveness.

Scoring:

- 0 - No attempt at concealment suspected.
- 1 - Examiner suspects that there may be (either) delusions or hallucinations in the background, but the subject is not concealing much of the psychopathology.
- 2 - Examiner suspects that there is a considerable preoccupation with delusions (even a delusional system) or hallucinations, but the subject tries to conceal them.
- 3 - No concealment but other delusions or hallucinations probably present. Not elicited because of poor intelligence and education or incoherence or silliness, etc.

☐ (65)

Overall rating of preoccupation with delusions and hallucinations.

Scoring:

- 0 - No delusions or hallucinations.
- 1 - No delusions or hallucinations definitely rated but examiner suspects that they may be present.
- 2 - Preoccupied with past delusions or hallucinations only. Not actively deluded or hallucinated at present.
- 3 - Delusions or hallucinations definitely present but subject is not preoccupied with them for much of the time. Can turn attention to other things without difficulty.
- 4 - Delusions or hallucinations present and take up most of the subject's attention. Preoccupied to the exclusion of many other matters.
- 5 - Patient can hardly discuss anything but delusions.

☐ (55)

Rate acting-out delusions.

(Rate from case-record, etc.)

Scoring:

- 0 - No delusions or hallucinations.
- 1 - Subject able to keep delusions or hallucinations to himself, or to confide them only to a few trusted people (sympathetic relatives, friends, doctors, etc.). He does not express them in public nor act upon them. Does not talk out loud to voices.
- 2 - Subject has acted upon delusions or hallucinations during past month, or expressed them in public (i.e., outside the small circle of people who would be expected to be sympathetic). This has not, however, resulted in severe social disturbance or a social crisis.
- 3 - As (2) but acting out, or public expression, has resulted in severe social disturbance or a social crisis.

☐ (67)

☐ OFF OFF

SENSORY AND FACTORS APPERTING.

- ** HAVE YOU HAD ANY LAPSES OF MEMORY RECENTLY?
(Have there been any periods in which you completely forgot what happened?)
(What was it like?)
(How do you explain it?)

Rate forgets, blackouts, amnesia lasting more than one hour: irrespective of aetiology.

- 1 - less than 12 hours.
- 2 - 12 - 24 hours.
- 3 - more than 24 hours.

☐ (68)

- ** WHAT MEDICINES OR DRUGS DO YOU TAKE?
(Do you take anything for your nerves or your mood?) Obtain list of drugs.
(Who prescribes?)

Rate drug abuse during month. One category only.

- 1 - Cannabis.
- 2 - Amphet., etc.
- 3 - LSD, amphetamine, etc.,
- 4 - Cocaine, heroin, etc.

☐ (69)

- ** MAY I ASK ABOUT YOUR DRINKING HABITS? HOW MUCH DO YOU USUALLY DRINK EACH DAY?
(Is alcohol in any way a problem for you? In what way?)

(CHECK LIST: Present on card if needed. DURING THE PAST MONTH HAVE YOU:
HAD FAMILY PROBLEMS BECAUSE OF DRINKING?
MISSED WORK BECAUSE OF DRINKING?
HAD MORNING SNAKES OR OTHER WITHDRAWAL SYMPTOMS?
HAD BLACKOUTS FOR SEVERAL HOURS?
HEARD VOICES OR SEEN VISIONS?)

Rate alcohol abuse during past month.

- 1 - Agrees alcohol has been a problem but not 2.
- 2 - Any check-list item applies.

☐ (70)

Rate dissociative states during past month:

Narrowing of consciousness which serves an unconscious purpose and is commonly accompanied or followed by a selective amnesia, e.g., trance, possession state, fugue, hyperaemia, stupor, etc.
Do not include if caused by drugs, alcohol, epilepsy, etc.,

- 1 - Present during the past month, but not at examination.
- 2 - Present at examination

☐ (71)

Rate conversion symptoms, e.g., paralysis, anaesthesia, blindness, tremor, seizures, etc., if mentioned during interview.

- 1 - Present during month, not at examination.
- 2 - Present at examination.

☐ (72)

Rate clouding or stupor at examination.

- 1 - Clouding. Inadequate comprehension of external impressions, with perplexity, and impairment of attention and orientation.
- 2 - Stupor: Subject appears comatose but there is no clouding or impairment of consciousness.

☐ (73)

If any suspicion of poor memory or disorientation:

MAY I ASK ONE OR TWO STANDARD QUESTIONS WE ASK OF EVERYBODY?

HOW OLD ARE YOU?

CAN YOU TELL ME THE YEAR AND THE MONTH?

WHAT IS THE NAME OF THE PRIME MINISTER?

Rate degree of impairment of memory. See glossary for definition.

- 1 - Mild.
- 2 - Moderate.
- 3 - Severe.

☐ (74)

17.

INSIGHT.

DO YOU THINK THERE IS ANYTHING THE MATTER WITH YOU?

(What do you think it is?)

(Could it be a nervous condition?)

(What do you think the cause is?)

(Why did you need to come to hospital?)

(Do you think (specify delusions or hallucinations) were part of a nervous condition?)

Psychotic symptoms (i.e., symptoms from Sections 12 - 16):

- 0 - Full insight (in intelligent subject, able to appreciate the issues involved).
- 1 - As much insight into the nature of the condition as social background and intelligence allow.
- 2 - Agrees to a nervous condition but examiner feels that subject does not really accept the explanation in terms of a nervous illness (e.g., gives delusional explanation, the result of persecution, or rays, etc.).
- 3 - Denies nervous condition entirely.
- 9 - Psychotic illness not present.

☐ (75)

Neurotic symptoms (i.e., symptoms from Sections 1 - 11 only):

- 0 - Full insight (in intelligent subject, able to appreciate the issues involved).
- 1 - As much insight into the nature of the condition as social background and intelligence allow.
- 2 - Gives physical explanation for neurotic symptoms.
- 3 - Denies neurotic symptoms entirely.
- 9 - Neurotic illness not present.

☐ (76)

Card 7
HOW MUCH DOES IT INTERFERE WITH YOUR WORK OR YOUR RELATIONSHIPS WITH OTHER PEOPLE?

NEUROTIC

(Have you actually been out of work, or been unable to do the housework, or go shopping, travelling, etc., during the past month?)

(Have the symptoms impaired your efficiency in any other way?)

Rate social impairment due to neurotic condition

- 0 - No neurotic or psychotic symptoms present.
 - 1 - Neurotic symptoms present but little diminution of subject's efficiency or interference with everyday activities.
 - 2 - Neurotic symptoms interfere with subject's efficiency to a moderate extent but are not incapacitating, e.g., subject neglects housework or can't enjoy leisure activities or social relationships, or finds work-efficiency reduced because of worry, tension, irritability, depression, anxiety, etc. Subject does not, however, stop work altogether or completely neglect household.
 - 3 - Subject severely incapacitated by neurotic symptoms: had to have at least a week off work during past month; was housebound for a week or more; was actively withdrawn from all social relationships, etc. The subject does not have to be totally incapacitated for the whole month for this rating to be made, but impairment has to be very severe.
 - 8 - Examiner unsure.
 - 9 - Psychotic condition present.
- (If both psychotic and neurotic condition, rate whichever shows more impairment).

☐ (77)

Rate social impairment due to psychotic condition

- 0 - No neurotic or psychotic symptoms present.
- 1 - Psychotic symptoms present but little diminution of subject's efficiency or interference with everyday activities.
- 2 - Psychotic symptoms interfere with subject's efficiency to a moderate extent but are not incapacitating, e.g., subject neglects housework or can't enjoy leisure activities or social relationships, or finds work-efficiency reduced. Subject does not, however, stop work altogether or completely neglect household.
- 3 - Subject severely incapacitated by psychotic symptoms: had to have at least a week off work during past month; was housebound for a week or more; was actively withdrawn from all social relationships, etc. The subject does not have to be totally incapacitated for the whole month for this rating to be made, but impairment has to be very severe.
- 8 - Examiner unsure.
- 9 - Neurotic condition, and no psychotic condition, present.

☐ (78)

GENERAL QUESTION

HAVE THERE BEEN ANY OTHER THINGS LATELY THAT I HAVEN'T COVERED?

Specify:

Note here any points that seem to be important or unusual about the subject or the interview which are not covered in the schedule.

Reconsider schedule to make sure that all obligatory questions have been asked. Also consider whether behaviour, affect and speech ratings can be made or whether further observation or examination is necessary. If not, this is the end of the interview.

Palpitations

- 0 - Symptoms absent.
 1 - Present in fairly severe degree, or very severe but intermittent during interview.
 2 - Present in very severe degree and almost continuous during interview.
 3 - Examiner not sure.
 9 - Subject not examined, or examination not appropriate.

R.S. If in doubt, rate (0). A rating of (1) means there is no doubt about the symptom being present in fairly severe form.

Behaviour during interview.

Self-neglect (cleanliness, shaven, make-up, state of hair and clothes). ☐ (20)

Piercing appearance

(secret documents openly displayed, special clothes or ornaments with symbolic significance, etc. Do not include mannerisms or posturing - symptom 28). ☐ (21)

Slowness and underactivity (sits abnormally still, walks abnormally slowly, delay in performing movements). ☐ (22)

Agitation (fidgety, restlessness, pacing, frequent unnecessary movements). ☐ (23)

Gross excitement and violence (throws things, runs or jumps about, waves arms wildly, shouts or screams). ☐ (24)

Improper behaviour (sings, facetious, silly jokes, flippant remarks, unduly familiar). ☐ (25)

Distraction (stops talking or changes subject due to distraction by trivial noises or events outside the room or turns attention to furniture, etc) ☐ (26)

Embarrassing behaviour (making sexual suggestions or advances to interviewer; loss of social restraint - scratches genitals, passes loud flatul, etc.). ☐ (27)

Mannerisms and posturing (odd, stylised movements or acts, usually idiosyncratic to the patient, often suggestive of special meaning or purpose: assuming and maintaining uncomfortable or inappropriate postures). ☐ (28)

Stereotypies, etc. (constant repetition of movements or postures such as rocking, rubbing, nodding, grimacing: no special significance). ☐ (29)

Behaves as if hallucinated (non-verbal: as though hears voices or visions; lips move soundlessly, looks round, giggles to self - not just from embarrassment, shyness, etc.). ☐ (30)

Catatonic movements

(Negativism: does the opposite of what he is asked.

Ambulancence: begins to take proffered hand, then withdraws; etc.

Echopraxia: imitates examiner's movement.

Flexibilitas cerea: arm remains where it is put, for at least 15 seconds.

Waghen: excessive co-operation in passive movement.

Echolalia: imitates words and phrases with same intonation and inflection of voice).

(These items can be separately rated in special projects).

Affect during interview

Observed anxiety (tense worried look or posture, fearful apprehensive look, frightened tone of voice, tremor). ☐ (32)

Observed depression (sad, mournful look, tears, gloomy tone of voice, deep sighing, voice cracks on distressing topic). ☐ (33)

Histrionic (feelings expressed in exaggerated, dramatic, histrionic manner). ☐ (34)

Manic affect (unduly cheerful, smiling, euphoric, elated). ☐ (35)

Hostile irritability (unco-operative, irritable, angry, overtly hostile, discontented, haughty, antagonistic). ☐ (36)

Surveillance

☐ (37)

Personality (personality)

(38)

Lability of mood (whether lability of one mood, or changing from one mood to another).

(39)

Blunted affect (expressionless face and voice, uniform blunting whatever the topic of conversation, indifference to distressing topics, whether delusional or normal).

- 1 - Blunting not uniform, e.g., at times responds affectively but at other times is markedly flat; or responds with some evidence of affect, but definitely less than expected.

(40)

- 2 - Severe and uniform blunting.

Incongruity of affect (emotion is shown, but not congruent with topic).

(41)

Speech during interview.

Slow speech (long pauses before answering, long pauses between words).

(42)

Pressure of speech (more copious speech than normal, too rapid speech, very loud voice, too circumstantial speech).

(43)

Non-social speech (talks, mutters, whispers out loud, out of context of conversation with examiner).

(44)

Muteness

- 1 - Almost mute, fewer than twenty words in all.

(45)

- 2 - Totally mute.

Restricted quantity of speech (subject frequently fails to answer, questions have to be repeated, restricted to minimum necessary, no extra sentences, no additional comments).

(46)

Neologisms and idiosyncratic use of words or phrases, e.g., 'One is called "Per-God" and the other is called "Per-the-Devil"', '...miracle-willed through God's "tam-barn"', 'Well, there is a frequenting of clairvoyance', 'Per-God', 'Per-the-Devil' and 'tam-barn' are neologisms; 'frequenting of clairvoyance' is an example of ordinary words used idiosyncratically. Do not rate this symptom present unless examples are written down.

(47)

Disorder of content of speech.

Three types of disordered content are specified: in each case, the effect is to make it very difficult to grasp what the subject means. However, the symptoms are defined in terms of specific components so that it should, in most cases, be possible to say whether one, two or all three symptoms are present. If in doubt, rate hierarchically, i.e., rate incoherence in preference to flight of ideas and flight of ideas in preference to poverty of speech.

If the patient does not talk enough to give a rateable sample of speech, rate all three symptoms Y.

Incoherence of speech. The subject's meaning is obscured by distorted grammar, lack of logical connection between one part of a sentence and another or between sentences, sudden irrelevances or 'Knight's move', grossly pedantic phrases, answering off the point, etc., For example:

'We've seen the downfall of the radius crown by the Roman Catholics, whereas when you come to see the drinking side of the business, God saw that Noah, if he lost his reason, he got nobody there to look after them.'

(48)

'I did suggest to you, that intrinsic or congenital sentiment or refinement of disposition would be so miracle-willed through God's "tam-barn" as to assume quite the opposite'.

'I believe we live in a world, in an age, where the elements are a force that eldars of professionalism hope, not to conquer, but to control'.

'What's your address?' 'It's supposed to be Salisbury near Birmingham'.
(Vorbedreden).

Do not rate this symptom present unless examples are written down.

A rating of 1 means that very little normal speech is present.

N.B. A free flow of delusions is not necessarily incoherent. A subject may talk about delusions quite coherently.

Flight of ideas.

Words are associated together inappropriately by sound or rhyme (clang association). Although the original aim of the sentence may quickly be lost, a path can be traced through associations of the white-black-coffin or ring-worm variety, or through associations with distracting stimuli, e.g.,

'How is your appetite?' 'I feel as if I have lost my appetite. I have had an orange. A real juicy orange'. (Sees patient walking past window) 'She is going for E.C.T. Eaters treatment or teddy bear's picnic. I call it'

☐ (49)

Do not rate this symptom present unless examples are written down.

A rating of 2 means that very little normal speech is present.

Poverty of content of speech. The subject talks freely but so vaguely that little information is given in spite of the number of words used: rambles on without coming to a point; may wander far from original theme. Exclude incoherence or flight of ideas. Rate only if severe and always give written example.

☐ (50)

Misleading answers. Subject's answers are misleading because answers 'yes' or 'no' to everything, or frequent self-contradictions, or appears to be deliberately misleading. Do not include incoherence, flight of ideas or poverty of speech here.

☐ (51)
Re-rate adequacy of interview.

- 0 = Ratings made adequately represent the symptoms present.
- 1 = Some problem but key symptoms have been rated.
- 2 = Serious question as to adequacy of interview for rating key symptoms (other than sections 18-20).
- 3 = Only sections 18-20 could be rated.

☐ (52)

Check that every box has an entry except those below ticked out-off points.

Complete coding sheet if one is being used.

APPENDIX 4) POST-TRAUMATIC STRESS DISORDER CHECKLIST INTERVIEW

SECTION ONE

- 1)How often do you remember the incident, do thoughts of the incident come into your mind uninvited, are these recollections distressing.
- 2)Have you had any distressing dreams of the incident. How often.
- 3)Do you find yourself feeling or acting the same as you did during the incident, do you ever feel that you are reliving the incident.
- 4)Do you experience intense distress/anxiety when faced with situations that resemble or symbolise the incident.

SECTION TWO

- 1)Have you tried to avoid thoughts and feelings regarding the incident.
- 2)Have you tried to avoid any activities or situations that would cause you to recollect the incident.
- 3)Are there any aspects of the incident that you cannot remember.
- 4)Do you find you have lost interest in things previously important to you.
- 5)Do you feel detached or isolated from other people.
- 6)Have you found it harder than normal to express emotions since the incident.
- 7)Do you feel that your future is in any way not as promising as it was before the incident.

SECTION THREE

- 1)Do you have difficulty falling or staying asleep.
- 2)Do you find that you have been more irritable since the incident.
- 3)Do you find it harder than usual to concentrate.
- 4)Do you find you are very much more alert or wary since the incident.
- 5)Do you find you are more easily startled since the incident.
- 6)Have you noticed any physical reactions when in situations that resemble or symbolise the incident.

APPENDIX 5) COPIES OF SELF-REPORT SCHEDULES COMPLETED BY
DRIVERS

SCALED VERSION OF THE GENERAL HEALTH QUESTIONNAIRE

GENERAL HEALTH QUESTIONNAIRE

GHQ-28

Please read this carefully:

We should like to know if you have had any medical complaints, and how your health has been in general, over the past few weeks. Please answer ALL the questions on the following pages simply by underlining the answer which you think most nearly applies to you. Remember that we want to know about present and recent complaints, not those that you had in the past.

It is important that you try to answer ALL the questions.

Thank you very much for your co-operation.

HAVE YOU RECENTLY:

A1 — been feeling perfectly well and in good health?	Better than usual	Same as usual	Worse than usual	Much worse than usual
A2 — been feeling in need of a good tonic?	Not at all	No more than usual	Rather more than usual	Much more than usual
A3 — been feeling run down and out of sorts?	Not at all	No more than usual	Rather more than usual	Much more than usual
A4 — felt that you are ill?	Not at all	No more than usual	Rather more than usual	Much more than usual
A5 — been getting any pains in your head?	Not at all	No more than usual	Rather more than usual	Much more than usual
A6 — been getting a feeling of tightness or pressure in your head?	Not at all	No more than usual	Rather more than usual	Much more than usual
A7 — been having hot or cold spells?	Not at all	No more than usual	Rather more than usual	Much more than usual
B1 — lost much sleep over worry?	Not at all	No more than usual	Rather more than usual	Much more than usual
B2 — had difficulty in staying asleep once you are off?	Not at all	No more than usual	Rather more than usual	Much more than usual
B3 — felt constantly under strain?	Not at all	No more than usual	Rather more than usual	Much more than usual
B4 — been getting edgy and bad-tempered?	Not at all	No more than usual	Rather more than usual	Much more than usual
B5 — been getting scared or panicky for no good reason?	Not at all	No more than usual	Rather more than usual	Much more than usual
B6 — found everything getting on top of you?	Not at all	No more than usual	Rather more than usual	Much more than usual
B7 — been feeling nervous and strung-up all the time?	Not at all	No more than usual	Rather more than usual	Much more than usual

HAVE YOU RECENTLY

C1 — been managing to keep yourself busy and occupied?	More so than usual	Same as usual	Rather less than usual	Much less than usual
C2 — been taking longer over the things you do?	Quicker than usual	Same as usual	Longer than usual	Much longer than usual
C3 — felt on the whole you were doing things well?	Better than usual	About the same	Less well than usual	Much less well
C4 — been satisfied with the way you've carried out your task?	More satisfied	About same as usual	Less satisfied than usual	Much less satisfied
C5 — felt that you are playing a useful part in things?	More so than usual	Same as usual	Less useful than usual	Much less useful
C6 — felt capable of making decisions about things?	More so than usual	Same as usual	Less so than usual	Much less capable
C7 — been able to enjoy your normal day-to-day activities?	More so than usual	Same as usual	Less so than usual	Much less than usual
D1 — been thinking of yourself as a worthless person?	Not at all	No more than usual	Rather more than usual	Much more than usual
D2 — felt that life is entirely hopeless?	Not at all	No more than usual	Rather more than usual	Much more than usual
D3 — felt that life isn't worth living?	Not at all	No more than usual	Rather more than usual	Much more than usual
D4 — thought of the possibility that you might make away with yourself?	Definitely not	I don't think so	Has crossed my mind	Definitely have
D5 — found at times you couldn't do anything because your nerves were too bad?	Not at all	No more than usual	Rather more than usual	Much more than usual
D6 — found yourself wishing you were dead and away from it all?	Not at all	No more than usual	Rather more than usual	Much more than usual
D7 — found that the idea of taking your own life kept coming into your mind?	Definitely not	I don't think so	Has crossed my mind	Definitely has

A
 B
 C
 D
 TOTAL

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IMPACT OF EVENTS SCALE

IMPACT OF EVENT SCALE

Below is a list of comments made by people after disasters. Please read each item and indicate how frequently these comments were true for you DURING THE LAST SEVEN DAYS by placing a tick in the appropriate box. If they did not occur please tick the "not at all" column.

	NOT AT ALL	RARELY	SOMETIMES	OFTEN
1. I thought about it when I didn't mean to.				
2. I avoided letting myself get upset when I thought about it or was reminded of it.				
3. I tried to remove it from memory.				
4. I had trouble falling asleep or staying asleep because of the pictures and/or thoughts about it that came into my mind.				
5. I had waves of strong feelings about it.				
6. I had dreams about it.				
7. I have stayed away from reminders of it.				
8. I have felt as if it hadn't happened or it wasn't real.				
9. I have tried not to talk about it.				
10. Pictures about it popped into my mind.				
11. Other things kept making me think about it.				
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them.				
13. I have tried not to think about it.				
14. Any reminder brought back feelings about it.				
15. My feelings about it have been sort of numb.				

THE POST-TRAUMATIC SYMPTOM SCALE

PTSS-10

Below you find ten questions about common reactions among people who have been involved in an accident or a disaster. Kindly answer each question to indicate how you have been reacting DURING THE LAST SEVEN DAYS. Your answer may be YES or NO. If in doubt, take the alternative closest to how you feel or react.

Please answer all the questions.

(Encircle either YES or NO - whatever seems right for yourself).

DURING THE LAST SEVEN DAYS I HAVE HAD:

1. Difficulty with sleep	YES	NO
2. Nightmares about the accident or disaster	YES	NO
3. Depressed feelings	YES	NO
4. Tendencies to jump or startle at sudden noises or unexpected movements	YES	NO
5. Tendencies to withdraw myself from others	YES	NO
6. Irritable feelings (I am easily getting irritable or infuriated)	YES	NO
7. Frequent swings in mood	YES	NO
8. Bad conscience, self accusations or guilt	YES	NO
9. Fears when approaching the place of the accident or situations that remind me of it	YES	NO
10. Tensions in my body	YES	NO

RECENT DIFFICULTIES/EVENTS SCALE

RECENT DIFFICULTIES / EVENTS

BELOW ARE A SET OF QUESTIONS ABOUT MAJOR DIFFICULTIES AND/OR EVENTS YOU MAY HAVE EXPERIENCED DURING THE LAST 6 MONTHS.

PLEASE MAKE SURE YOU ANSWER EITHER YES OR NO TO EVERY QUESTION:

1. During the last 6 months.....

have there been any serious marital difficulties in your family? YES NO

2. During the last 6 months.....

have there been serious financial difficulties in your family? YES NO

3. During the last 6 months.....

has a close friend or family member died? YES NO

4. During the last 6 months.....

have you become seperated from a close friend or family member YES NO
(perhaps, because they moved away etc)?

5. During the last 6 months.....

have you, or someone close to you, experienced a serious illness, YES NO
accident, or injury?

6. During the last 6 months.....

have you experienced any other serious or distressing problems YES NO
or events?

If you answered YES to question 6, please give details:

THE PERCEIVED STRESS SCALE

Name:

Interview number:

Date:

Cohen : PERCEIVED STRESS

The questions in this scale ask you about your feelings and thoughts during the LAST MONTH. In each case, you will be asked to indicate HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

For each question please tick the appropriate column

In the LAST MONTH	never	almost never	sometimes	fairly often	very often
1. How often have you been upset because of something that happened unexpectedly?					
2. How often have you felt that you were unable to control the important things in your life?					
3. How often have you felt nervous and "stressed"?					
4. How often have you dealt successfully with irritating life hassles?					
5. How often have you felt that you were effectively coping with important changes that were occurring in your life?					
6. How often have you felt confident about your ability to handle your personal problems?					
7. How often have you felt that things were going your way?					
8. How often have you found that you could not cope with all the things that you had to do?					
9. How often have you been able to control irritations in your life?					
10. How often have you felt that you were on top of things?					
11. How often have you been angered because of things that happened that were outside your control?					
12. How often have you found yourself thinking about things that you have to accomplish?					
13. How often have you been able to control the way you spend your time?					
14. How often have you felt difficulties were piling up so high that you could not overcome them?					

THE EYSENCK PERSONALITY QUESTIONNAIRE

E.P.Q. (Adult)

NAME.....

INTERVIEW NUMBER.....

INSTRUCTIONS Please answer each question by putting a circle around the "YES" or the "NO" following the question. There are no right or wrong answers, and no trick questions. Work quickly and do not think too long about the exact meaning of the questions....

PLEASE REMEMBER TO ANSWER EACH QUESTION

- | | | | |
|----|--|-----|----|
| 1 | Do you have many different hobbies?..... | YES | NO |
| 2 | Do you stop to think things over before doing anything?..... | YES | NO |
| 3 | Does your mood often go up and down?..... | YES | NO |
| 4 | Have you ever taken the praise for something you knew someone else had really done? | YES | NO |
| 5 | Are you a talkative person?..... | YES | NO |
| 6 | Would being in debt worry you?..... | YES | NO |
| 7 | Do you ever feel "just miserable" for no reason?..... | YES | NO |
| 8 | Were you ever greedy by helping yourself to more than your share of anything?.. | YES | NO |
| 9 | Do you lock up your house carefully at night?..... | YES | NO |
| 10 | Are you rather lively?..... | YES | NO |
| 11 | Would it upset you a lot to see a child or an animal suffer?..... | YES | NO |
| 12 | Do you often worry about things you should not have done or said?..... | YES | NO |
| 13 | If you say you will do something, do you always keep your promise no matter how inconvenient it might be?..... | YES | NO |
| 14 | Can you usually let yourself go and enjoy yourself at a lively party?..... | YES | NO |
| 15 | Are you an irritable person?..... | YES | NO |
| 16 | Have you ever blamed someone for doing something you knew was really your fault? | YES | NO |
| 17 | Do you enjoy meeting new people?..... | YES | NO |
| 18 | Do you believe insurance schemes are a good idea?..... | YES | NO |
| 19 | Are your feelings easily hurt?..... | YES | NO |
| 20 | Are all your habits good and desirable ones?..... | YES | NO |

PLEASE TURN OVER

page 1

- 21 Do you tend to keep in the background on social occasions?.....YES NO
- 22 Would you take drugs which may have strange or dangerous effects?.....YES NO
- 23 Do you often feel "fed-up"?.....YES NO
- 24 Have you ever taken anything (even a pin or button) that belonged to someone else?.....YES NO
- 25 Do you like going out a lot?.....YES NO
- 26 Do you enjoy hurting people you love?.....YES NO
- 27 Are you often troubled about feelings of guilt?.....YES NO
- 28 Do you sometimes talk about things you know nothing about?.....YES NO
- 29 Do you prefer reading to meeting people?.....YES NO
- 30 Do you have enemies who want to harm you?.....YES NO
- 31 Would you call yourself a nervous person?.....YES NO
- 32 Do you have many friends?.....YES NO
- 33 Do you enjoy practical jokes that can sometimes really hurt people?.....YES NO
- 34 Are you a worrier?.....YES NO
- 35 As a child did you do as you were told immediately and without grumbling?.....YES NO
- 36 Would you call yourself happy-go-lucky?.....YES NO
- 37 Do good manners and cleanliness matter much to you?.....YES NO
- 38 Do you worry about awful things that might happen?.....YES NO
- 39 Have you ever broken or lost something belonging to someone else?.....YES NO
- 40 Do you usually take the initiative in making new friends?.....YES NO
- 41 Would you call yourself tense or "highly-strung"?.....YES NO
- 42 Are you mostly quiet when you are with other people?.....YES NO
- 43 Do you think marriage is old-fashioned and should be done away with?.....YES NO
- 44 Do you sometimes boast a little?.....YES NO
- 45 Can you easily get some life into a rather dull party?.....YES NO
- 46 Do people who drive carefully annoy you?.....YES NO
- 47 Do you worry about your health?.....YES NO
- 48 Have you ever said anything bad or nasty about anyone?.....YES NO
- 49 Do you like telling jokes and funny stories to your friends?.....YES NO
- 50 Do most things taste the same to you?.....YES NO
- 51 As a child were you ever cheeky to your parents?.....YES NO
- 52 Do you like mixing with people?.....YES NO
- 53 Does it worry you if you know there are mistakes in your work?.....YES NO
- 54 Do you suffer from sleeplessness?.....YES NO

55	Do you always wash before a meal?.....	YES	NO
56	Do you nearly always have a "ready answer" when people talk to you?.....	YES	NO
57	Do you like to arrive at appointments in plenty of time?.....	YES	NO
58	Have you often felt listless and tired for no reason?.....	YES	NO
59	Have you ever cheated at a game?.....	YES	NO
60	Do you like doing things in which you have to act quickly?.....	YES	NO
61	Is (or was) your mother a good woman?.....	YES	NO
62	Do you often feel life is very dull?.....	YES	NO
63	Have you ever taken advantage of someone?.....	YES	NO
64	Do you often take on more activities than you have time for?.....	YES	NO
65	Are there several people who keep trying to avoid you?.....	YES	NO
66	Do you worry a lot about your looks?.....	YES	NO
67	Do you think people spend too much time safeguarding their future with savings and insurances?.....	YES	NO
68	Have you ever wished that you were dead?.....	YES	NO
69	Would you dodge paying taxes if you were sure you could never be found out?....	YES	NO
70	Can you get a party going?.....	YES	NO
71	Do you try not to be rude to people?.....	YES	NO
72	Do you worry too long after an embarrassing experience?.....	YES	NO
73	Have you ever insisted on having your own way?.....	YES	NO
74	When you catch a train do you often arrive at the last minute?.....	YES	NO
75	Do you suffer from "nerves"?.....	YES	NO
76	Do your friendships break up easily without it being your fault?.....	YES	NO
77	Do you often feel lonely?.....	YES	NO
78	Do you always practice what you preach?.....	YES	NO
79	Do you sometimes like teasing animals?.....	YES	NO
80	Are you easily hurt when people find fault with you or the work you do?.....	YES	NO
81	Have you ever been late for an appointment or work?.....	YES	NO
82	Do you like plenty of bustle and excitement around you?.....	YES	NO
83	Would you like other people to be afraid of you?.....	YES	NO
84	Are you sometimes bubbling over with energy and sometimes very sluggish?.....	YES	NO
85	Do you sometimes put off until tomorrow what you ought to do today?.....	YES	NO
86	Do other people think of you as being very lively?.....	YES	NO
87	Do people tell you a lot of lies?.....	YES	NO
88	Are you touchy about some things?.....	YES	NO
89	Are you always willing to admit it when you have made a mistake?.....	YES	NO
90	Would you feel very sorry for an animal caught in a trap?.....	YES	NO

PLEASE CHECK TO SEE THAT YOU HAVE ANSWERED ALL THE QUESTIONS

THE SOCIAL PROVISIONS SCALE

Name:
Interview number:
Date:

SOCIAL PROVISIONS SCALE

Instructions: In answering the set of questions below, I want you to think about your current relationships with partner, family, friends, colleagues, etc. Please tell me to what extent you agree that each statement describes your current relationships with other people. Use the following scale to give me your opinion. If you feel a statement is very true of your current relationships, you would circle "4, Strongly Agree". If you feel a statement clearly does not describe your relationships, you would circle "1, Strongly Disagree".

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. There are people I can depend on if I really need it.	1	2	3	4
2. I feel that I do not have close personal relationships with other people.	1	2	3	4
3. There is no one I can turn to for guidance in times of stress.	1	2	3	4
4. There are people who enjoy the same social activities I do.	1	2	3	4
5. Other people do not view me as competent.	1	2	3	4
6. I feel part of a group of people who share my attitudes and beliefs.	1	2	3	4
7. I do not think other people respect my skills and abilities.	1	2	3	4
8. If something went wrong, no one would come to my assistance.	1	2	3	4
9. I have close relationships which give me a sense of emotional security and well-being.	1	2	3	4
10. There is someone I could talk to about important decisions in my life.	1	2	3	4
11. I have relationships where my competence and skills are recognised.	1	2	3	4
12. There is no one who shares my interests and concerns.	1	2	3	4

	Strongly Disagree	Disagree	Agree	Strongly Agree
13. There is a trustworthy person I could turn to for advice if I were having problems.	1	2	3	4
14. I feel a strong emotional bond with at least one other person.	1	2	3	4
15. There is no one I can depend on for help if I really need it.	1	2	3	4
16. There is no one I feel comfortable talking about problems with.	1	2	3	4
17. There are people who admire my talents and abilities.	1	2	3	4
18. I lack a feeling of intimacy with another person.	1	2	3	4
19. There is no one who likes to do the things I do.	1	2	3	4
20. There are people I can count on in an emergency.	1	2	3	4
21. I know someone who would loan me £100 to help me.	1	2	3	4
22. There are people I regularly spend time with.	1	2	3	4
23. I know someone who would bring my meals to my room or apartment if I were sick.	1	2	3	4
24. If I decided to go to a movie today or tomorrow, I could easily find someone to go with me.	1	2	3	4
25. If I needed it, my family or someone else would help me with financial support on a continuing basis.	1	2	3	4

THE COPE SCALE

COPE

INSTRUCTIONS: We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to attempt to deal with stress. This questionnaire asks you to indicate what you generally do and feel, when you experience stressful events. Obviously, different events bring out somewhat different responses, but think about what you usually do when you are under a lot of stress.

Respond to each of the following items by circling one of the numbers to the right of each question, using the response choices listed below. Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Please answer every item. There are no right or wrong answers, so choose the most accurate answer for YOU, not what you think most people would say or do. Indicate what YOU usually do when YOU experience a stressful event

		I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot
1	I try to grow as a person as a result of the experience	1	2	3	4
2	I turn to work or other substitute activities to take my mind off things	1	2	3	4
3	I get upset and let my emotions out	1	2	3	4
4	I try to get advice from someone about what to do	1	2	3	4
5	I concentrate my efforts on doing something about it	1	2	3	4
6	I say to myself "this isn't real"	1	2	3	4
7	I put my trust in God	1	2	3	4
8	I admit to myself that I can't deal with it, and quit trying	1	2	3	4
9	I restrain myself from doing anything too quickly	1	2	3	4
10	I discuss my feelings with someone	1	2	3	4
11	I get used to the idea that it happened	1	2	3	4
12	I talk to someone to find out more about the situation	1	2	3	4
13	I don't allow myself to get distracted by other thoughts or activities	1	2	3	4
14	I daydream about things other than this	1	2	3	4
15	I get upset and am really aware of it	1	2	3	4

		I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot
16	I seek God's help	1	2	3	4
17	I make a plan of action	1	2	3	4
18	I accept that this has happened and that it can't be changed	1	2	3	4
19	I hold myself back from doing anything until I can do something effective	1	2	3	4
20	I try to get emotional support from friends or relatives	1	2	3	4
21	I just give up trying to reach my goal	1	2	3	4
22	I take additional action to try to get rid of the problem	1	2	3	4
23	I refuse to believe that it has happened	1	2	3	4
24	I let my feelings out	1	2	3	4
25	I try to see it in a different light, to make it seem more positive	1	2	3	4
26	I talk to someone who could do something concrete about the problem	1	2	3	4
27	I don't let myself do anything until I am sure it will be useful	1	2	3	4
28	I sleep more than usual	1	2	3	4
29	I try to come up with a strategy about what to do	1	2	3	4
30	I focus on dealing with this problem, and if necessary let other things slide a little.	1	2	3	4
31	I get sympathy and understanding from someone	1	2	3	4
32	I drink alcohol or take drugs, in order to think about it less	1	2	3	4
33	I give up the attempt to get what I want	1	2	3	4
34	I look for something good in what is happening	1	2	3	4
35	I think about how I might best handle the problem	1	2	3	4
36	I pretend that it hasn't really happened	1	2	3	4
37	I make sure not to make matters worse by acting too soon	1	2	3	4

		I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot
38	I try hard to prevent other things from interfering with my efforts at dealing with this	1	2	3	4
39	I go to the movies or watch TV, to think about it less	1	2	3	4
40	I accept the reality of the fact that it happened	1	2	3	4
41	I ask people who have had similar experiences what they did	1	2	3	4
42	I feel a lot of emotional distress and I find myself expressing those feelings a lot	1	2	3	4
43	I take direct action to get around the problem	1	2	3	4
44	I try to find comfort in my religion	1	2	3	4
45	I force myself to wait for the right time to do something	1	2	3	4
46	I reduce the amount of effort I'm putting into solving the problem	1	2	3	4
47	I talk to someone about how I feel	1	2	3	4
48	I learn to live with it	1	2	3	4
49	I put aside other activities in order to concentrate on this	1	2	3	4
50	I think hard about what steps to take	1	2	3	4
51	I act as though it hasn't even happened	1	2	3	4
52	I do what has to be done, one step at a time	1	2	3	4
53	I learn something from the experience	1	2	3	4
54	I hold off doing anything about it until the situation permits	1	2	3	4
55	I pray more than usual	1	2	3	4
56	I keep myself from getting distracted by other thoughts or activities	1	2	3	4
57	When you are under stress, do you usually feel:				
	(1) that you definitely can do something about the situation				
	(2) that you probably can do something about the situation				
	(3) that you probably can do nothing about the situation, or				
	(4) that you definitely can do nothing about the situation				

THE MODIFIED SOCIAL ADJUSTMENT SCALE

WORK, LEISURE AND FAMILY LIFE QUESTIONNAIRE

We are interested in how you have been in the past two weeks,
We would like you to answer some questions about your work,
spare time activities and your family life.

Please answer the questions on the following pages by ticking
on the line the answer which you think most nearly applies to you.

WORK OUTSIDE THE HOME: The following questions are about how things have been in your job (full-time or half-time).

If you do not have a job go straight on to the next section.

OVER THE PAST TWO WEEKS HAVE YOU:

1. missed any time from work?

Not at all ...	Occasionally	About half the time ...	Most of the time ...	All the time ...
----------------	--------------	-------------------------	----------------------	------------------
2. been doing your job well?

All the time...	Most of the time...	About half the time ...	Occasionally	Not at all
-----------------	---------------------	-------------------------	--------------	-----------------
3. felt ashamed of how you have been doing your work?

Not at all ...	Occasionally	About half the time ...	Most of the time...	Constantly
----------------	--------------	-------------------------	---------------------	------------
4. got angry with or argued with people at work?

Not at all ...	Occasionally	About half the time ...	Most of the time...	Constantly
----------------	--------------	-------------------------	---------------------	------------
5. felt upset, worried or uncomfortable at work?

Not at all ...	Occasionally	About half the time ...	Most of the time...	Constantly
----------------	--------------	-------------------------	---------------------	------------
6. been finding your work interesting

All the time...	Most of the time ...	About half the time ...	Occasionally	Not at all
-----------------	----------------------	-------------------------	--------------	------------------

SOCIAL AND LEISURE ACTIVITIES: The following questions are about your friends and what you have been doing in your spare time.

FOR THE PAST TWO WEEKS HAVE YOU:

- | | | | | | |
|---|------------------------|----------------------------|------------------------------|----------------------------|------------------------|
| 3. been in touch with any of your friends? | Very often... _____ | Often _____ | A few times _____ | Very rarely _____ | Not at all _____ |
| 4. been able to talk about your feelings openly with your friends? | All the time ... _____ | Most of the time ... _____ | About half the time... _____ | Occasionally _____ | Not at all _____ |
| 5. done things socially with your friends (eg. visiting, entertaining, going out together). | Very often... _____ | Often..... _____ | A few times _____ | Very rarely _____ | Not at all _____ |
| 6. spent your available time on hobbies or spare time interests? | All the time ... _____ | Most of the time... _____ | About half the time... _____ | Occasionally _____ | Not at all _____ |
| 17. got angry with or argued with your friends? | Not at all ... _____ | Occasionally _____ | About half the time... _____ | Most of the time ... _____ | Constantly _____ |
| 18. been offended or had your feelings hurt by your friends? | Not at all ... _____ | Occasionally _____ | About half the time... _____ | Most of the time ... _____ | Constantly _____ |
| 19. felt ill at ease, tense or shy when with people? | Not at all ... _____ | Occasionally _____ | About half the time... _____ | Most of the time ... _____ | Constantly _____ |
| 20. felt lonely and wished for companionship? | Not at all ... _____ | Occasionally _____ | About half the time... _____ | Most of the time ... _____ | Constantly _____ |
| 21. felt bored in your free time? | Not at all ... _____ | Occasionally _____ | About half the time... _____ | Most of the time ... _____ | Constantly _____ |

EXTENDED FAMILY: The following questions are about your extended family, i.e. your parents, brothers, sisters, in-laws, and children not living at home. Please do not include your partner or children living at home.

OVER THE PAST TWO WEEKS HAVE YOU:

- | | | | | | |
|---|------------------|---------------------|------------------------|---------------------|------------------|
| 22. got angry with or argued with any of your relatives? | Not at all | Occasionally | About half the time... | Most of the time... | Constantly |
| 23. made an effort to keep in touch with your relatives? | Very often... | Often | A few times | Very rarely | Not at all |
| 24. been able to talk about your feelings openly with your relatives? | All the time ... | Most of the time... | About half the time... | Occasionally | Not at all |
| 25. depended on your relatives for help, advice or friendship? | Not at all | Occasionally | About half the time... | Most of the time... | Constantly |
| 26. worried more than necessary about things happening to your relatives? | Not at all | Occasionally | About half the time... | Most of the time... | Constantly |
| 27. been feeling that you have let your relatives down at any time? | Not at all | Occasionally | About half the time... | Most of the time... | Constantly |
| 28. been feeling that your relatives have let you down at any time? | Not at all | Occasionally | About half the time... | Most of the time... | Constantly |

PARTIAL: The following questions are about how things have been between you and your partner. This could also include somebody with whom you have a steady relationship and whom you see daily. If you are NOT living with, or in daily contact with your partner, go straight on to the next section.

OVER THE PAST TWO WEEKS HAVE YOU:

- | | | | | | |
|---|----------------------|----------------------|------------------------|---------------------|--------------------|
| 29. got angry with each other or argued with one another? | Not at all | Occasionally | About half the time... | Most of the time... | Constantly |
| 30. been able to talk about your feelings and problems with your partner? | All the time ... | Most of the time ... | About half the time... | Occasionally | Not at all |
| 31. been making most of the decisions at home yourself? | Not at all | Occasionally | About half the time... | Most of the time... | All the time |
| 32. tended to give in to your partner and let her have her own way when there was a disagreement? | Not at all | Occasionally | About half the time... | Most of the time... | All the time |
| 33. and your partner shared the responsibility for practical matters that have arisen? | All the time... | Most of the time ... | About half the time... | Occasionally | Not at all |
| 34. had to depend on your partner to help you? | Not at all ... | Occasionally | About half the time... | Most of the time... | Constantly |
| 35. been feeling affectionate towards your partner? | All the time... | Most of the time ... | About half the time... | Occasionally | Not at all |
| 36. and your partner had sexual relations? About how many times? | Four or more times.. | Three times | Twice | Once | Not at all |
| 37. had any problems during sexual intercourse (e.g. pain or difficulty reaching climax)? | Not at all ... | Occasionally | About half the time... | Most of the time... | Every time |
| 38. enjoyed your sexual relations with your partner? | Every time... | Most of the time ... | About half the time... | Occasionally | Not at all |

CHILDREN: The following questions are about how things have been with your children.
If you do not have any children living at home go straight on to the next section.

OVER THE PAST TWO WEEKS HAVE YOU:

- | | | | | | |
|---|------------------|----------------------|------------------------|---------------------|-----------------|
| 39. been interested in your children's activities, eg. school, friends, etc.? | All the time ... | Most of the time ... | About half the time .. | Occasionally | Not at all |
| 40. been able to talk to and listen to your children? | All the time ... | Most of the time ... | About half the time... | Occasionally | Not at all |
| 41. been shouting at or arguing with your children? | Not at all ... | Occasionally | About half the time .. | Most of the time .. | Constantly |
| 42. been feeling affectionate towards your children? | All the time... | Most of the time ... | About half the time... | Occasionally | Not at all |

FAMILY UNIT: The following questions are about how things have been with your immediate family, that is those with whom you are presenting living. If you are NOT living with an immediate family, please ignore this section.

OVER THE PAST TWO WEEKS HAVE YOU:

- | | | | | | |
|--|----------------|--------------|------------------------|---------------------|------------|
| 43. been worrying more than necessary about things happening to your family? | Not at all ... | Occasionally | About half the time... | Most of the time.. | Constantly |
| 44. been feeling that you have let your immediate family down at any time? | Not at all.... | Occasionally | About half the time... | Most of the time.. | Constantly |
| 45. been feeling that your immediate family has let you down at any time? | Not at all ... | Occasionally | About half the time .. | Most of the time... | Constantly |

APPENDIX 6) INCIDENT AND VICTIM INDEPENDENT VARIABLES

INCIDENT AND VICTIM INDEPENDENT VARIABLES		
	number	percent
Victim jumped in front of train	52	68.42
Victim prostrate on track in station	13	17.11
Victim confronted as walking on track	7	9.21
Victim not seen prior to contact	4	5.26
Victim died	41	53.95
Body of victim known to be mutilated	37	48.68
Body of victim known to be not mutilated	39	51.32
Victim seen after incident, mutilated	12	15.79
Victim seen after incident, not mutilated	39	51.32
Victim not seen after incident	25	32.89
Victim seen after incident, dead and mutilated	10	13.16
Victim seen after incident, alive and mutilated	2	2.63
Victim seen after incident, dead and not mutilated	7	9.21
Victim seen after incident, alive and not mutilated	32	42.11
Victim female	26	34.21
Age of victim:		
17-28 years	26	34.21
29-40 years	25	32.89
41-86 years	25	32.89

APPENDIX 7) DRIVER INDEPENDENT VARIABLES

DRIVER INDEPENDENT VARIABLES		
	number	percent
Driver had prior history of psychiatric care	9	11.84
Driver had experienced previous incident/s	25	32.89
Average pre-incident annual sickness absence ≥ 20 days	20	26.67
Asian ethnic group	12	15.79
Afro/Caribbean ethnic group	10	13.16
Irish ethnic group	3	3.95
United Kingdom ethnic group	51	67.11
Driver married	37	48.68
Driver cohabiting	9	11.84
Driver single	24	31.58
Driver separated	3	3.95
Driver divorced	3	3.95
Driver Protestant	11	14.47
Driver Catholic	9	11.84
Driver Muslim	4	5.26
Driver Hindu	4	5.26
No religious conviction	48	63.16
Age of driver:		
20-31 years	28	36.84
32-44 years	26	34.21
45-63 years	22	28.95

APPENDIX 8) PAPERS SUBMITTED IN SUPPORT OF CANDIDATURE FOR
DEGREE OF DOCTOR OF PHILOSOPHY

The following papers have been published and are included in this thesis:

Farmer, R.D.T., O'Donnell, I. and Tranah, T. (1991) Suicide on the London Underground System. *International Journal of Epidemiology* 20, 3, 707-711.

Farmer, R.D.T., Tranah, T., O'Donnell, I. and Catalan, J. (1992) Railway Suicide: The Psychological Effects on Drivers. *Psychological Medicine*, 22, 407-414.

The following papers have been accepted for publication but are not yet published therefore reprints are not available:

Tranah, T. and Farmer, R.D.T. (1992) Psychological reactions of drivers to railway suicide. *Social Science and Medicine*, (In press).

O'Donnell, I., Tranah, T. and Farmer, R.D.T. (1992) An Overview of Suicide on Railways. *Social Science and Medicine*, (In press).

Railway suicide: the psychological effects on drivers

RICHARD FARMER, TROY TRANAH,¹ IAN O'DONNELL AND JOSE CATALAN

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SYNOPSIS People have jumped (or fallen) in front of trains on the London Underground system in increasing numbers throughout the twentieth century. During the past decade there have been about 100 such incidents each year, of which around 90 would involve the train driver witnessing his train strike the person on the track. Most are suicides or attempts at suicide. They represent major unexpected and violent events in the lives of the train drivers and it might be expected that some of them would respond by developing a post-traumatic stress reaction of the type identified by Horowitz (1976) or other adverse psychological reactions or both. The research reported in this paper was designed to characterize the range of responses of drivers to the experiences of killing or injuring members of the public during the course of their daily work. It was found that 16.3% of the drivers involved in incidents did develop post-traumatic stress disorder and that other diagnoses, e.g. depression and phobic states, were present in 39.5% of drivers when interviewed one month after the incident.

INTRODUCTION

There are few publications which describe the epidemiology of suicide on railways (Guggenheim & Weisman, 1972; Johnston & Waddell, 1984; Symonds, 1985; Cocks, 1989; Farmer et al. 1991). There are many research reports concerned with the reactions of individuals to acute stressors of various kinds. However, there is no published work on the reaction of train drivers to the specific stress of being unwittingly involved in traumatic acts of self destruction. In this research the train drivers involved in incidents on the London Underground during a 27-week period in 1990-1 were interviewed in order to assess the incidence of Post-Traumatic Stress Disorder (PTSD) and other adverse psychological reactions.

Under normal circumstances the trains on the London Underground system approach stations at about 50 kph. When entering a station the driver has an unobstructed view of the platform and the track ahead of him. The driver applies the brakes either prior to, or just as, the front

cab draws level with the platform. At the usual speed at this point a train requires at least 25 meters to stop.

A large proportion of the people who jump (or fall) in front of trains do so within the first 20 metres of the platform. Although a driver may see an individual standing unusually close to the edge of the platform as the train enters the station, it is more usual for him to become aware of the problem only when an individual suddenly leaves the platform by jumping into the air to land either feet first on the track or slumped over the rails in front of the moving train. In these conditions the drivers have no way of preventing the train hitting or crushing the individual. The driver may hear a loud bang as the body hits the front of the cab or feel movements in the cab as the train wheels pass over the body. Following an incident the driver observes and sometimes assists the emergency teams in recovering the body or injured person. The frequency of incidents is such that there is a 1 in 50 chance that any one driver will be involved in such an incident each year. Some drivers on the system have the misfortune of experiencing many episodes during their career.

The syndrome now known as post-traumatic stress disorder (PTSD) was first described by

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Horowitz (1976) to specify the response of some individuals to distressing unexpected life events. The criteria set out in the *Diagnostic and Statistical Manual of Mental Disorders* (Third Edition, Revised, DSM-III-R, American Psychiatric Association, 1987) for the identification of a case are as follows.

A. The precipitating event would be considered to be unusual and distressing by most people.

B. The presence of recurrent and distressing thoughts, feelings or dreams that cause the event to be persistently re-experienced.

C. The avoidance of thoughts, feelings, activities or situations that might cause the traumatic event to be remembered (an extension of this avoidance is a numbing of general responsiveness).

D. An increased level of arousal.

E. The persistence of symptoms defined above for at least one month.

This definition was used in the present research. During the course of the research tests other than those presented in the paper were administered; the results of those tests will be the subject of future analyses.

METHOD

All individuals studied were drivers on the London Underground who had experienced a person jump or fall in front of their trains. All were male, the mean age at the time of the incident 38.1 years (S.D. = 11.80, range 20–63). Interviews took place between one and four months following an incident (the median time between incident and interview being 5.0 weeks). The interviews lasted on average 3.5 h and were carried out by one of two trained interviewers. All interviews included the following.

(i) A semi-structured interview.

(ii) A partially standardized clinical interview – the Present State Examination (PSE-9).

(iii) A checklist of the criteria for PTSD administered in the form of a semi-structured interview.

(iv) The completion of a number of self-report schedules.

The semi-structured interview sought to elicit qualitative information regarding the incident together with the personal demographic details,

career history and medical and psychiatric history of the driver. Through this interview it was also possible to ascertain the time taken off work following the incident and the occurrence of previous incidents of this type.

The PSE-9 (Wing *et al.* 1974) is a partially standardized clinical interview designed to explore the presence or absence of 140 psychiatric symptoms during the month preceding interview. The PSE-9 has been used in both psychiatric and community surveys (Wing *et al.* 1978). Among the indices produced are a PSE total score and the subject's position on an Index of Definition (ID). The ID gives 8 levels of confidence (1–8) that the symptoms reported represent a clinically diagnosable psychiatric disorder. Levels 5 to 8 are regarded as 'cases' and are accompanied by a 'tentative diagnosis' based on the International Classification of Disease (ICD-9, World Health Organization, 1977). The PSE-9 was used to identify 'cases' and where applicable provide a 'tentative' clinical diagnosis – the PSE-9 does not include PTSD as a clinical diagnosis.

The post-traumatic stress disorder (PTSD) checklist is based on the DSM-III-R criteria for post-traumatic stress disorder. Standardized questions were supplemented where necessary by additional enquiries designed to investigate the presence or absence of the 17 possible symptoms relevant to the diagnosis of PTSD (range 0–17). This interview provided the total number of PTSD symptoms that the driver had 'persistently' experienced during the month preceding interview, and whether sufficient numbers of symptoms fell into sections B, C and D of the DSM-III-R criteria to diagnose PTSD 'caseness'.

The self-report questionnaires were chosen for their proven reliability and validity and to allow comparisons with other PTSD research. In this study the PSE-9 and the PTSD checklist are the criterion variables. The concurrent validity of several self-report questionnaires is assessed.

The scaled version of the General Health Questionnaire [GHQ-28] (Goldberg & Hillier, 1979) rates the subject on four sub-scales: (a) somatic symptoms; (b) anxiety/insomnia; (c) social dysfunction; and (d) severe depression. The total score (0–28) is used as a screening tool, those subjects scoring 5 or over being

possible psychiatric cases. A separate score (0–7) is obtained for each sub-scale, providing a symptom profile for the subject. The 'GHQ method' (Goldberg & Williams, 1988) was used in scoring. The main reason for using the GHQ-28 in this study is the suggested ability of sub-scale 'b' to identify PTSD cases (Ramsay, 1990).

The Impact of Events Scale (IES; Horowitz *et al.* 1979) was used to assess the level of subjective stress experienced by drivers following the incident. Subjects indicate the frequency of occurrence of 15 items associated with a stress reaction during the seven days preceding the interview. This yields a total score in the range 0–75 and two sub-scale scores – symptoms of intrusion (0–35) and avoidance (0–40). Scores above the thresholds indicate that the subject might be experiencing a stress reaction of clinical intensity. Most published studies have only made use of the sub-scale scores, particularly the intrusion sub-scale. However, in this study the total score using the cut-off of ≥ 40 was used (addition of the cut-off values for the two IES subscales, ≥ 20 was also investigated). The IES was used to evaluate its ability to predict the presence of PTSD.

In the Post-Traumatic Symptom Scale (Holen *et al.* 1983) subjects are asked to indicate whether they experienced one or more of 10 symptoms associated with a traumatic stress reaction during the seven days preceding assessment. It gives a score in the range 0–10. The PTSS-10 was used in this study to assess its ability to predict cases of PTSD and other psychiatric problems and to allow comparison with the IES.

All of the drivers were interviewed as close to one month after the incident as possible. Occasionally extended sickness, communication problems or annual leave caused the interview to take place later than one month. The one month interval was chosen for two reasons: (i) the diagnosis of PTSD requires that the symptoms are present for at least one month; (ii) the Present State Examination (PSE-9) is concerned with the individual's mental state over the month preceding interview.

All interviews were scheduled during the driver's normal working day with the full co-operation of the Management of London Underground Limited and the relevant trade unions. This might account in part for the high response rate (84.3 %).

RESULTS

Inter-rater reliability of the two raters regarding their assessment of drivers using the Present State Examination was analysed using the kappa statistic (Fleiss, 1981). A kappa value of 1.0 indicates perfect agreement, a value of 0 indicates the level of agreement that would be gained by chance. The kappa result for this reliability analysis was 0.863 indicating satisfactory inter-rater reliability.

At one month after the incident seven (16.3 %) of the forty-three drivers satisfied the DSM-III-R criteria for PTSD using the PTSD checklist (group 1). The mean number of symptoms reported by these seven cases was 10.1 (S.D. = 2.2) (see Table 1); the mean for non-PTSD cases ($N = 36$) was 3.8 (S.D. = 2.3). All of the PTSD cases reached caseness on the PSE-9 and all had a tentative diagnosis of a depressive type (6 neurotic depression, 1 manic-depressive psychosis (depressed type)). Ten of the 36 non-PTSD subjects reached 'caseness' on PSE-9 (group 2), 3 neurotic depression, 6 phobic states and 1 manic-depressive psychosis (depressed type) (see Table 2). It is important to note that in order to fulfil the criteria for a 'case' on the PTSD schedule an individual has to score at least 1 in section B and at least 3 in section C and at least 2 in section D (see Table 3). Thus, provided the items are in the specific sections, the minimum total score required for caseness is 6. The mean PTSD total score for 'cases' both on PTSD and PSE-9 (group 1) was 10.1 (S.D. = 2.2, range 7–13), for those who were cases only on the PSE-9 (group 2) it was 5.2 (S.D. = 1.4, range 2–7) and for non-cases on both criteria (group 3) it was 3.3, (S.D. = 2.4, range 0–8). There was little difference between the proportions of each group giving a positive response to items C3, C6, C7, D4 and D6 of the PTSD criteria. The greatest differences in the proportion with a positive response were in items C1, C2, C4, D1, D2 and D5 (Table 3).

The distribution of the total PSE-9 symptom scores of the drivers is compared with those of a general population sample and a sample of psychiatric in-patients and out-patients in Table 4. The distribution of scores among the drivers is shifted to the right of the general population and to the left of the psychiatric population. The Wilcoxon test for location was completed, com-

Table 1. Mean and standard deviations for the three groups in the PSE-9 interview

Interview Schedule	Group 1		Group 2		Group 3	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
General Health Questionnaire (GHQ)						
Somatic subscale	3.57	2.61	2.00	1.41	0.65	1.14
Anxiety insomnia subscale	3.86	1.55	2.90	1.37	0.50	0.89
Social dysfunction subscale	4.00	2.27	1.60	1.85	0.27	0.71
Severe depression subscale	1.00	1.69	0.50	0.92	0.04	0.19
Total score	12.43	6.25	7.00	3.82	1.46	2.52
Present State Examination (PSE-9)						
Total score	22.71	4.56	13.80	4.58	4.08	2.73
Index of Definition	5.57	0.49	5.20	0.40	2.77	0.85
Impact of Events Scale (IES)						
Total score	43.71	10.11	33.60	7.38	15.96	17.02
Intrusion score	21.29	6.61	15.20	6.19	7.23	8.02
Avoidance score	22.43	5.85	18.40	4.88	8.73	9.43
Post-Traumatic Symptom Scale	6.14	2.70	4.80	2.04	1.58	1.74
Post-Traumatic Stress Disorder Checklist (DSM)						
Section b	3.00	0.93	1.70	1.10	1.31	1.26
Section c	3.43	0.73	1.50	0.67	0.69	0.72
Section d	3.71	1.28	2.00	1.48	1.31	1.03
Total score	10.14	2.23	5.20	1.40	3.31	2.43

Table 2. Frequency and distribution of sick leave compared with diagnoses as assessed by the PSE-9 interview and PTSD checklist

Caseness	Number (N = 43)	Percentage	Number off work	Days off (average)	Max	Min
PTSD cases	7	16.3	7	34.2	54	28
PSE-9 diagnoses						
'neurotic depression'	6		6			
'manic depressive psychosis, depressed'	1		1			
PSE-9 cases only	10	23.2	7	19.2	56	0
PSE-9 diagnoses						
'phobic states'	6		4			
'neurotic depression'	3		2			
'manic depressive psychosis, depressed'	1		1			
non-PTSD cases and non-PSE-9 cases	26	60.5	11	9.1	42	0

paring the driver PSE-9 total scores and hypothesized medians of the in- and out-patient group and the general population samples. In both comparisons the distribution of the driver sample was significantly different. Driver sample/general population sample = $P < 0.0001$, driver-/in- and out-patient sample = $P < 0.0001$.

The time taken off work following the incident, assessed at the time of the one-month interview, by drivers in different categories is shown in Table 2. All of the drivers who fulfilled the criteria for post-traumatic stress disorder (group 1) took some time off work – the mean was 33.3 days and the minimum was 28 days

(S.D. = 8.6, range 28–54). Seven (70.0%) of the non-PTSD cases who were classified as 'cases' by PSE-9 (group 2) had some time off work. The average sick leave among this group was 19.2 days (S.D. = 18.1, range 0–56). Eleven (42.3%) of the non-PTSD and non-PSE-9 cases (group 3) took sick leave, the average duration of time off was 9.1 days (S.D. = 13.2, range 0–42).

Four (23.5%) of the 17 drivers who were classified as cases by the PSE-9 had experienced previous incidents (range of number of incidents experienced = 0–5; only one driver had experienced more than one incident) compared with 50% of the 'non-case' group (13 out of 26)

Table 3. Distribution of reported PTSD symptoms as assessed by PTSD checklist for the three groups

DSS-III-R criteria		PSE case PTSD case		PSE case PTSD non-case		PSE non-case PTSD non-case	
		N	%	N	%	N	%
Cases		7		10		26	
B1	Recurrent and intrusive distressing recollections of the event	6	85.7	6	60.0	9	34.6
B2	Recurrent distressing dreams of the event	4	57.1	1	10.0	3	11.5
B3	Suddenly acting or feeling as if the traumatic event was recurring (re-living the experience, illusions, hallucinations and dissociative episodes)	6	85.7	5	50.0	11	42.3
B4	Intense psychological distress at exposure to events that symbolize or resemble an aspect of the traumatic event including anniversaries of the trauma	5	71.4	5	50.0	11	42.3
C1	Efforts to avoid thoughts and feelings associated with the trauma	7	100.0	6	60.0	12	46.2
C2	Efforts to avoid activities or situations that arouse recollections of the trauma	7	100.0	5	50.0	3	11.5
C3	Inability to recall an important aspect of the trauma	0	0.0	0	0.0	0	0.0
C4	Markedly diminished interest in significant activities	4	57.1	2	20.0	0	0.0
C5	Feeling of detachment or estrangement from others	4	57.1	0	0.0	2	7.7
C6	Restricted range of affect (e.g. unable to have loving feelings)	2	28.6	1	10.0	1	3.8
C7	Sense of foreshortened future (e.g. does not expect to have a career, marriage, long life)	0	0.0	1	10.0	0	0.0
D1	Difficulty in staying or falling asleep	6	85.7	2	20.0	5	19.2
D2	Irritability or outbursts of anger	6	85.7	5	50.0	6	23.1
D3	Difficulty in concentrating	3	42.9	1	10.0	0	0.0
D4	Hypervigilance	4	57.1	6	60.0	9	34.6
D5	Exaggerated startle response	5	71.4	4	40.0	5	19.2
D6	Physiological reactivity on exposure to events that resemble an aspect of the traumatic event	2	28.6	2	20.0	9	34.6

Table 4. Present State Examination (PSE-9) scores

Subjects	Total symptom score					
	0-5	6-10	11-15	16-20	> 21	
Drivers	44.2	20.9	14.0	4.7	16.3	
In- and out-patients*	2.0	7.0	9.0	21.0	60.0	
General population sample*	73.0	14.0	7.0	3.0	2.0	

* Data taken from Wing *et al.* 1978

(range of number of incidents experienced = 0-4, four drivers had experienced more than one incident).

Six of the 7 PTSD 'cases' scored 'caseness' on

the GHQ-28 (≥ 5) (group mean = 12.4, s.d. = 6.2), four were above the cut-off for the PTSS-10 (≥ 6) (group mean = 6.1, s.d. = 2.7), five scored above the cut off for the IES total score (≥ 40) (group mean = 43.7, s.d. = 10.1), three scored above the IES intrusion scale cut-off (group mean = 21.3, s.d. = 6.6) and five scored above the IES avoidance sub-scale cut-off (group mean = 22.4, s.d. = 5.8) (for both sub-scales cut-off ≥ 20). Thus none of these tests could be used as a satisfactorily efficient screening tool for post-traumatic stress disorder. Table 5 shows the sensitivity (percentage of PTSD cases detected by other tests) and specificity (percentage of non-PTSD cases excluded by other tests) for the psychometric self-report tests used.

Table 5. *Specificity and sensitivity of psychometric tests in detecting post-traumatic stress disorder*

Test	Sensitivity	Specificity
Impact of events scale		
Total	71.4	83.3
Intrusion sub-scale	42.9	88.9
Avoidance sub-scale	71.4	80.5
Post-traumatic stress symptoms		
Total	57.1	86.1
General health questionnaire		
Total	85.7	72.2
Sub-scale b	85.7	75.0

DISCUSSION

Three distinct groups of drivers emerged, each displaying a different degree, or possibly type, of reaction to the traumatic incident. Group 1 subjects ($N = 7$; 16.3%) satisfied the checklist criteria for PTSD and were identified as 'cases' on PSE-9. All the drivers in this group had taken substantial time off work following the incident. Group 2 subjects ($N = 10$; 23.2%) did not satisfy the check-list criteria for PTSD but attained caseness on the PSE-9. Nearly a third of drivers in this category had no time off work and the average time off work among the remainder was significantly lower than that taken by group 1 subjects. Group 3 subjects ($N = 26$; 60.5%) were neither cases on the PSE-9 nor on the PTSD checklist. Compared with groups 1 and 2, group 3 subjects were less likely to take time off and those that did took less time off. Sickness absence following an incident appears to be a useful indicator of 'caseness'.

Previous experience of a similar incident does not appear to be an important determinant of 'caseness'. Indeed it is possible that some form of 'inoculation' to this type of stressor may occur. Following previous events the driver may have applied a variety of coping strategies that would have been tested regarding their efficacy in combating symptoms and other incident related problems. Those coping strategies found to help are likely to be used again following subsequent incidents and hopefully reduce the severity and duration of adverse reactions following these incidents.

PTSD is not a diagnostic option in PSE-9. Post-traumatic stress disorder is classified within

the DSM-III-R as an 'Anxiety Disorder' yet all our PTSD cases had a PSE-9 'diagnosis' of a depressive type. In the latest draft version of the ICD-10 (WHO, 1990) PTSD has been included within the general category 'Reaction to severe stress, and adjustment disorders'. Although three non-PTSD cases had a diagnosis of 'neurotic depression' on PSE-9 six of the ten subjects in group 2 gained a diagnosis of 'phobic state', which is an anxiety disorder. Groups 1 and 2 appear to differ both in scoring PTSD 'caseness' and the type of PSE-9 diagnoses attained. Subjects scoring a depressive type diagnosis are more likely to also be diagnosed as a PTSD case than those drivers scoring a diagnosis of phobic state.

Other studies have also identified a link between depression and PTSD. Using the sub-scale scores of the 90-item Symptom Checklist (SCL-90, Derogatis *et al.* 1973) Horowitz *et al.* (1980) found their sample (66 persons receiving treatment for a pathological stress response) reported higher scores on the depression sub-scale than on any other sub-scale included within the SCL-90 (e.g. anxiety and phobic anxiety subscales). Depression was found to be the most common overlapping diagnosis in a sample of PTSD in-patients by Green *et al.* (1985). McGuire (1990) in reviewing treatment approaches to PTSD noted that several clinicians have reported successes in treating PTSD using antidepressants (both tricyclics and monoamine oxidase inhibitors).

Close scrutiny of the list of individual symptoms included in the criteria for a diagnosis of PTSD reveals an overlap between PTSD and depression. Many of the behavioural and cognitive symptoms characterizing depression appear in sections C and D of the PTSD criteria. There are three possible explanations for our findings from group 1 drivers: (a) subjects who are PTSD cases are at the same time presenting an independent depressive illness; (b) the symptoms of numbing/avoidance and increased arousal reported by PTSD cases are causing a parallel misdiagnosis of a depressive type; (c) an 'atypical depressive illness' is leading to a presentation of symptoms labelled as PTSD.

Six of the ten subjects in group 2 (those scoring 'caseness' on the PSE-9 but not on the PTSD checklist) narrowly missed diagnoses of PTSD despite reporting 6 or more PTSD

symptoms (group mean = 5.2, s.d. = 1.4). This phenomenon has been noted by other researchers (Ramsay, 1990). Sixteen (37.2%) of all drivers scored six or more PTSD symptoms as measured by the PTSD checklist. On the PSE-9 six of the ten subjects making up group 2 were diagnosed as 'phobic states', the four remaining cases being three 'neurotic depression' and one 'manic-depressive psychosis, depressed type'. This group appear to have experienced an adverse reaction to the traumatic incident. However, this reaction has not developed into PTSD, as it is currently defined.

Members of group 3 received no 'diagnosis' either on the PTSD checklist or the PSE-9. Though some individuals scored above the respective cut-offs for the three self-reports (IES, GHQ-28, PTSS-10) the numbers were small, no more than 4 subjects scoring above the threshold on any of the self-report schedules. These subjects would appear to have suffered little or no adverse reaction to the initial incident.

Data from the PSE-9 total symptom scores, are distributed in a bimodal fashion (Table 4) with a clear shift to the right in comparison with the general population sample. Whereas the psychiatric patients and the general population sample both have continuous distributions that for the drivers appears to be discontinuous with a high proportion scoring a total PSE-9 score of 20 or more. The pattern of our results are significantly different from a general population sample and the in- and out-patient sample. The in- and out-patient sample consisted of neurotic patients of both sexes, age range 16-64; the general population sample consisted of women only age range 18-65. Due to the constitution of these two groups there are limitations in drawing comparisons. However, with this in mind, it is still of interest to compare the respective patterns of score distribution.

Wing *et al's* (1978) general population study showed that 12.0% scored a total PSE-9 score of 11 or over, only 2.0% score ≥ 21 . In the driver sample 15 (34.9%) scored ≥ 11 and seven (16.3%) scored a total PSE-9 score of 21 or more. However, the drivers' results are not comparable with the in-patient and out-patient samples' total PSE-9 scores. The same authors found in a sample of in-patients and out-patients that 90.0% gained a total PSE score ≥ 11 (34.9% of drivers scored ≥ 11), with 60.0%

scoring ≥ 21 (16.3% of drivers scored ≥ 21). Our results appear to lie somewhere between these two groups, suggesting that there are two distinct groups among the drivers, those adversely affected and those not adversely affected.

Mean PSE-9 total scores are also of interest regarding PTSD diagnoses. Drivers in group 1 gained a significantly higher mean PSE-9 total score than drivers in group 2. This might indicate that the higher the level of psychiatric distress the more likely is an co-diagnoses of PTSD.

Comparing the three IES scales (total score, intrusion sub-scale and avoidance sub-scale) and the PTSS-10 for their ability to identify PTSD cases the best predictor was the IES total score, followed by the IES avoidance sub-scale, the PTSS-10 and finally the IES intrusion scale (Table 5). This finding was surprising given that the IES intrusion sub-scale is commonly felt to be a good predictor of possible PTSD caseness. In identifying general 'caseness' (whether PTSD or PSE-9) there was little difference between the PTSS-10 and the three IES scales (the PTSS-10 was marginally better - sensitivity 47.1%, specificity 96.1%). However, the GHQ-28 sub-scale 'b' (anxiety/insomnia) using a cut off ≥ 3 , was as suggested (Ramsay, 1990), the best predictor of PTSD cases (sensitivity 85.7%, specificity 75.0%) and of general 'caseness' whether PTSD or other (sensitivity 76.5%, specificity 92.3%). The GHQ-28 total score was almost as good a predictor of general 'caseness' using cut-off ≥ 5 (sensitivity 76.5%, specificity 88.5%). The GHQ-28 was the best predictor of both PTSD cases and general psychiatric cases within this population. However, the sensitivity and specificity of the GHQ-28 are not sufficient for it to be used with complete confidence as an accurate screening instrument in this situation. Although the IES and PTSS did not prove as efficient in predicting cases of PTSD they did have the advantage of providing information regarding experience of specific symptoms associated with PTSD. Therefore, their use in this respect may be of value.

Our results indicate that not all drivers are affected by these incidents but the number affected is significant and the symptoms reported are often incapacitating. Research on the effects of persons jumping or falling in front of London Underground trains on the drivers is continuing with a view to establishing the duration of

symptoms, identifying factors that, intrinsic to the incident or to the driver, are associated with adverse reactions and to discovering the most appropriate interventions to help those drivers who develop psychological problems following incidents of this type.

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Suicide on the London Underground System

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Over the past 50 years there has been an increase in the numbers of people jumping/falling in front of trains on the London Underground system. Case-fatality rates have fallen from 70% in the 1950s to 55% today. The proportion certified as suicide has fallen while the proportions certified as accidents or open verdicts have risen. There is unusual clustering of events at some stations which are adjacent to psychiatric units. The hypothesis that ease of access to London Underground stations may sometimes be a determinant of suicide is investigated.

Suicide by jumping under moving trains has been a problem for the railways since their early days. In 1877 Cox¹ remarked that, 'Recently, suicide by falling before a railway train has exercised an extraordinary fascination for disordered minds'. In 1886 Ogle² reported that between 1873 and 1883 the railways accounted for 2.4% of male suicides and 0.8% of female suicides in England and Wales. Anderson³ drew attention to a rise in railway suicides both in absolute numbers and as a percentage of all suicides from the 1870s to the 1900s. By 1909 they accounted for 5.8% of male and 3.0% of female suicides nationwide. Roughly the same proportion of suicides in five Metropolitan boroughs in London (Hackney, Hampstead, Islington, St Pancras and Stoke Newington) were on the railways between 1936-1938.⁴ Capstick⁵ reported that 1.6% of suicides in Wales 1951-1955 were caused by being run over by a moving train.

Today suicide on railway systems still constitutes a problem. In addition to the morbidity suffered by others, particularly train drivers, a death on a busy railway system causes significant distress to many passengers by disrupting normal services for on average 36.12 minutes. The maximum delay time 1980-1989 was 229 minutes.⁶ Since the late 1940s accidental and non-accidental injury and death on the London Underground system has increased. Part of the increase is related to changes in passenger throughput but there

remain some unexplained variations in numbers of incidents.

METHODS

The London Underground network covers the whole of central London, most of the outer suburbs and some of the semi-rural areas north of the metropolis. The earliest line was opened in 1863 and the latest in the 1970s. There are now ten lines serving a total of 273 stations on 408 km of track. Most of the stations in the centre of London are underground; many in the outer suburbs are above ground. It is the most frequently used form of public transport in central London, with 815 million passengers journeys in 1989.

Under the provisions of the Railways Act (1873) there is a legal requirement that all injuries occurring on railway property be reported to the Railway Inspectorate and that all fatalities be investigated by a coroner and jury. Despite the requirement to report and investigate all incidents there is no central records system in which detailed information on all incidents is held. This investigation involved building a comprehensive database from the records of London Underground Limited (LUL), the British Transport Police (BTP) and Her Majesty's Coroners for Central London.

Data collection comprised several phases. Information relating to the time, date and location (station and line) of incidents together with the sex of the victim, the immediate outcome of the incident (dead/alive) and the delay to the service was gathered for each event 1940-1989 from the Railway Operations

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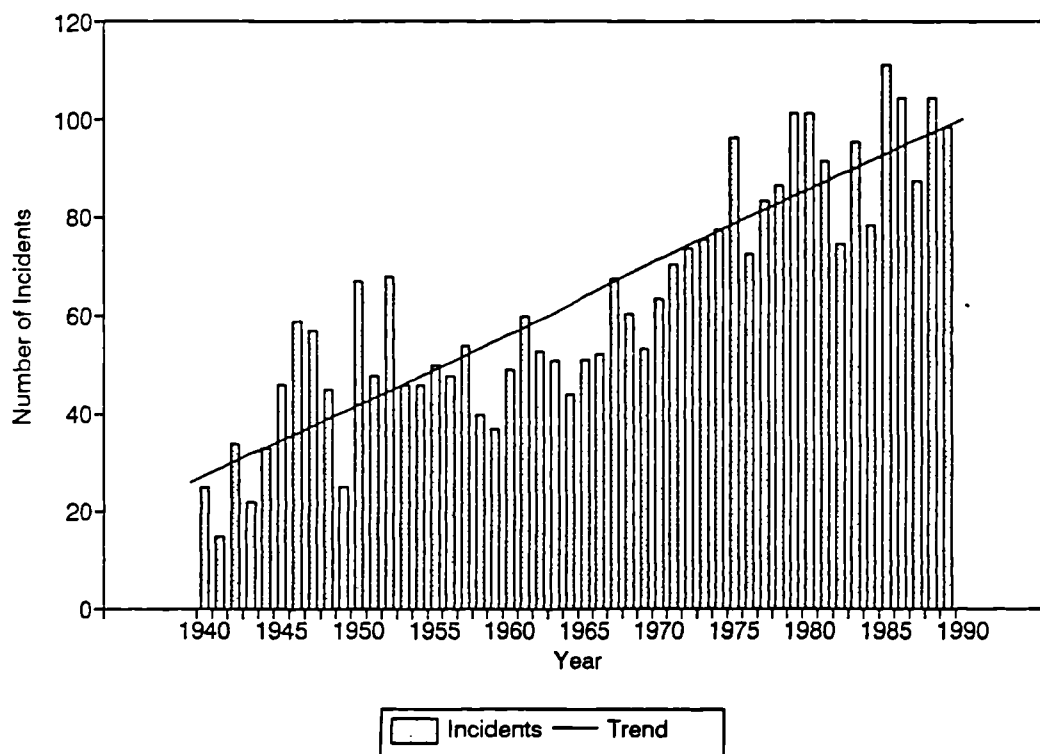


FIGURE 1 People under London Underground trains—incidents per year.

and Passenger Services departments of LUL. These departments record all incidents causing a delay to the service greater than two minutes. These data, together with information from LUL's archives allowed the research team to build a skeleton database.

Information concerning the age, address postcode and inquest verdict was then collected from the registers of sudden deaths, accidental deaths, suicides and injuries on the London Underground which have been maintained by 'L' Division of the British Transport Police since 1975. This information served to validate and enrich the original database.

The BTP's original case files for 450 incidents were also carefully examined. These files typically contain statements from the train driver and guard, any inde-

pendent witnesses to the event and the victim's next of kin. This information served as a further check on the primary database and gave detail of victims' biographies and psychiatric histories and their modus operandi. One of the authors (IO'D) attended coroners' inquests and interviewed the survivors of suicide attempts on the London underground in order to complete the picture.

It is believed that all incidents of people falling or jumping in front of LUL trains between 1940 and the end of 1989 have been identified ($N = 3144$). The amount of information available on each case varies.

RESULTS

The annual number of incidents increased from about 25 per year in the early 1940s to about 100 in the late 1980s. The upward trend, calculated using a least squares regression, has been fairly consistent throughout the years (Figure 1). Incidents are unevenly distributed in space, the Northern Line experiencing more than any other line (Table 1).

The peak hours for incidents are between 11.00 and 12.00 and between 15.00 and 16.00. Neither of these are within the peak rush hour periods. The smallest numbers of incidents occur on Sundays; Mondays have slightly more incidents than other weekdays. The peak

TABLE 1 Number of incidents by line 1975-1989

Line	No	Line	No
Bakerloo	92	Metropolitan	140
Central	225	Northern	363
District	262	Piccadilly	234
East London	5	Victoria	145
Jubilee	51		

Incidents occurring on the Circle Line are recorded under either the District or the Metropolitan Line with which it shares platforms

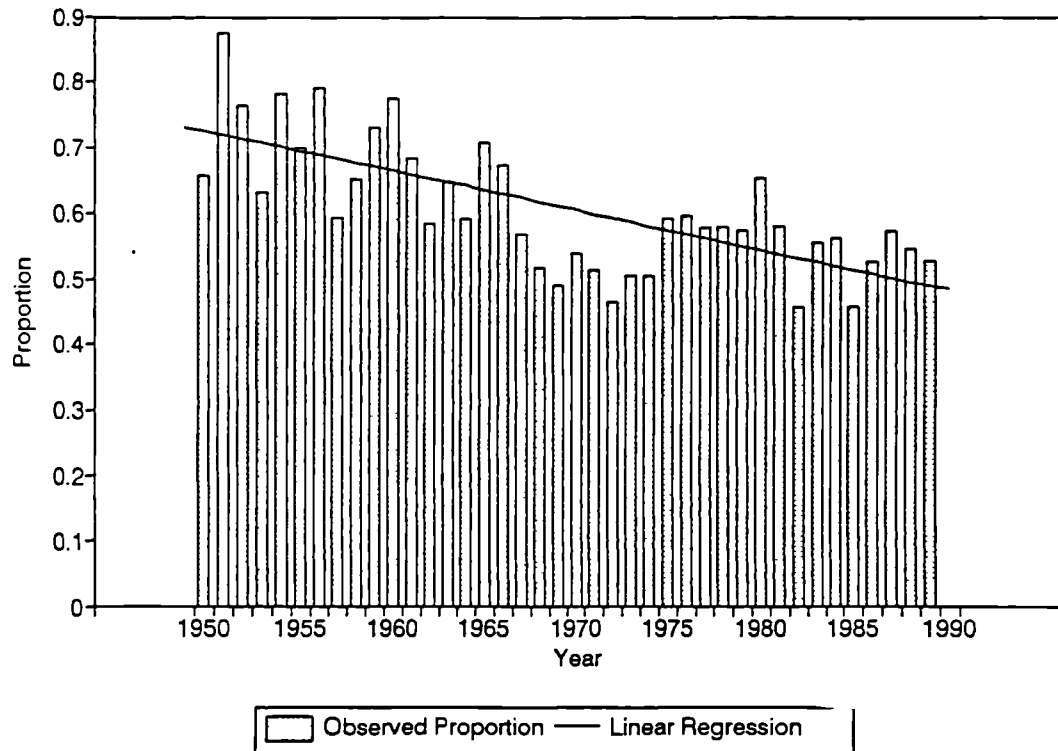


FIGURE 2 People under London Underground trains—proportion of incidents that were fatal.

months are March and May. The ratio of men to women is 1.76:1. Some 75% of incidents involve people under 55 years of age.

From the archives it was possible to establish the immediate outcome of incidents from 1950 onwards. In the 1950s about 70% of all incidents were fatal, in more recent years the fatality rate has fallen to about 55% (Figure 2). The chances of survival appear to be influenced by the presence of a channel several feet deep between the rails which is a feature of some lines only. It is not absolutely clear why these channels were built but they are normally referred to as 'suicide pits' by LUL staff. The survival rate at stations which have

this feature is 55%. It drops to 32% at stations without pits.

Table 2 shows the verdicts returned by coroners' juries in the periods 1951 to 1965 and 1976 to 1989 (these data were unobtainable for the years before 1951 and for the period 1966 to 1975). The proportion of deaths certified as suicides has fallen whilst the proportions certified as accidents (including misadventure) and as 'open' (undetermined as to whether accidentally or purposely inflicted) have risen. In the last ten years 51.2% of the male deaths and 73.5% of

TABLE 2 Verdicts of coroners' juries at inquests following deaths on London Underground Tracks

Period	Percentage of all deaths on tracks		
	Accident	Undetermined	Suicide
1951-1955	16	15	70
1956-1960	13	15	69
1961-1965	11	15	74
1976-1980	15	22	63
1981-1985	21	21	58
1986-1989	22	23	55

TABLE 3 Stations with the highest number of incidents involving people being hit by trains (1940-1989)

Station	Numbers	Rate per million passengers per year
Kings Cross St Pancras	98	0.027
Victoria	81	0.026
Embankment	57	0.085
Piccadilly Circus	54	0.036
Earl's Court	53	0.071
Waterloo	52	0.035
Mile End	49	0.140
Tooting Bec	42	0.168
Oxford Circus	41	0.016
Liverpool Street	39	0.020

the female deaths on the system have been certified as suicide. The sex difference in certification holds for all age groups. Between 1977 and 1988 4.84% of all suicide verdicts returned by coroners in Greater London involved people jumping in front of moving LUL trains.

Some 17.7% of all incidents occurred at one of the ten stations shown in Table 3. The busiest stations on the system have the highest number of incidents (Spearman's $r = 0.7$). The ratio of incidents to average annual passenger throughput serves to identify two stations with exceptionally high incident rates—Tooting Bec and Mile End. Both of these stations are close to psychiatric units and in both stations a high proportion of the victims were inpatients at the time of the incident (at least 55% for Tooting Bec and at least 22% for Mile End). This phenomenon has been found at other stations which are proximate to psychiatric institutions. To date we have been unable to locate a station adjacent to such an institution which has a low incidence. Incidents at other stations involve a high proportion of people of no fixed abode—King's Cross (17%), Embankment (27%), Earl's Court (21%).

DISCUSSION

The overall trends in the number of incidents involving people jumping/falling in front of trains is lower than would be expected given the trends in passenger traffic throughout the London Underground system. Between 1979–1989 the annual number of passenger journeys on the London Underground increased by 40% while the annual number of incidents was virtually stable.

In the past ten years the ratio of suicides on the Underground system to all suicides within Greater London has remained more or less constant. There has been an interesting fall in the case-fatality rate in the past decade. This is unlikely to be the result of improvements in medical care or the speed with which the injured can be conveyed to hospital as the majority of the incidents are immediately fatal. At this stage the reasons for the decline in the case-fatality rates are not clear and are the subject of further investigation.

Logically there can only be three reasons for a person being hit by a Underground train—murder, suicide and accident. There were virtually no attempted murders on the system during the period covered by this investigation. When a murder is suspected the police investigate the circumstances of the death in great detail and it is therefore unlikely that they are under-reported. It can be assumed that the substantial majority of incidents are either suicide or accidents.

Interestingly the proportion certified as suicide has fallen and that fall is compensated for by a rise both in the proportion of accidents and open verdicts. It is widely held that 'open verdicts' are often recorded by coroners in England and Wales in some cases of 'true' suicide. Were this to be the case it would be expected that the proportion of accidents would remain more or less constant and the only scope for changes in certification would be between suicides and 'open verdicts'. In the absence of comprehensive data, which is not now available, it is not possible to explain the change in the proportions certified in different categories, nevertheless it remains an interesting observation.

Clearly it is to be expected that there will be some variation in suicide rates with passenger throughput: thus it is not surprising that the busiest stations have the highest numbers of incidents. The fact that the peak hours for incidents are not coincident with the peaks of passenger flow indicates that this is not the most important determinant of the number of events that occur. The high numbers of events at stations adjacent to psychiatric units is remarkable. This observation combined with the fact that a high proportion of the incidents involve current inpatients might indicate that ease of accessibility of the stations may be a determining factor of suicide for mentally ill people. Elsewhere it has been argued that the opportunity for suicide might be a determinant of suicide mortality and that the removal of the method might reduce incidence.^{7,8} It is worthwhile exploring this hypothesis in more detail in relation to suicides on the London Underground at stations adjacent to psychiatric institutions.

The difficulties involved in removing this means of committing suicide are great but not insurmountable. Features such as platform edge doors which open only when the train has come to a halt in the platform are a feature of some modern Underground systems. For example such barriers were introduced on the Singapore Metro to save energy in air conditioned stations but they have had obvious beneficial side effects. The Singapore system has experienced no suicide attempts since it began running in 1987. Such modifications may not be possible, in engineering terms, on older systems. However it may be possible to reduce case fatality by digging more 'suicide pits' or modifying rolling stock (e.g. a 'skirt' to prevent bodies going under the wheels where the most serious injuries are caused). These options are being investigated more fully.

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